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Wage inflation data: CPI versus SEPH

What is meant by "wage inflation"?

In the previous issue of our newsletter, we discussed the importance of establishing the benchmark salary for the plaintiff in the year of the incident.[1] In this month's newsletter issue, we tackle the importance of adjusting the plaintiff's benchmark salary in the year of the incident using sources for wage inflation. Many experts (and counsel and adjusters) turn to *Consumer Price Index* ("CPI") data, which measures *price* inflation (or deflation), to adjust wages between years. This is not the appropriate index to use (and we review the reasons for this below). Not only will the CPI data underestimate or overestimate the change in wages, the CPI itself is specifically denounced by Statistics Canada as a measure of changes in wages.

In almost all cases, the individual's benchmark salary established at the date of incident will have to be adjusted (inflated or deflated)[2] from that date to the assumed or established "date of valuation" (the anticipated date of settlement or trial).[3] There are two adjustments that are required:

(i) Wage inflation[4] that accrues to all workers in the economy, but which varies by industry; and
(ii) Occupation-specific, or individual-specific "real" wage growth, which may be experienced by workers, as they accumulate more work experience, tenure, or benefit from a promotion.

The best (and primary) source for wage inflation (component (i) above) in Canada is Statistics Canada's *Employment, Earnings and Hours*[5] ("EEH") data, which was

[1] See *Brown's Economic Damages Newsletter* **"Matching Data Sources to Plaintiff Salaries",** vol. 6, issue #2, March 2009.
[2] There are many instances where an SEPH wage index in a particular industry or province will show a *decline* in average weekly wages from one year to the next. We incorporate all such decreases, treating the adjustments as wage 'deflation'.
[3] The one exception to this, other than the plaintiff's salary being governed by collective agreements or salary grids, is that there are no wage increases that occur from the date of incident to the date of valuation. This could occur if the pre-trial period is short (1 to 2 years) or there is a recession. For instance, in the mid-1990s, the Alberta government forced a –5% wage *decrease* on many public sector collective bargaining units, which was implemented into the wage schedules of collective agreements.
[4] In the time period between the date of incident and date of valuation, wage inflation encompasses *both* wage inflation and general productivity increases experienced by all workers. In the future calculation, the use of a real discount rate implicitly accounts for "wage inflation" but not productivity increases. Quantum experts specify productivity increases separately in the future loss period.
[5] This publication is produced monthly and annually. Economists who use it for wage inflation use monthly editions for the current year to compare to the same months in the previous year, as the lag time for publication by Statistics Canada is quite long – usually 3 to 6 months. This source is the counterpart of the US publication *Employment and Earnings* (U.S. Department of Labor).

replaced by Statistics Canada's *Survey of Employment, Payrolls and Hours* ("SEPH") on January 1, 2001.[6] This data is "designed to provide monthly estimates to measure levels and month-to-month trends of payroll employment, paid hours and earnings."[7] The target population is "composed of all employers in Canada, except those primarily involved in agriculture, fishing and trapping, private household services, religious organizations and the military personnel of the defence services."[8] The definition of an employee covered in the SEPH survey is:

> "…any person drawing pay for services rendered or for paid absences and for whom the employer must complete a Canada Revenue Agency T-4 form. The employee concept includes full-time employees, part-time employees (those who regularly work fewer hours than the standard work week of the establishment). **It also comprises working owners, directors, partners and other officers of incorporated businesses."**[9] (emphasis added)

Notably, this definition will *exclude* "owners or partners of unincorporated businesses, the self-employed, unpaid family workers, persons working outside Canada, military personnel and casual workers for whom a T-4 is not required."[10] Nonetheless, tracking the trend of wage increases and decreases for wage earners in a similar industry sector will yield some idea of the types of adjustments that could be applied to a sole proprietor in the same industry sector.

