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Canada's Global Competitiveness Challenge: *Trade Performance Versus Total Factor Productivity Measures*

By FIDEL EZEALA-HARRISON*

ABSTRACT. Any conclusions regarding Canada's *competitiveness* must be based on the criteria of total factor *productivity* rather than *trade* performance. The use of available data on merchandise export/import balance is misleading because *merchandise trade*, for instance, precludes trade in *services*. While trade performance criteria is less than sufficient in judging the competitiveness of *Canada*, close study of the total factor productivity criteria does not find evidence for the alleged "crisis of Canadian loss of competitiveness."

I

Introduction

CANADA'S PRODUCTIVE EFFICIENCY and competitiveness are said to have lagged during the past few years behind their "boom levels." This judgment is based on studies which claim that the country has been facing declining productivity, poor research and development (R&D) record, a growing trade deficit in high-tech products, an ill-trained labor force, and thus, an overall inability to compete with her major trading partners (Warda, 1990; Rugman and D'Cruz, 1989). An example is a 1989 Report of the Premier of Ontario which concluded that the Province was losing competitiveness, and that Canada's high growth and high value-added industries (such as the telecommunications industry) "is tremendously uncompetitive."¹

This paper seeks to determine whether the claims of the alleged loss of Canadian competitiveness are based on solid scientific evidence or on impression. It also searches for other supporting evidence based on scientific criteria that truly suggest a loss of competitiveness.

A 1989 study by Rugman and D'Cruz which ranked the major industrialized countries of the world on criteria ranging from industrial efficiency to human resources and socio-political stability, concluded that Canada was losing competitive edge. In areas such as natural resource endowment, Canada ranks high,

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and in others, such as international orientation, Canada ranks low (indicating that Canada's presence in export markets is weakly perceived).

These ranking criteria are less than scientific, as they are based on impressions and perceptions of the rankers whose impressions tend to be subjective, and may change frequently. For example, in 1990 Italy ranked 18th among 24 countries in socio-political stability, size of the national debt, and business confidence, while Germany and Japan ranked 1st and 2nd respectively. On this basis one would expect a relatively very dismal performance by Italy in the international market. But Italy ranked only second to Japan, as the world's fastest growing exporter. The U.S. Bureau of Labor Statistics' (1989) report on *International Comparisons of Manufacturing Productivity and Labor Costs Trends (1988)* indicates that Italy not only had an extremely productive manufacturing sector, but also had one of the fastest growing economies in Europe throughout the 1980s. The apparent contradiction in this example suggests that conclusions about competitiveness based on mere perceptions are apt to be misleading.

The Rugman and D'Cruz study also claimed that Canada's manufacturing productivity growth rate of 3.8% for the six-year period 1981 to 1987 was below average. Compared to Japan with a productivity growth rate of 6.2% over that period, this seemed to be a poor performance. However, Germany also had only 2%, and did poorer than Britain at 5.4%. If this report is viewed together with the report of the *OECD Economic Outlook (1990)*, a very different conclusion emerges. The latter report showed that the average U.S. total labor productivity (measured as output per unit of labor time employed) growth rate for the decade 1979 to 1988 was just 0.8% compared to Canada's 1.4%. But the U.S. Bureau of Labor Statistics' (1989) report affirmed that the U.S. international competitiveness was satisfactory. Since about 75% of all of Canada's trade is with the U.S., and because Canada seems not to be terribly at a disadvantage, it might be reasonable to say that the fear of losing competitive edge in Canada has been over-emphasised.

In a 1993 *World Competitiveness Report*, the result of a joint study of the World Economic Forum and the International Institute of Management Development (IMD), Canada was ranked 11th in competitiveness among the industrialized countries (as it was in 1992) below such countries as Austria, Belgium, Netherlands, Denmark, New Zealand and Sweden. In arriving at its rankings, the study employs statistical data on surveys of 18,000 business managers "who are asked to give their views on national and international prospects" of each country in the areas of "domestic economic strength, internationalization of the economy, finance, infrastructure, and government."² This methodology of sampling opinions on vague matters that would be differently regarded by the re-

spondents, accordingly does not yield objective indicies for assessing competitiveness.

The accuracy and meaningfulness of a determination as to whether or not a country is competitive depends on how competitiveness is defined, and what indicies are used to determine competitiveness. The *World Economic Forum (World Competitiveness Report)* (1989) defines competitiveness as the ability of entrepreneurs to design, produce and market goods and services, the price and non-price characteristics of which form a more attractive package than that of competitors. Markusen (1992) advocates a definition of industry competitiveness based on total factor productivity as an index of productive efficiency.

The next section provides a theoretical framework on which to base the choice of criteria for measuring competitiveness. Employing the criteria suggested by the theoretical model, Section III examines Canada's global competitiveness profile since the post-war period as compared with its trade performance. Section IV discusses the prospects, implications, and policy perspectives of the global competitiveness challenge for Canada.

II

Conceptual Issues in Measuring Global Competitiveness

THE PARTICULAR WAY in which the term "competitiveness" is defined and measured would affect the result of any study on whether or not a country is "competitive." Most often, competitiveness and a change in competitiveness, is associated with trade performance (Cas et al. 1988), for if a country loses export share (in a particular item or sector) or gets increased import penetration (in a particular commodity or sector), it is said to have become less competitive (Rugman and D'Cruz, 1989). But this is a rationalization rather than an independent judgment of what caused such a situation.

Earlier studies on the topic have tended to use the term in ways that relate closely to both productivity, trade performance, and real income growth over time. Markusen (1992), who prefers to use the term in a way that is associated with an industry's productivity relative to that of other major trading countries, has pointed out how the term "competitiveness" changes if it is equated with trade performance.

The connection between trade performance and competitiveness should not be made, especially as the two are also equated at the level of an entire country. As Markusen (1987) showed, this misconception resulted in large current account deficits in the U.S. during the 1980's being interpreted as a loss of U.S. competitiveness, which it was not. In fact, a notion of competitiveness based on the

trade performance definition may generate results that are virtually opposite to the results produced by the productivity definition.

