# *Railways as an Engine of Economic Growth? Who Benefited from the Canadian Railway Boom, 1870-1910?*

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*Contrary to the received view, this paper argues that railways played a significant role in Quebec's economic growth through their impact upon railway-related industry over the period 1870 to 1910. I also find that Quebec drew considerably more federal government subsidies for railway construction than did Ontario. The importance of railways to Canadian manufacturing growth is also assessed. My findings provide further evidence that generalizations from Fogel's classic study on railway-related backward linkages in the United States can be misplaced and misleading.*

*Contrairement aux idées reçues en la matière, l'auteur du présent essai soutient que les chemins de fer ont joué un rôle déterminant dans l'essor économique du Québec entre 1870 et 1910, en favorisant le développement d'industries complémentaires. L'auteur note ensuite que le Québec a reçu à ce titre du gouvernement fédéral des subventions beaucoup plus importantes que l'Ontario. Il évalue par ailleurs les effets d'entraînement que la construction de chemins de fer a eus sur la croissance du secteur manufacturier au Canada. Enfin, il souligne que les résultats de ses recherches l'autorise à affirmer que les généralisations que certains se permettent à partir de l'étude désormais classique de Fogel sur les liens en amont avec les États-Unis peuvent être abusives et trompeuses.*

It is generally argued that the Canadian railway construction boom of the late nineteenth and early twentieth centuries did little to benefit the Quebec economy.[1]

This construction boom was heavily subsidized by the dominion government of Canada. François-Albert Angers forcefully and eloquently argued that the dominion government discriminated against Quebec in terms of railway construction and aid for economic development. Dominion spending, he claimed, was biased in favour of Ontario and Canada's western provinces. In a word, the dominion government chose to allocate its available resources towards the development of Canada, west of Quebec, prior to

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1. As the data in Table 5 make clear, each decade of the 1870-1910 period experienced significant railroad construction. *See* Alan G. Green, "Growth and Productivity Change in the Canadian Railway Sector, 1871-1926", Stanley L. Engerman and Robert E. Gallmann, eds., *Long-Term Factors in American Economic Growth*, Chicago and London, 1986, pp. 779-810, for an empirical assessment of the growth of Canada's railroads.

providing Quebec with the government assistance thought necessary for Quebec to realize its maximum feasible level of economic development. This choice, which was against the best interests of Quebec, was made so as to insure the profitability of the western railways. Such an agenda restrained Quebec'c economic development in the late nineteenth century.[2] Recently, Angers' line of argument has been reiterated by P.-A. Linteau, R. Durocher, and J.-C. Robert in *Histoire du Québec contemporain*. These authors emphasize that Quebec did not benefit nearly as much as did Ontario from investments in railways.[3] Brian Young, in his study of the construction of Quebec's north-shore railway, has forwarded a similar argument.[4]

Evidence in support of discrimination presently rests upon an implicit assumption that the economic benefits which might accrue to a region from railway construction can be inferred simply from data on total dominion government grants for railway construction and on the mileage of track constructed in each province. Such an assumption does not take into consideration whether Dominion subsidies were less on a per capita basis or, more importantly, as an inducement to private investment in railway construction, on a per mile of track basis. And, on a more general level, the discrimination thesis fails to consider the effects that railway construction (wherever it was carried out) might have had on Quebec's manufacturing, primarily through its impact upon railway-related manufacturing activities as well as in making markets in Ontario and the western provinces more accessible to Quebec's industry.

In order to examine Angers' important thesis, I construct estimates of dominion government subsidies for railway construction in Quebec and Ontario. These estimates indicate that, in terms of subsidies granted per mile of track, Quebec benefited more from dominion government grants than did Ontario. In this respect, I find that the dominion government did not discriminate against Quebec. Estimates of municipal and provincial governments subsidies for railway construction in Quebec and Ontario are also produced. I find that while, according to all measures, municipalities in Ontario granted more for railway construction than their Quebec counterparts, Quebec is found to be far ahead of Ontario with respect to provincial government grants. Moreover, total subsidies per mile of track were far greater in Quebec than in Ontario, even after taking into consideration the subsidies granted by all levels of government.

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2. François-Albert Angers, "L'évolution économique du Canada et du Québec en cent ans de Confédération", Rodrigue Tremblay, ed., *L'économie québécoise : histoire, développement, politiques*, Montréal, 1976, p. 245, argues that Canada's east-west railroad project was a product of British inspired military considerations rather than any economic imperative. Unlike the development policies adopted in other countries, which concentrated on developing those regions first settled, the Canadian government decided to open up new lands, "[...] condamnait formellement le Québec à être en quelque sorte abandonné pour une période indéterminée [...] développer d'abord tout le reste du Canada à l'ouest de Montréal, puis retour au Québec ensuite, seulement quand le développement du reste du Canada aura permis la réalisation d'un état normal de rentabilité des investissements déjà engagés dans l'Ouest." Montreal benefited from the western oriented railroad policy in so far as it was a port of entry to the Canadian west. *See also* pp. 246, 249.

3. Paul-André Linteau, René Durocher, and Jean-Claude Robert, *Histoire du Québec contemporain: de la Confédération à la crise, 1867-1929*, Montréal, 1979, p. 84. To substantiate their argument, the authors refer to Gaétan Gervais', "L'expansion du réseau ferroviaire québécois, 1875-1895", Ph.D. diss., University of Ottawa, 1978, finding that between 1867 to 1896, Quebec received only 13.8 percent of Dominion railroad subsidies compared to Ontario's 28 percent.

