

Contextualizing Maritime Canada: Productivity and Structure in Provincial Manufacturing, 1870*

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Contextualizing Maritime Canada: Productivity and Structure in Provincial Manufacturing, 1870*

DISCUSSIONS OF INDUSTRIAL ACTIVITY FIGURE PROMINENTLY in the economic historiography of the Canadian regions. The existing literature about Atlantic Canada recognizes a period of manufacturing growth in New Brunswick and Nova Scotia immediately after Confederation, followed by a collapse in later decades.¹ There is also a recurrent suspicion that the fundamental turning point was Confederation itself.² More recently, however, the literature has considered quantitative measures of regional prosperity which suggest that at the time of Confederation the Maritime economy already was, in some respects, less prosperous than that of Quebec and Ontario.³

- * Earlier versions of this paper were presented to the Atlantic Canada Economic Association meeting in Charlottetown in October 1993 and to the Social and Economic History Workshop at Queen's University in January 1994. We are grateful for the helpful comments of participants at these meetings, of Rosemary Ommers and of the anonymous referees of this journal. The research would not have been possible without the financial support of the Social Sciences and Humanities Research Council of Canada.
- 1 T.W. Acheson, "The National Policy and the Industrialization of the Maritimes", *Acadiensis*, I, 2 (Spring 1972), pp. 1-28 and "The Maritimes and Empire Canada", in David Bercuson, ed. *Canada and the Burden of Unity* (Toronto, 1977), pp. 87-114; David Alexander, *Atlantic Canada and Confederation: Essays in Canadian Political Economy* (Toronto, 1983); E.R. Forbes, *The Maritime Rights Movement, 1919-1927* (Toronto, 1977) and "Misguided Symmetry: The Destruction of Regional Transportation Policy for the Maritimes", in Bercuson, ed., *Canada and the Burden of Unity*, pp. 60-86; David Frank, "The Cape Breton Coal Industry and the Rise and Fall of BESCO", *Acadiensis*, VII, 1 (Autumn 1977), pp. 3-34.
 - 2 This view finds its roots in sentiment against joining Confederation and, after 1867, for secession. See Colin Howell, "W.S. Fielding and the Repeal Elections of 1886 and 1887 in Nova Scotia", *Acadiensis*, VIII, 2 (1979), pp. 28-46; D.A. Muise, "Parties and Constituencies: Parties and Federal Elections in Nova Scotia, 1867-1896", Canadian Historical Association, *Historical Papers/Communications historiques* (1971), pp. 183-202; Ken Pryke, *Nova Scotia and Confederation* (Toronto, 1979). Indeed, it has been argued that Confederation was 'a critical turning point' and 'a disaster' for the Atlantic provinces. Alexander, *Atlantic Canada*, pp. 44-50 and "Economic Growth in the Atlantic region, 1880-1940", *Acadiensis*, VIII, 1 (1978), pp. 47-76. Textbook overviews sympathetic to this scenario include Janine Brodie, *The Political Economy of Canadian Regionalism* (Toronto, 1990), chapter 5, and Paul Phillips, *Regional Disparities* (Toronto, 1982).
 - 3 Kris Inwood, "Maritime Industrialization from 1870 to 1910: A Review of the Evidence and Its Interpretation", *Acadiensis*, XXI, 1 (Autumn 1991), pp. 132-55; Kris Inwood and Jim Irwin, "Canadian Regional Commodity Income Differentials at Confederation", in Kris Inwood, ed., *Farm, Factory and Fortune* (Fredericton, 1993), pp. 93-120. Early evidence on this point is provided by Richard Caves and Richard Holton, *The Canadian Economy: Prospect and Retrospect*

Marilyn Gerriets and Kris Inwood, "Contextualizing Maritime Canada: Productivity and Structure in Provincial Manufacturing, 1870", *Acadiensis*, XXVI, 1 (Autumn 1996), pp. 32-51.

We believe that it is particularly important to determine the timing and nature of productivity differentials between Maritime and central Canada. Published census tabulations indicate that average labour productivity in Maritime Canada and Quebec manufacturing was considerably less than in Ontario as early as 1870.⁴ Of course, the considerable heterogeneity of the manufacturing sector reduces the value of a single measure of average productivity, especially since the provinces differed a great deal in the types of industries, sizes of establishments and in the seasonality of work. In this paper we attempt to control for these differences in order to see more clearly the nature of provincial differences and their relationship to the differing structures of provincial manufacturing. Further, we are able to improve the quality of the estimate through a retabulation of data taken from the original enumerators' manuscripts of the 1871 industrial census.⁵ These data provide no more than a snapshot of industrial activity in a single year, but it is a richly detailed snapshot which provides useful evidence about Canadian manufacturing in a benchmark year.

One measure of the importance of manufacturing is its share of income, which may be earned in either commodity or service production. In 1871 manufacturing accounted for roughly one-third of Canadian commodity incomes, although there was significant regional variation.⁶ Service income is harder to measure, but a reasonable guess about its importance would imply that manufacturing constituted between 20 and 25 per cent of the entire Canadian economy.⁷ Employment and earnings in manufacturing were expanding quickly even among rural people whose principal source of livelihood was the sea, mine, forest or farm.⁸ Manufacturing growth outpaced that of other sectors because of rapid technological change and productivity growth in the wake of industrialization and because of buoyant demand for a variety of manufactured goods.⁹

(Cambridge MA, 1959), Tables 19 and 20 and John Chamard and Kris Inwood, "Regional Industrial Growth during the 1890s: The Case of the Missing Artisans", *Acadiensis*, XVI, 1 (Autumn 1986), pp. 101-18, Table Four.

- 4 Inwood, "Maritime Industrialization", Table Three. The census enumeration in the spring of 1871 (hence the 1871 census) describes some information, such as population, at a single point in time, which in this case is 1 April 1871. However, other information which describes activity over some period (for example, the agriculture, forestry, fishing, mining and manufacturing industries) refers to the 12 month period 1 April 1870 to 31 March 1871, a period which is substantially 1870.
- 5 The source used in all previous studies is the published census tabulation which may be found in volume 3 of the 1871 Canadian census. As noted in the text below, we avoid some of the ambiguity in these tables with our own tabulation of data in the manuscripts.
- 6 Inwood and Irwin, "Canadian Regional", Table Two.
- 7 If services accounted for one-third of the economy, then the manufacturing share of all economic activity would have been 22 per cent.
- 8 Kris Inwood and Jim Irwin, "Regional Perspectives on Canadian Growth, 1870-90", unpublished paper presented to the annual meeting of the Economic History Association (Chicago), September 1995.
- 9 Labour productivity is the amount of output divided by the amount of labour used to generate that output. Capital productivity is output divided by the capital used to generate that output. Total factor productivity is a combination of individual input productivities (labour, capital and anything else which might be measured and included in the analysis). Total input or factor productivity, in turn, bears upon the measure of efficiency; the latter is a broader concept because it includes some assessment of whether the various inputs are used in a cost-minimizing fashion (given their various prices and the anticipated level of output). Total input productivity and efficiency are more powerful

Productivity advantages and/or growth contributed to the success of some firms and industries over others and, among the successful, increased the revenues which might be contested and divided by capital and labour.¹⁰ The introduction of more efficient technologies sometimes caused the loss of skilled craft employment, although it is important to recognize the extent of artisanal survival in some industries.¹¹ More generally, the pace of technological change and productivity growth was influenced by and, in at least some cases, changed the distribution of power¹² and the organization of gender and family relations.¹³

concepts for analytic purposes but more difficult to obtain empirically. For that reason we focus on partial input productivity, or output divided by the relevant input.