Prior to 1991, the EEH data should be used, and is categorized by *Standard Industrial Classification* code ("SIC"),[11] by province and territory.[12] After 1991, SEPH data should be used; it is categorized by the *North American Industry Classification system* ("NAICS") codes, and by province and territory.[13]

On March 31, 2009, with the release of the January 2009 SEPH data, Statistics Canada changed the estimation method used to compile the SEPH data in order to "improve the quality of the data at the provincial and territorial levels." This affected the measure we rely on, that of 'average weekly earnings'. Previously released estimates back to 2001 will be replaced to "ensure continuity in data series." At the same time, Statistics Canada included "data quality indicators" into many of the SEPH data points. In doing so, Statistics Canada now suppresses any data that is deemed "unreliable for publication" when the coefficient of variation is more than 35% with a data indicator of 'F'.[15] The main goals of the new estimation method were to:

- "Replace the current estimator, which has a risk of being biased for certain domains, with an approximately unbiased estimator for domains with sufficient sample size";[15]
- Review data needs to ensure efficient sample allocation;
- Weight the relative importance of industries within provinces and territories;
- Omit data from establishments with fewer than two employees; and
- Increase the monthly sample size from 11,000 to 15,000 units.[16]

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[6] SEPH is a monthly survey that combines two sources of data: a census of administrative data and an establishment based survey, the *Business Payrolls Survey* ("BPS"). This source is the counterpart of the U.S. publication *Employment and Earnings* (U.S. Department of Labor). The EEH data was replaced by the SEPH data back to 1991. The EEH data was retained for years prior to 1991.

[7] Statistics Canada, ***Employment, Earnings and Hours*** *January 2009* catalogue no. 72-002-X, p. 352.

[8] Statistics Canada, ***Employment, Earnings and Hours*** *January 2009* catalogue no. 72-002-X, p. 353.

[9] Statistics Canada, ***Employment, Earnings and Hours*** *January 2009* catalogue no. 72-002-X, p. 356.

[10] Statistics Canada, ***Employment, Earnings and Hours*** *January 2009* catalogue no. 72-002-X, p. 356.

[11] While this classification scheme is not ideal (as it does not report wage changes by occupation, but rather by industry), it does accord with the literature findings that productivity increases vary significantly by industry, and are also susceptible to geographical differences.

[12] Similar data for census metropolitan areas are not available.

[13] Concordance between the two classification schemes is explained in Statistics Canada, *Concordance between the Standard Classification of Goods (SCG) and the 1997 North American Industrial Classification System (NAICS)*, catalogue no. 12F0092XDB released January 17, 2000. A description of the various industries and groups of industries is contained in the "North American Industrial Classification System" manual, catalogue no. 12-501-XPE.

[14] Statistics Canada, **Survey of Employment Payrolls and Hours (SEPH)** *Note to users* released on March 26, 2009.

[15] The main improvement with this estimation technique was to eliminate the need for the provincial estimates to be distributed similarly to Canada-wide estimates in terms of the census administrative data (from which data on the total number of employees and earnings are gathered) vis-à-vis the BPS data (which provides earnings data but not total number of employees). In other words, "The new estimation method better reflects the particular characteristics of individual provinces and territories". (Source: Statistics Canada, Labour Statistics Division, *Improvements in 2009 to the Survey of Employment, Payrolls and Hours* March 2009, p. 2).

[16] Statistics Canada, *Redesign of the Survey of Employment Payrolls and Hours Change of Estimator and Sampling Plan* March 2009, p. 5.

Statistics Canada admits that with this new estimation technique, and the assignment of quality indicators, it is "more dependent on sample size to generate good quality data at the province and territorial level" so when sample sizes are too small to produce reliable estimates the series will no longer be available. Statistics Canada expects this to occur mostly at the province/territory 4 digit NAICS level.[17] The implication for forensic experts is that prior to 2009, we may have data for various 4-digit NAICS codes but after 2009 they might be suppressed. This will mean reverting to a 3-digit NAICS code (a more aggregated industry sector) after 2009 for wage data.[18]Statistics Canada's evaluation of the impact of the new estimation method is that users will "see…shifts and more variability at the provincial and territorial level" but the estimates are "considered more accurate under the new method."[19]

Notably, the EEH/SEPH data reflect "wage inflation" (wage increases due to cost-of-living increases) and also actual "productivity" adjustments (wage increases due to increased output in the economy) in the pre-trial period. The EEH/SEPH data do *not* reflect "real" or individual-specific wage growth (component (ii) above) because it averages many heterogeneous workers together (i.e., across all companies, unionized and non-unionized employment, people of all ages, and varying degrees of tenure). In other words, wages for entry-level workers are combined with wages for senior workers, across many different occupations. Individual increases for promotions or merit increases are offset by wage decreases experienced in industries with declining employment or wage freezes. "Real" wage growth is derived using data specific to age (where age acts as a proxy for work experience) or specific to level of responsibility or steps/levels on a collective agreement (or, in the case of lawyers, the 'year of call to the bar'). It cannot be derived from the EEH/SEPH data; other sources must be used. This is the subject left to another newsletter topic.

