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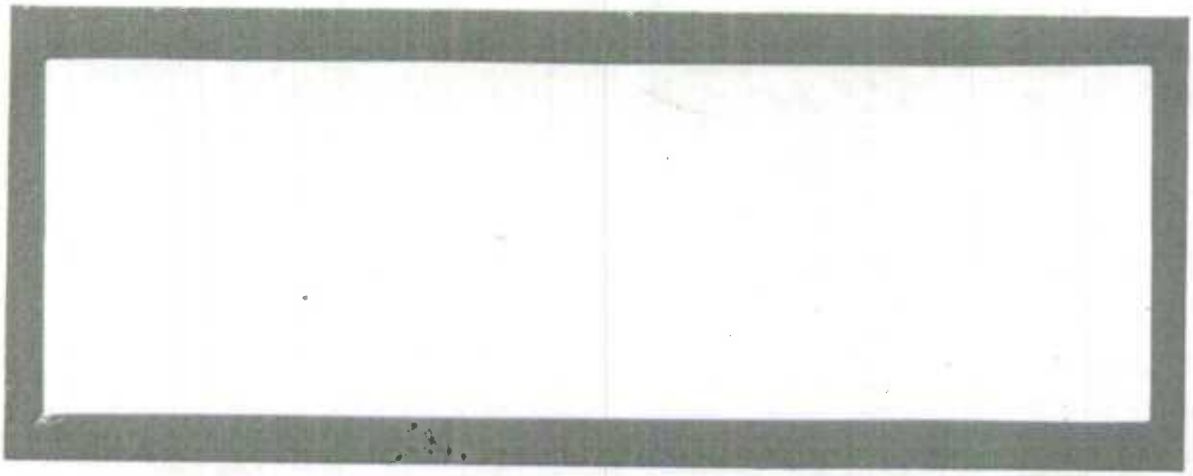

Methodology Branch

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MONTH-IN-SAMPLE EFFECTS IN THE LABOUR FORCE SURVEY

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ABSTRACT

The Canadian Labour Force Survey (LFS) uses a rotating panel design in which each selected dwelling remains in the sample for six consecutive months, and is then replaced by a new dwelling so that one-sixth of the overall sample is replaced each month. Each panel is designed to be representative of the population. However, studies have shown that the LFS experiences month-in-sample bias, particularly for the first month, i.e., the estimate of a variable based on the panel of dwellings which are in the sample for the first month differs significantly from the overall estimate. Measures of the month-in-sample-bias used in this study are the Bailar and modified Mohl month-in-sample indices, for estimated counts and rates of key LFS variables. The work of Brisebois and Mantel (1996) and Kennedy, Drew and Lorenz (1994) on the month-in-sample bias in the Labour Force Survey have been compared with those obtained in this follow-up, from the perspective of improved nonresponse and poststratification adjustments, using these month-in-sample indices.

Key words: Bailar index; Modified Mohl index; nonresponse adjustment; poststratification.

EFFETS DUS AU NOMBRE DE MOIS DANS L'ÉCHANTILLON DE L'ENQUÊTE SUR LA POPULATION ACTIVE

Gopa Ray et Diane Stukel

RÉSUMÉ

L'Enquête sur la population active (EPA) au Canada s'appuie sur un plan de sondage avec renouvellement de panel, dans lequel chaque ménage retenu fait partie de l'échantillon pendant six mois consécutifs, après quoi il est remplacé par un nouveau ménage, de sorte qu'un sixième de l'échantillon total est renouvelé chaque mois. Chaque panel est conçu de façon à être représentatif de la population. Cependant, des études ont montré que l'EPA se caractérise par un biais dû au nombre de mois dans l'échantillon, particulièrement en ce qui a trait au premier mois, c'est-à-dire que l'estimation d'une variable fondée sur le panel de ménages faisant partie de l'échantillon au cours du premier mois diffère sensiblement de l'estimation globale. Les mesures du biais dû au nombre de mois dans l'échantillon utilisées dans la présente étude, pour les chiffres et les taux estimés des variables clés de l'EPA, sont l'indice de Bailar et l'indice modifié de Mohl. Les résultats des travaux de Brisebois et Mantel (1996) ainsi que de Kennedy, Drew et Lorenz (1994) relatifs au biais dû au nombre de mois dans l'échantillon de l'Enquête sur la population active ont été comparés à ceux obtenus dans le cadre de la présente étude de suivi à l'aide de ces indices du biais, dans la perspective d'une amélioration des ajustements relatifs à la non-réponse et à la poststratification.

