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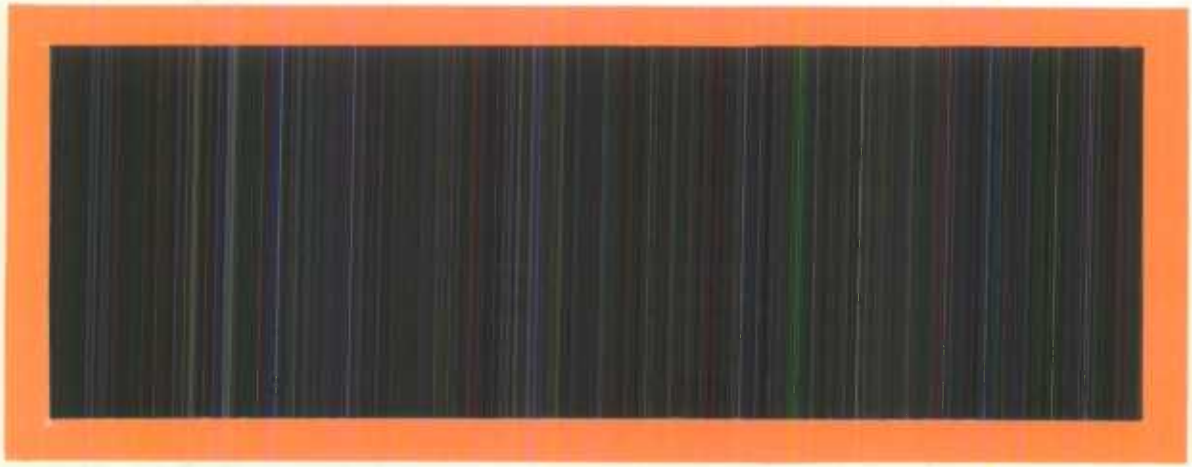

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Working Paper No. TSRA-89-015E

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ANNUAL REVIEW OF THE SEASONAL ADJUSTMENT OF INTERNATIONAL TRAVEL SERIES

BY

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September, 1989.

ABSTRACT

The International Travel Series are reviewed with regard to the appropriateness of the Seasonal Adjustment Options used last year. Changes are recommended whenever the old options are no longer optimal. Furthermore, recommendations are made concerning Easter adjustment, an option that was not available in last year's seasonal adjustment options.

RÉSUMÉ

Les options relatives à la désaisonnalisation, sélectionées l'an dernier pour les séries des Voyages internationaux, font l'objet d'un ré-examen. Des changements sont recommandée dans les cas où les anciennes options ne s'avèrent plus optimales. Des traitements relatifs à l'ajustement pour Pâques sont proposées; cette option n'était pas disponible dans le logiciel de désaisonnalisation de l'an dernier.

1. Review of the Seasonal Adjustment Options Applied to the Series

The International Travel series to and from Canada by province were published in seasonally adjusted form in 1988 for the first time.

Since one extra year of information can introduce substantial changes in the structure of the series, it is good practice to check once a year if the seasonal adjustment options selected in the previous year are still appropriate for the extended series. This practice was followed for the four sets of traveller series (visitors from U.S., Visitors from overseas, Residents from U.S., Residents from overseas) and it was found that in some instances it was necessary to change some of the options regarding the decomposition model, the ARIMA model used for forecasting, the trading-day adjustment and\or Easter adjustment procedures, the length of the seasonal moving averages etc. Table 1 lists the modifications of seasonal adjustment options that need to be introduced to achieve optimal adjustment of the series.

TABLE 1: MODIFICATION OF SEASONAL ADJUSTMENT OPTIONS APPLIED TO THE INTERNATIONAL TRAVEL SERIES

Series	Old Option	New Option
1. U.S. Visitors		
Alberta	Multiplicative decomposition	Additive decomposition
B.C.	Multiplicative decomposition	Additive decomposition
Total	No ARIMA model	ARIMA Model: 011 011 log
2. Overseas Visitors		
Nfld.	Multiplicative decomposition	Additive decomposition
Manitoba	No ARIMA model	ARIMA model: 011 011 log
Alberta	Multiplicative decomposition	Additive decomposition
	3x5 seasonal moving average	3x3 seasonal moving average
Total	No ARIMA model	ARIMA Model 011 011 log
3. Residents from U.S.		
N.S.	ARIMA model 212 011	ARIMA Model 011 011 log
	No trading-day adjustment	Trading-day adjustment
Manitoba	Additive decomposition	Multiplicative decomposition
Alberta	No ARIMA model	ARIMA Model 212 011
B.C.	3x3 seasonal moving average	3x5 seasonal moving average

Table 1 (Cont'd.)