The only exception to using the EEH/SEPH data is if it is known that the person would be governed by a particular compensation scheme (say, at a specific company) or by a particular collective agreement (say, as a nurse or teacher). In this case, the compensation grids and/or collective agreements will implicitly embody cost-of-living and productivity increases (or not, depending on the outcome of collective bargaining units) in the annual cost-of-living adjustments negotiated by the union. The differences in pay levels *from one year to the next* (or from one time period to the next time period) reflect the 'wage inflation' in these cases. (Note that differences in pay levels <u>between</u> *"steps" or "levels"* on pay grids reflect "real" wage growth, or component (ii) above, *not* wage inflation and productivity).

Why can't the CPI (price inflation) be used to adjust wages?

Although the CPI is technically an index of change in prices for goods *and* services, it should be noted that the "services" included in this index are not an adequate representation of wages (even though in some isolated circumstances they represent the retail cost to consumers of purchasing labour), for several reasons. First, the factors that are responsible for the largest increase in the services component of the CPI are usually mortgage interest cost; prices for food purchased in restaurants; and tuition fees. Also included in this index are increases for rent and telephone services.[20] One can see simply from a description of these consumer services that they are a very indirect way of sampling the change in wages for banking employees, restaurant workers, university employees, landlords and the various personnel who provide telecommunications. Second, the various components of the goods and services index are weighted according to the proportion in which consumers distribute their income amongst the different goods and services. To the extent that this distribution is skewed more heavily to goods (and ones that are volatile, like food and energy), the CPI index will obscure the wage change in services with the wage change in goods (as they are

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[17] Statistics Canada, Labour Statistics Division, *Improvements in 2009 to the Survey of Employment, Payrolls and Hours* March 2009, p. 3.

[18] For instance, the 3-digit NAICS code 611 is labeled "Educational services": establishments primarily engaged in providing instruction and training in a wide variety of subjects. This instruction and training is provided by specialized establishments, such as schools, colleges, universities and training centres." The 4-digit NAICS code 6111 is "Elementary and Secondary Schools" whereas code 6112 is "Community Colleges and C.E.G.E.P.s" and code 6113 is "Universities." (Source: Statistics Canada, Nor*th American Industry Classification System (NAICS) – Canada 2007*, catalogue no. 12-501-XIE, pp. 466-468.) One can see that the 4-digit NAICS codes (6111, 6112, 6113) are more ideal and specific to a plaintiff's industry sector than 3-digit NAICS code (611), which combines and averages employee earnings across *all* types of educational institutions.

[19] Statistics Canada, Labour Statistics Division, *Improvements in 2009 to the Survey of Employment, Payrolls and Hours* March 2009, p. 3. In graphing the old and new estimates for average weekly earnings back to 2001 in this publication, Statistics Canada found that there is now more variability in the new method for the smaller provinces (i.e., PEI) and territories (i.e., NWT, Yukon and Nunavut); and for the following industry sectors: forestry, logging and support; mining, quarrying and oil and gas extraction; utilities; information and cultural industries; and management of companies and enterprises.

[20] *The Consumer Price Index* (Ottawa: Minister of Industry, 2000).

combined in the index). Additionally, there are more measurement problems with the services basket than the goods basket. [21]

> Statistics Canada's *The consumer price index reference paper* [22] notes that
>
> The CPI is an official measure of consumer price change through time and, as such, is of interest to government, unions, business organizations, research institutions and very large segments of the general public…This popularity, while indicative of wide acceptance, also poses problem because the CPI cannot serve all uses equally well. Users are advised, therefore, to approach the CPI with caution, especially when using it for purposes that lie outside of its main focus…
>
> Even though the CPI is used as a measure of price-induced changes in the purchasing power of the consumer dollar, the ***index does not dictate what the specific adjustments should be to wages and other forms of income.*** (emphasis added)

The authors also note that indices for provinces and census metropolitan areas should be used with caution, especially since only the shelter series in the index is based on city-specific price data.[23] This means that the CPI is not adequate to the task of adjusting for wage inflation by sector or industry, because it combines all services, whereas EEH/SEPH data differentiate wage changes by industry sector (using the NAICS codes). Forensic economists in the US concur that the CPI is *not* the correct measurement index to measure change of wages.[24]

We have performed several analyses that compare the change in *wage* inflation (as measured by the SEPH data back to 1991) to the change in *price* inflation (as measured by the CPI data) for various regions and industry sectors in Canada.