Mots clés : Indice de Bailar; indice modifié de Mohl; ajustement en fonction de la non-réponse; poststratification.

1. Introduction

Month-in-sample bias has been the subject of several studies on the LFS. Two examples of such studies are that by Kennedy, Drew and Lorenz (1994) on the impact of nonresponse and poststratification adjustments on month-in-sample bias in the LFS, and by Brisebois and Mantel (1996) on the use of different indices to measure month-in-sample effects for the LFS.

Kennedy, Drew and Lorenz (1994) observed that nonresponse in the LFS varies by month-in-sample, the first month-in-sample having the highest nonresponse, and the second month-in-sample having the least nonresponse for the 'refusals' category, with the nonresponse increasing from the second to the sixth month-in-sample, for this category. The significant effect in the first month is due to difficulties in contacting households the first time, the majority of the nonresponse being in the 'no one at home' category. As tenure in the survey increases, the 'temporarily absents' and 'no one at homes' decrease. This apparent difference in response rate by month-in-sample tenure led to the conjecture that it may be prudent to implement the nonresponse adjustments within rotation groups. The study by Kennedy, Drew and Lorenz was implemented prior to 1995, to see if the present method of nonresponse adjustment, which weight adjusts within rotation groups, was worthy of implementation.

The study by Kennedy, Drew and Lorenz considered month-in-sample indices for employment and unemployment totals, using the then prevalent method of nonresponse adjustment "across rotations", and assuming no poststratification. These were compared with indices obtained using the present nonresponse adjustment "within" rotations, again assuming no poststratification. This facilitated the comparison of the proposed new method of nonresponse adjustment with the old one. The results showed that there was a moderate (-2.7 to -3.9%) negative bias for the first month-in-sample under the old method of nonresponse, but a smaller (1.1% to 1.8%) positive bias under the new method. Therefore, the proposed method of nonresponse adjustment definitely would provide improvements.

Kennedy, Drew and Lorenz then introduced the effect due to poststratification, by considering three different combinations of old versus new nonresponse and poststratification adjustments. The three combinations or methods are given in the next paragraph. Note that in the pre-1995 method of poststratification, the estimates of population from the survey agreed with Census-based population estimates for 30 province level age-sex categories, and various sub-provincial regions, i.e., economic regions (ERs) and Census metropolitan areas (CMAs). In the present or new poststratification, controls have been added that force the estimate of population of each rotation to be one-sixth of the total province level estimated population.

Method I of Kennedy, Drew and Lorenz used the old method of nonresponse adjustment "across" rotations, in conjunction with the old method of poststratification. Method II used the old nonresponse adjustment "across" rotations, in conjunction with the present poststratification. In method III, they used the present method of nonresponse adjustment "within" rotations in conjunction with the present method of poststratification. They compared the three methods, using traditional Bailar indices for January 1993 to December 1993, and for 'employed' and 'unemployed'

totals for the provinces of Ontario and British Columbia. Note that a comparison of method I with method II would give an indication of the effect of changing methods of poststratification whereas a comparison of method II with III would do the same for nonresponse. A dominant month-in-sample effect was observed for the first month in the sample, using method I. Pairwise comparisons by rotation group for the three methods indicated that the largest difference was due to the introduction of the present method of poststratification (i.e., method I vs. method II). Methods II and III yielded similar results indicating a minimal effect from a change in method of nonresponse adjustment. The measure used by Kennedy, Drew and Lorenz was the traditional Bailar index. In this paper, we extend their work by considering the modified Mohl index as well, to see if the results are different using different indices.

