

## THE CANADIAN MANUFACTURING SECTOR, 2002-2008: WHY IS IT CALLED DUTCH DISEASE?

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### SUMMARY

High-profile complaints about so-called Dutch disease have led many to question if industry in some parts of the country is suffering due to the success of the natural resources sector in others. This paper considers changes in manufacturing employment from 2002- 2008, a time of increased commodity prices. At first glance, the figures appear alarming – Canada shed 328,000 manufacturing jobs during that period – but the decline wasn't entirely commodity-driven. Canada is the sole G-7 country in which manufacturing is on par with what it was 40 years ago; manufacturing employment rose in the decade prior to the decline thanks to government austerity, which spurred monetary easing, making industry more export-competitive. Much of the contraction from 2002-2008 was a natural reaction to this unsustainable situation. Higher commodity prices in the same period actually had a benign – if not positive – effect on Canada's manufacturing industry, notwithstanding the fall in employment. The manufacturing jobs that were lost were typically low paying, and were offset by the creation of better-paying employment in other sectors. The available data on gross employment flows suggest that the disruptions associated with the shift of employment out of manufacturing were surprisingly small. The reduction in employment was largely achieved through attrition; layoff rates held steady while hiring rates fell. Moreover, the data are not consistent with fears that the manufacturing sector was hollowed out. Research and development activities held steady and investment in new technology continued to grow, leaving the manufacturing sector healthier in 2008 than it was in 2002.

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<sup>†</sup> The author wishes to acknowledge the helpful comments of the anonymous referees.

## LE SECTEUR MANUFACTURIER CANADIEN DE 2002 À 2008: LE MAL HOLLANDAIS?

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### RÉSUMÉ

La grogne largement médiatisée sur ce qu'on a appelé le mal hollandais a conduit bien des gens à se demander si l'industrie, dans certaines régions du pays, ne faisait pas les frais de la réussite du secteur des ressources naturelles dans d'autres régions. Cet article porte sur les mutations dans la situation de l'emploi du secteur manufacturier entre 2002 et 2008, au moment où les prix des produits de base étaient à la hausse. À première vue, les chiffres semblent alarmants - le Canada a perdu 328 000 emplois dans ce secteur au cours de cette période, mais le déclin n'était pas entièrement attribuable aux prix des produits de base. Le Canada est le seul pays du G7 où le secteur manufacturier est dans un état comparable à ce qu'il était 40 ans auparavant; le nombre des emplois a augmenté au cours de la décennie qui a précédé le déclin en raison de l'austérité gouvernementale qui a contribué à l'assouplissement de la politique monétaire et permis à l'industrie d'être plus compétitive sur le plan des exportations. Dans une large part, le ralentissement entre 2002 et 2008 résultait naturellement de cette situation intenable. En fait, le prix à la hausse des produits de base durant la même période a eu très peu d'effet - sinon un effet positif - sur l'industrie manufacturière du Canada, malgré la perte d'emplois mal payés qui ont été remplacés par des emplois mieux rémunérés dans d'autres secteurs. Les données disponibles sur les taux bruts d'emploi indiquent que les perturbations liées à la baisse des emplois dans le secteur de la fabrication ont été étonnamment faibles. C'est l'usure des effectifs qui est en grande partie responsable de cette baisse tandis que les taux de licenciements demeuraient stables et que l'embauche chutait. De plus, les données semblent infirmer les craintes selon lesquelles le secteur manufacturier aurait été éviscéré. Les activités de recherche et de développement sont demeurées stables et l'investissement dans les nouvelles technologies a continué de croître, si bien que le secteur manufacturier se portait mieux en 2008 qu'en 2002.

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<sup>†</sup> L'auteur tient à exprimer sa reconnaissance envers des lecteurs qui désirent conserver l'anonymat, pour leurs commentaires utiles.

## WAS DUTCH DISEASE A BLESSING?

A popular description of Dutch disease takes the following form: when the prices of resources increase, the exchange rates of resource-exporting countries appreciate. This increase in the exchange rate makes other exports less competitive on world markets, and results in a loss of output and employment in these sectors — notably manufacturing.<sup>1</sup> The surge in the prices of oil and commodities that began in 2002 has led to a significant restructuring of the Canadian economy, and one of the most widely discussed elements of this transformation is the shrinking of the Canadian manufacturing sector. Between 2002 and 2008, manufacturing employment fell by 328,000, from 2.29 million (15 per cent of total employment) to 1.96 million (11.5 per cent of all jobs).

These losses are, on the face of it, cause for concern. Firstly, the dislocations incurred during the transition away from manufacturing are costly in themselves. And even if employment in other sectors increases, those gains may not be enough to offset the jobs lost in manufacturing — and wages in the manufacturing sector are typically higher than those in the rest of the economy. In the longer term, there is the risk that the manufacturing sector will be hollowed out and unable to expand again if — as has always been the case in the past — commodity prices fall.