For instance, when we compare the main index for wage changes (the *industrial aggregate,* code 11-91N, which averages all the industry sectors together) to the change in the *all-items* Consumer Price index, we generally find a 6 to 10% overall difference in the aggregate change from 1991 to 2008. The differences are smaller for Nova Scotia (there is only a 1% difference in the aggregate change in this time frame) and bigger for Alberta (16%

[...continued on page 5]

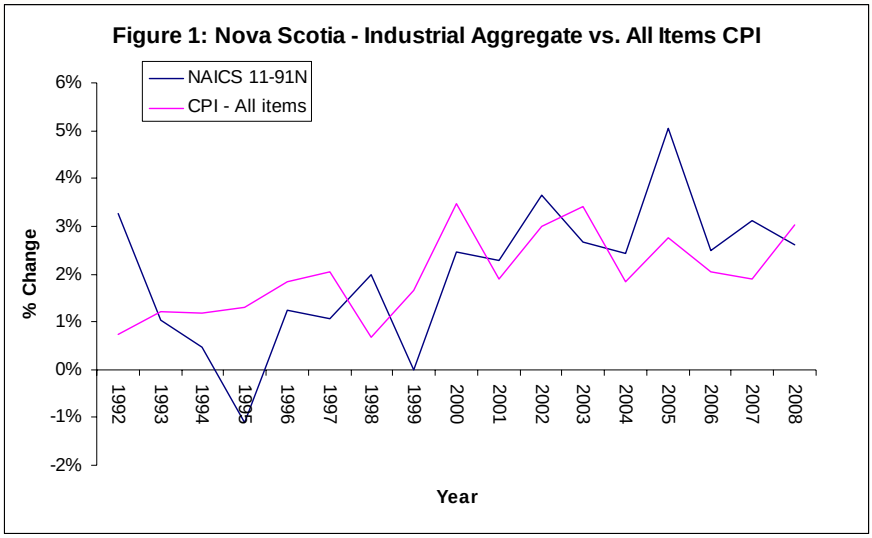

Figure 1 shows that the change in prices does not always model the change in wages, even if the aggregate overall percentage change is similar in this time frame (1991 to 2008).

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[21] Prud'homme, M. & K. Kostenbauer, *Service Inflation: Why is it Higher? A Partial Examination of the Causes* (Ottawa: Statistics Canada Analytical Series Prices Division December 1997).

[22] The *Consumer Price Index Reference Paper* (Ottawa: Statistics Canada, 1995), pp. 22-23.

[23] *The Consumer Price Index Reference Paper* (Ottawa: Statistics Canada, 1995), p. 26.

[24] For example see Martin, G.D. & Vavoulis, T., *Determining Economic Damages* Revision 11 (Santa Ana: James Publishing Group, 1999) at 3-32 who write:

> The ECI [US wage inflation data] differs from CPS [US price inflation] data in that it relies on not one, but two major components. Both include hourly wages, but the difference between the two in this measure is that ECI includes straight-time wage and salary rates, production bonuses, incentive earnings, commission payments, and cost of living adjustments. The second major component, present in ECI but not in CPS data, is employer benefits, which contains several different categories….Perhaps one way to describe the difference between the two studies is to say that the CPS data track the "change in average wages" while the ECI track the "average change in wages."

difference). The latter difference is likely due to the impact of the resource industry on the change in wages in Alberta. The year-by-year changes are still quite different however. Figures 1 and 2 plot the year-by-year percentage changes in the industrial aggregate to the CPI, all-items index.