4. Brian J. Young, *Promoters and Politicians: The North-South Railways in the History of Quebec, 1854-1885*, Toronto, 1978, p. 144, concludes: "In making the contribution to tying Canada by steel *a mari usque ad mare*, Quebec paid a high price."

I also present estimates which measure the importance of railway-related manufacturing activities to the growth and size of total manufacturing activities in Quebec, Ontario and Canada as a whole. In that way, I attempt to evaluate the *indirect* impact which railway construction had upon Quebec, Ontario and Canadian manufacturing growth from 1870 to 1910. For the discrimination thesis to be confirmed, I should find, at the very least, that Quebec derived little indirect benefit from railway construction. This thesis would be further reinforced if I find that most indirect benefits were captured by Ontario. My findings, however, are quite the contrary. Indeed, I find that railway-related industries played a critical role in Quebec's manufacturing growth while being relatively insignificant to Ontario's manufacturing growth.

These findings allow me to address some of the more general questions related to the importance of railways raised in the now classic works of Robert Fogel and Albert Fishlow.[5] Fogel argues that the indirect benefits with respect to backward linkages from railway construction were insignificant to American manufacturing growth.[6] My results, on the other hand, indicate that these indirect benefits were of greater importance in Canada, especially in Quebec, particularly from 1900 to 1910. These results caution against generalizing from the American experience. Moreover, they are consistent with some studies on the European experience.[7] Ultimately, my study suggests that significant growth in one industry can play a critical role in a region's or country's growth process.

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Supporters of the discrimination thesis have provided little concrete evidence to support the view that Quebec was discriminated against by the dominion government. We know only that Quebec possessed consistently less railway mileage than Ontario from 1870 to 1910 (*see* Table 5). Also, Gaétan Gervais finds that total dominion government grants for railway construction to Ontario exceeded those going to Quebec over the 1867 to 1896 period.[8] The discrimination thesis implicitly assumes that if Quebec had received its "fair share" of dominion government aid, more track would have been laid in Quebec which, in turn, would have resulted in more economic growth. However, a careful examination of my estimates for government grants for railway construction and for the significance of railway-related industry suggests that this implicit assumption is incorrect.

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5. Robert William Fogel, *Railroads and American Economic Growth: Essay in Econometric History*, Baltimore, 1964; Albert Fishlow, *American Railroads and the Transformation of the Ante-Bellum Economy*, Cambridge, Mass., 1971.

6. Fogel, *ibid.*, pp. 145, 234, finds that the manufacturing value added purchased directly or indirectly by railroads amounted to no more than 3.94 percent in 1859. Fishlow, *ibid.*, pp. 143-145, 149, 156, 160-161, is less pessimistic as to the indirect contribution of railways to American manufacturing. But it is not clear to what extent Fishlow would adjust upward Fogel's estimate.

7. Though many studies on railroads in Europe suggest that backward linkages were relatively insignificant to the manufacturing sector of most European nations (*see* Patrick O'Brien, *The New Economic History of the Railways*, New York, 1977, pp. 59-70, for a summary of the literature and refer to Patrick O'Brien, ed., *Railways and the Economic Development of Western Europe, 1830-1914*, New York, 1983, for a selection of country studies), Rainer Fremdling, writing on Germany, and Michel Laffut, writing on Belgium, argue that the backward linkages from railways were important to Germany's and Belgium's industrial growth, pp. 125-127, 137, 209-212, though the significance of these linkages are never clearly specified. *See also* Rainer Fremdling, "Railroads and German Economic Growth: A Leading Sector Analysis with a Comparison to the United States and Great Britain", *Journal of Economic History*, 37, 1977, pp. 584-593, 601.

8. Gervais, "L'expansion du réseau", p. 46, finds that the dominion government spent $14,667,000 on railroad construction in Quebec and $29,889,000 in Ontario from 1867 to 1896. My estimates, using the 1897 end-year, are similar. I find that Quebec received $14,942,450, while Ontario attracted $29,759,707 (*see* Table 2).

**Table 1** **Government Grants for Railroad Construction in Quebec and Ontario by 1909 (current Canadian dollars)**

| | Quebec | Ontario |
|---|---|---|
| Total grants: | | |
| 1. Dominion government | $22,195,776[a] | $10,568,081 |
| 1a. Dominion government inclusive of grants for the Canadian Pacific main line[b] | | 36,691,792 |
| 2. Provincial government | 14,181,259 | 8,787,325 |
| 3. Municipal government | 983,291 | 9,815,257 |
| 4. Total | 37,360,326 | 29,170,663 |
| 4a. Total inclusive of 1a | | 55,294,374 |
| Total grants per mile of track:[c] | | |
| 1. Dominion government | 6,059 | 1,434 |
| 1a. Dominion government inclusive of grants and track of the Canadian Pacific main line[d] | | 4,978 |
| 2. Provincial government | 3,871 | 1,192 |
| 3. Municipal government | 268 | 1,332 |
| 4. Total | 10,198 | 3,958 |
| 4a. Total inclusive of 1a | | 7,502 |
| Total grants per capita:[e] | | |
| 1. Dominion government | 11.07 | 4.18 |
| 1a. Dominion government inclusive of grants for the Canadian Pacific main line | | 14.51 |
| 2. Provincial government | 7.07 | 3.48 |
| 3. Municipal government | 0.49 | 3.88 |
| 4. Total | 18.63 | 11.64 |
| 4a. Total inclusive of 1a | | 21.87 |

[a] The Dominion government subsidies include $5,160,053 given to the Quebec government, "Report of the Department of Railroads and Canals", 1910, p. 15.