This article argues that these concerns are, for the most part, overstated and not consistent with the evidence. The transition of employment out of manufacturing was largely achieved by attrition, and job creation in other sectors more than offset those losses. The shift out of manufacturing was also accompanied by an increase in real wages, both in the economy as a whole and in the manufacturing sector; the jobs that were lost were generally low paying. The Canadian manufacturing sector of 2008 employed fewer workers than in 2002, but it paid higher wages, and the stock of hi-tech machinery and equipment available to those workers had increased. Moreover, manufacturing employment in research and development increased during this time. The term Dutch disease is a misnomer; the Canadian manufacturing sector was arguably healthier in 2008 than it was in 2002.

## THE MECHANICS OF DUTCH DISEASE

The Dutch disease story is essentially one of how the economy adjusts to an increase in the foreign demand for the output of one sector. Suppose for simplicity that there are only two sectors: resources and manufacturing. An increase in the demand for Canadian resource exports increases the demand for labour and hence wages in that sector; these higher wages attract workers from the manufacturing sector. This reduction in the supply of manufacturing workers produces upward pressures on wages, even as the increased labour supply brings wages down in the resources sector. This transfer of workers from manufacturing to the resource sector will continue as long as there are higher wages to be had in the resource sector, and will stop when wages in the two sectors are equalized.

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<sup>1</sup> The effects of the exchange rate appreciation on the manufacturing sector are not uniformly negative. The stronger Canadian dollar made it easier for manufacturing firms to increase purchases of imported capital equipment, as noted in a later section.

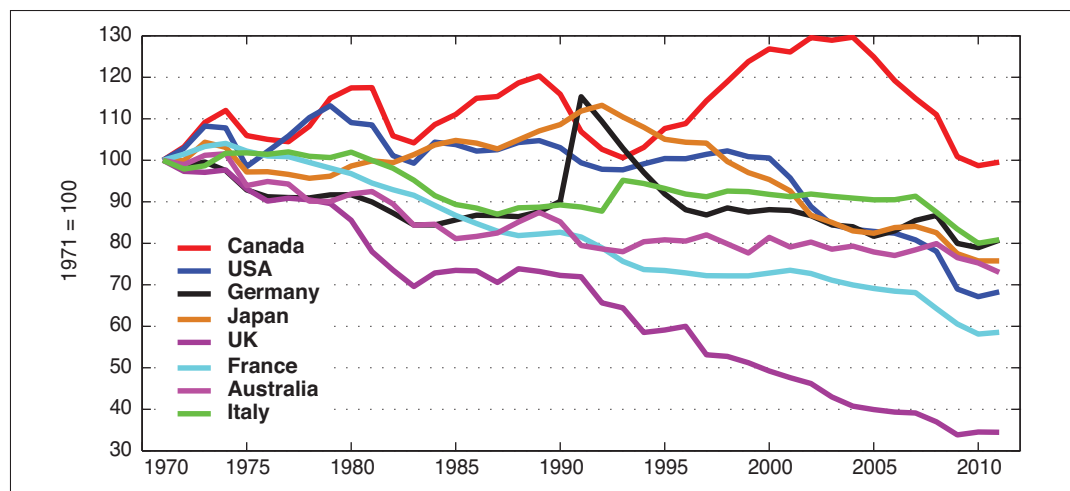
Descriptions of Dutch disease often focus attention on the role of nominal exchange rates, but the exchange rate is part of the transmission mechanism, not the underlying cause of the sectoral shift. Higher foreign demand for Canadian resource exports will lead to an increase in the real exchange rate, either by an increase in the nominal exchange rate or by an increase in the price level. This real appreciation is part of the market signal to shift productive resources out of the manufacturing sector. Under a flexible exchange rate, manufacturing exporters become less competitive as the value of the currency appreciates. Under a fixed exchange rate, the increased inflow of capital produces inflationary pressures and manufacturing exporters become less competitive as their costs increase.

A fixed exchange rate would not prevent Dutch disease; monetary policy doesn't affect the relative price changes that drive sectoral shifts. Canada has had a long experience with commodity price cycles. The difficulties in maintaining a fixed exchange rate in the face of sharp changes in resource prices led the Bank of Canada to abandon the Bretton Woods system of fixed exchange rates in the 1950s.<sup>2</sup> Exchange rate appreciations also affect resource exporters, so flexible exchange rates play a key role in moderating the effects of a surge in commodity prices.

## INTERNATIONAL AND HISTORICAL CONTEXT

The reduction in Canadian manufacturing employment between 2002 and 2008 was not an event unique to Canada, or to the period 2002-2008. Manufacturing employment in industrialized countries has been falling for decades (Figure 1), and this trend predates the arrival of Chinese manufacturers on world markets. Indeed, Canada is the only G-7 country in which manufacturing employment is on a par with what it was 40 years ago. From an international perspective, the question isn't so much, why has Canadian manufacturing employment fallen? It is why has Canadian manufacturing employment resisted the global downward trend?