Following Kennedy, Drew and Lorenz, (1994), Brisebois and Mantel (1996) studied the effects of month-in-sample bias in the LFS. Their main contribution was to improve upon the indices provided by Bailar (1975) and Mohl (1991). They created a modification of the Bailar index which accounts for differences among the sample error effects; the original index does not do so, and thus can be unstable. Similarly, they provided a modification to the Mohl index that accounts for trends in the underlying estimates. Focusing on the latter index, they investigated month-in-sample biases based on subweighted (Horvitz-Thompson) estimates of both employment and unemployment rates, at the national and 5 regional levels for May 1990 to August 1994.

The purpose of the Brisebois and Mantel study was to determine if month-in-sample effects existed for panel estimates of employment and unemployment rates, to determine their magnitude and to see if they followed a similar pattern in the different regions. For the employment rate, the National level showed some significant effects, as did the Atlantic, P.Q., and Prairie levels, with a pattern of increasing from negative to positive as the number of months-in-sample increased. The indices for the unemployment rate showed some significant effects for each region, with the effects generally decreasing as the number of months in the sample increased from 2 to 6, at the national and regional levels.

Their rationale for examining subweight-based estimates rather than final weighted estimates was based on the conjecture that the latter may mask differences among month-in-sample groups, rendering them difficult to interpret. In this paper we extend their work by basing the comparison on final (poststratified) estimates. These poststratified estimates include a control which forces each rotation estimate to add up to one-sixth of the total population at the provincial level. In addition, we also include the new nonresponse adjustment which defines weighting classes at the rotation group level crossed with other geographic areas. These two adjustments are believed to lessen the estimated bias due to the first month-in-sample.

We now describe some of the indices used to measure month-in-sample effect. The basic idea of these indices is to compare estimates based on data from each month-in-sample to the average or weighted average over the six month-in-sample rotations.

Bailar (1975) defined a month-in-sample index at time t, and month-in-sample k, as

$$I^{B}_{k,t} = 6\,\hat{r}_{k,t} / \Sigma_{i=1}^{6}\,\hat{r}_{i,t}\,,$$

where,

k is the month-in-sample, $k = 1, 2, ...,6$.

t is the time point; for example, $t = 1,2,..., 52$, for LFS data from May 1990 to August 1994,

$\hat{r}_{k,t}$ is the estimate for the k-th month-in-sample at time t of the LFS variable in question.

However, since this index includes sample error effects as well as month-in-sample effects, it is not very stable. To overcome this, Mohl (1991) defined a month-in-sample index as

$$I^{M}_{k,t} = 6\hat{r}_{k,t} / \sum_{i=1}^{6} \hat{r}_{i,t-k+i} . \qquad (2.1)$$

Although this index is based on estimates from the same panel and so sampling errors are not a concern, it is confounded with trends in the underlying true rate or total over time.

Thus, Brisebois and Mantel (1996) suggested a modified Mohl index which accounts for trends in the underlying rate or total:

$$I^{MM}_{k,t} = 6r^{*}_{k,t} / \sum_{i=1}^{6} r^{*}_{i,t-k+i} , \text{ where}$$

$$r^{*}_{i,t} = \hat{r}_{i,t} - (\hat{r}_{t} - \sum_{j=1}^{6} \hat{r}_{t-i+j}/6) \qquad (2.2)$$

and $\hat{r}_{t}$ is the simple average of $\hat{r}_{i,t}$, i=1,2,...,6.

2. A Look at Month-in-Sample Using Different Indices: A Comparison With Kennedy-Drew-Lorenz Results

In this section, we attempt to compare the results of Kennedy, Drew and Lorenz, where the Bailar index was used, to similar results using the modified Mohl index, to see if the conclusions are comparable using the different indices.