On a theoretical plain, Markusen (1992) suggests three reasons why a definition of industry competitiveness centered on trade performance will conflict with one centered on productivity. The first is technologically related: technological progress which transfers factors of production out of a sector X into another sector Y, will result in shrinking trade performance in sector X (increasing imports or decreasing exports) even though there has been no decreased productivity in the X industry. The second reason is externally related: a decrease in the world price of some commodity X (due to, say, more supply from new countries entering the world market, or deteriorating world market demand) will lower trade performance in X, even though productivity does not deteriorate relative to other producers. The third reason is political: domestic import barriers or export subsidies may improve trade performance in a sector, but generally they do not increase productivity.

The use of trade performance in particular gives the term “competitiveness” a normative connotation (for example, more competitiveness is better than less competitiveness), and fails to differentiate between the micro and macro applications of the term. At a micro level, more competitiveness is perfectly sensible for individual firms within a given industry, but this does not mean that the industry is economically desirable.³ This is because, with balanced trade in the economy, some industries will be exporters while others will be domestic-oriented and competing locally with imports. Global market changes that result in declining exports or increased imports would not necessarily mean a loss in competitiveness. Capital inflow (imports) that may be used for productive investment may lead to a balance of trade deficit or a current account deficit, but on the other hand, may constitute an investment for raising future productivity and competitiveness. However, when such deficit-creating capital inflow is used to increase or maintain current consumption, then its association with the loss of competitiveness may be valid.⁴

A clear definition and measurement of competitiveness must not only be adopted, but also a clear distinction must be made between the use of the term in a strictly *positive* sense (as when the declining X industry is referred to as “losing competitiveness”), and its use in a *normative* sense (in which case the X industry’s “losing competitiveness” may be desirable). Global competitiveness may be defined in terms of technology and scale: a country is competitive if its industries have an average level of total factor productivity greater than or equal to that of its foreign competitors. Or, it may be defined in terms of costs: a country is competitive if its industries have an average level of unit costs (average costs) lower than or equal to that of its foreign competitors.⁵

A country can be competitive under the technological and scale definition, but not so under the cost definition. The latter may obtain when its industries pay higher prices for factor inputs than its competitors. An example is the alleged higher labor costs in Canada relative to the United States. Moreover, the technological and scale definition does have a normative connotation (higher productivity is good), but the cost definition does not automatically merit the accolade. It is not necessarily undesirable that a country is not competitive in terms of unskilled and/or labor-intensive production. If a country loses market share in her export markets mainly because of the entry of new foreign competitors, this can hardly be said to be a loss of competitiveness. But where such a loss of market share is due to increased productivity of foreign competitors, then it can legitimately be referred to as a loss of competitiveness.

Productivity always plays the major role in the determination of a country's longer term cost competitiveness. Rao and Lempiere (1992c) studied labor productivity and unit labor cost performance of Canadian industries, and concluded that total factor productivity provided a more complete picture, even though labor productivity and labor costs are a usual way to measure how competitive a country is.

Productivity is a measure of the efficiency of the production process, by relating outputs to inputs.⁶ It is said to have increased when the same amount of input produces larger quantities of output than before, or the same output level as before is produced with smaller quantities of inputs. As a result of the difficulties of productivity measurement, many studies have tended to focus on single factor productivity such as labor productivity, or capital productivity, and an index for observing "how productive" an industry or a country is (see: Cas et al. 1988). The danger with this procedure, however, is that individual factor productivity hardly captures all the gains in productive efficiency.

It can be quite misleading if, say, changes in labor productivity are entirely attributed to changes in labor input because the output of any given amount of labor is affected (positively or negatively) by other co-operant factors independent of the labor input. For example, a labor-saving capital substitution may occur in response to falling capital costs and/or rising wages. As output levels remain unchanged after such a shift away from labor, the result would be a higher average product of labor, which could then give the erroneous impression that the efficiency of labor has increased, which is not the case.

The use of total factor productivity overcomes these problems by measuring the relationship between output and its total factor input (a weighted sum of all inputs), thereby giving the residual output changes not accounted for by total factor input changes. Being a residual, changes in total factor productivity are not influenced by changes in the various factors which affect technological

progress such as the quality of factors of production, flexibility of resource use, capacity utilization, quality of management, economies of scale, and the like. Also, changes in total factor productivity are not influenced by efficient factor substitutions induced by changes in relative factor prices and product demand conditions (see Rao and Preston, 1984). Therefore, such changes are the measures of the efficiency (productivity) with which all factors are used in the production process.⁷

A theoretical model on which we base our conceptual formulation of the measure of competitiveness is presented in the *Appendix* at the end of the text.

III

Recent Trends in Canadian Competitiveness

STUDIES ON CANADIAN COMPETITIVENESS have generally concluded that Canada has gradually lost competitiveness during the past four decades. These conclusions seem to have been made despite the particular definition of competitiveness adopted, and irrespective of whether the trade performance criteria or the total factor productivity criteria were used. We shall examine these assertions by using a descriptive statistical analysis to study data on the two criteria, in turn.

On the trade performance criteria, the *OECD Trade by Commodities: Country Summaries (1958-1971)* indicates that the annual average growth rate of total Canadian exports for the period 1958-1971 was 11.1%, while the rate for total imports was 9.7%. This is consistent with the data in Table 1 which summarizes trade flows among Canada and other major world trading areas over the period 1966-1972.

Between Canada and the world, it shows a yearly average total exports of \$21,025 billion (1972 U.S. dollars) and a yearly average total imports of \$18,169 billion, most of which (in descending order) were with the United States, Britain, the European Community, Japan, the Eastern Bloc, and Latin America. In terms of the 1972 to 1966 ratio of exports among trading partners, Canada's world export ratio of 1.98 compares favorably with her import ratio of 1.81. That is, the 1972 to 1966 ratio of the country's exports to the rest of the world (1.98 shown in last column of Table 1) indicates a steady growth in the volume of exports, while the 1972 to 1966 ratio of imports from the rest of the world (1.81 shown in first column of Table 1) was lower than that of exports. The evidence here indicates a steady positive net trade performance for Canada over the period.

Table 2 shows the share of Canadian exports in total imports of her leading trading partners over the post-war period 1958-1971. It reveals a steady annual high rate of growth that averaged nearly 10%. In particular, Canada's export performance with each of the G7 countries was very impressive.

