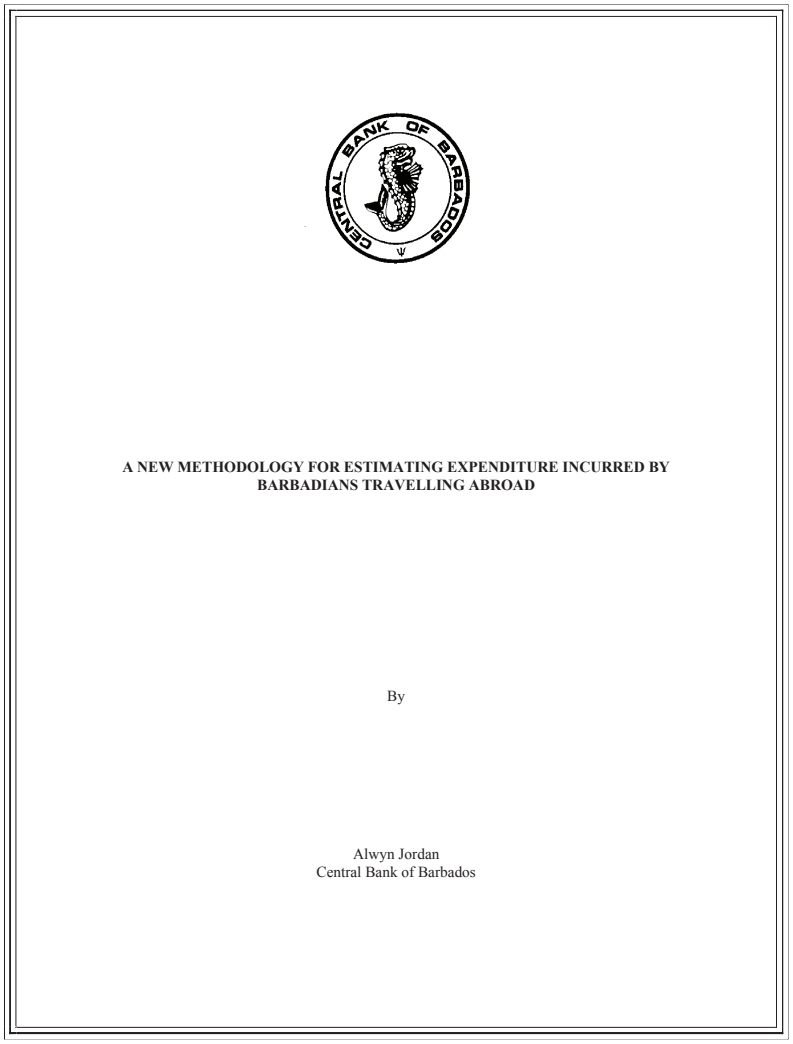

A New Methodology for Estimating Expenditure Incurred by Barbadians Travelling Abroad

Alwyn Jordan

The component Travel (according to the fifth edition of the IMF's Balance of Payments Manual (1993)) refers to the value of an assortment of services consumed by travellers[1]. For the Balance of Payments, travel is broken down into travel credits and travel debits. Travel credits are the cost of goods and services purchased by travellers who come to Barbados, while travel debits refer to the total value of goods and services purchased by Barbadian residents[2] while overseas.

Unlike travel credits, which are calculated based on information compiled by the Statistical Department and the Barbados Tourism Authority, travel debit information is not collected directly. Data on travel debits is derived mainly from foreign exchange sales to Barbadians for the purposes of holidays and business activities. This contrasts with other countries such as Canada where information for travel debits is obtained by questionnaire from residents returning from overseas.

In the context of Barbados, estimates of expenditure by Barbadians are relatively small compared to travel credits, averaging approximately 13.6% from 1997-2002. Nevertheless, given the vital role that tourism net earnings play in the Balance of Payments, more accurate forecasts of travel debits would serve to provide better analysis of the expected net foreign exchange inflows from tourism.

The paper therefore seeks to create a new framework for forecasting travel debits using a relatively new data series obtained from the Immigration Department of actual Barbadian travellers returning from trips overseas for the period 1997 to 2002 (Table 1, Appendix A), along with other variables which may influence travel debits.

---

[1] A traveller is an individual staying for less than one year in an economy of which he is not a resident for any purpose other than (i) being stationed on a military base or being an employee (including diplomats and other embassy personnel of an agency of his or her government, (ii) being an accompanying dependent of an individual mentioned under (i) or (iii) undertaking a productive activity directly for an entity that is resident of that economy.

[2] For a thorough discussion of the concept of residency, see The Balance of Payments of Barbados (2002) p. 22-24.