FIGURE 1: MANUFACTURING EMPLOYMENT



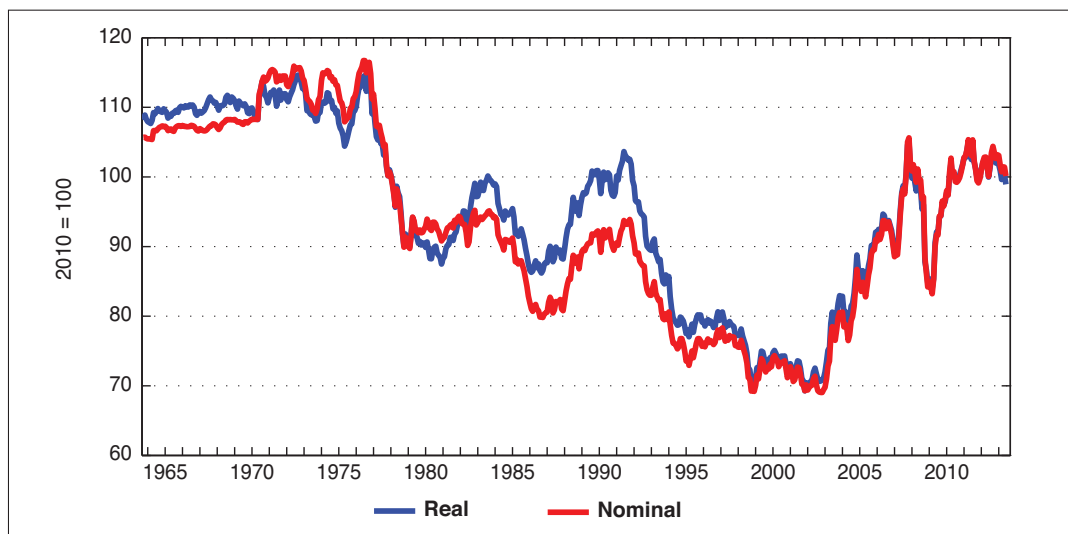
Data source: FRED database, Federal Reserve Bank of St Louis

<sup>2</sup> For a review of this episode, see Schembri, Lawrence (2008). "Canada's experience with a flexible exchange rate in the 1950s: Valuable lessons learned," *Bank of Canada Review*, Spring 2008: 3-15.

The post-2002 decline should also be put in context with the increase in manufacturing employment over the preceding 10 years. Part of the increase immediately after 1992 can be attributed to the recovery from the 1990-92 recession, but the sustained growth in Canadian manufacturing employment through the rest of the decade was a phenomenon unmatched in other industrialized countries.

The deficit-cutting efforts on the parts of both the federal and provincial governments in the latter half of the 1990s induced a significant fiscal policy contraction, and the Bank of Canada compensated by relaxing monetary policy. In the two years following the federal governments's 1995 austerity budget, the Bank of Canada reduced its policy rate by more than five percentage points, and this monetary easing contributed to the continuing depreciation of the Canadian dollar, which reached a historical low in 2002 (Figure 2). This depreciation made Canadian exporters more competitive on world markets, and particularly manufacturing exporters; commodity exporters faced weak prices in the latter part of the 1990s. (Weak commodity prices were of course another important contributor to the 1990s depreciation.)

**FIGURE 2: CANADIAN EFFECTIVE EXCHANGE RATE**



*Data source: Bank of International Settlements*

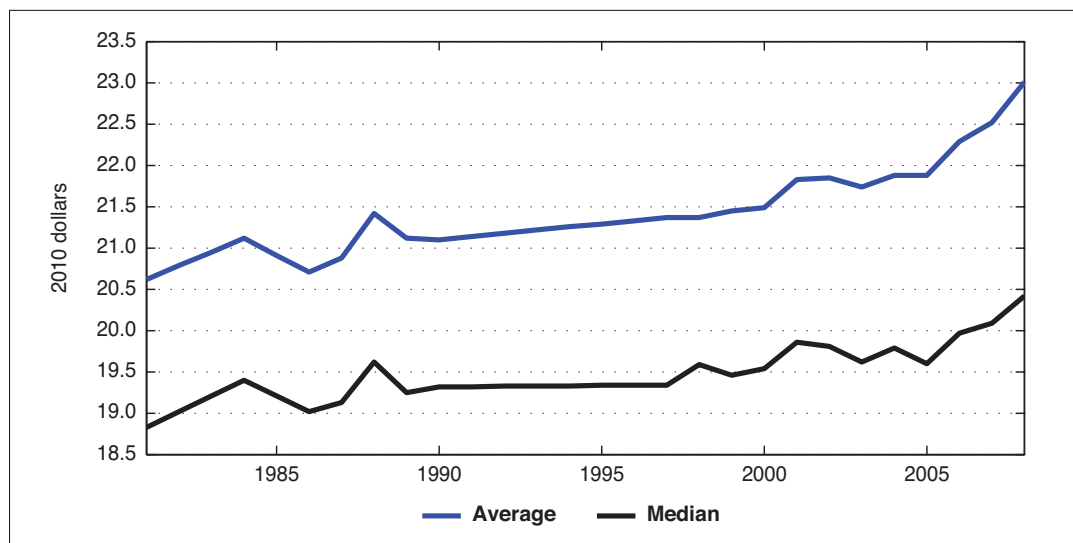
The grandfather fallacy is the tendency to look only at the change from a given starting point, and not the starting point itself. The global trend toward reduced employment in manufacturing had been reversed in Canada by a combination of the Bank of Canada's attempt to offset a fiscal contraction and by record-low commodity prices. Both were transitory events. Government spending resumed its usual pace once deficits were under control, and commodity prices would eventually stop falling. So before examining the Dutch disease episode of 2002-2008, it is important to note that the situation that prevailed in 2002 was in many ways exceptional and unsustainable.