- 10 Michael Bliss, *A Canadian Millionaire* (Toronto, 1978) and *A Living Profit* (Toronto, 1974); J. Burant, "A Written Portrait: Saint John Photographers and Their Studios in the 1871 Census", *Archivaria*, XVII (1984), pp. 275-7; J. Burgess, "L'industrie de la chaussure", *Revue d'histoire de l'amérique française*, XXXI (1977), pp. 187-210; W.J. Donald, *The Canadian Iron and Steel Industry* (Boston, 1915); Alan McCullough, *The Primary Textile Industry in Canada: History and Heritage* (Ottawa, 1992); Duncan McDowall, *Steel at the Sault* (Toronto, 1984).
- 11 Joanne Burgess, "The Growth of a Craft Labour Force: Montreal Leather Artisans, 1815-31", Canadian Historical Association, *Historical Papers/Communications historiques* (1988), pp. 48-62; Paul Craven, ed., *Labouring Lives: Work and Workers in Nineteenth Century Ontario* (Toronto, 1995); Peter Delottinville, "Trouble in the Hives of Industry: The Cotton Industry Comes to Milltown, N.B., 1879-92", Canadian Historical Association, *Historical Papers/Communications historiques* (1980), pp. 100-15; Craig Heron, "Hamilton's Steelworkers and the Rise of Mass Production", Canadian Historical Association, *Historical Papers/Communications historiques* (1982), pp. 103-31 and *Working in Steel: The Early Years in Canada, 1883-1935* (Toronto, 1988); Greg Kealey, *Toronto Workers Respond To Industrial Capitalism 1867-92* (Toronto, 1980); Greg Kealey and Bryan Palmer, *Dreaming of What Might Be: The Knights of Labour in Ontario, 1880-1900* (Cambridge, 1982); Ian McKay, "Capital and Labour in the Halifax Baking and Confectionary Industry", *Labour/le travail*, 3 (1978), pp. 63-90; Peter Moogk, "Apprenticeship Indentures: A Key to Artisan Life in New France", Canadian Historical Association, *Historical Papers/Communications historiques* (1971), pp. 65-83 and "In the Darkness of a Basement: Craftsmen's Associations in Early French Canada", *Canadian Historical Review*, LVII (March 1976) pp. 399-439; Nolan Reilly, "The General Strike in Amherst, Nova Scotia, 1919", *Acadiensis*, IX, 2 (Spring 1980), pp. 56-77; Anders Sandberg, "Dependent Development, Labour and the Trenton Steel Works, Nova Scotia c1900-1913", *Labour/le travail*, 27 (Spring 1991).
- 12 T.W. Acheson, "The Social Origins of the Canadian Business Elite", in David Macmillan, ed., *Canadian Business History: Selected Studies, 1497-1971* (Toronto, 1972), pp. 144-75 and "Changing Social Origins of the Canadian Industrial Elite, 1880-1910", *Business History Review*, 47 (Summer 1973), pp. 189-217; David Burley, *A Particular Condition of Life* (Kingston and Montreal, 1994); Paul Craven and Tom Traves, "The Class Politics of the National Policy", *Journal of Canadian Studies*, 14 (1979), pp. 14-38; Gordon Darroch, "Early Industrialization and Inequality in Toronto, 1861-99", *Labour/le travail*, 11 (1981), pp. 31-61 and "Occupational Structure, Assessed Wealth and Homeowning during Toronto's Early Industrialization, 1861-1899", *Histoire sociale/Social History*, 16 (1983), pp. 381-410; M. Katz, M. Doucet and M. Stern, *The Social Organization of Early Industrial Capitalism* (Cambridge, 1982); Larry McCann and Jill Burnett, "Social Mobility and the Ironmasters of Late Nineteenth Century New Glasgow", in L.D. McCann, ed., *People and Place: Studies of Small Town Life in the Maritimes* (Fredericton, 1987), pp. 59-78; Ian McKay, "The Crisis of Dependent Development: Class Conflict in the Nova Scotia Coalfields, 1872-1876", *Canadian Journal of Sociology*, 13 (1988); Leo Panitch, "Dependency and Class in Canadian Political Economy", *Studies in Political Economy*, 6 (Autumn 1981), pp. 7-33; Gerald Panting and Eric Sager, *Maritime Capital* (Montreal and Kingston, 1990); Philip Wood, "Marxism and the Maritimes: On the Determinants of Regional Capitalist Development", *Studies in Political Economy*, 29 (Summer 1989), pp. 123-53.
- 13 Bettina Bradbury, *Working Families* (Toronto, 1993); Marjorie Griffith Cohen, *Women's Work: Markets and Economic Development in Nineteenth Century Ontario* (Toronto, 1988); Christine Burr,

A necessary condition for the growth of productivity in some industries was the availability of appropriate raw materials¹⁴ or a new source of power.¹⁵ In other industries, the realization of scale economies waited for the market-expanding impact of transportation improvement,¹⁶ urbanization¹⁷ or the development of local

“Class and Gender Relations within the Toronto Typographical Union”, *Canadian Historical Review*, LXXIV, 3 (September 1993), pp. 344-66; Gail Cuthbert-Brandt, “Weaving It Together: Life Cycle and the Industrial Experience of Female Cotton Workers in Quebec”, *Labour/le travail*, 7 (Spring 1981), pp. 113-26; Chad Gaffield, “The Social and Economic Origins of Contemporary Families”, in Maureen Baker, ed., *Families: Changing Trends in Canadian Society*, 2nd edition (Toronto, 1990), pp. 21-40; Janine Roelens Grant and Kris Inwood, “Labouring at the Loom: A Case Study of Rural Manufacturing in Leeds County, 1870”, *Canadian Papers in Rural History*, VII (1990), pp. 215-36 and “Gender and Organization in the Canadian Cloth Industry”, *Canadian Papers in Business History*, 1 (1989), pp. 17-32; Margaret McCallum, “Separate Spheres: The Organization of Work in a Confectionary Factory, Ganong Bros., Saint Stephen, New Brunswick”, *Labour/le travail*, 24 (August 1989), pp. 69-90; Del Muike, “The Industrial Context of Inequality: The Female Participation in Nova Scotia’s Paid Labour Force, 1871-1921”, *Acadiensis*, XX, 2 (Spring 1991), pp. 3-31; Joy Parr, *The Gender of Breadwinners: Women, Men and Change in Two Industrial Towns* (Toronto, 1990).