Table 1

CANADA AND MAJOR TRADING PARTNERS 1972 TRADE FLOWS (millions of U.S. dollars, and ratios 1972/1966)								
Exports to:								
	Canada	U.S.	U.K.	Japan	EEC	Latin Amer.	East. Block	World
Exports from:								
Canada	-	14061	1325	959	1127	559	678	21025
U.S.	12416	-	2659	4941	8819	6476	880	49703
U.K.	952	3401	-	429	5577	819	811	24370
Japan	1105	8891	981	-	2207	1695	1495	28655
EEC	1121	9146	6366	1187	-	3688	4994	124150
Latin Amer.	646	5733	730	1092	3469	-	487	17215
East. Block	159	352	1032	1228	3982	170	-	12417
World	18169	54536	25720	20010	115607	17580	14441	-
	--- Ratio 1972:1966 ---							
(Adjusted for exchange rate changes)								
Canada	-	2.03	1.16	2.41	1.74	1.80	1.05	1.98
U.S.	1.71	-	1.37	1.92	1.46	1.41	4.09	1.50
U.K.	1.40	1.54	-	2.05	1.76	1.75	1.39	1.53
Japan	3.97	2.74	3.99	-	3.41	3.39	3.26	2.69
EEC	1.94	2.05	2.30	2.64	-	1.90	2.24	2.17
Latin Amer.	2.06	1.39	0.94	2.04	1.39	-	1.11	1.42
East. Block	1.98	1.78	1.33	1.75	1.89	1.18	-	1.54
World	1.81	2.04	1.62	2.26	2.08	2.00	1.74	-

Source: IMF Direction of Trade Statistics

Table 3 shows data on the share of Canadian imports in total exports of her leading trading partners over the period. Comparing the contents of Tables 1 and 2 indicate that Canada maintained a positive trade balance over the period. Apart from the United States which provided an average of 20% of total Canadian imports, Canada maintained a steady trade surplus with all partners. This represented a healthy trade performance up to the early 1970s at least.

Canadian trade performance changed negatively after 1970. Tables 4 and 5 provide the dollar values as well as the percentages of total of the volumes of trade. Imports from the U.S. grew from \$9.9 billion in 1970 (71% of total Canadian imports) to \$47.4 billion in 1980. However, Canadian export to U.S. reached an all time high of \$111.2 billion (75% of total Canadian exports) in 1990, and stood at \$109.4 billion (still 75% of total Canadian exports) in 1991. At these times imports were \$87.8 billion in 1990 and \$86.2 billion in 1991 (both representing about 64% of total Canadian imports).

With Japan, Canada had a positive performance in 1970 (exports \$813 million, imports \$582 million), a trend which continued through 1980 to 1990 when Canada registered a negative trade performance with Japan (exports \$8.2 billion,

Table 2

VOLUME OF CANADIAN EXPORTS IN TOTAL IMPORTS OF TRADING PARTNERS
1958-71 (millions of U.S. dollars)

	1958	1960	1962	1964	1966	1968	1970	1971	% growth
Australia	55	102	99	139	110	177	193	181	9.0
Belg/Lux.	73	71	64	94	110	119	184	179	7.6
Brazil	22	20	27	22	20	46	89	93	10.5
China	7	9	137	126	171	151	136	202	25.2
EEC	438	449	431	525	597	706	1154	1090	7.9
France	48	75	55	76	80	78	151	155	7.8
W. Germ.	209	171	168	201	166	215	371	316	4.4
India	82	38	28	61	100	104	126	149	8.8
Italy	31	68	70	59	107	123	180	208	12.6
Japan	109	182	202	308	366	563	762	771	14.5
Mexico	33	40	39	62	50	53	92	80	7.0
Nethlds.	78	64	72	95	134	171	268	233	11.7
Norway	58	71	65	63	100	109	170	185	7.4
Sweden	12	22	18	28	34	30	47	45	9.2
U.K.	806	943	863	1119	1047	1134	1437	1351	3.6
U.S.	3021	3110	3510	4129	5786	8527	10575	12060	11.6
USSR	20	8	3	293	297	83	98	125	16.6
Venez.	45	36	39	60	71	95	108	120	9.1

Source: IMF Direction of Trade Statistics, various issues

Table 3

SHARE OF CANADIAN IMPORTS IN TOTAL EXPORTS OF TRADING
PARTNERS, 1958-71 (millions of U.S. dollars)
[Canadian imports from them as % of their total exports]

	1958	1960	1962	1964	1966	1968	1970	1971
Australia	2.0	1.8	1.8	1.8	1.7	2.0	2.9	2.4
Belg/Lux.	1.2	1.1	1.0	1.0	0.8	0.7	0.4	0.5
Brazil	2.3	2.0	2.4	2.6	1.9	1.9	1.7	1.7
China	0.3	0.3	0.4	0.9	1.3	1.8	1.3	1.3
EEC	1.1	1.0	0.9	0.9	1.0	1.0	0.9	0.9
France	0.8	0.7	0.7	0.7	0.9	0.9	0.8	1.0
W. Germ.	1.2	1.1	1.0	1.0	1.1	1.1	1.0	1.1
India	2.4	2.2	2.9	1.9	2.3	2.0	1.9	2.1
Italy	1.3	1.2	1.0	1.1	1.0	1.0	1.1	1.0
Japan	2.5	2.8	2.4	2.4	2.4	2.6	2.9	3.3
Mexico	4.5	2.8	2.5	2.1	2.5	3.9	3.2	3.4
Nethlds.	0.9	0.8	0.8	0.6	0.8	0.8	0.6	0.5
Norway	0.5	0.5	1.5	2.0	2.0	1.9	1.9	2.1
Sweden	0.7	0.8	0.8	1.0	1.6	1.5	1.5	1.5
U.K.	5.8	5.8	4.8	4.2	4.1	4.2	3.7	3.7
U.S.	20.6	18.3	18.6	18.0	22.4	24.6	22.3	24.9
USSR	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1
Venez.	9.3	7.9	8.1	9.2	7.3	11.6	10.5	12.3