[b] According to the "Report of the Department of Railways and Canals", 1910, p. 84, Canadian Pacific received $29,416,346 in subsidies for its main line. This grant pertains only to that portion of the line running from Callander, Ontario to Vancouver, British Columbia: 2,560.9 miles. Of this track, 953 miles are in Ontario, of which 653 miles are from Callander to Fort Williams (now Thunderbay). The remainder, leading to the Ontario-Manitoba border was constructed at government expense and turned over to the Canadian Pacific. This approximately 300-mile stretch of track was not covered by the above bonuses. In total, the 722 miles of the main line constructed at government expense was not covered by the bonuses (*see* Glazerbrook, *A History of Transportation*, p. 72). Ontario's share of the main line covered by bonuses is 35.5 percent (653 of 1,839 miles). Therefore, Ontario's share of Dominion bonuses for the main line amounted to $10,442,803. I estimate the value of the 300 miles of government-constructed track in Ontario to have been $15,680,908. This appears to be an upper-bound estimate which in turn biases my results in favour of the discrimination hypothesis (*see* Table 2, note b). Total government aid to Ontario for the construction of the Canadian Pacific main line was, therefore, $26,123,711.

[c] In 1909, Quebec possessed 3,663 miles of track compared to Ontario's 7,370 miles, exclusive of the Ontario section of the Canadian Pacific main line referred to in note a.

[d] Government subsidies are $26,123,711 and the mileage estimate used is 8,323.

[e] The population of Quebec in 1910 was 2,005,776 and in Ontario, 2,527,291.

*Notes*: The estimates for grants are deduced from data in the "Report of the Department of Railways and Canals", 1910. For details, refer to Morris Altman, "Railroads as an 'Engine' of Growth?", statistical appendix.

*Sources*: Morris Altman, "Railroads as an 'Engine' of Growth? in Canada and its Central Provinces, 1870-1910", working paper, Department of Economics, University of Ottawa, 1987; Canadian Pacific Railway, *Annual Report*

*of the Year and Report of Proceedings at the Tenth Annual Meeting of Shareholders*, Montreal, 1891; *Census of Canada, 1930-1931*, Ottawa, 1932, on population data; G.P. de T. Glazenbrook, *A History of Transportation in Canada: National Economy, 1867-1936*, vol. 2, Toronto, 1964; "Report of the Department of Railways and Canals", *Sessional Papers of the Parliament of Canada*, nº 10, Ottawa, 1900; "Report of the Department of Railways and Canals", *Sessional Papers of the Parliament of Canada*, nº 20b, Ottawa, 1910; Table 2, notes.

At first glance (Table 1), it appears that my estimates tend to corroborate the discrimination thesis. By 1909, it would appear that Quebec received substantially less dominion government aid than did Ontario: $22.2 million for Quebec compared to about $36.7 million for Ontario. But this is a statistical illusion. Over 70 percent of dominion government subsidies to Ontario were for a mere 11 percent of the total mileage of track in Ontario by 1909. This heavily subsidized stretch of track (953 miles in all) constituted the portion of the Canadian Pacific main line running from Callander, Ontario to the Ontario-Manitoba border, a region whose hinterland was consistently isolated, sparsely populated and unexploited territory from 1870 to 1910. The dominion government's purpose in seeing this section of the main line built was to link Ontario and Quebec to the western part of the Canadian Confederation. Thus, one might argue that aid to this line constituted aid, not only to Ontario, but also to Quebec, since both provinces stood to benefit from access to the Canadian west. This, then, serves as a legitimate basis for excluding all dominion government subsidies for this portion of the Canadian Pacific main line from the Ontario total.

In this case, Ontario's share of dominion government railway subsidies falls to only $10.6 million (Table 1). On a per mile of track basis, Dominion aid amounts to $6,059 to Quebec and $1,434 to Ontario, excluding the Canadian Pacific main line, but still only $4,978 to Ontario, if one includes it. On a per capita basis, dominion government subsidies come to $11.07 to Quebec and $4.18 to Ontario, if one excludes the Canadian Pacific track, and to $14.51, if one includes it. However, the most important measure of government aid is grants per mile of track. This is what generates the incentive for private enterprise to invest in the construction of railways. Thus, on a per line of track basis, no matter whether or not one excludes the Canadian Pacific main line, Quebec attracted more than its fair share of dominion government grant money. On a per capita criterion, Quebec did not fare as well (however, only marginally so), but only if one includes subsidies for the Canadian Pacific main line in the Ontario total (Table 1). This argument changes little when one examines total subsidies for railway construction by 1897, which is closer to Gervais' end-year (Table 2). However, when one compares the estimates for 1897 and 1909, it is evident that, in terms of Dominion aid, the increase of aid going to Quebec exceeded that going to Ontario.

With respect to provincial government grants, Quebec governments provided considerably more money for railway construction than their Ontario counterparts, irrespective of which measure one chooses. This is in sharp contrast to the considerable difference in municipal subsidies to railway construction between both provinces. Urban centres in Quebec spent only $268 per mile of track by 1909 as compared to the $1,332 spent in Ontario (Table 1). Provincial government subsidies in Quebec, however, more than compensated for the unwillingness or, more probably, the inability of Quebec municipalities to raise more grant money. When all government grants are taken together, grants per mile of track in Quebec are almost 40 percent more than in Ontario, even after one takes into account the Dominion funds granted for the Callander to Ontario-Manitoba segment of the Canadian Pacific main line. On a per capita basis, total government grants add up to $18.63 for Quebec and $21.87 for Ontario (Table 1).