- 14 Kris Inwood, “Local Control, Resources and the Nova Scotia Steel and Coal Company”, Canadian Historical Association, *Historical Papers/Communications historiques* (1986), pp. 254-82 and “The Influence of Resource Quality on Technological Persistence: Charcoal Iron in Quebec”, *Material History Review*, 36 (Fall 1992), pp. 36-46.
- 15 Morris Altman, “Resource Endowments and Location Theory in Economic History: A Case Study of Quebec and Ontario at the Turn of the Century”, *Journal of Economic History*, XLVI, 4 (December 1986), pp. 999-1010; John Dales, *Hydroelectricity and Industrial Development in Quebec, 1898-1940* (Cambridge MA, 1957); Albert Faucher, *Histoire économique et unité canadienne* (Montreal, 1970); Albert Faucher and Maurice Lamontagne, “History of Industrial Development”, in J.-C. Falardeau, ed., *Essays on Contemporary Quebec* (Quebec, 1953) pp. 23-37; Larry McNally, *Water Power on the Lachine Canal, 1846-1900*, manuscript report 56 (Ottawa, 1982); Richard Reid, “The Rosamond Woollen Company of Almonte: Industrial Development in a Rural Setting”, *Ontario History*, 75 (1983); David Walker, “Energy and Industrial Location in Southern Ontario, 1871-1921”, in D. Walker and J. Bates., eds., *Industrial Development in Southern Ontario* (Waterloo, 1974), pp. 41-68.
- 16 Morris Altman, “Railways as an Engine of Growth: Who Benefitted from the Canadian Railway Boom, 1870-1910”, *Histoire sociale/Social History*, XXI, 42 (November 1988), pp. 269-82; P. Craven and T. Traves, “Canadian Railways as Manufacturers, 1850-1880”, Canadian Historical Association, *Historical Papers/Communications historiques* (1988), pp. 254-81; Ken Cruikshank, “The Intercolonial Railway, Freight Rates and the Maritime Economy”, *Acadiensis*, XXII, 1 (Autumn 1992), pp. 87-110; Forbes, *Maritimes Rights* and “Misguided Symmetry”; Ben Forster, “Finding the Right Size: Markets and Competition in Mid- and Late Nineteenth-Century Ontario”, in Roger Hall, et al, eds., *Patterns of the Past: Interpreting Ontario’s History* (Toronto, 1988), pp. 150-73; Kris Inwood, “Transportation, Tariffs and the Canadian Iron Industry, 1867-1897” (University of Guelph Department of Economics Discussion Paper, 1989); Gerald Tulchinsky, *The River Barons: Montreal Businessmen and the Growth of Industry and Transportation, 1837-53* (Toronto, 1977).
- 17 T.W. Acheson, *Saint John: The Making of a Colonial Urban Community* (Toronto, 1985); Dean Beeby, “Industrial Strategy and Manufacturing Growth in Toronto, 1880-1910”, *Ontario History*, LXXVI, 3 (September 1984), pp. 199-232; E.J. Chambers and G.W. Bertram, “Urbanization and Manufacturing in Central Canada, 1870-1890”, in S. Ostry and T.K. Rymes, eds., *Papers on Regional Historical Statistics* (Toronto, 1966); Elizabeth Bloomfield and Gerald Bloomfield, “Our Prosperity Rests on Manufactures: Industry in the Canadian Urban System, 1871”, *Urban History Review*, XXII (1994), pp. 75-96; James Gilmour, *The Spatial Evolution of Manufacturing: Southern Ontario 1851-1891* (Toronto, 1972); Robert Lewis, “Restructuring and the Formation of an Industrial District in Montreal’s East End, 1850-1914”, *Journal of Historical Geography*, 20 (1994), pp. 143-57; Larry McCann, “Staples and the New Industrialism”, *Acadiensis*, VIII, 2 (Spring 1979),

markets through population growth and rising incomes.¹⁸ Canadian scholars have been especially sensitive to the possibility of a technological or productivity 'failure',¹⁹ exacerbated or even caused by the structure of commerce and finance²⁰ or inappropriate government policy.²¹ Productivity also attracts attention in the

- pp. 47-79 and "The Mercantile-Industrial Transition in the Metal Towns of Pictou County, 1857-1931", *Acadiensis*, X, 2 (Spring 1981), pp. 29-64; Del Muise, "The Great Transformation: Changing the Urban Face of Nova Scotia, 1871-1921", *Nova Scotia Historical Review*, (Autumn 1991); Jacob Spelt, *Urban Development in South-Central Ontario* (Toronto, 1972); John Weaver, "The Location of Manufacturing Enterprise: The Case of Hamilton's Attraction of Foundries, 1830-1890", in Richard Jarrell and Arnold Roos, eds., *Critical Issues in the History of Canadian Science, Technology and Medicine* (Thornhill, 1981), pp. 197-217.
- 18 Corinne Beutler, "Les moulins à farine du Séminaire de Saint-Sulpice à Montréal (1658-1840)", Canadian Historical Association, *Historical Papers/Communications historiques* (1983), pp. 184-207; Gérard Bouchard, "Sur un démurage raté: industrie latière et co-intégration au Saguenay (1880-1940)", *Revue d'histoire de l'amérique française* (été 1991), pp. 73-100; Serge Courville et al, "The Spread of Rural Industry in Lower Canada, 1831-51", *Journal of the Canadian Historical Association*, 2 (1991), pp. 43-70; Kris Inwood and Phyllis Wagg, "The Survival of Handloom Weaving in Rural Canada circa 1870", *Journal of Economic History*, 54, 2 (June 1993); Doug McCalla, "The Internal Economy of Upper Canada", *Agricultural History*, 59, 3 (July 1985), pp. 397-416; Françoise Noel, "Chambly Mills, 1784-1815", Canadian Historical Association, *Historical Papers/Communications historiques* (1985), pp. 102-16; W.T. Wylie, *The Blacksmith in Upper Canada, 1784-1850* (Gananoque, 1990).
- 19 Don Davis, "Dependent Motorization: Canada and the Automobile to 1930", *Journal of Canadian Studies*, 21, 3 (Autumn 1986), pp. 106-32; Chris de Bresson, "Have Canadians Failed to Innovate?" *History of Science and Technology in Canada Bulletin*, 6 (1982), pp. 10-23; Kris Inwood, "Resource Discovery and Technological Change: The Early Years of Steel Production in Nova Scotia", *Bulletin of the Canadian Institute of Metallurgy* (1983), pp. 59-65 and "Productivity Change in Obsolescence: Charcoal Iron Revisited", *Journal of Economic History*, 45, 2, (1985), pp. 293-8; Larry McNally, "Technical Advance and Stagnation: The Case of Nail Production in Nineteenth-Century Montreal", *Material History Review*, 36 (Fall 1992), pp. 38-45; Glen Williams, *Not for Export* (Toronto, 1983); Peter Wylie, "Technological Adaptation in Canadian Manufacturing, 1900-29", *Journal of Economic History* XLIX, 3 (September 1989), pp. 569-91.
- 20 T.W. Acheson, "The Great Merchant and Economic Development in Saint John", *Acadiensis*, IX, 1 (Autumn 1979), pp. 3-24; David Burley, "Credit and Debt in the Transition to Industrial Capitalism, the Case of Mid-nineteenth Century Brantford Ontario", *Histoire sociale/Social History* (May 1987), pp. 79-100; Lou Evans and Neil Quigley, "Discrimination in Bank Lending Practice: A Test Using Data from the Bank of Nova Scotia 1900-1937", *Canadian Journal of Economics*, 23, 1 (February 1990); Lewis R. Fischer and Eric Sager, eds., *The Enterprising Canadians* (St. John's, 1979); Frank, "The Cape Breton Coal"; Kris Inwood, *The Canadian Charcoal Iron Industry, 1870-1914* (New York, 1986), chapters 5-7; Greg Marchildon, "Promotion, Finance and Merger in the Canadian Manufacturing Industry, 1885-1918", Ph.D. dissertation, The London School of Economics and Political Science, 1990 and "John F. Stairs, Max Aitken and the Scotia Group: Finance Capitalism and Industrial Decline in the Maritimes, 1890-1914", in Inwood, ed., *Farm, Factory and Fortune*; Doug McCalla, "Review of the History of Canadian Business", Canadian Historical Association, *Historical Papers/Communications historiques* (1978); L.R. McDonald, "Merchants against Industry: An Idea and Its Origins", *Canadian Historical Review*, LVI (1975), pp. 263-81; R.T. Naylor, *The History of Canadian Business* (Toronto, 1975); Jorge Niosi, "La Laurentide (1887-1928): pionnière du papier journal au Canada", *Revue d'histoire de l'amérique française* (décembre, 1975), pp. 375-416.
- 21 Acheson, "The Great Merchant", "The Maritimes" and "The National Policy"; John Dales, *The Protective Tariff in Canada's Development* (Toronto, 1966) and "'National Policy' Myths, Past and Present", *Journal of Canadian Studies*, 14 (Fall 1979), pp. 39-50; Ken Cruikshank, "Taking the Bitter with the Sweet: Sugar Refiners and the Canadian Regulatory State", *Canadian Historical Review*, LXXIV, 3 (September 1993), pp. 367-94; Trevor Dick, "Canadian Newsprint, 1913-30: National Policies and the North American Economy", *Journal of Economic History*, XLII, 3