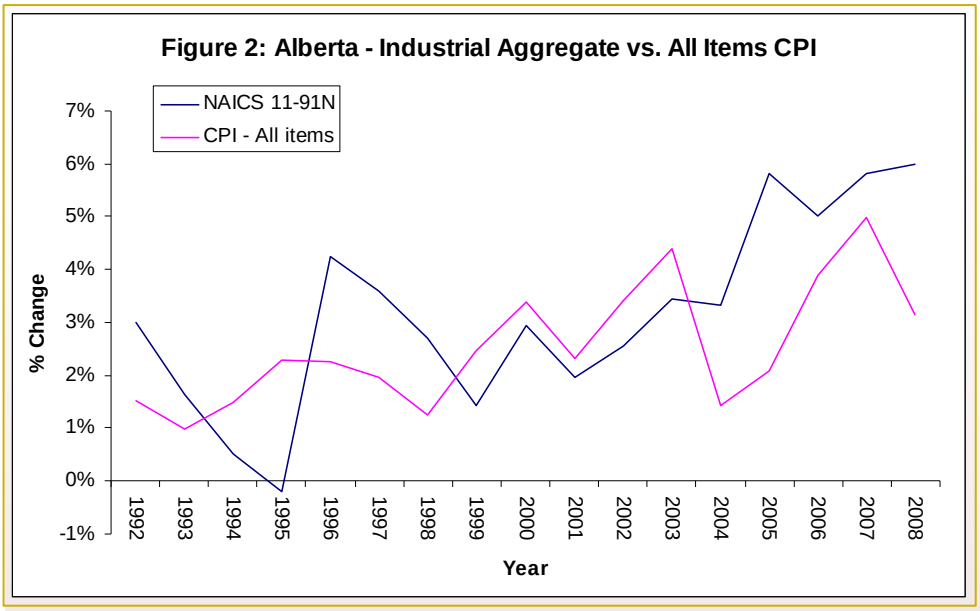
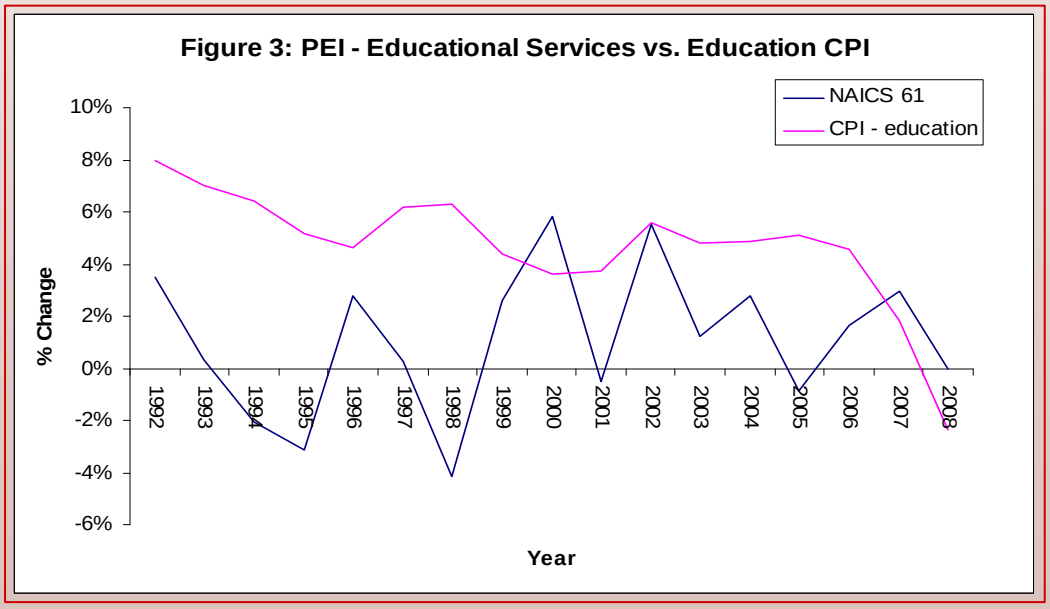
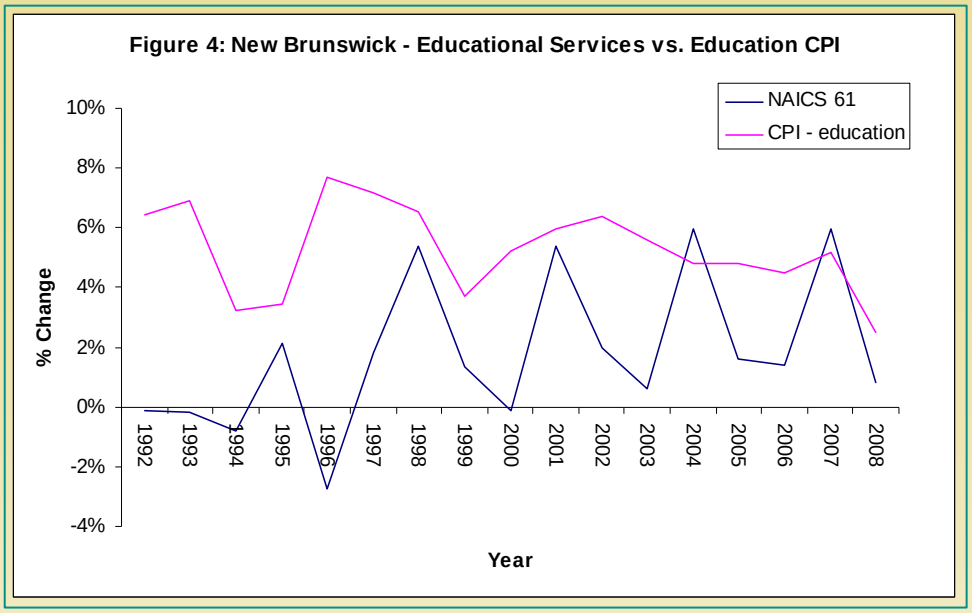