**Table 2** **Government Grants for Railroad Construction in Quebec and Ontario by 1897 (current Canadian dollars)**

| | Quebec | Ontario |
|---|---|---|
| Total grants: | | |
| 1. Dominion government | $14,942,450[a] | $5,203,799 |
| 1a. Dominion government inclusive of grants for the Canadian Pacific main line[b] | | 29,759,707 |
| 2. Provincial government | 12,250,479 | 6,791,323 |
| 3. Municipal government | 506,074 | 9,433,349 |
| 4. Total | 27,699,003 | 21,428,471 |
| 4a. Total inclusive of 1a | | 45,984,379 |
| Total grants per mile of track:[c] | | |
| 1. Dominion government | 4,538 | 891 |
| 1a. Dominion government inclusive of grants and track of the Canadian Pacific main line[d] | | 4,297 |
| 2. Provincial government | 3,720 | 1,137 |
| 3. Municipal government | 154 | 1,579 |
| 4. Total | 8,412 | 3,607 |
| 4a. Total inclusive of 1a | | 7,013 |
| Total grants per capita:[e] | | |
| 1. Dominion government | 9.44 | 2.41 |
| 1a. Dominion government inclusive of grants for the Canadian Pacific main line | | 13.80 |
| 2. Provincial government | 7.74 | 3.15 |
| 3. Municipal government | 0.32 | 4.38 |
| 4. Total | 17.50 | 9.94 |
| 4a. Total inclusive of 1a | | 21.33 |

[a] *See* Table 1, note a.

[b] According to the "Report of the Department of Railways and Canals", 1898, the Canadian Pacific received $56,093,888 in subsidies. This includes the $31,093,888 of government-constructed track turned over to the Canadian Pacific plus $25,000,000 of grants. The former sum is lower than the $37,785,319 referred to as the cost of the government-built track by the "Report of the Department of Railways and Canals", 1910, p. 15. The higher total is also quoted by Fowke, *The National Policy*, p. 49, and by Easterbrook and Aitken, *Canadian Economic History*, p. 429. It appears that the lower sum excludes the cost of surveys. I use the higher figure for my estimates. Ontario's share of the government-constructed track amounted to 300 miles or 41.6 percent of the total (*see* Table 1, note a). The value of Ontario's share of government track was, therefore, $15,680,908. And, since Ontario's possessed 35.5 percent of the Canadian Pacific main line which was covered by federal government bonuses (*see* Table 1, note a), Ontario captured $8,875,000 of the $25,000,000 of bonuses. Total grants for the Canadian Pacific main line located in Ontario, therefore, amounted to $24,555,908.

[c] In 1897, Quebec possessed 3,293 miles of track and Ontario, 5,973 miles, exclusive of its share of the Canadian Pacific main line.

[d] Government subsidies are $29,759,707 and the mileage estimate used is 6,926 miles.

[e] No census data for the 1897 population are available. The population figures which I use, 1,582,740 and 2,155,242 for Quebec and Ontario respectively, are hypothetical and are derived using the interest rate formula and the census estimates for these provinces' populations in 1890 and 1900.

*Notes*: The estimates for grants are deduced from data in the "Report of the Department of Railways and Canals", 1898. For details, *refer* to Morris Altman, "Railroads as an 'Engine' of Growth?", statistical appendix.

*Sources*: W.T. Easterbrook and Hugh G.T. Aitken, *Canadian Economic History*, Toronto, 1956; V.C. Fowke, *The National Policy and the Wheat Economy*, Toronto, 1957; "Report of the Department of Railways and Canals", *Sessional Papers of the Parliament of Canada*, n° 8, Ottawa, 1898; Table 1, sources.

Clearly, in Quebec, much more grant money was required to realize a mile of railway. In other words, railway construction in Quebec was much more inelastic to state subsidies than in Ontario. This suggests that the absence of railway track in Quebec was not a product of dominion government discrimination, but rather of underlying problems in the Quebec economy, which made rail construction in this province relatively less profitable than in Ontario.[9] One cause for this might have been the relative poverty of the Quebec economy which, apart from Montreal, generated a smaller need for railways than the more prosperous Ontario economy.[10]

I estimate the indirect benefits from railway construction by measuring the growth of value added and employment in railway-related manufacturing industries relative to the growth of total manufacturing value added and employment. The railway-related industries include the census classifications of car repairs, car and car works, and railway supplies. This measure indicates the percentage of overall manufacturing growth which can be attributed to railway construction and the use and maintenance of the railways. But this measure excludes the purchases made by these industries in other sectors of the economy, such as in iron products, and is, therefore, very much of a lower-bound estimate of the indirect benefits of railways. My upper-bound estimate for such benefits is the growth of gross output in the railway-related industries relative to growth of the total manufacturing value added. Gross output incorporates inputs purchased from other industries by the railway-related industries. This latter estimate, however, includes imports and, thus, represents a biased measure of upper-bound benefits. I provide no upper-bound estimate for employment attributable to railway construction.[11] This upper-bound estimate still cannot do justice to the actual indirect benefits, which railways generated, since its focus is upon the manufacturing sector. Quebec, for example, gained considerably from the grain trade, much of which passed through the port of Montreal by way of Canada's transcontinental railway and feeder lines.[12]

Immediately, an objection may be raised by some experts that the methodology which I adopt to measure the indirect benefits of railways is incorrect. Those economic historians who use the general equilibrium-neoclassical theory framework to guide their analysis would argue that the indirect benefits of railways can only be measured by the extent to which the railway-related industries generated *more* value added and employment than other sectors. For it is assumed, by ahistorical definition, that had there been no railway-related manufacturing in Canada, other manufacturing activities would have taken its place. Therefore, the railway-related manufacturing activities which did take place only crowded

9. This is hinted at by Gervais, *ibid.*, p. 359. *See also* Young, *Promoters and Politicians*, pp. 7, 80, 113.

10. On the relative poverty of the Quebec economy, *see* Morris Altman, "Economic Development With High Wages: An Historical Perspective", *Explorations in Economics History*, 25, 1988, pp. 198-224.