Source: IMF Direction of Trade Statistics, various issues

Table 4

CANADIAN IMPORTS BY COUNTRY								
(10-year averages in millions of U.S. dollars, and % growth)								
	1970	%	1980	%	1990	%	1991	%
Total Imports	13952	100	69273	100	135922	100	135284	100
U.S.	9917	71.1	47445	68.5	87803	64.6	86235	63.7
Japan	582	4.2	2904	4.2	9517	7.0	10249	7.0
U.K.	738	5.3	1969	2.8	4840	3.6	4182	3.1
W. Germany	370	2.7	1492	2.2	3832	2.8	3734	2.8
France	158	1.1	807	1.2	2434	1.8	2670	2.0
Mexico	47	0.3	342	0.5	1730	1.3	2574	1.9
South Korea	15	0.1	432	0.6	2252	1.7	2110	1.6
China	19	0.1	181	0.3	1392	1.0	1852	1.4
Italy	145	1.0	641	0.9	1953	1.4	1792	1.3
Hong Kong	78	0.6	557	0.8	1059	0.8	1021	0.8
Sweden	106	0.8	423	0.6	899	0.7	789	0.6
Australia	146	1.0	521	0.8	767	0.6	664	0.5
Switzerland	81	0.6	488	0.7	648	0.5	661	0.5
Netherlands	79	0.6	230	0.3	721	0.5	599	0.4
Spain	34	0.2	197	0.3	496	0.4	461	0.3
Belgium	52	0.4	237	0.3	550	0.4	447	0.3
USSR	9	0.1	72	0.1	185	0.1	233	0.2
New Zealand	43	0.3	150	0.2	214	0.2	195	0.1
Cuba	9	0.1	163	0.2	130	0.1	153	0.1
Israel	14	0.1	62	0.1	125	0.1	127	0.1
Yugoslavia	7	0.1	34	0.1	94	0.1	71	0.1
Czechoslovakia	27	0.2	64	0.1	70	0.1	65	0.1
Poland	12	0.1	75	0.1	79	0.1	63	0.1

Source: Statistics Canada (1992).

imports \$9.5 billion). The situation with Japan is similar to those with Britain, France, Germany, and Italy.

A closer examination of the data indicates that during these periods when Canada suffered negative trade performance with the rest of the world (with whom she conducts under 40% of her total trade), she did achieve significant positive trade performance with the U.S. (with whom she conducts over 60% of her total trade). The negative performance with the rest of the world may therefore be due to redirection of Canadian trade from the rest of the world to the U.S., rather than representing decreases in overall Canadian trade performance. Thus, judging on trade performance criteria, it cannot be concluded that Canada had lost competitiveness.

It is important to recognize the relative size of Canada's service-sector exports as against the level of merchandise exports. McRae (1992) found that service exports amounted to Cdn\$18.1 billion in 1987, a figure representing 14.4% of that year's value of merchandise trade, and significantly less than the 21% figure achieved in early 1960's. The general trend shows a declining relative importance of service exports in comparison to merchandise exports through 1961-1987. But the service sector of the Canadian economy did not decline (in absolute terms) over this period.⁸

Table 5

CANADIAN EXPORTS BY COUNTRY								
(10-year averages in millions of U.S. dollars, and % growth)								
	1970	%	1980	%	1990	%	1991	%
Total Exports	16820	100	76158	100	148170	100	145281	100
U.S.	10900	64.8	48173	63.3	111202	75.0	109473	75.4
Japan	813	4.8	4373	5.7	8215	5.5	7152	4.9
U.K.	1501	8.9	3244	4.3	3511	2.4	3027	2.1
W. Germany	388	2.3	1667	2.2	2300	1.6	2432	1.7
France	157	0.9	1017	1.3	1302	0.9	1414	1.0
Mexico	96	0.6	494	0.6	606	0.4	460	0.3
South Korea	19	0.1	512	0.7	1563	1.1	1888	1.3
China	142	0.8	873	1.1	1654	1.1	1852	1.3
Italy	187	1.1	1004	1.3	1173	0.8	1060	0.7
Hong Kong	21	0.1	199	0.3	680	0.5	836	0.6
Sweden	49	0.3	285	0.4	328	0.2	231	0.2
Australia	202	1.2	678	0.9	903	0.6	678	0.5
Switzerland	41	0.2	387	0.5	1053	0.7	593	0.4
Netherlands	281	1.7	1441	1.9	1515	1.0	1719	1.2
Spain	67	0.4	236	0.3	387	0.3	504	0.3
Belgium	192	1.1	1001	1.3	1237	0.8	1097	0.8
USSR	102	0.6	1540	2.0	1125	0.8	1478	1.0
New Zealand	44	0.3	114	0.2	158	0.1	94	0.1
Cuba	59	0.4	425	0.6	173	0.1	131	0.1
Israel	15	0.1	115	0.2	145	0.1	138	0.1
Yugoslavia	27	0.2	70	0.1	57	-	45	-
Czechoslovakia	7	-	128	0.2	17	-	17	-
Poland	15	0.1	357	0.5	35	-	38	-

Source: Statistics Canada (1992).

In fact, Canada is one of only six OECD countries reporting a deficit on service-sector transactions, ranking last among them in terms of service-export propensity (*i.e.* the proportion of service exports to total exports). However, in terms of service-industry employment levels, McRae found that relatively few Canadian jobs currently depend directly on the export of services: 3.6% of the total service-sector employment level in 1988 were directly dependent on service exports. Undoubtedly, the number of service jobs that are export-sensitive in the sense that they depend on exports that enter into international commerce indirectly through the merchandise account, is much higher. But the obvious importance of the service sector to domestic output and employment levels does not carry over to international commerce. Thus, merchandise trade balance would not give an accurate reflection of Canada's trade performance.

On the whole, exports are concentrated on the U.S. market, and are in general made up of higher proportion of resource based-goods for which the share of world exports has decreased in recent years. Canada may have lost its share of world markets because its exports are concentrated in goods for which demand grew more slowly than for other items in world trade, and also because these preclude service exports.

On the productivity criteria, we distinguish between two closely related measures of productivity: labor productivity (LP) and total factor productivity (TFP). The former denotes output per labor time unit, and depends on work effort, skill of the worker, quantity and quality of co-operant inputs (capital, land, energy, etc), and the work environment. Total factor productivity denotes the efficiency with which all inputs are used in the production process, and to a very large extent affects (and even mainly determines) labor productivity.

Preliminary indications are that Canada's productivity trends have not followed a consistent pattern during the 1950–1990 era. Strong general showings were recorded up to the early 1970s, but since the 1973 oil-price shock, productivity declines did set in, particularly in manufacturing. However, a study by the Economic Council of Canada (1992) stated that “Canada has substantially improved its overall levels of labor productivity (real GDP per worker) and real per capita income relative to the United States . . . for whereas in 1950 the U.S. productivity was 32% higher than Canada's, today the two countries have virtually identical productivity and income levels.” We examine both TFP and LP trends in Canada, and try to use them to reach conclusions regarding Canada's competitiveness profile.