## WAGES AND THE SHIFT OUT OF MANUFACTURING

Employment dominates the debate about Dutch disease, but wages are the driving factor behind the shifts in employment out of the manufacturing sector. As noted earlier, the sectoral shifts model predicts that the reduction in employment in manufacturing is caused by workers leaving that sector and taking higher-paying work in the expanding sectors.

Real wage growth was anemic through the 1990s (Figure 3), and the loss in purchasing power induced by the 20 per cent depreciation in the value of the Canadian dollar during the decade was a contributing factor. The only period of significant wage growth over the past 30 years was during the shift out of manufacturing. This seems paradoxical; how can job losses in a high-wage sector result in an increase in the national average? The explanation is that the lost manufacturing jobs were, for the most part, lower-paying jobs.

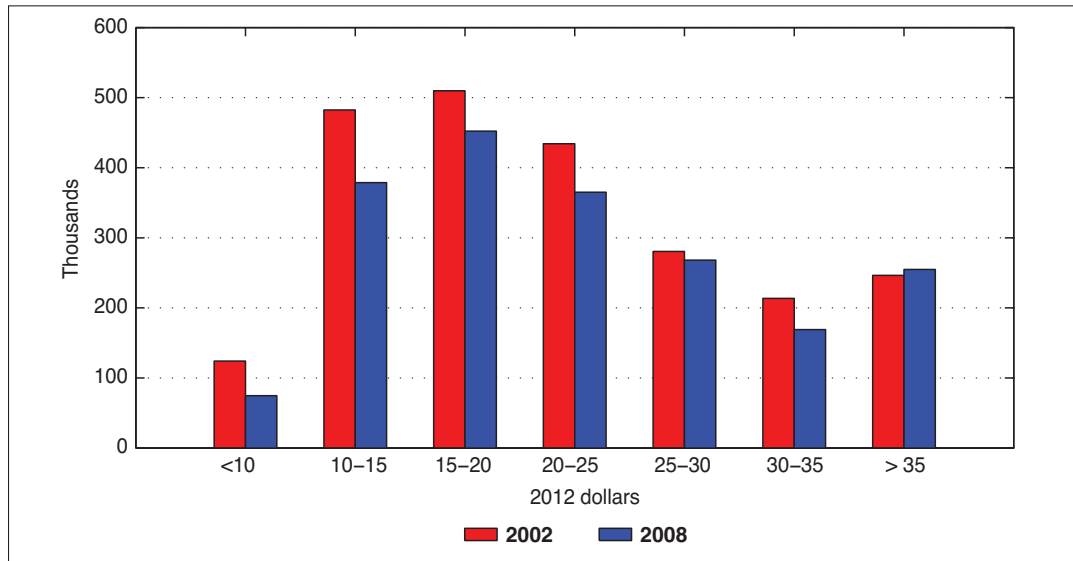
**FIGURE 3: REAL HOURLY WAGES OF FULL-TIME WORKERS AGED 17 TO 64**



Source: Morissette et al, (2012)

Figure 4 graphs the distribution for hourly wages in 2002 and 2008, expressed in 2012 dollars. The lost manufacturing jobs were generally concentrated where wages are lowest. The number of jobs paying \$35/hour or more was largely unchanged between 2002 and 2008. More than 60 per cent of the manufacturing jobs lost paid less than \$19.05/hour — the median wage in 2002. So even though average and median wages in the manufacturing sector were and remained higher than in the economy as a whole, the reduction in manufacturing employment contributed to general increases in wages in the economy as a whole.