11. Paul Craven and Tom Traves, "Canadian Railroads as Manufacturers, 1850-1880", *Canadian Historical Association, Historical Papers*, 1983, p. 264, argue that the Canadian census of 1870-1871 excludes railway company manufacturing activities from its aggregate tables "resulting in a grossly distorted picture of the scale and organization of the Canadian railway supply and heavy engineering industries." If this was indeed the case, my estimates of the relative growth of railway-related manufacturing activities might be exaggerated, while I would be underestimating the size of such output. However, the evidence presented by Craven and Traves, p. 266 (Table 3), does not indicate whether the omitted firms had their output classified under census classifications not identified by the authors. And this is a possibility which Craven and Traves admit to, p. 264, fn 17.

12. *See* Benoît Broillette, "Le port et les transports", Esdras Minville, ed., *Montréal économique*, Montréal, 1943, pp. 167-174, on the significance of railroads to Montreal.

out other potential manufacturing activities. It is assumed that full employment of all resources (human and nonhuman) is the rule, and that all potential savings are always invested, and that the potential level of savings is fixed. Therefore, the government-inspired railway boom could only affect the allocation of scarce and fixed economic resources as opposed to affecting an increase in such resources.[13]

However, such assumptions have little empirical bearing upon Canadian economy and, in particular, upon the economy of Quebec. Over 60,000 people left Quebec from 1870 to 1910 to other regions of Canada and to the United States.[14] Canada, as a whole, generated 471,000 emigrants from 1870 to 1900. Only from 1900 to 1910, during Canada's wheat boom, was Canada's net migration positive: 716,000 individuals.[15] Therefore, the supply of labour in Canada was *flexible* throughout the 1870-1910 period, responding to the ebb and flow of labour demand. Moreover, there is ample evidence that Canada was capable of attracting foreign capital (savings) when the need arose.[16] And, there is no evidence to suggest that Canadians were investing all or even most of their potential savings. For this reason, it is likely that the railway-related industries added to total production as opposed to crowding-out other economic activity. And, for this reason, my upper-bound estimates for the indirect contribution of railways to economic growth is unlikely to be an exaggerated measure.

My estimates indicate that, particularly from the 1880s onwards, Quebec's indirect benefits were considerable and substantially greater than Ontario's. From 1870 to 1880, between 3 and 9 percent of Quebec's increase in real manufacturing value added can be attributed to railway industries as compared to between 2 and 5 percent in Ontario (Table 3). Over the next decade, these industries accounted for between 12 to 24 percent of the growth of real manufacturing value added in Quebec and between only 0.6 to 0.7 percent in Ontario; and this was during the era of the construction of the Canadian Pacific's main line for which Ontario received so much Dominion grant money. From 1890 to 1910, Quebec's indirect benefits changed little from what they were in the 1880s, while Ontario's now ranged from 4 to 6 percent. With respect to employment growth, 6 percent of Quebec's and 5 percent of Ontario's manufacturing employment growth took place in the railway industries in the 1870s. In the 1880s, these industries generated 6 and 0.13 percent of these provinces' employment growth respectively. From 1890 to 1910, however, the railway industries contributed over 21 percent to Quebec's manufacturing employment growth but only 7 percent to Ontario's.[17]

One can see that growth in Quebec's manufacturing sector was very dependent upon those manufacturing activities most directly spawned by railway construction in Canada as a whole. And, in the 1890-1910 period, that period which encompassed Canada's wheat boom, Quebec's indirect benefits from railway construction were even more substantial,

13. *See* Carol E. Heim and Philip Mirowski, "Interest Rates and Crowding During Britain's Industrial Revolution", *Journal of Economic History*, 47, 1987, pp. 128-139, for a critique of the crowding-out approach to the analysis of economic growth.

14. Morris Altman, "Economic Development with High Wages", p. 28.

15. William L. Marr and Donald G. Paterson, *Canada: An Economic History*, Toronto, 1980, Table 6:7.

16. *See*, for example, Penelope Hartland, "Private Enterprise and International Capital", *Canadian Journal of Economics and Political Science*, 19, 1953, pp. 70-80.

17. These estimates are in terms of a 1913 base-year (*see* Table 6 for details). If a 1890 base-year is used, my findings would be similar; only now, railroads would be of even greater significance. This can be seen in Annex 1.

even though railway construction in Quebec was negligible in this era (Table 5). Ontario's indirect benefits were also of significance, but fade in comparison to Quebec's. Quebec, it would appear, received more than its share of indirect benefits. The railway-related industries were significantly larger in Quebec than in Ontario for all census years, except 1880, in spite of Quebec's consistently smaller population (Table 6).[18] One can only hazard to guess what Quebec's manufacturing growth would have been without a dynamic railway-related manufacturing sector. My results suggest that Quebec's manufacturing growth would have been even further behind Ontario's in 1910 than it already was.[19] This, of course, assumes that, particularly in Quebec, all resources were not fully employed or otherwise fixed in supply.