On the TFP criteria, studies by Statistics Canada (1992) as well as that of Rao and Lempriere (1992b) indicate that Canada's business sector TFP growth fell to 0.7% per year over the period 1974–1988 from its level of 2.6% over 1962–1973. The primary (resource) sector also showed TFP decline at an average of 0.5% in the 1974–1988 period compared to its pre-1973 level of 2.8%. In the same periods, the manufacturing sector's TFP growth averaged only 0.3% per year compared to its pre-1973 level of 1.6%.

The above figures are averages spanning over five to ten years periods, and do not reveal intra-sectoral TFP performance. There is therefore the danger that they may have clouded any improvements in TFP growths within individual micro sectors. The data in Tables 6 and 7 reveal specific intra-sectoral TFP trends in Canada over 1962–1988.

In Table 6 we see that overall TFP growth actually improved for the primary sector from negative values in 1974–1979 to significant positive values (2.1% for agriculture, 2.9% for fishing, and 3.3% for forestry) during the 1980s decade. Moreover, following the arguments already explained above, the declining trend of the service sector's TFP need not be of concern, although they were used in the Rao and Lempriere figures.

In manufacturing TFP, even though Table 7 shows a meagre 0.3% growth in the 1974–88 period (compared to the 1.6% before 1973), there were strong individual sector TFP growths in high value-added manufacturing, namely, wood products, electrical products, textiles and clothing, and chemicals from 1962

Table 6

AVERAGE ANNUAL % GROWTH IN TOTAL FACTOR PRODUCTIVITY,
IN CANADA, 1962-88*

	62-73	74-88	74-79	80-88
Primary Sector	2.8	-0.5	-2.8	1.1
Agriculture	2.4	0.5	-1.8	2.1
Fishing	-2.6	1.2	-1.2	2.9
Forestry	2.0	2.2	0.6	3.3
Mining	2.3	-1.5	-4.2	0.3
Service Sector	1.0	0.4	0.5	0.4
Construction	0.2	0.6	0.7	0.6
Transp., storage, & communications	3.5	2.2	2.6	1.9
Utilities	3.6	0.9	0.2	1.4
Wholesale & retail	2.2	0.9	0.1	1.4
Finance, insurance, & real Estate	-0.7	-1.2	-0.8	-1.4
Community, business, & pers. services	-0.2	-0.1	0.3	-0.4
Total nonmanuf.	1.4	0.3	0.0	0.5
Total manuf. sector	1.6	0.3	0.5	0.2
Total business sect.	2.6	0.7	0.4	0.9

Source: Statistics Canada (1992);

* Based on real (1986 dollars) gross output.

through 1988. Rao and Lempriere (1992c: 11) reported an overall primary industry TFP growth that outweighed the problems in other sectors, leading to a net positive and growing TFP performance in the aggregate business sector throughout the 1980s.

The general trend in sectoral output showed that over the period 1962-1988, annual TFP growth averaged between 0.8 and 0.9% in all sectors combined. But the non-manufacturing sector had a more favorable TFP performance: it remained fairly stable over 1974-1979 and rose at a steady 0.5% annually over 1980-1988. When this performance is considered together with the fact that Canada's comparative advantage over this period was in the non-manufacturing sector, one could hardly conclude that Canada suffered severe losses of TFP growth.

On labor productivity, Tables 8 and 9 reveal some LP slowdown in the primary sector during 1974-1979, which then recovered dramatically during 1980-1990.⁹ The service sector did not seem to have suffered serious setbacks. Manufacturing, however, did suffer annual LP growth decline from 4.5% in 1962-1973 to 1.9% during 1974-1988, but intra-sectoral performance were not that dismal.

Again we see the strength shown by the high value-added manufacturing sector, as well as that of wood products, electrical products, chemicals and textiles and clothing industries in terms of relative steady growth.

Table 7

AVERAGE ANNUAL % GROWTH TOTAL FACTOR PPRODUCTIVITY
IN MANUFACTURING IN CANADA, 1962-88*

	62-73	74-88	74-79	80-88
Total manufacturing sector	1.6	0.3	0.5	0.2
Resource-based manuf.	0.9	0.1	0.0	0.2
Food and beverages	1.0	0.0	0.3	-0.1
Tobacco	1.3	0.1	0.6	-0.2
Paper and allied pdts.	0.6	-0.1	0.3	-0.4
Primary metal pdts.	1.1	0.4	-0.7	1.2
Wood products	0.8	1.4	0.9	1.8
Petroleum refining	0.9	0.2	0.0	0.3
Nonmetallic mineral pdts.	2.3	0.5	-0.1	1.0
High value-added manuf.	2.6	0.5	0.8	0.3
Nonelectrical machinery	1.6	-0.2	0.9	-0.9
Electrical products	2.7	2.3	2.4	2.3
Transportation equip.	2.8	0.1	0.4	-0.1
Other manufacturing	1.9	0.4	0.7	0.3
Chemicals	2.2	0.4	-0.9	1.2
Fabricated metal pdts.	1.7	0.1	0.2	0.0
Furniture and fixtures	1.8	-0.5	-0.4	-0.6
Textiles and clothing	2.1	1.4	2.8	0.5
Printing and publishing	1.0	0.4	1.6	-0.4
Rubber and plastics	2.3	0.9	2.1	0.1
Miscellaneous manuf.	1.4	-0.1	1.0	-0.8

Source: Statistics Canada (1992);

* Based on real (1986 dollars) gross output.

When compared to other industrialized economies, especially the other G7 countries, Canada's aggregate manufacturing LP was above those of Japan, U.K. and France during the postwar period. Table 10 indicates that only the U.S. (for 1950 through 1990), West Germany (1975 through 1990), and Italy (1980 through 1990) outperformed Canada. But on the whole, Canada's position among the G7 is relatively on the positive side.

Table 11 compares real GDP per employed person and real per capita GDP among the G7 countries. This offers a slightly different, albeit alternative, yardstick for assessing relative overall productivity in the various economies. It shows that Canada's per capita real GDP has stayed higher than all but one of the G7 countries (the U.S.) throughout the period 1950-1990. The situation is similar in terms of real GDP per employed person.