**FIGURE 4: DISTRIBUTION OF REAL HOURLY EARNINGS: MANUFACTURING**



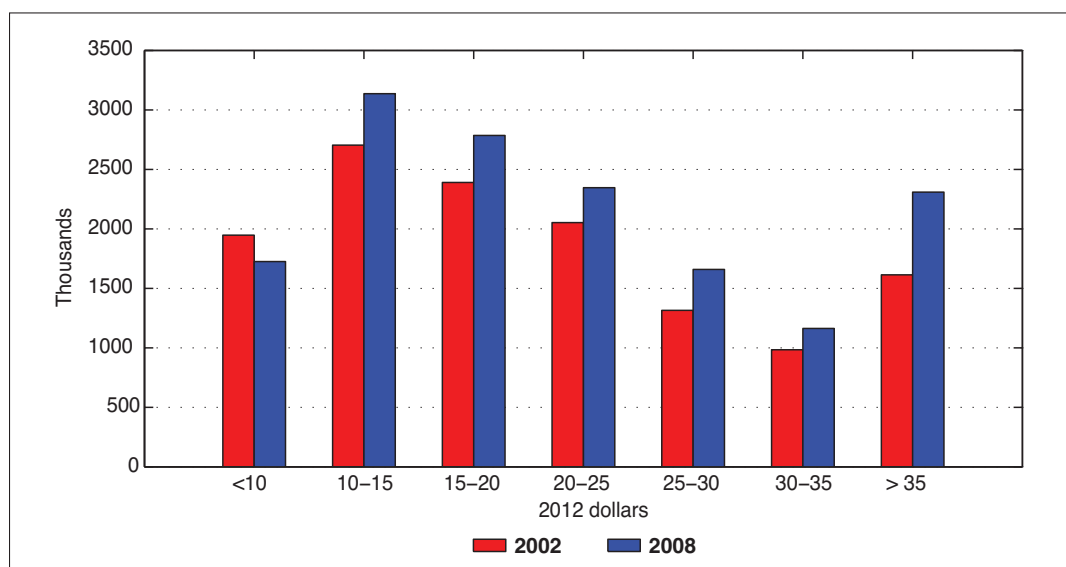
The lost manufacturing jobs were typically those that paid low wages, as the sectoral shift model would predict. The net result of these employment shifts was a generalised acceleration in the rate of growth of real wages. Real median hourly wages in the manufacturing sector grew at an average rate of 0.27 per cent a year between 1981 and 2002,<sup>3</sup> and this growth rate doubled to 0.54 per cent a year between 2002 and 2008.

The sectoral shift model also predicts that the new jobs created in the expanding sector will be better paying than those lost in the declining sector. Figure 5 reproduces the exercise performed in Figure 4 for the non-manufacturing sector<sup>4</sup> and illustrates several important differences compared to the changes observed in manufacturing. The first is — perhaps not surprisingly — that employment in the non-manufacturing sector increased between 2002 and 2008. These new jobs were, for the most part, relatively well-paid; 75 per cent of the jobs behind the net increase in non-manufacturing employment paid more than the 2002 median wage.

<sup>3</sup> Calculated using the data provided by Morissette, René, Garnett Picot and Yuqian Lu (2012). “Wage growth over the past 30 years: Changing wages by age and education,” *Economic Insights* (8), June 2012, Statistics Canada, and the LFS data after 1998.

<sup>4</sup> The resource sector was not the only industry to benefit from the increase in commodity process: associated industries such as construction, transportation and related services would have also benefited.

**FIGURE 5: DISTRIBUTION OF REAL HOURLY EARNINGS: NON-MANUFACTURING**



**TABLE 1: CHANGES IN EMPLOYMENT BY SECTOR, 2002-2008 (THOUSANDS OF WORKERS)**

Hourly wage (2012 dollars)	Manufacturing	Non-manufacturing	Total
0-10	-49.4	-222.2	-262.2
10-15	-103.7	432.5	324.6
15-20	-57.6	394.7	337.0
20-25	-69.2	293.3	222.3
25-30	-12.3	344.4	332.4
30-35	-44.6	179.7	132.2
35-	8.4	695.4	703.1
Total	-328.3	2 117.8	1 789.5

Another concern of the Dutch disease story is that the number of lost manufacturing jobs may not be completely replaced by gains in other sectors, even if the wages offered by the expanding sectors are higher. These fears do not seem to be consistent with recent Canadian experience — total employment grew faster than the working-age population. The employment rate<sup>5</sup> increased from 61.7 per cent in 2002 to 63.5 per cent in 2008 — the highest level ever observed in Canada.

The net result of the shift of jobs out of the manufacturing sector on wages was largely positive: mainly low-paying jobs were lost, and these losses were more than offset by mainly higher-paying jobs in other sectors.

## THE DYNAMICS OF THE EMPLOYMENT TRANSFERS

Transitions of any kind involve some level of disruption, but the sectoral-shifts model predicts that job losses in the manufacturing sector should be relatively pain-free. Instead of layoffs, the reduction in manufacturing employment would be brought about by workers leaving the sector

<sup>5</sup> The employment rate is the share of working-age people who are in employment.



in search of higher wages elsewhere. This section focuses on the mechanics of the decline in manufacturing employment. Did workers jump, or were they pushed?