Tables 2.1 and 2.2 show the results of Kennedy, Drew and Lorenz using Bailar indices for totals of 'employed' and 'unemployed' respectively for January 1993 to December 1993 in the provinces of B.C. and Ontario. They use two sets of estimates based on the old method of nonresponse adjustment, and either no poststratification or the present poststratification. We see that, in general, the month-in-sample effect for the first month is more pronounced than other months since it deviates from one in greater magnitude. The overall month-in-sample effect (including that for the first month) is diminished by the present poststratification as seen in the columns marked '*' of those tables. Note that without poststratification, the index is less than one for the first month, indicating underestimation of the parameter. With the presence of poststratification, the underestimation is either diminished or changed to a small overestimation.

Since we wished to see the effect of changing the month-in-sample index from Bailar to modified Mohl, we compared the above results with those obtained from an identical analysis using

the modified Mohl index instead. The recomputed values are given in tables 2.3 and 2.4. On comparing our results with those of Kennedy, Drew and Lorenz, we see that the month-in-sample effect for k=1 is not always less than 1 (as it was in tables 2.1 and 2.2), using the modified Mohl index and based on no poststratification. In fact, the reverse is true for the month-in-sample effects for the 'employed' in table 2.3 signalling the presence of positive relative bias for k=1. Unfortunately, using the modified Mohl index, the present poststratification does not always seem to dampen the month-in-sample effects. This is made evident by the fact that the modified Mohl index moves farther away from one in absolute value for k=1, for the poststratified column as compared to the subweighted column.

Based on the results of Kennedy, Drew and Lorenz, we see that there is a diminished estimate of the absolute bias in the presence of the present poststratification using the Bailar index. It is curious that we see less evidence of this using the more reliable modified Mohl index.

TABLE 2.1: Bailar indices I_k for total number of employed based on subweighted/ post-stratified estimates of counts, 9301 to 9312 - Kennedy, Drew and Lorenz results

	Ontario		B.C.	
K	Subweighted**	poststratified*	subweighted**	poststratified*
1	0.971	1.003	0.961	0.992
2	1.008	1.001	1.001	0.988
3	1.013	1.002	1.014	0.999
4	1.011	1.001	1.013	1.009
5	1.003	0.999	1.009	1.008
6	0.994	0.997	1.003	1.004

** Based on old method of nonresponse adjustment and no poststratification

* Based on old method of nonresponse adjustment and present poststratification (Kennedy, Drew and Lorenz, Method II)

TABLE 2.2: Bailar indices I_k for total number of unemployed based on subweighted/post-stratified estimates of counts, 9301 to 9312 - Kennedy, Drew and Lorenz results

	Ontario		B.C.	
k	Subweighted**	poststratified*	Subweighted**	Poststratified*
1	0.964	0.999	0.973	1.005
2	1.022	1.009	1.095	1.088
3	1.019	1.002	1.027	1.014
4	1.005	0.998	0.966	0.958
5	0.999	0.997	0.959	0.956
6	0.986	0.991	0.980	0.980

** Based on old method of nonresponse adjustment and no poststratification

* Based on old method of nonresponse adjustment and present poststratification (Kennedy, Drew and Lorenz, Method II)

k = month-in-sample

TABLE 2.3: Modified Mohl indices I_k for total number of employed based on subweighted/poststratified estimates of counts, 9301 to 9312 - Our Results

k	Ontario		B.C.	
	Subweighted**	Poststratified*	subweighted**	Poststratified*
1	1.069	1.048	1.044	1.099
2	1.061	1.018	1.035	1.032
3	1.022	1.001	1.021	1.009
4	0.977	0.981	0.988	0.975
5	0.945	0.975	0.955	0.950
6	0.927	0.977	0.958	0.934