The current methodology for projecting travel debits for each quarter relies on the values of travel credits and exports given in the following Equation:

Equation 1

$$D_{t+f} = \left\langle \frac{1}{4}\left[\left(D_{t} \Big/ (C_{t} + E_{t}) \right) + \left(D_{t+1} \Big/ (C_{t+1} + E_{t+1}) \right) + \left(D_{t+2} \Big/ (C_{t+2} + E_{t+2}) \right) + \left(D_{t+3} \Big/ (C_{t+3} + E_{t+3}) \right) \right] \right\rangle \times (C_{t+f} + E_{t+f})$$

Where D_{it} = travel debits in quarter i of year t

C_{it} = travel credits in quarter i of year t

E_{it} = domestic exports in quarter i of year t

f = forecast year

As the equation illustrates the current methodology is inadequate because it makes the assumption that the value of expenditure incurred by Barbadians travelling overseas is linked to the value of domestic exports and travel credits in that same quarter. However, it is possible first that Barbadian travel patterns are not correlated with the travel patterns of overseas tourists and secondly, intuitively there is no real link between exports of goods and services and Barbadians travelling overseas.

Charts 1 – 7 show trends in several key variables over the 1997 to 2003 period, these are: travel credits, long-stay visitors to the island, cruise ship visitors, total arrivals, domestic exports, sales of foreign currency for travel abroad and Barbadian tourists. The most striking observation is that on average, the majority of Barbadians tend to go overseas in the third quarter (approximately 35.4% of all Barbadian travellers go abroad in the third quarter) and fourth quarters (26.1%) with the lowest numbers of residents travelling in the first quarter (15.5%) and second quarter (23.0%) respectively. In contrast, on average the bulk of long-stay and cruise visitors journeyed to the island during the first and fourth quarters respectively of each year. However, historically more cruise ship passengers came to the island during the second quarter than in the third quarter, while the situation is reversed for long-stay arrivals. The pattern of exports is also not similar to that for Barbadian tourists because the highest proportion of exports takes place in the first and second quarters while an equal proportion of export sales tend to occur in the third and fourth quarters. Moreover, the number of Barbadian tourists has been on average increasing each year over the sample period but exports have been declining.

Apart from the visual inspection, regression analysis also showed the deficiency of the use of travel credits and exports as variables in the calculation of travel debits. As mentioned previously, information on travel debits is not collected presently; however a good indicator of the trends in travel debits is the value of foreign exchange sales to Barbadians for the purpose of holiday and business trips. As Table 2 (Appendix A) illustrates, the only meaningful regression relationship using Ordinary Least Squares analysis was seen between foreign exchange sales for Barbadians travelling overseas and Barbadian tourists. This relationship is positive and significant at the 10% level reflecting the fact that historically foreign exchange sales for travel have been highest in the third and fourth quarters at about 33.8% and 25% respectively followed by the second and first quarter with 24.5% and 16.5% of total foreign exchange sales in that order. All of the other results are counter-intuitive since they indicated that if the independent variables expanded, then the amount of foreign exchange sales to Barbadians would contract.

New Methodology

The new technique therefore seeks to improve the current methodology by using historical data for the number of Barbadians travelling overseas from 1997 to 2002. As was stated previously there is a positive and significant relationship between Barbadian tourist data and foreign exchange sales for the purpose of holiday and business travel. Hence it seems plausible to use forecasts of Barbadian tourists for a particular quarter as one of the variables to obtain future values for travel debits.

To forecast Barbadian tourists however, the author relied on instruction from the Balance of Payments Compilation Guide (1995). One of the variables suggested to model travel statistics was the impact of economic activity on the travel plans of locals. Hence, several regression models using Barbadian tourists as the dependent variable and real GDP as the independent

variable were attempted for the interval 1997:1 to 2003:2 and the best results are shown in Table 3 (Appendix A).

An investigation of the R^2 values shows first that the number of Barbadians travelling in the current period seems to be more strongly influenced by the level of real GDP lagged two periods than on real GDP lagged one period or current period real GDP, indicating perhaps that Barbadians tend to assess the current economic situation then make their travel plans in subsequent periods. The low values of both the R^2 and Durbin-Watson statistic suggest that there are omitted variables from the equation, however, since the aim of the regression was to find a variable which was correlated with he local tourists figures rather than explaining the reasons for local travel, the models estimated seemed adequate. Based on the regression results, model 3 was chosen as the best model and forecasts for Barbadians travelling overseas were obtained from real GDP projections.