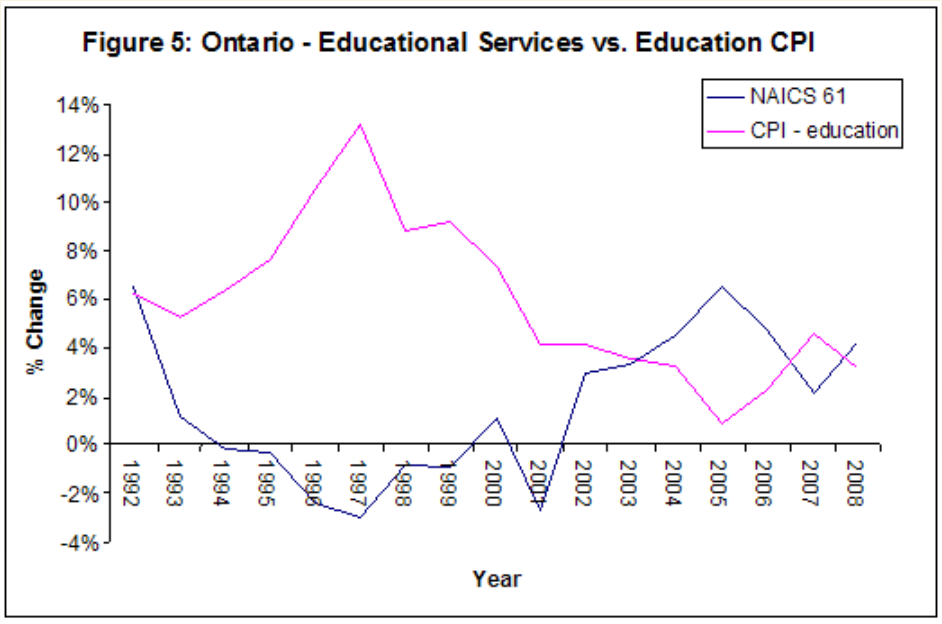
Figure 2 shows that while the two indices are tracking movements in similar directions (except for 1994-95 when wages experienced a downward adjustment), the magnitude of the changes is quite different for most years (only 1999 to 2003 are similar in direction and magnitude).

The differences *within* industry sectors are far more dramatic. For instance, if a user wanted to model the wage changes to the plaintiff's salary within a specific industry, the SEPH provides a wealth of data for this process, unlike the CPI data.