literature comparing the pace and structure of manufacturing growth before and after the turn of the century 'wheat boom',²² in different countries²³ and in different regions within Canada.²⁴

Our principal concern is the relationship between productivity and regional development, since regions with high and rising levels of productivity during the past two centuries have tended to enjoy rapid income and employment growth.²⁵ The lines of causal influence are complex, but it is clear that the level of productivity has enormous potential to affect regional and national development. Hence it is essential that we ascertain the extent, nature and origin of provincial productivity differentials at the earliest possible moment in the evolution of the Canadian regions.

One source for the study of manufacturing and its productivity in 19th century Canada is the industrial census. The enumeration closest to Confederation is the

(September 1982), pp. 659-87; Ian Drummond, "Ontario's Industrial Revolution", *Canadian Historical Review*, LXIX, 3 (September 1988), pp. 283-99; Ernest R. Forbes, "Consolidating Disparity: The Maritimes and the Industrialization of Canada during the Second World War", *Acadiensis*, XV, 2 (Spring 1986), pp. 3-27; Ben Forster, *A Conjunction of Interests: Business, Politics and the Tariff, 1825-1879* (Toronto, 1986); Guy Gaudreau, "L'État, le mesurage du bois et la promotion de l'industrie papetière", *Revue d'histoire de l'amérique française* (automne 1989), pp. 203-19; Dianne Middleton and David Walker, "Manufacturers and Industrial Policy in Hamilton, 1880-1910", *Urban History Review*, 8 (1980), pp. 20-40; Tom Traves, *The State and Enterprise: Canadian Manufacturers and the Federal Government, 1917-31* (Toronto, 1979); Peter J. Wylie, "When Markets Fail: Electrification and Maritime Industrial Decline", *Acadiensis*, XVII, 1 (Autumn 1987), pp. 74-96.

- 22 Morris Altman, "A Revision of Canadian Economic Growth: 1870-1910 (a challenge to the gradualist interpretation)", *Canadian Journal of Economics*, XX, 1 (February 1987), pp. 86-113; Gordon Bertram, "Historical Statistics on Growth and Structure in Manufacturing in Canada, 1870-1957", in J. Henripin and A. Asimakopulos, eds., *Conferences on Statistics 1962 and 1963* (Toronto, 1964), pp. 93-152; Ian M. Drummond, *Progress without Planning: the Economic History of Ontario from Confederation to the Second World War* (Toronto, 1987), part 3; Alan Green and Mac Urquhart, "New Estimates of Output Growth in Canada", in D. McCalla, ed., *Perspectives on Canadian Economic History* (Toronto, 1987), pp. 186-99; Inwood, "Maritime Industrialization"; Duncan McDougall, "Canadian Manufactured Commodity Output, 1870-1915", *Canadian Journal of Economics*, 1, 1 (1971), pp. 21-36.
- 23 Robert H. Babcock, "Economic Development of Portland (Maine) and Saint John (N.B.) during the Age of Iron and Steam, 1850-1914", *American Review of Canadian Studies*, IX (Spring 1979), pp. 3-37; John Dales, "Estimates of Canadian Manufacturing Output by Markets, 1870-1915", in Henripin and Asimakopulos, eds., *Conferences on Statistics*, pp. 61-91 and *The Protective Tariff*; Kris Inwood and Tim Sullivan, "Nineteenth Century Ontario in its Regional Context", *Canadian Papers in Business History*, II (1993); Phillip Wood, "Barriers to Capitalist Development in Maritime Canada, 1870-1930: A Comparative Perspective", *Canadian Papers in Business History*, I (1989), pp. 33-58.
- 24 Morris Altman, "Economic Development with High Wages: An Historical Perspective", *Explorations in Economic History*, 25, 2 (April 1988), pp. 198-224; Caves and Holton, *The Canadian Economy*, pp. 141-95; Kris Inwood, "The Iron Industry", in I.M. Drummond, *Progress Without Planning: The Economic History of Ontario, 1870-1939* (Toronto, 1987), pp. 185-207; Inwood and Chamard, "Regional Industrial Growth"; John Lutz, "Losing Steam: The Boiler and Engine Industry as an Index of British Columbia's Deindustrialization, 1880-1915", *Canadian Historical Association, Historical Papers/Communications historiques* (1988), pp. 168-208; John McCallum, *Unequal Beginnings: Agriculture and Economic Development in Quebec and Ontario until 1875* (Toronto, 1980).
- 25 Paul Krugman, *Geography and Trade* (Cambridge MA, 1991).

census undertaken in the spring of 1871.²⁶ Like other aspects of the census, the record of industrial activity is most easily examined through summary tables prepared by census staff from the unpublished enumerators' manuscripts.²⁷ These tabulations indicate that as early as 1870 establishments in Atlantic Canada, on average, had significantly lower productivity than those in Ontario.²⁸ This finding is significant because the patterns visible in 1871 arguably reflect structures inherited from the pre-Confederation era *and* contributed to the experience of uneven regional development in subsequent decades.

The tables prepared by census staff are convenient, accessible and have been widely used. One limitation is that the data are tabulated by industry and by district only. Hence we cannot examine additional tabulations which might reveal other characteristics of analytical interest. A more severe limitation is the organization of data into industries with no information about the criteria used to classify individual establishments into the various categories. The arithmetic of civil servants appears to have been largely accurate, but their tabulation process inevitably involved a number of corrections, interpolations and editorial judgements.