**Table 3** **Significance of the Growth in Railroad-Related Manufacturing Activities in the Growth of Total Manufacturing (for constant Canadian dollars, 1913 = 100)**

| Period | Value Added (Railroads)/ Value Added (Total Mfg.) | Gross Output (Railroads)/ Value Added (Total Mfg.) | No. of Employees (Railroads)/ No. of Employees (Total Mfg.) |
|---|---|---|---|
| A. Quebec | | | |
| 1870-1880 | 3.49% | 8.72% | 7.74% |
| 1880-1890 | 12.45 | 24.06 | 6.17 |
| 1890-1910 | 9.49 | 24.41 | 20.94 |
| B. Ontario | | | |
| 1870-1880 | 2.11 | 5.38 | 5.15 |
| 1880-1890 | 0.58 | 0.72 | 0.13 |
| 1890-1910 | 4.12 | 6.06 | 7.41 |
| C. Canada | | | |
| 1870-1880 | 2.17 | 6.89 | 4.58 |
| 1880-1890 | 5.84 | 11.53 | 1.79 |
| 1890-1910 | 7.39 | 24.81 | 16.16 |
| 1890-1900 | 1.14 | 18.06 | 13.21 |
| 1900-1910 | 7.71 | 16.95 | 16.95 |

*Sources*: These percentages are derived from the total real output and employment estimates for Quebec and Ontario in Morris Altman, "Economic Development with High Wages: An Historical Perspective", mimeo, Department of Economics, University of Ottawa, 1986, Tables 2 and 4. For the Canadian totals, I use Morris Altman, "A Revision of Canadian Economic Growth, 1870-1910: A Challenge to the Gradualist Interpretation", *Canadian Journal of Economics*, 20, 1987, Table 9. For the railroad-related manufacturing sector estimates, I construct output and employment estimates found in the appendix to this paper.

Table 4 illustrates the share of railway industries in total manufacturing output and employment. Their share is negligible, albeit rising, in both provinces, in 1870 and 1880. From 1880 to 1890, and again by 1910, the share of railway industries in Quebec's

18. The population in 1870, 1880, 1890, 1910 for Quebec is 1,191,516, 1,359,027, 1,488,535, 2,005,776 respectively, and for Ontario, 1,620,851, 1,926,922, 2,114,321, 2,527,291 respectively. *See*: *The Census of Canada, 1930-1931*, Ottawa, 1932, vol. 1, Table 17a.

19. With respect to the growth of manufacturing value added, Quebec grew at a rate of 2.22 percent annually in the 1870s, 3.22 percent in the 1880s, 3.58 percent from 1890 to 1910 as compared to growth rates of 3.04, 3.23, 3.70 and 3.42 percent respectively for Ontario. Quebec is even further behind Ontario with respect to the growth of per capita output. In terms of manufacturing employment growth, Quebec experienced annual growth rates of 2.61, 3.04, 1.65 and 2.24 percent in the 1870s, 1880s and the 1890-1910 period respectively, while Ontario employment grew by 3.16, 3.32 and 1.90 percent respectively. *See* Morris Altman, "Economic Development with High Wages" (Tables 3 and 5).

manufacturing output increases substantially. The same holds true for Ontario. By 1910, the percentage of total manufacturing output comprised of railway-related industries is between 7 and 10 percent in Quebec and between 2 and 4 percent in Ontario. The share of these industries in total manufacturing employment is 8 percent in Quebec and only 3 percent in Ontario. This static measure of indirect benefits from railway construction indicates a less dramatic, but nevertheless important, contribution to manufacturing output and employment.

**Table 4** **The Share of the Railroad-Related Manufacturing Sector in Total Manufacturing Activities (for constant Canadian dollars, 1913 = 100)**

| Year | Value Added (Railroads)/ Value Added (Total Mfg.) | Gross Output (Railroads)/ Value Added (Total Mfg.) | No. of Employees (Railroads)/ No. of Employees (Total Mfg.) |
|---|---|---|---|
| A. Quebec | | | |
| 1870 | 0.31% | 0.58% | 0.21% |
| 1880 | 0.94 | 2.18 | 1.76 |
| 1890 | 4.06 | 8.12 | 2.90 |
| 1910 | 6.80 | 16.53 | 7.95 |
| B. Ontario | | | |
| 1870 | 0.13 | 0.33 | 2.12 |
| 1880 | 0.64 | 1.64 | 1.53 |
| 1890 | 0.62 | 1.39 | 1.14 |
| 1910 | 2.43 | 3.80 | 3.11 |
| C. Canada | | | |
| 1870 | 0.16 | 0.44 | 0.20 |
| 1880 | 0.62 | 1.89 | 1.37 |
| 1890 | 1.78 | 4.04 | 1.49 |
| 1900 | 1.75 | 4.84 | 2.44 |
| 1910 | 4.87 | 11.19 | 5.81 |

*Sources*: *See* Table 3, sources.

**Table 5** **Mileage of Railroad Track**

| Year | Quebec | Ontario | Canada |
|---|---|---|---|
| 1867 | 523 | 1,275 | 2,087 |
| 1870 | | | 2,617 |
| 1880 | | | 7,194 |
| 1890 | | | 13,627 |
| 1894 | 3,024 | 6,267 | 15,627 |
| 1900 | 3,414 | 6,818 | 17,657 |
| 1909 | 3,663 | 8,229 | 24,104 |

*Sources*: Department of Agriculture, *The Statistical Yearbook of Canada for 1894*, Ottawa, 1895, p. 679; *The Statistical Yearbook of Canada for 1900, Ottawa, 1901, p. 354; The Statistical Yearbook of Canada for 1910*, Ottawa, 1911, pp. 361, 362.