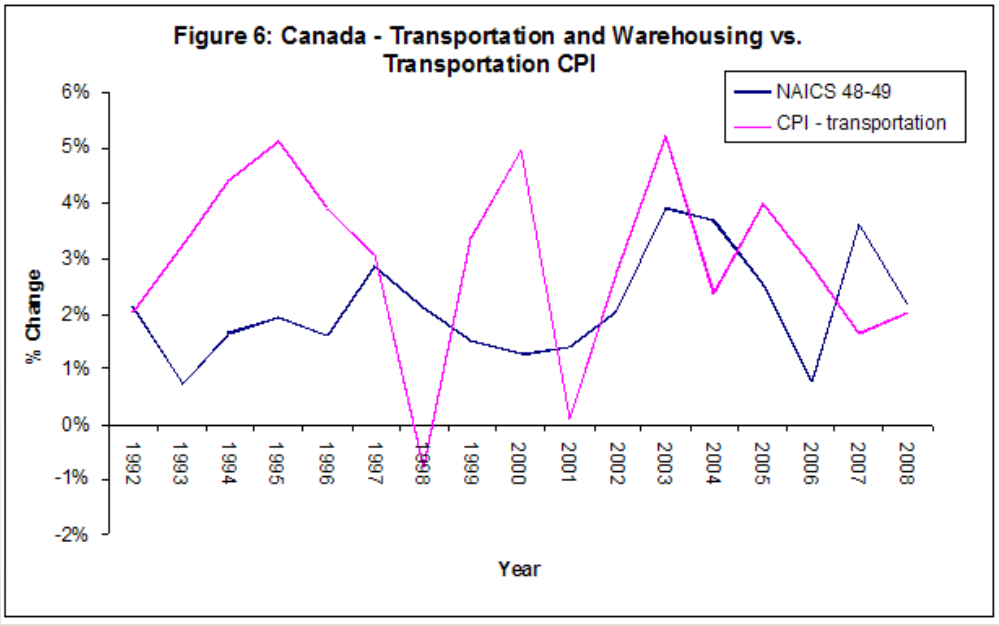




Figures 3, 4 and 5 compare the educational wage index (NAICS code 61) in PEI and New Brunswick and Ontario to the CPI sub-index "recreation, education and reading". We can see that these indices are measuring quite different things. The educational wage index is measuring the wages paid to staff in educational institutions (high schools, colleges, universities, etc.). In contrast, the CPI sub-index "recreation, education and reading" is tracking the cost of toys, recreational vehicles and equipment, and tuition fees and other reading material. Both the year-by-year changes and the overall aggregate change of these indices show how erroneous it would be to attempt to model the change in wages of educational staff using the CPI sub-index that includes "education".



A final comparison below shows the difference between the transportation and warehousing wage index (NAICS code 48-49) with the sub-index from the CPI called "transportation". The latter tracks the cost of purchasing or leasing vehicles, along with the usage costs (fuel and insurance and maintenance). The former tracks the wages paid to individuals who are employed in the business of managing transportation equipment and operating and sorting vehicles. The CPI index is measuring a consumer cost; the SEPH index is tracking the wages paid to individuals transporting goods in the economy. Not only are the year-by-year changes dramatically different in magnitude, they are also different in direction (one is positive when the other is negative).



Matching industry sector to plaintiff's wages

One of the most important aspects of utilizing wage inflation data is to match the SIC/NAICS code (which represents the industry within which the individual works) with the individual in question when his/her occupation does not intuitively suggest a particular industry. This is relatively straightforward if the person is a construction tradesperson, but more complicated with a clerical worker. In the latter case, the SIC/NAICS index will reflect clerical workers in many industries; so it is important to determine the industry within which the worker would have been located (and reaffirms the importance of industry analysis). When it is unclear where the person would have worked, or all industries are possibilities, then the industrial aggregate index is the appropriate index to use.

Figures 1 through 6 also demonstrate how important it is to choose the correct industry grouping to match the plaintiff's salary. There are significant variances between industry indices. It is not appropriate to simply use the industrial aggregate (the overall average) without reference to the industry within the plaintiff is employed. There is a good-sized literature that discusses the persistence of inter-industry differences in wage levels.