** Based on old method of nonresponse adjustment and no poststratification

* Based on old method of nonresponse adjustment and present poststratification

TABLE 2.4: Modified Mohl indices I_k for total number of unemployed based on subweighted/poststratified estimates of counts, 9301 to 9312 - Our Results

k	Ontario		B.C.	
	Subweighted**	poststratified*	subweighted**	Poststratified*
1	0.955	0.943	0.632	0.713
2	0.932	0.901	0.893	0.905
3	0.951	0.928	0.903	0.908
4	1.042	1.041	1.109	1.085
5	1.067	1.087	1.185	1.166
6	1.053	1.101	1.279	1.223

** Based on old method of nonresponse adjustment and no poststratification

* Based on old method of nonresponse adjustment and present poststratification

k = month-in-sample

3. The Effect of "Poststratification by Rotation" on Month-in-Sample Effect : A Comparison with Mantel - Brisebois Results

Tables 3.1 and 3.2 show the modified Mohl indices for estimates of the employment rate and unemployment rate respectively using the old nonresponse and present poststratification adjustments. The results are averaged over the 47 different occasions for which they could be calculated, i.e., for May 1990 to August 1994, at the national and regional levels. A t-test was conducted for each month-in-sample to determine if the average month-in-sample indices were significantly different from 1, at level of significance of .05 assuming that the 47 replicates were independent. Tables 3.3 and 3.4 show the Mantel and Brisebois results for identical variables, time period and indices, but based on the old method of nonresponse and no poststratification. We wished to see the effects of the present poststratification on month-in-sample using the modified Mohl index for each variable. Accordingly, we compare table 3.1 to table 3.3 and table 3.2 to table 3.4.

From tables 3.1 and 3.3 (employment rate), we see that the modified Mohl indices are least (although not in absolute value) in the first month-in-sample at the national level, and at each regional level, other than B.C.. The month-in-sample effect for month one is generally underestimated at the national and at each regional level. From tables 3.1 and 3.3 we see that significant month-in-sample effects near the beginning or the end of sample tenure were found at the national level, and for the Atlantic, Quebec and Prairie regions using a t-test. The estimates of month-in-sample effects for the employment rate variable at the national and regional levels have a fairly consistent pattern of increasing from values less than 1 to those greater than 1, as the number of months in the sample increases.

Tables 3.2 and 3.4 (unemployment rate) show significant effects at the national level, and for each region although not always at the beginning or end of sample tenure as expected. We see a generally decreasing trend in the month-in-sample effects as the month-in-sample increases from 2 to 6, at the national level, as well as for each region. The exception to this is in months 3 and 4 in the Prairies, which show large positive effects. For B.C., Prairies, Ontario and the national level, the modified Mohl index is significant, underestimates the true rate for the last month, and is much smaller than that for the first month, for both tables being compared. The modified Mohl index underestimates the true rate for the Atlantic region as well, for the last month in both tables; however, the entries are not significant. The maximum relative bias for the unemployment rate is 3.7% and 3.8% in tables 3.2 and 3.4 respectively, for B.C. for the second month-in-sample. At the national level, the maximum relative bias is 1.7% and 1.6% respectively, for the poststratified estimate of the unemployment rate.

It should be pointed out that tables 3.1 and 3.3 have identical results in terms of significance, as do tables 3.2 and 3.4. The month-in-sample effects in each pair of tables being compared are also near identical. This indicates that the present poststratification does little to diminish the month-in-sample effect (over no poststratification) for estimates of rates, under the modified Mohl index. This is similar to the conclusion drawn from tables 2.3 and 2.4 but for estimates of totals rather than rates, for a different time frame, and using the modified Mohl index. But this seems to differ from the results of Kennedy, Drew and Lorenz, drawn from tables 2.1 and 2.2, for totals and using the Bailar index.