Table 12 reveals that aggregate labor productivity and real income growth in Canada fared comfortably among those of other G7 countries over 1962-1990. Average annual growth in real GDP per employed person in Canada was higher than that of U.S., ranking only below Japan, W. Germany and France. But this

Table 8

AVERAGE ANNUAL % GROWTH IN LABOR PRODUCTIVITY IN CANADA, 1962-90*				
	62-73	74-90	74-79	80-90
Primary sector	7.6	1.0	-2.8	3.1
Agriculture	7.3	2.9	-0.4	4.7
Fishing	-2.4	0.4	-2.6	2.0
Forestry	4.8	3.5	1.8	4.4
Mining	5.6	-1.4	-6.0	1.1
Service sector	2.5	1.3	1.6	1.1
Construction	0.2	2.3	3.0	2.0
Transp., storage, & communications	5.6	3.3	3.9	3.0
Utilities	5.7	0.7	1.8	0.1
Wholesale & retail	3.1	1.0	0.4	1.4
Finance, insurance, & real estate	0.5	1.1	1.1	1.1
Community, business, & personal services	1.4	0.3	0.1	0.4
Total non-manuf. sect.	3.7	1.4	1.3	1.4
Total manuf. sector	4.5	1.7	2.1	1.5
Total business sector	4.0	1.3	1.3	1.3

Source: Statistics Canada (1992);

* Real (1986 dollars) GDP per hour.

is made up for in terms of average annual growth in real GDP per capita. In this, Canada outperformed all except Japan and Italy.

IV

Implications and Policy Perspectives

COMPETITIVENESS is a term that has been frequently misused and misapplied, particularly in business strategies and planning, as well as in political discourse and debates. As a result, the majority of the studies on competitiveness have dwelt on international trade performance and certain subjective social and economic criteria in deducing their conclusions regarding an economy's competitiveness. This study argues that competitiveness must be based on none other criteria than total factor productivity. On the basis of available data, it is found that the calculated decline in Canada's share of world exports (from 5.3% in 1971 to 4.0% in 1989, for instance) and her poor performance on overall trade balance during the past four decades, is due to redirection of Canadian trade from the rest of the world to the U.S., rather than an indication of overall loss of world competitiveness. And even then, conclusions based on merchandise export/import balance would be misleading because merchandise trade pre-

Table 9

AVERAGE ANNUAL GROWTH IN LABOR PRODUCTIVITY IN CANADIAN MANUFACTURING, 1962-90*				
	62-73	74-90	74-79	80-90
Total manuf. sector	4.5	1.9	2.1	1.7
Resource-based manuf.	3.7	1.3	0.4	1.9
Food, beverages & tobacco	4.3	0.7	1.3	0.4
Paper and allied pdts.	2.4	1.0	0.7	1.2
Primary metal pdts.	3.4	2.5	-1.8	5.3
Wood products	2.9	4.0	2.9	4.6
Petroleum refining	8.0	1.0	-2.7	3.4
Nonmetallic mineral pdts.	5.2	0.5	1.2	0.0
High value-added manuf.	6.2	3.0	3.2	2.9
Nonelectrical machinery	3.0	0.4	2.6	-1.1
Electrical products	5.0	6.4	4.8	7.4
Transportation equipment	8.1	2.0	2.6	1.6
Other manufacturing	4.3	1.7	3.2	0.7
Chemicals	5.4	2.7	3.6	2.1
Fabricated metal products	3.9	0.4	0.5	0.3
Furniture and fixtures	4.5	-1.1	-1.4	-0.9
Printing and publishing	1.6	1.2	3.3	-0.1
Leather products	2.0	3.1	4.9	1.9
Textiles	7.1	4.3	7.0	2.5
Clothing	2.0	2.4	5.5	0.4
Rubber and plastics	5.6	1.5	3.2	0.4
Miscellaneous manuf.	3.6	0.8	2.6	-0.3

Source: Statistics Canada (1992);

* Real (1986 dollars) GDP per hour.

Table 10

AGGREGATE MANUFACTURING LABOR PRODUCTIVITY*
LEVELS OF CANADA COMPARED TO OTHER G7, 1950-90
(Canada = 100)

	U.S.	Japan	France	Germany	Italy	U.K.
1950	184.7	16.7	60.9	58.5	49.7	74.9
1955	173.0	22.7	60.7	68.8	46.6	65.9
1960	154.9	28.1	65.3	84.4	60.0	63.2
1965	149.3	33.2	68.8	87.4	64.7	58.3
1970	137.4	52.8	83.5	98.3	75.5	60.8
1975	135.8	60.3	88.6	105.8	79.6	61.3
1980	129.3	72.0	99.6	111.1	101.7	59.4
1985	123.4	73.0	99.7	106.3	108.6	64.9
1990	141.3	88.5	115.1	116.9	121.2	78.6

Source: Computed from U.S. Department of Labor
(Bureau of Labor Statistics, 1992);

* Real value-added per hour.

Table 11

REAL GDP PER EMPLOYED PERSON, CANADA AND OTHER G7, 1950-90 (Canada = 100)							
	Canada*	U.S.	Japan	Germany	France	Italy	U.K.
1950	19768	131.5	20.7	45.1	50.1	38.8	71.5
1955	23341	128.3	24.1	52.3	52.6	44.1	67.2
1960	25150	126.6	30.5	62.6	60.3	53.3	69.2
1965	29009	127.1	40.1	66.8	67.7	62.0	67.4
1970	31982	120.5	57.0	74.5	77.0	76.6	70.6
1975	35300	112.8	62.4	76.8	80.8	78.5	70.9
1980	37177	109.2	70.0	82.5	87.7	90.1	73.1
1985	40899	105.3	72.9	80.6	87.8	86.6	74.5
1990	41996	107.5	82.7	85.1	96.5	95.1	76.6
	-- Real GDP Per Capita --						
1950	7217	143.8	24.0	51.5	63.8	46.0	87.9
1955	8112	145.7	30.7	68.8	68.2	52.8	89.7
1960	8671	138.7	41.4	85.4	75.6	62.9	92.5
1965	10420	134.4	52.9	84.8	78.0	65.1	86.8
1970	12030	127.8	73.7	86.8	84.3	73.9	83.3
1975	14564	111.4	70.2	78.3	79.6	67.7	76.2
1980	16671	108.4	73.3	80.7	79.3	73.4	72.3
1985	18362	107.2	77.4	78.0	75.8	70.5	71.7
1990	20257	106.5	85.9	79.4	78.5	73.5	71.4

Source: Computed from U.S. Department of Labor
(Bureau of Labor Statistics, 1992);

* 1990 U.S. dollars

cludes trade in services. Thus, while trade performance criteria is less than sufficient in judging Canada's competitiveness, our close study of the total factor productivity criteria does not find evidence for the alleged "crisis of Canadian loss of competitiveness."