The relationship between net and gross employment flows is determined by the following identity:

$$\text{Change in employment} = \text{hires} - \text{layoffs} - \text{quits}$$

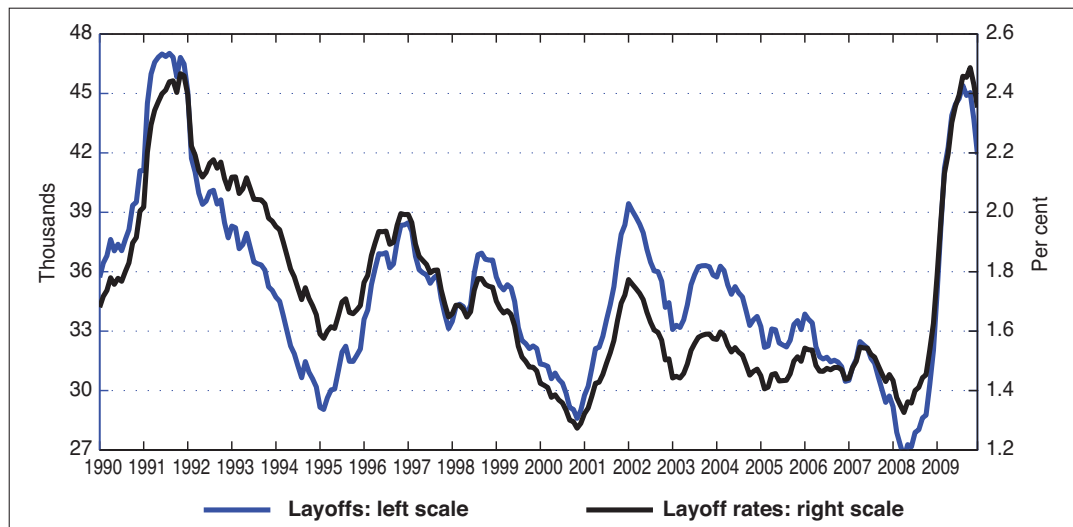
There are no comprehensive Canadian data for gross employment flows,<sup>6</sup> but Tapp notes that the Public Use Microdata Files of the *Labour Force Survey* are nonetheless a rich source of information about the labour force transitions relevant for the matter at hand.<sup>7</sup>

- **Layoffs:** The number of people in a given month who are unemployed, who report unemployment durations of four weeks or less and who report being laid off as the reason why they are unemployed.
- **Job leavers:** The number of people in a given month who are unemployed, who report unemployment durations of four weeks or less and who left their previous employment of their own accord.
- **Hires:** The number of people in a given month who are in employment and who report job tenures of one month.

The monthly numbers display significant seasonal patterns, so the discussion here is based on the 12-month moving averages.

The scale of the gross flows in and out of employment is an order of magnitude greater than the net flows that are the focus of most analyses. The net loss of 328,000 manufacturing jobs between 2002 and 2008 should be put in the context of a labour market in which more than 30,000 manufacturing workers report being laid off in an average month (Figure 6).

**FIGURE 6: MANUFACTURING SECTOR LAYOFFS**



Data source: Labour Force Survey, Public Use Microdata Files

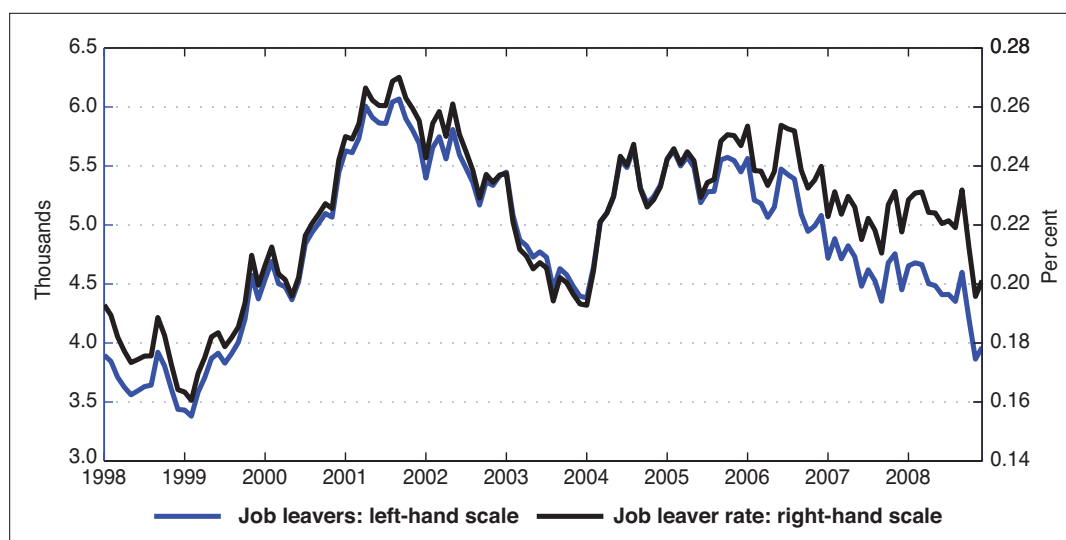
<sup>6</sup> The data used here cannot identify transitions from one job to another, or transitions between being in employment and being out of the labour force.

<sup>7</sup> Stephen Tapp, 2011. "Lost in transition: the costs and consequences of sectoral labour adjustment," Canadian Journal of Economics, Canadian Economics Association, vol. 44(4), pages 1264-1296, November.