UPDATING NON-PECUNIARY AWARDS FOR INFLATION (APRIL 2009, CANADA)

		Non-Pecuniary Damages - Sample Awards				
Year of Accident/	**"Inflationary"**	$10,000	$25,000	$50,000	$75,000	$100,000
Year of Settlement or Trial	**Factors***					
April 2008-April 2009	1.023	$10,231	$25,576	$51,153	$76,729	$102,306
Avg. 2007-April 2009	1.027	$10,272	$25,680	$51,359	$77,039	$102,719
Avg. 2006-April 2009	1.049	$10,491	$26,228	$52,456	$78,684	$104,912
Avg. 2005-April 2009	1.070	$10,701	$26,753	$53,505	$80,258	$107,011
Avg. 2004-April 2009	1.094	$10,938	$27,346	$54,691	$82,037	$109,383
Avg. 2003-April 2009	1.114	$11,142	$27,854	$55,708	$83,562	$111,416
Avg. 2002-April 2009	1.145	$11,449	$28,623	$57,246	$85,869	$114,491
Avg. 2001-April 2009	1.171	$11,708	$29,270	$58,540	$87,809	$117,079
Avg. 2000-April 2009	1.200	$12,003	$30,006	$60,013	$90,019	$120,025
Avg. 1999-April 2009	1.233	$12,330	$30,824	$61,648	$92,472	$123,296
Avg. 1998-April 2009	1.254	$12,543	$31,358	$62,715	$94,073	$125,430
Avg. 1997-April 2009	1.267	$12,668	$31,670	$63,340	$95,009	$126,679
Avg. 1996-April 2009	1.287	$12,873	$32,183	$64,365	$96,548	$128,730
Avg. 1995-April 2009	1.308	$13,076	$32,690	$65,380	$98,070	$130,760
Avg. 1994-April 2009	1.336	$13,357	$33,392	$66,783	$100,175	$133,567
Avg. 1993-April 2009	1.338	$13,379	$33,446	$66,893	$100,339	$133,785
Avg. 1992-April 2009	1.363	$13,629	$34,071	$68,143	$102,214	$136,286
Avg. 1991-April 2009	1.383	$13,831	$34,578	$69,155	$103,733	$138,311
Avg. 1990-April 2009	1.461	$14,609	$36,524	$73,047	$109,571	$146,095
Avg. 1989-April 2009	1.531	$15,309	$38,272	$76,545	$114,817	$153,089
Avg. 1988-April 2009	1.607	$16,072	$40,180	$80,359	$120,539	$160,719
Avg. 1987-April 2009	**1.672**	$16,717	$41,793	**$83,586**	$125,380	$167,173
Avg. 1986-April 2009	1.745	$17,446	$43,615	$87,230	$130,844	$174,459
Avg. 1985-April 2009	1.818	$18,177	$45,443	$90,886	$136,329	$181,772
Avg. 1984-April 2009	1.890	$18,897	$47,243	$94,487	$141,730	$188,973
Avg. 1983-April 2009	1.971	$19,711	$49,277	$98,554	$147,831	$197,107
Avg. 1982-April 2009	2.087	$20,868	$52,169	$104,338	$156,507	$208,677
Avg. 1981-April 2009	2.311	$23,113	$57,783	$115,566	$173,349	$231,133
Avg. 1980-April 2009	2.600	$26,000	$65,001	$130,002	$195,003	$260,005
Avg. 1979-April 2009	2.863	$28,634	$71,586	$143,172	$214,757	$286,343
Jan. 1978-April 2009	**3.262**	$32,615	$81,538	$163,077	$244,615	**$326,154**

$83,586= $50,000 x 1.672 represents the dollar equivalent in April 2009 of $50,000 based on inflation increases since 1987. Similarly, $326,154 (=$100,000 x 3.262) represents the dollar equivalent in April 2009 of $100,000 in 1978 based on inflationary increases since the month of January 1978.

* Source: Statistics Canada, Consumer Price Index, monthly CPI release, rolling average (except for Jan. 1978).

Consumer Price Index — Unemployment Rate

From Apr 2008 to Apr 2009* (rates of inflation)		For the month of Apr 2009	
Canada**	0.4%	Canada:	8.0%
Vancouver:	0.4%	Vancouver:	6.5%
Toronto:	0.8%	Toronto:	8.9%
Edmonton:	-0.6%	Edmonton:	5.4%
Calgary:	-0.3%	Calgary:	6.3%
Halifax:	-0.1%	Halifax:	5.9%
St. John's, NF:	0.9%	St. John's, NF:	7.6%
Saint John, NB:	0.0%	Saint John, NB:	6.1%
Charlottetown:	0.1%	Charlottetown (PEI):	12.4%

* Using month-over-month indices. Source: Statistics Canada

** 12 month rolling average up to April 2009 is 2.3% (see table above).

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