The editing of data prior to tabulation is known to have been important in other censuses.²⁹ In Canada, however, little is known about the preparation of data for publication.³⁰ The Census Bureau provided no account of its editorial and tabulation procedures. Lack of information about the internal workings of the

26 Canada was one of the first countries in the world to undertake a systematic enumeration of industrial activity. The United States undertook the first more or less comprehensive industrial enumeration in 1850; France and Canada followed in 1871. On the Canadian industrial census, see Kris Inwood, "The Representation of Industry in the Canadian Census, 1871-91", *Histoire sociale/Social History*, 28 (November 1995).

27 Canada, *Census*, 1870-71, vol. III.

28 Inwood, "Maritime Industrialization".

29 Susan Carter and Richard Sutch, "Fixing the Facts: Editing of the 1880 United States Census of Occupations with Implications for Long-Term Labor-Force Trends and the Sociology of Official Statistics", *Historical Methods*, 29, 1 (winter 1996), pp. 5-24.

30 Welcome exceptions include Jean-Pierre Beaud et Jean-Guy Prévost, "Classement statistique, représentations sociales et discours économique: les métiers et professions dans les recensements canadiens", *Interventions économiques*, 24 (1992), pp. 129-49 and Michael Wayne, "The Black Population of Canada West on the Eve of the American Civil War: A Reassessment Based on the Manuscript Census of 1861", *Histoire sociale/Social History*, 28 (November 1995). There has been some examination of the enumeration process: A.A. Brookes, "Doing The Best I Can: The Taking of the 1861 New Brunswick Census", *Histoire sociale/Social History*, 9 (1976), pp. 73-7; Bruce Curtis, "On the Local Construction of Statistical Knowledge: Making Up the 1861 Census of the Canadas", *Journal of Historical Sociology*, 7 (1994), pp. 416-34; David P. Gagan, "Enumerators Instructions for the Census of Canada, 1852 and 1861", *Histoire Sociale/Social History*, 7 (1974), pp. 355-65; Normand Fortier, "Les recensements canadiens et l'études de l'agriculture québécoise, 1851-1901", *Histoire Sociale/Social History*, XVII, 34 (November 1984), pp. 257-86; Gilles Lauzon, "Cohabitation et déménagements en milieu ouvrier Montréalais: Essai de réinterprétation à partir du cas du village Saint-Augustin (1871-1881)", *Revue d'histoire de l'Amérique française*, 46, 1 (été 1992), pp. 115-42; Marvin McInnis, "Some Pitfalls in the 1851-52 Census of Agriculture of Lower Canada", *Histoire sociale/Social History*, XIV, 27 (May 1981), pp. 219-31. Unfortunately, there is almost no discussion of industrial enumeration in this literature.

census is particularly worrisome for data describing economic activity, since they inevitably require more complex processing than do the basic demographic data. Preparation of the published industrial tables, for example, required many layers of decisions about what counts as manufacturing, how to organize firms into industries, how to edit or correct anomalous data, how to tabulate missing data and so on. The value of the published tabulations is somewhat diminished by our ignorance of census methodology on these points.

Examination of the original entries made by enumerators about individual firms avoids some of these difficulties and minimizes others. The 1871 industrial manuscripts are especially valuable because they contain information which was never tallied and published, including floating capital, commodity detail, type of power and force, months of operation and the records of many handweavers.³¹ A team at the University of Guelph has made the industrial manuscripts machine-readable.³² We use a new version of the Guelph data which incorporates various corrections and organizes the data with the classification system of the 1890-91 census.³³

These data reveal considerable diversity in the degree of specialization; 188 and 168 different industries were represented in Ontario and Quebec, while New Brunswick and Nova Scotia returned only 101 and 97 respectively. The 10 largest industries in each province, which are reported in Table One, accounted for approximately one-half of central Canadian output and two-thirds of all output in Atlantic Canada. Six industries (blacksmith shops, foundries, saw mills, flour mills, boot and shoe manufactures and tailoring and millinery establishments) figured in the top 10 for each province, but their proportions differed greatly. Boot and shoe manufacture contributed 14 per cent of all Quebec output but only five per cent in Ontario. Sawmilling accounted for 30 per cent of all New Brunswick output but only 10 per cent in Quebec. Tanneries were important everywhere except in Ontario, whereas flour and woollen mills were most important in the latter province. Ship-building accounted for 14 per cent of Nova Scotia output and 11 per cent in New Brunswick, but less than one per cent in Ontario.

31 The industrial data were recorded on Schedule 6 of the enumeration undertaken by the Census Bureau of the Canadian Department of Agriculture during April and May of 1871. The source is preserved as National Archives of Canada, RG 31, Series 1, 1871.

32 The team of Kris Inwood, Gerald Bloomfield and Elizabeth Bloomfield developed the database from 1987 to 1990 with the support of the Social Sciences and Humanities Research Council. The database made use of records which had been collected previously by Inwood and the Bloomfields in unrelated projects.

33 Kris Inwood, *Interpretation Guide and Coding Manual for the 1870-71 Canadian Industrial Database* (University of Guelph, 1994) and "The Representation of Industry". A small number of industrial categories have been consolidated because of difficulty in discriminating among them.

Table One
Output Share of 10 Largest Industries, by Province, 1870

	Ont	Que	NB	NS
number of industries	188	168	101	97
output share of ten largest industries	.55	.56	.73	.65
output share of select industries:				
boot and shoe	.05	.14	.06	.09
blacksmithing	.04	.04	.05	.06
boats and ships	.01	.03	.11	.14
carpentry	.03	.04	.02	.06
carriages	.05	.04	.03	.02
clothing	.06	.05	.04	.03
engine-building	.02	.04		.02
flour-milling	.07	.04	.03	.03
foundries/machine shops	.06	.03	.05	.03
sawmilling	.12	.10	.30	.13
tanneries	.02	.04	.04	.05
woollen mills	.04	.01	.01	.01
cabinetry/furniture	.03	.02	.01	.03
lath mills	.01	.01	.02	.01

Notes: All information is from the industrial manuscripts of the 1871 census; Schedule 6, 1871, RG 31, series 1, National Archives of Canada [NAC]. Output is value added (product value less raw materials and miscellaneous costs).³⁴ Handweaving data are omitted because of serious enumeration inconsistencies across provinces.³⁵ Note that the provinces count different sets of industries as their ten-largest. The sum of the ten-largest industries is calculated on the rounded data reported here. No establishments in New Brunswick were classifiable as specialized engine-builders.

34 Miscellaneous costs are a fixed proportion of revenue in each industry group, following M.C. Urquhart, *Gross National Product, Canada, 1870-1926* (Kingston and Montreal, 1993), p. 394ff. The allocation of industries into groups for this purpose follows, with minor deviation, the scheme outlined by Morris Altman, "A Framework for Organizing the Canadian Manufacturing Census Material, 1870-1910", University of Saskatchewan Department of Economics Discussion Paper, 88-04, January 1989.

35 Inwood and Wagg, "The Survival of Handloom".

Diversity in industrial structure is hardly surprising given the complex regional patterns of culture, natural resources, settlement history and so on, but it does underline the importance of comparing productivity on an industry-by-industry basis. Any comparison which aggregates together various industries will conflate inter-industry and inter-provincial differences. The problem would be inconsequential if all provinces had the same industrial structure, or if different industries had similar levels of productivity. Since neither is true, the analysis of productivity is best conducted on an industry-by-industry basis.