TABLE 3.1: Modified Mohl indices I_k for the employment rate based on old nonresponse and present poststratification, 9005 to 9408 - Our Results

k	Atlantic	P. Q.	Ontario	Prairies	B.C.	Canada
1	0.994*	0.995*	0.998	0.995*	0.999	0.997*
2	0.997*	0.998*	1.000	0.999	0.998	0.999*
3	1.002	1.001	1.001	1.000	0.999	1.001
4	1.001	1.001	1.000	1.001	1.002	1.001
5	1.002*	1.003*	1.000	1.001	1.001	1.001*
6	1.004*	1.003	1.001	1.003*	1.002	1.002*

* significant at the 5% level based on t-test

TABLE 3.2: Modified Mohl indices I_k for the unemployment rate based on old nonresponse and present poststratification, 9005 to 9408 - Our Results

k	Atlantic	P. Q.	Ontario	Prairies	B.C.	Canada
1	0.986*	0.981*	1.010	1.003	1.020	0.999
2	1.014*	1.016*	1.020*	0.999	1.037*	1.017*
3	1.005	1.006	1.002	1.020*	1.010	1.007*
4	1.001	1.000	0.997	1.012*	0.981	0.999
5	0.999	0.989	0.995	0.990	0.979*	0.991*
6	0.994	1.008	0.976*	0.977*	0.973*	0.987*

* significant at the 5% level based on t-test

k = month-in-sample

TABLE 3.3: Modified Mohl indices I_k for the employment rate based on old nonresponse and no poststratification, 9005 to 9408 - Brisebois and Mantel results

K	Atlantic	P. Q.	Ontario	Prairies	B.C.	Canada
1	0.994*	0.995*	0.992	0.996*	1.000	0.997*
2	0.997*	0.997*	1.000	0.999	0.998	0.999*
3	1.002	1.001	1.001	1.000	0.998	1.000
4	1.001	1.001	1.000	1.000	1.001	1.001
5	1.003*	1.003*	1.000	1.001	1.001	1.001*
6	1.004*	1.003	1.001	1.003*	1.002	1.002*

* significant at the 5% level based on t-test

TABLE 3.4: Modified Mohl indices I_k for the unemployment rate based on old nonresponse and no poststratification, 9005 to 9408 - Brisebois and Mantel results

K	Atlantic	P. Q.	Ontario	Prairies	B.C.	Canada
1	0.987*	0.982*	1.010	1.002	1.022	0.999
2	1.012*	1.018*	1.018*	0.999	1.038*	1.016*
3	1.004	1.006	1.004	1.020*	1.012	1.008*
4	1.000	0.999	0.998	1.012*	0.981	0.998
5	1.001	0.989	0.995	0.990	0.979*	0.991*
6	0.996	1.006	0.976*	0.978*	0.969*	0.987*

* significant at the 5% level based on t-test
k = month-in-sample

4. The Effect of "Nonresponse by Rotation" on Month-in-Sample Effect

Tables 4.1 and 4.2 show the modified Mohl indices for the variables employment rate and unemployment rate respectively, for July 1995 to June 1998, averaged over the 31 occasions for which they could be determined. A t-test was carried out at level of significance of 0.5%, at the national level and at each regional level for each month-in-sample, to determine if the average modified indices were significantly different from 1, assuming that the 31 replicates were independent. The tables 3.1 and 3.2 were based on the old method of nonresponse adjustment and present poststratification This section shall show the effects of the present nonreponse adjustment by comparing tables 4.1 and 4.2 to tables 3.1 and 3.2, respectively.

We see in table 4.1 that there is an improvement in the estimated relative bias compared with our estimates from table 3.1. Not only are the indices close to 1, but there is no apparent predominant month-in-sample effect for the first month in the sample, observed in the previous sections. The only month-in-sample effects significantly different from 1 at the 0.5% level of significance, are those for P.Q. for k=5, and Ontario for k=2, 5 and 6.