The decline in manufacturing productivity witnessed in Canada during the 1970-1990 decades was not unique to Canada; it was a general situation that afflicted all industrialized economies. And there is evidence to suggest that manufacturing productivity will improve in the coming decade. Competitiveness should not be confused with common economic problems such as growing balance of trade deficits, high unemployment, high government budget deficits and growing national debt. Though these problems are serious, especially where they are structural, these are not structural problems for the Canadian economy, and may be easily tackled by the appropriate policy measures. They need not threaten or lessen Canada's ability to compete globally.

It is hardly consistent that Canada would be lagging in global competitiveness and yet have one of the highest living standards in the world, and over the past two decades maintained the second highest level of real GDP per employee,

Table 12

CANADA AND OTHER G7, 1962-90 AVERAGE ANNUAL % GROWTH IN REAL GDP PER EMPLOYED PERSON AND PER CAPITA,					
	62-90	62-73	74-90	74-79	80-90
Growth in Real GDP Per Employed Person					
Canada	1.7	2.4	1.1	1.3	1.1
U.S.	1.1	1.9	0.6	0.0	0.9
Japan	4.9	7.9	2.9	2.9	2.9
France	3.3	4.7	2.2	2.5	2.1
Germany	2.8	4.1	1.8	2.7	1.4
Italy	3.6	5.6	2.2	2.8	1.9
U.K.	2.1	3.0	1.4	1.3	1.5
Growth in Real GDP Per Capita					
Canada	2.9	4.0	2.2	2.9	1.8
U.S.	2.0	2.8	1.5	1.5	1.5
Japan	5.2	8.0	3.2	2.5	3.5
France	3.0	4.3	2.0	2.3	1.8
Germany	2.6	3.5	2.0	2.5	1.7
Italy	3.3	4.3	2.6	3.3	2.2
U.K.	2.1	2.7	1.7	1.5	1.9

Source: Computed from U.S. Department of Labor
(Bureau of Labor Statistics, 1992).

second only to the U.S., and ahead of Germany and Japan. In 1991, the U.N. ranked Canada highest among all OECD countries in terms of national income, literacy, life expectancy, and general quality of life. These do not seem to be attributes that suggest an economy in a competitiveness crisis.

Canada's relaxation of the Foreign Investment Review Agency (FIRA) and the Free Trade Agreement (FTA) during the later half of the 1980s may have all led to increased inflow of foreign investment that deepened capital and raised factor productivities. Investment may also have been attracted into those sectors of the economy where there are global competitive advantages. These developments are consistent with the assertion that the country did not lose competitiveness during the period up to the early 1990s. But certainly, as with anything else, there is room for improvement.

There are other studies that support the view that Canada's alleged loss of competitiveness has been over-exaggerated. Luciani (1993) argues that many of Canada's current economic problems, such as growing balance of trade deficits, high unemployment, and increased national debt burden, are a consequence of rigid monetary and fiscal policy rather than an erosion of her competitiveness, and stresses that even though Canada's manufacturing productivity has lagged in the past, so have those of other industrialized economies.

The global competitiveness challenge presents Canada with tremendous opportunities and prospects. Among other things, this challenge has served as a

constant reminder of the need to improve and maintain productivity levels in the Canadian economy, in that, it is only by doing so that Canada can broaden its export base and achieve larger global market shares in manufacturing products, and particularly in high-technology products. Moreover, it must maintain its global market shares in those areas where it has traditionally been strong: resources and resource-based manufactured products.

Canada must achieve substantial improvement in her relative productivity and cost performance if she must successfully diversify her manufacturing exports base and meet the competitiveness challenge. In particular, she needs to significantly increase her global exports of technology-intensive products, by improving her productivity and cost performance in the high-technology industries such as machinery and transportation equipment, chemicals, and other high value-added products.

Clearly, global competitiveness is hardly a lasting achievement in a world of incessant socio-political and economic changes. In relation to her major global competitors (U.S., the EEC, Japan, and the Asian Newly Industrialized Countries), Canada has not been at any disadvantage, nor has she lost global competitiveness *per se*. Existing data suggests that Canada fares rather strongly in terms of productivity.

Appendix

A Framework for the Measure of Global Competitiveness

The conceptual framework of measuring competitiveness can be set out by the use of the production function

$$Q_i = Q_i(L_i, K_i, R_i) \quad [1]$$

where subscript *i* denotes the *i*th sector, and

Q = quantity of output,

L = labor input,

K = capital input,

R = natural resource input.

The growth rate of sectoral output over time would be given by

$$dQ_i/dt = \partial Q_i/\partial L_i \cdot dL_i/dt + \partial Q_i/\partial K_i \cdot dK_i/dt + \partial Q_i/\partial R_i \cdot dR_i/dt \quad [2]$$

Assuming each sector is characterized by a production function of the Cobb-Douglas type:

$$Q = \rho L^\alpha K^\beta R^\gamma$$

where ρ = the total factor productivity index, and α , β , γ are factor shares of labor, capital, and resources respectively, in total output.¹⁰

Changes in ρ over time for the i^{th} sector of the economy is given by

$$d\rho_i/dt = dQ_i/dt - (\alpha_i dL_i/dt + \beta_i dK_i/dt + \gamma_i dR_i/dt) \quad [3]$$

Substituting (2) into (3) we obtain

$$d\rho_i/dt = \partial Q_i/\partial L_i \cdot dL_i/dt + \partial Q_i/\partial K_i \cdot dK_i/dt + \partial Q_i/\partial R_i \\ \times dR_i/dt - (\alpha_i dL_i/dt + \beta_i dK_i/dt + \gamma_i dR_i/dt)$$

i. e.