The provinces also differed in the typical size of their industrial establishments. The evidence in Table Two distinguishes the smallest one-third of establishments in a particular industry, the largest one-third in that industry and the remaining medium-sized firms. By this definition, small firms constituted about 40 per cent of all firms in each province except Ontario, where only 25 per cent of the firms were small. Large firms accounted for a quarter of all firms everywhere except in Ontario, where the figure was 40 per cent. The distribution of output by size of firm also shows, although less dramatically, the greater importance of smaller firms in Maritime Canada.

Table Two
Distribution of Establishments and Output,
by Establishment Size and Province, 1871

	Establishments			Output		
	small	medium	large	small	medium	large
Ontario	.25	.34	.41	.03	.12	.85
Quebec	.42	.32	.26	.03	.09	.88
New Brunswick	.38	.33	.29	.04	.13	.83
Nova Scotia	.40	.34	.25	.05	.14	.81
Canada	.33	.33	.33	.03	.12	.85

Notes: The size categories are determined independently for each industry. The source is Schedule 6, 1871, RG 31, ser. 1, NAC.

It is clear that Ontario establishments tended to be larger and that larger firms were located disproportionately in that province. The smaller firms were represented disproportionately in Quebec and Atlantic Canada. These differences are significant, in part because of evidence from other jurisdictions of higher productivity among larger firms, at least in some industries.³⁶ We do not examine

36 Jeremy Atack, "Returns to Scale in Antebellum United States Manufacturing", *Explorations in Economic History*, XIV (1977), pp. 337-59; Kenneth L. Sokoloff, "Was the Transition from the Artisanal Shop to the Non-mechanized Factory Associated with Gains in Efficiency?: Evidence from

in this paper the correlation between productivity and size of enterprise, but if larger firms were more productive, then Ontario manufacturing would have been more efficient for that reason alone. Our goal is to examine productivity differences among firms of roughly comparable size in the same industry in order to avoid any complications that arise from a comparison of different-sized firms or different industries.

One final influence upon our methodology is a recognition of industrial and regional differences in the seasonal rhythm of activity. Manufacturing in many regions slowed for the haying and again for the late summer harvest, although the nature of seasonal effects varied in response to the local choice of crops, the importance of animal husbandry and the size of the farm sector. More generally, seasonal underemployment in agriculture and hence availability of labour to manufacturing depended on proximity to city and forest, the gender composition of the workforce (since married women found it more difficult to travel to work) and other factors.

Individual industries had their own specific patterns. Cheese factories often shut for the winter, just as the asheries and charcoal burners became active. Beer was brewed in the fall because it could be maintained during the winter months. Sawmilling was particularly active during the spring run-off, while flour milling for local consumption was a more continuous activity.

Another source of complexity was transportation. Winter affected water transportation differently from rail which was different again from cart and sleigh. Not surprisingly, the seasonal dimensions of economic activity in a particular region depended, in part, on the kind of transportation used in that activity and in that region.

A standardized census cannot hope to assess the full complexity of seasonal rhythms which characterized individual industries and regions. Nevertheless, the enumerators employed in the spring of 1871 were able to collect information about the number of months in which each establishment was active during the year. This information has been inaccessible until recently because it was never published, or even tallied, by census staff. Our tabulation of the manuscript data in Table Three confirms the existence of substantial differences in the typical operating season of some industries and in the same industry in different provinces.

Table Three
Average Months of Activity by Province and the Share
of Select Industries in National Output and Employment, 1870

	Share of Cdn		Average Months of Activity			
	Output	Work	Ont	Que	NB	NS
all industries	1.00	1.00	9.5	8.9	7.1	7.8
Industries averaging more than 10 months operation						
boots and shoes	.08	.09	11.1	10.7	10.5	10.5
foundries/machine shops	.05	.03	11.2	10.8	11.6	11.4
tailors and milliners	.05	.08	11.3	11.2	11.7	11.0
blacksmithing	.04	.05	11.1	10.6	9.9	9.3
carriages	.04	.04	11.5	10.8	10.6	10.5
cabinetry and furniture	.02	.02	10.9	10.4	10.4	10.3
harnesses and saddlery	.02	.02	11.5	11.4	11.4	11.1
printing and publishing	.02	.02	11.9	11.8	11.5	12.0
tanneries	.03	.02	11.3	11.4	11.2	10.2
bakeries	.02	.01	11.7	11.4	12.0	12.0
breweries	.02	.01	11.3	10.3	12.0	10.0
woollen mills	.02	.04	10.5	10.5	11.2	11.4
engine building	.03	.01	12.0	12.0		12.0
furnaces and heaters	.01	.01	10.6	11.2		12.0
stave mills	.01	.01	11.5	12.0		
tinsmithing	.01	.01	11.7	11.2	10.0	11.5
tobacco works	.01	.01	11.7	11.8	12.0	10.5
Industries with a shorter operating season						
saw mills	.13	.16	6.7	3.9	4.8	4.3
flour and grist milling	.05	.03	11.0	9.6	8.2	7.2
boats and ships	.03	.04	9.9	8.6	7.6	8.2
carpentry and joinery	.03	.03	9.8	9.7	9.6	8.5
bricks and tiles	.01	.02	5.1	4.1	4.2	4.1
cooperage	.02	.02	9.6	5.0	4.2	5.7
shingle mills	.01	.02	5.6	2.8	2.6	3.5
agricultural implements	.02	.01	10.7	8.9	4.8	7.8
carding and fulling	.01	.01	7.0	6.7	5.4	5.3
lime kilns	.01	.01	3.6	3.1	5.4	3.9
oil refining	.01	.01	9.8	9.0		
sashes, doors, blinds	.01	.01	10.2	9.9	9.2	8.5

Notes: The measure of work is person-months. The source is Schedule 6, 1871, RG 31, ser. 1, NAC.

The industries in Table Three each contributed at least one per cent of Canadian industrial employment and/or output. They may be divided into industries operating more and less than 10 months per year. With one or two exceptions, the industries in both groups, and especially the latter, had a longer operating season in central Canada than in New Brunswick and Nova Scotia. Most of the difference arises with industries which tended to operate less than 10 months. In these industries the average operating season in Quebec also differed significantly from that in Ontario.

This evidence is consistent with other sources and confirms that the representation of industry-specific employment as a year-round activity will incorrectly inflate the measure of work effort and depress the measure of labour productivity, and it will do so most in industries and provinces with a shorter working year.³⁷ A partial correction for mismeasurement of the labour input is possible using the manuscript description of months of operation. Specifically, we calculated labour productivity as output divided by worker-months, rather than workers. A worker-month is the number of workers multiplied by the months in which the establishment operated.

The data remain incomplete because the number of working hours per month varied by industry, region and by type of worker. In some industries, for example, women probably worked fewer hours per month than men. Unfortunately, the 1871 enumerators did not collect information on hours of work or report months of work separately for men and women. The adjustment for months of operation, therefore, is a partial, although important, improvement in the quality of the labour data.