Layoffs in manufacturing are volatile and closely related to the business cycle; not surprisingly, layoffs increased sharply during the recessions of 1990-92 and 2008-09. But the Dutch disease period does not appear to be characterised by a noticeably large surge in layoffs. Layoff rates during 2002-2008 were generally lower than those recorded when manufacturing employment was increasing during the latter half of the 1990s. This pattern is consistent with the sectoral shifts story. If the reduction in manufacturing had been due to a reduction in the demand for labour, we would have expected to see an increase in layoffs and layoff rates as in 1990-92 and 2008-09.<sup>8</sup>

While job leavers are too few<sup>9</sup> to have a significant effect on changes in employment, they are a useful indicator of the (perceived) strength of the job market. When labour demand is strong, workers who are unhappy with their current employment are more likely to quit in the expectation of finding a better job. But if jobs are scarce, workers will be more reluctant to leave the security of the job they have. Job-leaving patterns are also closely related to the business cycle (Figure 7); job-leaving rates decline sharply during recessions. If job-leaving rates are a measure of workers' confidence in their ability to find a better job than the one they currently hold, then the Dutch disease period was one in which manufacturing workers generally had more faith in the labour market than they did in the 1990s, when manufacturing employment was increasing.

**FIGURE 7: MANUFACTURING SECTOR JOB LEAVERS**



*Data source: Labour Force Survey, Public Use Microdata Files*

<sup>8</sup> Even if layoff rates declined for manufacturing workers as a whole, it still might have been the case that the most vulnerable workers were more likely to lose their jobs. A breakdown of layoff patterns suggests that this is not the case. Layoff rates fell for workers without a post-secondary certificate or diploma, as well as for workers with job tenures less than five years. Layoff rates for longer-tenure workers and for those with post-secondary credentials remained steady.

<sup>9</sup> It should be noted that this group does not include people who quit their jobs and left the labour force.

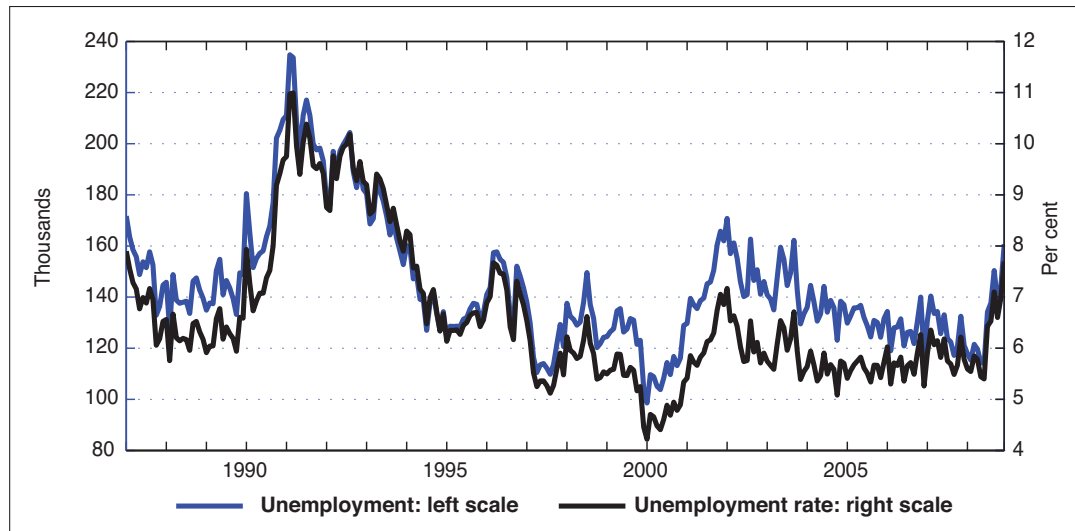
Probably the most important factor driving the reduction in manufacturing was the decline in hiring graphed in Figure 8.<sup>10</sup> The pace of hiring slows noticeably during the Dutch disease period compared to the rates observed in the latter part of the 1990s. Figure 9 suggests that this slowdown in hiring did not result in significantly higher levels or rates of manufacturing sector unemployment.<sup>11</sup>

**FIGURE 8: MANUFACTURING SECTOR: HIRES**



Data source: Labour Force Survey, Public Use Microdata Files

**FIGURE 9: UNEMPLOYMENT IN MANUFACTURING SECTOR**



Data source: Cansim Table 282-0094

<sup>10</sup> The data in Figure 7 start in 1998. An apparent data redefinition in 1997 makes comparisons problematic. The raw data show an implausibly sharp fall in hiring in January 1997, followed by numbers comparable with the new level. The data in CANSIM series V2085354 —manufacturing workers with job tenures of one to three months— do not display this sudden drop, but do have features similar to those graphed in Figure 7 after 1998.

<sup>11</sup> Unemployed manufacturing workers are those who are unemployed and whose last employment was in the manufacturing sector.

If the principal explanation for the reduction in manufacturing employment was a reduction in the demand for labour, we would have expected to see more evidence of disruption than is visible in the data. The decline seems to have been brought about by attrition. Gross employment flows out of the sector remained at their usual levels, but a larger proportion of these losses were not replaced.