**Table 6** **Real Output Estimates and Employment Estimates for Railroad-Related Manufacturing Activities (thousands of Canadian dollars, 1913 = 100)**

| Year | Value Added | | Gross Output | Number of Employees |
|---|---|---|---|---|
| A. Quebec | | | | |
| 1870 | $147 | ($119)[a] | $276 | 138 |
| 1880 | 554 | ($442) | 1,292 | 1,439 |
| 1890 | 3,300 | ($2,854) | 6,598 | 3,200 |
| 1910 | 11,167 | ($9,391) | 26,842 | 12,164 |
| B. Ontario | | | | |
| 1870 | 95 | ($77) | 247 | 179 |
| 1880 | 642 | ($512) | 1,645 | 1,761 |
| 1890 | 860 | ($744) | 1,915 | 1,819 |
| 1910 | 6,935 | ($5,832) | 10,836 | 7,229 |
| C. Canada | | | | |
| 1870 | 216 | | 569 | 368 |
| 1880 | 1,035 | | 3,170 | 3,391 |
| 1890 | 3,853 | | 8,728 | 5,265 |
| 1900 | 4,002 | | 11,083 | 9,363 |
| 1910 | 23,504 | | 53,971 | 29,075 |

[a] The bracketed-term is the value added estimate which incorporates M.C. Urquhart's estimates of the value of miscellaneous expenses for all of Canada. This reduces my original value added estimates by 19.0, 20.2, 13.5 and 15.9 percent for each of the above census years respectively.

*Notes*: These estimates are derived from the censuses of Canada and the Dominion Bureau of Statistics' *Standard Industrial Classification Manual*. The current dollar gross output and value added estimates yielded by the censuses (not shown here) are converted into constant dollar values using deflator for iron and its products provided by the Dominion Bureau of Statistics, found in *Historical Statistics of Canada*. No deflator for railroad-related manufacturing activity with respect to inputs or outputs are presently available. The current dollar gross output estimates are derived by summing the census figures for the gross output in railroad-related industries such as rolling stock, railway supplies, car repairs, car and car works, and spike and axle factories. To generate current dollar value added estimates, I deduct, from the gross output estimates, the census figures for the cost of raw materials, fuel and heating. For the Canadian estimates, I also deduct the value of miscellaneous expenses using M.C. Urquhart's estimates for the transportation sector, drawn from his worksheets, which he so kindly made available to me. This makes my railroad-related output estimates compatible with my total output estimates for Canada. No estimates on miscellaneous expenses are available for Quebec and Ontario. Thus, my value added estimates for these provinces and Canada are not compatible. To be made so requires that the provincial value added estimates be reduced by about 18 percent using the Canadian estimates for miscellaneous expenses. These tentative estimates are presented in brackets above. Changing my provincial value added estimates would not alter the results presented in Table 2. In Table 3, however, the results in column 2 are less than they would have been if the value added esimates were reduced by 18 percent.

*Sources*: *Census of Canada, 1870-1871*, vol. 3, Ottawa, 1875; *Census of Canada, 1880-1881*, vol. 3, Ottawa, 1883; *Census of Canada, 1890-1891*, vol. 3, Ottawa, 1894; *Census of Canada, 1900-1901*, vol. 3, 1902; *Census of Canada, 1911*, vol. 3, Ottawa, 1913; Dominion Bureau of Statistics, *Standard Industrial Classification Manual*, Ottawa, 1948; M.C. Urquhart and K.A.H. Buckley, eds., *Historical Statistics of Canada*, Toronto, 1965; M.C. Urquhart, "Worksheets: Manufacturing Summary Charts", mimeo, Department of Economics, Queen's University, Kingston, Ontario, 1986.

The results for Canada as a whole are largely a reflection of what transpired in the two most populated provinces of the Dominion. In the 1870s, the railway industries' share in the growth of manufacturing output ranged between 2 and 7 percent, rising to between 6 and 11 percent in the 1880s (Table 3). This share increased to between 7 and 25 percent in the 1890-1910 period. With respect to the growth of manufacturing employment, the railway industries contributed 4.5 percent in the 1870s, only 2 percent in the 1880s, but over 16 percent from 1890 to 1910. The share of these industries in total manufacturing

output and employment is less significant, but still, of some moment by 1910, comprising between 5 and 11 percent of the manufacturing value added, and about 6 percent of manufacturing employment (Table 4). And although the contribution of railways to Canadian manufacturing was never overwhelming, it was definitely more important than in the United States.[20] Growth in Canadian manufacturing might have been severely constrained had the railway industries not existed.

In conclusion, not only was Quebec not discriminated against by the dominion government with respect to its share of direct and indirect benefits emanating from railway construction, but it gained significantly from railway construction, both in absolute terms and in comparison to Ontario. Quebec's serious shortfall in the supply of railway mileage relative to Ontario should in no way detract from these benefits. Rather, this shortfall should direct further attention to the structural problems in the Quebec economy that precluded the construction of more rail by private enterprise or by any group hoping for profits as a result of its investment. Ontario's and indeed all of Canada's gains from railway construction were of importance. But railway construction made its greatest contribution to Quebec which, when compared to Ontario, was a relatively backward economic entity.[21] Perhaps it is in relatively backward economies that a large investment project, such as Canada's railway construction boom of the late nineteenth and early twentieth centuries, can have its greatest impact through its backward and forward linkages in a region's economy. If, however, relatively backward regions are to benefit from a large investment project, like Quebec, they would have to be the heart of such an investment project, writ large, and possess economies capable of responding to the incentives generated by such an investment.