We have less to say about capital because it is more difficult to improve upon the measures of capital productivity. The quality of the capital data is significantly inferior to that of labour. Census enumerators received no guidelines about how to conceptualize capital. The existence of large inter-industry differences in capital productivity probably reflects different interpretations of the concept of fixed capital, rather than radically different productivities.³⁸

One further precaution against the use of unreliable information is to discard any manuscript record which looks suspicious in some fashion. A description of the broad outlines of industrial activity requires the use of all known establishments even if it is necessary to interpolate for missing information. Tables One and Two, for example, are prepared on this basis.³⁹ A careful analysis of industrial activity,

37 Evidence of part-time work and occupational pluralism in Atlantic Canada is reviewed effectively in Larry McCann, "'Living a Double Life': Town and Country in the Industrialization of the Maritimes", in Douglas Day, ed., *Geographical Perspectives on the Maritime Provinces* (Halifax, 1988), pp. 93-113.

38 It is useful to keep in mind that the capital here is a measure of the capital stock in place, *not* capital in use. The inability to measure capital in use undoubtedly adds to the other sources of measurement uncertainty for capital.

39 In Tables One-Three we calculated output even if part of the necessary data was missing or suspect. We interpolated the value of either materials or products, as needed, using the average ratio to value added for the industry (first provincially and if that was not possible nationally). If both material

however, requires the exclusion of records which lack important information or are suspect for some other reason. A smaller database would not permit us to exclude a significant portion of the observations. Fortunately, the large size of the 1871 database makes it possible to exclude problematic observations and still retain sufficient data for analysis.

The sources of imprecision are various. Some enumerators simply stated that the information describing certain establishments was unreliable or imprecise. An explanation was given in other cases, for example, that the proprietor was absent, dead, deranged or did not maintain useful records. The accuracy of some entries is suspect because the firm was said to be under construction part of the year, active on an intermittent basis, in rented premises (creating uncertainty about fixed capital), joint with fishing, farming, forestry, a store or some other activity or to have returned some input in a misleading way (for example because of inventory fluctuations). We ignore any firm explicitly or implicitly identified by the enumerator as unreliable. We also set aside firms whose products were valued as the sum of material (or material plus labour) costs and those whose information is implausible (because of negative value added or productivity less than one-tenth or more than 10 times the average for that industry).

The various exclusions summarized in Table Four eliminate more than 11,000 records, or one-quarter of the total. The effect on relative productivity is reported in Table Five, which summarizes average productivity in each province relative to that of Ontario.⁴⁰ Capital productivity in the three eastern provinces varies from 85 per cent to 96 per cent of the level in Ontario throughout steps 2-9 of Tables Four and Five. Labour productivity in Quebec is about 85 per cent of the Ontario level, while in New Brunswick and Nova Scotia it is at a lower level, between 70 per cent and 75 per cent. These are the patterns visible in the published census tables and reported in previous work.⁴¹

and product value were missing, we used the report of employee-months and then employees, again imputing the average for the industry provincially (and if that was not possible, nationally). Firms whose raw material sum to a value greater than their products were treated as being without information and hence interpolated. The procedure is described in more detail in Inwood, "The Representation".

40 For example, the top left hand figure in step 1 indicates that total output in Quebec divided by the number of workers was 85% of the corresponding figure for Ontario.

41 Inwood, "Maritime Industrialization".

Table Four
Preparation of Database by Discarding Unusable
Records and Reconstitution of Multi-Product Establishments

	deleted	total records	explanation for exclusion
step 1		45375	
step 2	3868	41507	duplicates, inactive, not manufacturing, handweavers ⁴²
step 3	1784	39723	establishment produces in more than two industries ⁴³
step 4	971	38752	enumerator's comment suggests possible unreliability
step 5	3661	35091	missing data for output or input ⁴⁴
step 6		33671	reconstitution of divided establishments ⁴⁵
step 7	1983	31688	products valued as cost of materials or materials+labour
step 8	206	31482	materials and miscellaneous costs exceed the value of product
step 9	1697	29785	implausible labour or capital productivity (less than .1 or more than 10x industry average)

Note: The source is Schedule 6, 1871, RG 31, ser. 1, NAC.

- 42 We excluded records which duplicated other records or represent firms inactive during the year and firms outside of manufacturing as defined by the 1891 industrial classification; see Inwood, *Interpretation Guide*. We also excluded handweavers. Large numbers of handweavers were missed by the enumerators in Quebec, Nova Scotia, much of New Brunswick and some districts in Ontario; see Inwood and Wagg, "The Survival".
- 43 We regarded joint-product firms as distinct industries. For example, we distinguished the saw mills and the flour mills from the joint saw-flour and flour-saw mills. Firms contributing products classifiable in three different industries, such as the saw-flour-woollen mills, were simply discarded.
- 44 These establishments did not return a value for at least one of the following: products, raw materials, fixed capital, workers, months of operation.
- 45 A number of multi-product firms were divided or split by the enumerator and/or census commissioner. We reconstituted these divided records using criteria described in Inwood, "The Representation". Tables One-Three have been prepared on this basis.

Table Five
Labour and Capital Productivity Relative
to Ontario with Different Portions of the Data

	Productivity Relative to Ontario					
	Capital			Labour		
	Que	NB	NS	Que	NB	NS
step 1	.85	.94	.89	.84	.70	.79
step 2	.85	.94	.90	.82	.70	.74
step 3	.84	.96	.90	.83	.71	.74
step 4	.86	.96	.92	.84	.71	.74
step 5	.86	.96	.92	.85	.73	.73
step 6	.86	.94	.95	.85	.72	.75
step 7	.86	.93	.95	.85	.72	.77
step 8	.87	.94	.95	.85	.72	.76
step 9	.88	.89	.91	.85	.68	.72
step 10	.88	.89	.91	.86	.81	.83

Notes: The source is Schedule 6, 1871, RG 31, ser. 1, NAC. The steps are the same as in Table Four except for the addition of step 10, which is an adjustment for seasonality (see text).

The exclusions described in Table Four ensure a more accurate estimation of the provincial productivity differences. Another way to improve the comparison is to adjust for different months of operation. Here we make exactly the same calculation as in step 9 of Table Five, except that labour productivity is measured as output per worker-month rather than output per worker. The result, shown in step 10 of Table Five, is to increase labour productivity in Atlantic Canada to 80 per cent of the Ontario level and to leave the Quebec-Ontario comparison unaffected. Capital productivity is not adjusted for months of operation because we have assumed that industrial machinery and structures were not put to other uses in the off-season.

The adjustment for seasonality suggests that Maritime manufacturing in 1871 was less productive in its use of labour by about 20 per cent and capital by 10 per cent. This observation does not imply that any one industry in Maritime Canada was less efficient than the same industry in Ontario, since the provinces differed greatly in the composition of manufacturing activity. The only way to examine productivity within a particular industry is to examine the data for that industry.