$$d\rho_i/dt = dL_i/dt[\partial Q_i/\partial L_i - \alpha_i] + dK_i/dt[\partial Q_i/\partial K_i - \beta_i] + dR_i/dt[\partial Q_i/\partial R_i - \gamma_i].$$

As α_i , β_i , and γ_i are factor shares, then

$$\alpha_i = [\partial Q_i/\partial L_i]/[Q_i/L_i],$$

$$\beta_i = [\partial Q_i/\partial K_i]/[Q_i/K_i],$$

$$\gamma_i = [\partial Q_i/\partial R_i]/[Q_i/R_i];$$

therefore

$$d\rho_i/dt = dL_i/dt[\alpha_i Q_i/L_i - \alpha_i] + dK_i/dt[\beta_i Q_i/K_i - \beta_i] + dR_i/dt[\gamma_i Q_i/R_i - \gamma_i],$$

or

$$d\rho_i/dt = \alpha_i \cdot dL_i/dt[Q_i/L_i - 1] + \beta_i \cdot dK_i/dt[Q_i/K_i - 1] + \gamma_i \cdot dR_i/dt[Q_i/R_i - 1].$$

For the n sectors of the economy where $i = 1, 2, 3 \dots n$, the aggregate total factor productivity change is

$$d\rho_i/dt = \sum_1^n \{ \alpha_i \cdot dL_i/dt[Q_i/L_i - 1] + \beta_i \cdot \\ dK_i/dt[Q_i/K_i - 1] + \gamma_i \cdot dR_i/dt[Q_i/R_i - 1] \},$$

and this gives the national measure of productivity growth, which we posit as the most appropriate index for measuring competitiveness.¹¹

The total factor productivity growth is given as the weighted sum of input growth rates and the input productivities. This can be used to show that the growth in any particular factor's productivity depends on the growth in the total factor productivity. For instance, labor productivity growth is

$$dL_i/dt[\partial Q_i/\partial L_i - \alpha_i] \\ = d\rho_i/dt - \{\beta_i \cdot dK_i/dt[Q_i/K_i - 1] + \gamma_i \cdot dR_i/dt[Q_i/R_i - 1]\}^{12}$$

This indicates that labor productivity growth is influenced by total factor productivity growth as well as growth in the substitution of other inputs for labor.

Notes

1. The Report of the Premier's Council: Competing in the New Global Economy, Toronto: Queen's Printer for Ontario, 1989, compiled a remarkable list of evidence such as the relatively small number of technology-intensive industries in Canada (compared to Japan), manpower training, R&D, patent registrations, and number of engineers and scientists, to show that Canada was performing poorly.

2. Various subjective indicies were used by the study for these criteria. For instance, on the criterion of "internationalization" of the economy, the indicies used to pull down Canada's ranking are: a growing current account deficit created by government borrowing, a lack of diversification of export markets, and the growing anti-free-trade sentiment and protectionism in the country. On "finance," Canada was ranked high because her "interest rates, corporate bond issues, price-earnings ratios, and confidence in banks and financial firms were strong."

3. It is surely preferable for firms in an industry to be efficient, productive and profitable, and able to procure higher market shares. Therefore competitiveness at the level of the firm is obviously desirable.

4. A normative definition of macro competitiveness that focuses on *real income* relative to trading partners is also used. In this connection, competitiveness is equated with real income performance. The U.S. Presidential Commission on Industrial Competitiveness defines it in terms of a country maintaining a growth rate of real income equal to that of its trading partners in an environment of free and long run balance of trade (McCulloch, 1988). It was in following this definition that Britain was deemed to be losing competitiveness during the 1960's and 1970's when its growth of per capita income lagged behind that of much of Western Europe (Markusen, 1992). The growth of competitiveness in the Far East during the late 1980s has been thought of in terms of rising income levels and current account surpluses (Rao, 1992).

5. Global competitiveness can be measured by either unit costs or total factor productivity to achieve the same conclusions. For simplicity, in the remainder of this paper, any references to, say, higher productivity, implies lower unit costs (more competitive), and vice versa.

6. Practical measurements of productivity are difficult because measuring the output of a firm or industry often involves combining different types of output into a single output measure by means of weighting them by their relative importance in the total production of the firm or industry. The different types of inputs have to be combined in a single input measure by weighting them by their relative importance in the production process, and obtaining the accurate price measures for each component (used for the weighting purposes) often proves to be difficult. Also, the difficulties of measuring changes in the quantity of inputs and outputs, over time, compound the problems of measuring changes in productivity trends.

7. The use of total factor productivity overcomes the problems which, say, dumping, or lack of demand, may cause in assessing the state of competitiveness of a country that is highly productive in, for instance, raw materials. The occurrence of these phenomena would suggest a loss of competitiveness if trade performance criteria is used, but these do not indicate a loss of competitiveness. Competitiveness must relate to overall economic efficiency of a country's use of its resources rather than to the skillfulness of its external trade negotiators.

8. We have used a narrow definition of trade in service covering direct service exports only. If a wider definition is used, it is necessary to estimate the level of services embodied in physical goods and exported indirectly through the merchandise account of the balance of payments. McRae's 1992 study reports that indirect service exports are estimated to be over twice as large as direct service exports (\$27.7 billion in 1987): representing 36% of reported value of merchandise trade in 1987.

9. Labor productivity is defined here as real value-added per unit of labor input (labor time). Problems about the actual use of labor time in productive effort (which therefore affects what really constitutes labor productivity) arise when the question of labor effort as against labor time is considered. Studies in efficiency wage models of employment and productivity have dealt with such issues. For examples of these, see Lazear and Moore (1984), or Medoff and Abraham (1981). More recent examples can be found in Weiss (1990).

10. The parameter ρ is simply the Hicks-neutral technical change coefficient on the production function.

11. Although time series data could be employed to compute the trend values of ρ_t , which would then indicate competitiveness profile over time, such a methodology is beyond the scope envisaged for this study.

12. This result implies that inputs are complementary. That is, an additional unit increase in labor employed, say, will lead to an increase in the productivity of capital: $\partial Q_t / \partial K_t = \beta \rho L^\alpha K^{\beta-1} R^\gamma / K$; $\partial^2 Q_t / \partial K_t \partial L_t = \alpha \beta \rho L^{\alpha-1} K^{\beta-1} R^\gamma / KL > 0$. This result indicates that TFP measures represent the most effective way to capture the respective contributions of inputs to each other's productivity.

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