Series	Old Option	New Option
4. Residents from Overseas		
N.S	Additive decomposition No ARIMA Model	Multiplicative decomposition Arima Model 012 011 log
Alta.	No ARIMA Model	ARIMA Model 101 011 log

The series not appearing in Table 1 retain the original set of options selected last year. Appendices A to D give the complete set of options, including the modifications listed above, for all the series.

Since this year for the first time there was a software available for removing the effect of a March Easter holiday from the series. The series were processed through this software (the X11ARIMA/88 by Dagum (1988)) in June when the April data became available. At that time those travel series that displayed significant change in movement if Easter occurred in March instead of in April as usual, referred to as having significant Easter variation, were adjusted for Easter variation. During the present annual revision the review of the Easter adjustment option was also incorporated in the analysis and the results are included in Appendices A to D. According to the analysis, all the U.S. Visitors series which are suitable for seasonal adjustment need to be adjusted for Easter variation as well. Among the Overseas Visitors, only the

need adjustment for it. The Canadian Residents Returning from the U.S. series are also significantly effected by Easter variation with the exception of the Nova Scotia series. On the other hand, none of the Canadian Residents from Overseas series exhibit significant Easter variation and consequently, no Easter adjustment is necessary for them.

The X11ARIMA/88 software has a new feature, the availability of permanent prior adjustment for series with special type of extremes. Whenever a series is seasonally adjusted using the additive decomposition, it is possible that in some extreme cases, the seasonally adjusted values are negative. Since negative numbers make no sense in the case of the traveller series, last year a manual intervention was necessary to adjust for these values. This year the process could be automated using the permanent prior adjustment feature of X11ARIMA/88. The series affected by this type of adjustment are Overseas Visitors to Saskatchewan, Yukon Residents Returning from the U.S. and Newfoundland Residents Returning from Overseas.

2. REVISION POLICY FOR THE SEASONALLY ADJUSTED INTERNATIONAL TRAVEL SERIES

Whenever a new data point is added to a series, the seasonally adjusted figures undergo significant revisions at the end of the series (the last three years). This occurs partly because with the addition of a new data point, the previous values change their relative position in the series (from last to next to last and so on) and consequently, a different set of asymmetric filters is applied to them to derive the seasonally adjusted figure and partly because the new data point carries additional information about the series that needs to be incorporated during seasonal adjustment.

In addition to the revisions inherent to the seasonal adjustment process as new data is added to the series there is a further change in the seasonally adjusted figures due to revisions in the original data which only become final after three months. To minimize the number of revisions without sacrificing the quality of the seasonally adjusted data during the normal processing of the travel series, the seasonally adjusted figures are revised as far back as the original figures (see Morry (1988)).

During the time of the annual revision of seasonal adjustment methodology, the series are usually revised back three years to reflect the improvement in reliability resulting from the incorporation of the modified seasonal adjustment options as well as from the addition of one more year of data. This year, however, there is a further factor that needs to be considered during the annual revision and that is the first release of the overnight portion of the International Travel series in seasonally adjusted form. In order to keep the total and overnight travel series consistent regarding seasonal adjustment, special care was taken to synchronize the seasonal adjustment options of the two sets of series as much as possible. Since the overnight series will be published in seasonally adjusted form starting with the 1972 data, the total traveller series need to be revised back to 1972 this year to maintain consistency between the two sets of figures. Starting next year, however, the revisions of both types of series need to go back three years only.

Appendix "A"

U.S. VISITORS (TRAVEL1)

Series	Decomp. Model	ARIMA Model	Easter Yes=2	Trading-Day	Prior Daily Weights	MAVS
Nfld.	Do not adj.					
PEI	Do not adj. [A]					
NS	Mult.	011 011 log	Yes	No=0		1
NB	Mult.	011 011 log	Yes	Yes=0	0.844,0.616,0.863,1.093,0.953,1.273,1.308	1
Que.	Mult.	011 011 log	Yes	Yes=0	0.750,0.726,0.872,0.868,1.368,1.352,1.064	-
Ont.	Mult.	011 011 log	Yes	Yes=0	0.540,0.583,1.218,0.666,1.364,1.244,1.334	1
Man.	Mult.	012 011 log	Yes	Yes=0	0.346,1.330,0.690,0.736,1.511,1.129,1.258	-
Sask.	Mult.	011 011 log	Yes	Yes=0	0.874,0.610,1.043,0.997,1.360,1.154,0.961	-
Alta.	(Add.)	012 011 log	Yes	No=0		
B.C.	(Add)	011 011 log (EM)	Yes	Yes=2		1
YNT.	Mult.	011 011 log	Yes	Yes=0	1.006,0.822,0.594,1.164,0.438,2.037,0.940	1
Total	Mult.	(011 011 log)	Yes	Yes=0	1.008,0.367,1.122,0.851,1.292,1.316,1.044	1

Encircling indicates a change from last year's option.