However, the estimated relative bias behaves differently for the unemployment rate variable as indicated by table 4.2. At the national level, significant month-in-sample effects are present for k=1, 2, 5 and 6. The month-in-sample effect for the unemployment rate variable, has a relative bias of 2.8% and 2.2% respectively for k=1 and 2, at the national level. The Atlantic has a significant month-in-sample effect for k=1, the P.Q. has significant effects for k=2 and 6, while Ontario has significant results for k=1,5 and 6. The month-in-sample effects for the Prairies and B.C. are significant for k=1,2 and 6. Upon comparison of table 4.2 with table 3.2, where both use the present method of poststratification, we see that, with the exception of P.Q., there is more month-in-sample bias for k=1 with the present nonresponse adjustment than with the old method of nonresponse adjustment. For P.Q., there is a significant month-in-sample effect for k=2, with an increase in the relative bias to 3.1% over that of 0.6% for k=1 in table 4.2. The maximum relative bias for the unemployment rate variable is 4.4% in B.C. for k=1. This is followed by a relative bias of 3.9% for Ontario for k=1, and 3.5% for B.C. for k=2.

Thus, it seems that the effect of the new nonresponse adjustment brings about an improvement in terms of diminished month-in-sample effect, particularly for the first month, for the employment rate variable. It is curious, however, that for the unemployment rate variable, the month-in-sample effect seems to get worse, particularly for the first month-in-sample. This is quite different from the result found by Kennedy, Drew and Lorenz, discussed in the introduction of this paper, where they note that a comparison of their methods II with III gives practically no differences. In their case, they were observing estimated totals rather than rates, and were using the Bailar index rather than the modified Mohl index.

TABLE 4.1: Modified Mohl indices I_k for the employment rate based on present nonresponse and present poststratification, 9507 to 9806 - Our Results

K	Atlantic	P. Q.	Ontario	Prairies	B.C.	Canada
1	0.998	1.000	1.002	1.001	1.000	1.001
2	1.000	0.998	1.003*	0.999	1.001	1.001
3	1.000	0.999	1.001	0.999	1.002	1.000
4	1.000	0.999	0.999	1.001	1.000	0.999
5	1.001	1.003*	0.998*	0.999	0.998	1.000
6	1.000	1.002	0.997*	1.000	0.999	0.999

* significant at the 5% level based on t-test

TABLE 4.2: Modified Mohl indices I_k for the unemployment rate based on present nonresponse and present poststratification, 9507 to 9806 - Our Results

K	Atlantic	P. Q.	Ontario	Prairies	B.C.	Canada
1	1.028*	1.006	1.039*	1.034*	1.044*	1.028*
2	1.007	1.031*	1.014	1.026*	1.035*	1.022*
3	0.995	0.999	1.002	1.012	0.988	1.000
4	0.997	1.003	0.990	0.987	0.996	0.996
5	0.986	0.986	0.982*	0.989	0.982	0.985*
6	0.987	0.974*	0.972*	0.953*	0.956*	0.970*

* significant at the 5% level based on t-test
k = month-in-sample

5. Discussion and Conclusions

In section 2, we compared the month-in-sample effect on estimated total number of employed and unemployed using both the Bailar index and the modified Mohl index. While the results of Kennedy, Drew and Lorenz, using the Bailar index showed that there were improvements in the estimated bias due to the introduction of the present method of poststratification (over no poststratification), we showed that this result was much less evident using the modified Mohl index.

In section 3, using the modified Mohl index only, we observed that the introduction of the present method of poststratification did little to improve month-in-sample bias (over no poststratification) for estimated rates (rather than totals) of employment and unemployment. This seemed consistent with our results from section 2 using the modified Mohl index.

In section 4, again using the modified Mohl index, we observed that the introduction of the present method of nonresponse adjustment seemed to bring about an improvement in the month-in-sample bias for estimated employment rates. However, it seemed to worsen the bias for estimated rates of unemployment. This seemed to be at odds with the Kennedy, Drew and Lorenz results, which showed neither improvement nor worsening with the introduction of the present method of nonresponse adjustment, using the Bailar index for estimates of totals.

In conclusion, the results seem to vary, depending on which index is being used as a yardstick, and depending on whether totals or rates are being considered. However, in different instances, either poststratification within rotations or nonresponse adjusting within rotations seems to bring about a diminished month-in-sample bias, which substantiates their use for some of the cases.

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