20. Recall that Fogel, *Railroads and American Economic Growth*, pp. 145, 234, finds that the manufacturing value added purchased directly or indirectly by railroads amounted to no more than 3.94 percent in 1859.

21. However, John H. Coatsworth, "Indispensable Railroads in a Backward Economy: The Case of Mexico", *Journal of Economic History*, 39, 1979, pp. 955-966, provides us with an example of a relatively backward economy which was unable to capture much of its railroads' backward linkages which, instead, added to the demand for foreign-produced railway components. For a variety of reasons, Mexico was unable to undergo a process of import substitution. Quebec, on the other hand, was able to develop a manufacturing sector to service Canada's railroads. And this sector was one engine driving Quebec's manufacturing growth. *See* Morris Altman, "Economic Development with High Wages", on the extent of Quebec's *relative* economic backwardness.

**Annex 1**

**Constant Dollar Railroad Industry Output, 1890 = 100**
**(in thousands of Canadian dollars)**

| | Quebec | | | Ontario | | | Canada | | |
|---|---|---|---|---|---|---|---|---|---|
| | Gross | Value Added | | Gross | Value Added | | Gross | Value Added | |
| 1870 | $312 | $146 | ($173) | $279 | $107 | ($87) | $640 | $302 | ($244) |
| 1880 | 1,459 | 626 | (499) | 1,858 | 726 | (579) | 3,580 | 1,464 | (1,169) |
| 1890 | 7,337 | 3,726 | (3,223) | 2,162 | 978 | (848) | 9,854 | 5,026 | (4,350) |
| 1910 | 30,298 | 12,605 | (10,601) | 12,231 | 7,827 | (6,583) | 60,920 | 31,526 | (26,530) |

**Constant Dollar Total Manufacturing Output, 1890 = 100**
**(in thousands of Canadian dollars)**

| | Quebec | | Ontario | | Canada | |
|---|---|---|---|---|---|---|
| | Gross | Value Added | Gross | Value Added | Gross | Value Added |
| 1870 | $75,000 | $33,628 | $114,299 | $53,562 | $227,082 | $93,381 |
| 1880 | 100,930 | 41,793 | 160,855 | 71,590 | 313,638 | 119,526 |
| 1890 | 145,094 | 60,872 | 231,415 | 103,495 | 453,000 | 171,782 |
| 1910 | 182,422 | 137,333 | 529,334 | 243,880 | 1,067,674 | 429,890 |

**Significance of the Growth of Railroad Industries to Total Manufacturing Output**

| | Quebec | | Ontario | |
|---|---|---|---|---|
| | (Value Added Railroads)/ (Value Added Total Mfg.) | (Gross Output Railroads)/ (Value Added Total Mfg.) | (Value Added Railroads)/ (Value Added Total Mfg.) | (Gross Output Railroads)/ (Value Added Total Mfg.) |
| 1870-1880 | 5.88% | 14.05% | 3.43% | 8.76% |
| 1880-1890 | 16.25 | 30.81 | 0.79 | 0.95 |
| 1890-1910 | 11.61 | 30.03 | 4.88 | 7.17 |

| | Canada | |
|---|---|---|
| | (Value Added Railroads)/ (Value Added Total Mfg.) | (Gross Output Railroads)/ (Value Added Total Mfg.) |
| 1870-1880 | 4.44% | 11.24% |
| 1880-1890 | 6.82 | 121.01 |
| 1890-1910 | 10.27 | 19.78 |

*Notes and Sources*: The construction of the constant dollar estimates for the railroad-related manufacturing activity follows the procedure elaborated in Table 6. Only here, the deflator is to a base-year of 1890. The constant dollar estimates for total manufacturing activity are derived by deflating current dollar output estimates for Quebec and Ontario found in Morris Altman, "Economic Development with High Wages: An Historical Perspective", *Explorations in Economic History*, 25, 1988, with price index numbers to a base-year of 1890 found in Morris Altman, "A Revision of Canadian Economic Growth, 1870-1910: A Challenge to the Gradualist Interpretation", *Canadian Journal of Economics*, 20, 1987. This article also provides 1890 dollar estimates for Canadian manufacturing output.

## Colloque « Maladie, médecine et sociétés »

L'Association française Histoire au Présent tiendra son VI[e] colloque à Paris en mai 1990 sous le thème « Maladie, médecine et sociétés ». Quatre sujets principaux seront abordés :

1) Le champ et l'approche de l'Histoire des maladies :
   - les sources
   - les méthodes utilisées
   - l'histoire des maladies

2) Les maladies dans le cadre des différentes sociétés :
   - la présence et l'évolution des différentes pathologies
   - les maladies et l'environnement
   - les seuils de reconnaissance des différentes pathologies

3) Les perceptions et les interprétations des maladies :
   - la maladie vécue par le malade et son entourage
   - les représentations du monde et la maladie
   - le discours des soignants

4) Les réponses du corps social :
   - les initiatives des pouvoirs
   - les fonctionnements
   - les types de soins
   - le poids des maladies sur les sociétés

Le programme définitif du colloque sera arrêté à la fin de l'année 1989. Les historiens intéressés à y participer doivent faire parvenir le titre et un court résumé de leur projet de communication à l'adresse suivante :

Histoire au Présent
Colloque « Maladie, médecine et sociétés »
24, rue des Écoles
75005 Paris
France

On peut obtenir une description plus détaillée du colloque en écrivant à Monsieur François-Olivier Touati à l'adresse ci-haut mentionnée ou à :

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