EM = Extremes of ARIMA model are Modified.

Appendix "B"

OVERSEAS VISITORS (TRAVEL2)

Series	Decomp. Model	ARIMA Model	Easter Yes=2 No=0	Trading-Day	Prior Daily Weights	MAVS
Nfld.	(Add.)	No	No	No	-	3
PEI	Do not adj.					
N.S.	Mult.	011 011 log	No	No	-	-
N.B.	Add.	No	No	No	-	1
Que.	Mult.	011 011 log	Yes	Yes=0	1.120,0.358,1.074,0.892,1.286,0.736,1.539	1
Ont.	Mult.	011 011 log	Yes	Yes=0	1.071,0.218,1.190,1.129,1.445,0.474,1.473	1
Man.	Mult.	(011 011 log)	No	Yes=0	0.0,2.593,0.0,2.712,1.017,0.0,0.678	1
Sask.(PP)	Add.	No	No	No	-	-
Alta.	(Add.)	011 011 log	No	No	-	1
B.C.	Mult.	011 011 log	No	Yes=0	1.005,0.232,0.868,1.631,1.009,0.267,1.990	1
YNT	Do not adjust					
Total	Mult.	(011 011 log)	Yes	Yes=0	1.126,0.328,1.090,1.216,1.188,0.622,1.422	1

Encircling indicates change from last year's option
PP permanent priors applied.

Appendix "C"

CANADIAN RESIDENTS FROM U.S. (TRAVEL3)

Series	Decomp. Model	ARIMA Model	Easter	Trading-Day	Prior Daily Weights	MAVS
Nfld.	Do not adj.					
P.E.I.	Do not adj.					
N.S.	Mult.	(011 011 log)	No	(Yes=0)	1.206,1.008,0.222,1.197,1.366,0.652,1.350	1
N.B.	Mult.	011 011 log	Yes	Yes=0	0.792,0.581,1.080,0.982,0.842,1.406,1.316	-
Que.	Mult.	012 011 log	Yes	Yes=0	1.278,0.242,0.778,1.030,0.716,1.139,1.817	1
Ont.	Mult.	011 011 log	Yes	Yes=0	0.874,0.368,1.202,0.693,0.986,1.207,1.671	-
Man.	(Mult.)	011 011 log	Yes	Yes=0	0.754,0.542,1.198,0.753,0.982,1.693,1.079	1
Sask.	Mult.	011 011 log	Yes	Yes=0	1.109,0.277,1.325,0.210,1.313,1.186,1.580	-
Alta.	Add.	(212 011)	Yes	Yes=2		1
B.C.	Mult.	011 011 log	Yes	Yes	0.898,0.783,0.372,1.324,0.694,1.104,182.5	(0)
YNT(PP)	Add.	No	Yes	No		1
Total	Mult.	011 011 log	Yes	Yes	0.726,0.666,0.934,0.879,0.869,1.202,1.724	1

Encircling indicates a change from last year's option.

PP - permanent priors applied.

Appendix "D"

CANADIAN RESIDENTS FROM OVERSEAS (TRAVEL4)

Series	Decomp. Model	ARIMA Model	Easter Yes=2	Trading-Day	Prior Daily Weights	MAVS
Nfld.(PP)	Add.	No	No			
PEI	Do not adjust					
N.S.	(Mult.)	(012 011 log)	No	Yes	1.098,0.0,1.1072.162,0.429,1.350,0.854	
N.B.	Do not adjust					
Que.	Mult.	011 011 log	No	Yes	0.435,0.687,1.086,0.250,1.182,1.709,1.851	1
Ont.	Mult.	011 011 log	No	Yes	0.515,0.719,0.736,0.746,0.828,2.031,1.425	
Man.	Add.	No	No	No		1
Sask.	Do not adjust					
Alberta	Add.	(101 011 log)	No	No		
B.C.	Mult.	011 011 log	No	Yes	1.071,0.009,1.030,1.170,0.702,1.394,1.623	1
YNT	Do not adjust					
Total	Mult.	011 011 log	No	Yes	0.643,0.596,0.927,0.717,0.916,1.748,1.454	1

Encircling indicates a change from last year's option.

PP - permanent priors applied.

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Dagum, E.B. (1988): The X11ARIMA/88 Seasonal Adjustment Method - Foundations and User's Manual, Ottawa: Statistics Canada, Time Series Research and Analysis Division.

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