The data in Table Six describe industries which contributed more than 1 per cent of Canadian output and/or work (as in Table Three) and survived the various exclusions (Table Four) with sufficient observations to permit comparisons between Ontario and each of the other provinces. Ontario had the highest productivity in some industries but not in others. Overall, Ontario had a clear (more than five per cent) advantage in two-thirds of the labour productivity comparisons with New

Brunswick and Nova Scotia and in only one-fifth of the capital productivity comparisons reported in Table Six.⁴⁶

Table Six
Relative Productivity in Select Industries

	Productivity Relative to Ontario					
	Capital			Labour		
	Que	NB	NS	Que	NB	NS
bakeries	1.02	2.16	.73	1.21	.94	1.03
boats and ships	.81	1.16	1.23	.71	.96	.93
book binding	.58	1.04	.75	.83	.91	.90
boots and shoes	.98	.97	1.00	1.15	.97	1.18
blacksmithing	.82	1.30	1.09	.84	1.02	.92
cabinetry and furniture	.84	1.52	.73	.82	1.00	1.28
carriages	.87	1.14	1.05	.96	1.05	.88
carpentry and joinery	.95	1.16	1.00	.73	.93	.69
cooperage	.82	2.07	.93	1.02	.58	.76
flour and grist milling	.67	1.05	1.76	.85	.60	.68
flour-saw milling	.92	1.02	.64	.86	.53	.59
foundries/machine shops	.67	.93	.61	.77	.90	.90
furnaces and heaters	.71	1.40	.99	.68	.85	.84
harnesses and saddlery	.97	.96	.95	.96	1.15	.70
lath mills	.56	.79	1.38	.43	.89	1.03
saw mills	.93	1.20	1.16	.76	.93	.81
saw-flour milling	.93	1.15	1.09	1.48	.70	.71
shingle mills	.94	1.86	1.03	1.68	.81	1.36
stave mills	.67	.89	.89	.89	.88	.68
tailors and milliners	1.15	3.31	.76	1.09	.77	1.05
tanneries	1.15	.92	.98	1.00	.96	.98
woollen mills	.97	.67	.74	1.09	.85	.85

Notes: The measure of work is person-months. The source is Schedule 6, 1871, RG 31, ser. 1, NAC.

The diversity of experience makes it impossible to generalize about the productivity with which labour and capital were used by manufacturers in one province relative to another. The only basis for a summary comparison which does not introduce the confounding effect of industrial structure is to compare

46 A smaller differential implies a greater risk of measurement error and has a smaller influence on relative cost. The selection of a 5% threshold is admittedly somewhat arbitrary.

productivity *as if* provinces had a common structure. We attempt to do so by comparing Ontario separately with each of the other provinces; in each comparison we use only the industries common to both provinces.

The Ontario-Nova Scotia comparison, for example, uses only the industries present in these two provinces. These industries are averaged together in a way that implicitly assumes Ontario had the same industrial structure as Nova Scotia. The proportions are taken from the industrial distribution of provincial inputs. If the Nova Scotia workforce was one-third blacksmiths and two-thirds shoemakers, for example, then the latter would weight twice as heavily as the former in the construction of averages for Ontario and Nova Scotia in order to compare them. The other provincial comparisons are constructed in a parallel fashion.

This way of removing the influence of different provincial structures, reported in Table Seven, lowers relative capital productivity in Nova Scotia and Quebec and causes a pronounced increase in New Brunswick. The result for labour productivity is more consistent. The summary measure of labour productivity relative to Ontario is significantly higher in all provinces under the assumption of a common industrial structure.

Table Seven
Labour and Capital Productivity
Relative to Ontario under Different Assumptions

	Productivity Relative to Ontario					
	Capital			Labour		
	Que	NB	NS	Que	NB	NS
common industry structure	.84	1.05	.86	.99	.90	.93
common industry & size structure	.80	1.04	.89	.99	.93	1.01

Notes: The source is Schedule 6, 1871, RG 31, ser. 1, NAC.

The final step is to compare provinces as if they had the same distribution of establishment size as well as industries. We use the size classes illustrated in Table Two above. The procedure here is exactly the same as in the previous step except that big, medium and small-sized blacksmiths are treated as if they are separate industries.

Reweightings by size of establishment turns out to have little or no impact on relative capital productivity (second line of Table Seven). And there is no impact on labour productivity in Quebec relative to that of Ontario. However, for Maritime Canada, and especially for Nova Scotia, controlling for size of establishment increases the summary measure of relative labour productivity.

The successive comparisons suggest that refining the database and adjusting for seasonality reduces Ontario's productivity advantage to 9-12 per cent for capital

and 14-19 per cent for labour (Table Five, step 10). Even these differences disappear, however, when we control for the types of industries and size of establishments (Table Seven). The cumulative impact of discarding records to ensure data quality, correcting for seasonality and adjusting for industrial composition and establishment sizes is to eliminate the productivity differential. Capital productivity remains relatively low in Nova Scotia and Quebec, but their labour productivity equals that of Ontario. New Brunswick still has slightly lower labour productivity, but it also has higher capital productivity. The labour comparisons are of particular interest because labour is measured more accurately than capital.

We conclude, therefore, that productivity everywhere was roughly comparable to that of Ontario, providing the comparisons are drawn between the same size of enterprise in the same industries. The structure of provincial manufacturing, rather than the operation of individual firms, created the provincial productivity differentials evident from published census tables. Differentials did exist in some industries, not surprisingly, but there was no clear pattern of one province dominating the others in all or even most industries.

Although a great deal remains to be explored, already it is clear that manufacturing in the Maritime provinces (and to a considerable extent in Quebec) operated in fundamentally different ways than did the factories and workshops of Ontario. In fact, the differences are so large that it is difficult to compare across provinces. The best we can do with available evidence is to draw a comparison for a single year, 1871, that controls for variation in the size of establishment, the mix of industries and their patterns of seasonality. This evidence is no more than a snapshot of activity in a single year, but it does suggest that entrepreneurs, managers and workers in similar sizes and types of establishment were equally productive in all parts of Canada.

We must recognize, however, that Maritime manufacturers did *not* operate in the same industries, the size of their establishment was smaller and they worked fewer months of the year. And Maritime manufacturing was less productive because of these differences. The interesting question is how to explain the differences. Why more seasonality? Why the differences in structure? Why the differences in size?

We are not yet in a position to answer these questions, which, to a large extent, must be explored at the level of individual industries. Natural resource endowments undoubtedly influenced the relative importance of industries such as grist mills, saw mills and ship building. Differing availabilities of capital may have played a role. We may suspect also that in at least some industries productivity in Maritime Canada was hindered by the limited extent of the market, resulting from small and dispersed populations at relatively low incomes, exactly as understood by Adam Smith in his description of the Scottish highlands during the 1770s.⁴⁷

47 "The greatest improvement in the productive powers of labour ... seems to have been the effects of the division of labour ... the extent of this division must always be limited by ... the extent of the market". Smith goes on to argue that labour productivity was low in highland Scotland because "a country carpenter deals in every sort of work that is made of wood, a country smith in every sort of work that is made of iron"; see Adam Smith, *The Wealth of Nations* (London, 1776), Bk. I, Ch. 1.

The influence of scale on productivity and the consequences for regional differences in 19th-century Canada remains a topic for further research. Even if supporting evidence becomes available, however, it should not be forgotten that population density and income levels were the result of the level of economic development, and their causes remain to be explored. Nor should it be forgotten that policies well suited to promoting the industrialization of one region may have been poorly designed to promote the prosperity of differently endowed regions.