## HOLLOWING-OUT

There have always been cycles in manufacturing employment, but with each downturn worries are expressed that the reduction is so drastic that the sector will not be able to bounce back. The reduction in employment does not justify those fears. The jobs that were lost were generally low paying and Canada is still the only G-7 country where manufacturing employment is roughly the same as it was 40 years ago.

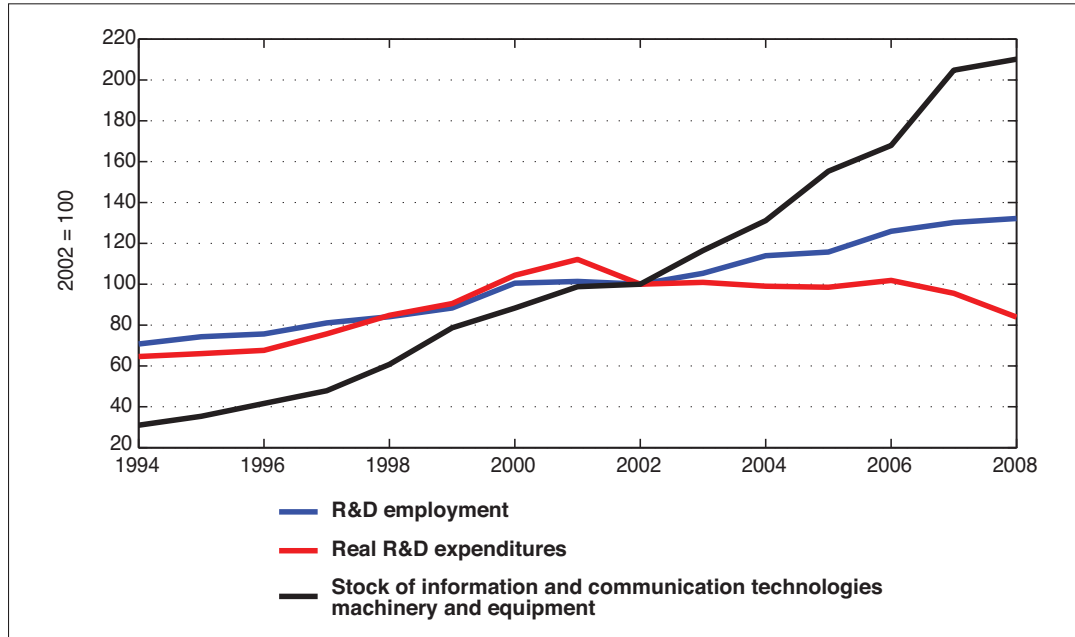
Krugman<sup>12</sup> posits a learning-by-doing model, in which the increasing returns that produce technical progress when a sector is expanding work in reverse when the sector is contracting. A sector that is shrinking becomes even less productive, and will eventually disappear altogether. Subsequent work on the economics of technical change has put emphasis on research and development (R&D), and in particular on the increasing returns that result from knowledge spillovers. A significant reduction in R&D activity would indeed be a cause for concern; dismantled research networks are difficult to reconstruct.

Manufacturing R&D activity appears to have held its own after 2002, even as employment was falling (Figure 10). R&D expenditures held constant until 2006 before falling slightly, but the number of researchers working in the manufacturing sector continued to increase, even as total employment fell. More generally, the manufacturing sector continued to invest in information and communications technology (ITC) machinery and equipment, the sort of investment that is most closely linked to technical progress. Indeed, since much of this capital equipment is imported, the appreciation of the Canadian dollar made it easier for manufacturing firms to increase their ITC holdings.

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<sup>12</sup> Krugman, Paul (1987). "The narrow moving band, the Dutch disease, and the competitive consequences of Mrs Thatcher," *Journal of Development Economics* 27: 41-55.

**FIGURE 10: R&D AND ITC CAPITAL STOCK: MANUFACTURING SECTOR**



*Data source: Cansim Tables 358-0024, 329-0057, 383-0025*

The possibility that the manufacturing sector — or any sector — might be hollowed out as R&D activity falls cannot be dismissed out of hand. However, the available data are not consistent with this sort of collapse. R&D activity has not been significantly reduced, and workers are making increased use of the latest technologies.

## **DUTCH THERAPY?**

The 2002-2008 commodity price boom and exchange rate appreciation produced a manufacturing sector that paid higher wages, that provided its workers with more and better equipment and that had increased employment in R&D. If the real measure of an industry's health is its ability to create value and not in the size of its workforce, then the net result of Dutch disease was a Canadian manufacturing sector that was healthier in 2008 than it was in 2002.

### **About the Author**

**Stephen Gordon** is a professor of economics at Laval University in Quebec City and a fellow of the Centre interuniversitaire sur le risque, les politiques économiques et l'emploi (CIRPÉE). He has degrees in economics from the University of Toronto, (B.A.), University of Western Ontario, (M.A.) and University of Toronto (Ph.D.). Mr. Gordon also maintains the economics blog [Worthwhile Canadian Initiative](#).

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