The next step involved forecasting values for travel debits from 2003:3 to 2005:4. In order to accomplish this a regression equation had to be constructed using variables, which would be significant in explaining travel debits. The first variable settled on was Barbadian tourists based on the discussion presented above, while the inflation rate was the second variable chosen. The inflation rate was selected because it could be postulated Barbadian travellers' expenditure would be influenced by the inflation rates in the economies in which the purchases occurred and since most of the price increases experienced in Barbados are due to imported inflation, this would be a good proxy for a composite of the inflation rates of our major destinations[3]. Unfortunately the coefficient associated with the inflation variable was not significant, therefore equation 2, which uses Barbadian tourists as the independent variable along with an AR(1) to correct for residual serial correlation was used to estimate travel debits. The forecast was then conducted using a static forecast, which calculated a sequence of one step ahead estimates, using actual rather than projected values for the lagged dependent variables. The results of the new estimation technique along with the old methodology are shown in Charts 8 – 10.

[3] N.B. the BOP Compilation Guide also suggested using exchange rates as an independent variable, however this was not attempted since one of the major destinations for Barbadian tourists is the United States whose currency has been tied to the Barbados currency since 1975.

Equation 2

$$TDebits_{it+f} = \underset{(5.79)}{25422320} + \underset{(1.20)}{788.76\ Btour_{it+f}} + 0.39\,AR(1)$$

$$R^2 = 0.616 \qquad Durbin - Watson = 1.77$$

where: $TDebits_{it+f}$ = Travel Debits in quarter i of year t+f

$Btour_{it+f}$ = Barbadian Tourists in quarter i of year t+f

( ) = values are standard errors

Conclusions and Recommendations

As charts 8 – 10 show, the forecasts using the new methodology are similar to the values obtained using the old format. Surprisingly the old and new methodology provide a similar quarterly distribution for travel debits, with the majority of the debits occurring in the third and fourth quarter, however, the new forecasting technique predicts a more realistic expansion pattern in travel debits on a yearly basis. In 2004 and 2005 growth in debits is predicted to be 5.4% and 3.7% respectively under the new model, however, the increase is projected to be 4.7% and then a mere 0.3% under the old methodology. This result seems counter-intuitive given that the economy is expected to continue to improve in 2004 and 2005, which indicates that Barbadians will have no reason to significantly reduce the growth in their travel expenditures. Given the improvements in the results, the new model is perhaps the preferred model and should therefore be incorporated into the Central Bank's forecasting methodology.

References

The Balance of Payments of Barbados, 2002, p. 22-24

The Central Bank of Barbados' Forecasting Model

The IMF's Balance of Payments Compilation Guide, 1995, pp. 122-124.

The IMF's Balance of Payments Manual, 1993, pp. 64-65.

Survey Form of Returning Nationals of the Government of Canada

Appendix A

Table 1
Number of Barbadians Travelling Overseas*

	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		
Years	**Holiday**	**Work**	**Holiday**	**Work**	**Holiday**	**Work**	**Holiday**	**Work**	**TOTAL**
1997	4512	5887	11863	4022	23861	4427	17967	4846	77385
1998	6228	5372	10506	2687	18477	2145	12152	2489	60056
1999	4373	5819	16080	4342	31862	4577	22423	5135	94611
2000	7166	10872	21640	5618	32603	4866	22454	5881	111100
2001	8150	11112	19805	5870	32174	4986	18816	5031	105944
2002	6509	11213	21043	5681	16978	22238	24064	5891	113617
2003	10185	8775	19600	5727	N/A	N/A	N/A	N/A	54603

Source: The Immigration Department
* Data prior to 1997 not reliable

Table 2
Results of Ordinary Least Squares Regressions using Sales of Foreign Exchange from Commercial Banks for Holiday and Business Travel Abroad as the Dependent Variable

Independent Variable	**Coefficient**	**Probability**	**R^2**	**Durbin Watson Statistic**
Travel Credit	-75721.28	0.00	0.33	1.53
Exports	-24012.56	0.80	0.00	1.70
Barbadian Tourists	378.51	0.10	0.11	1.45
Cruise Arrivals	-97035.1	0.01	0.26	1.64
Long-Stay Arrivals	-175858.8	0.35	0.04	1.57
Total Arrivals	-82505.97	0.01	0.24	1.58

Table 3

Regression Results

Model	**Dependent Variable***	**Independent Variable***	**Coefficient**	**Probability**	**R^2**	**Durbin Watson Statistic**
1	Barbadian Tourists	RealGDP	-0.000172	0.000171	0.040	1.069
2	Barbadian Tourists	RealGDP(-1)	0.000347	0.000134	0.219	1.392
3	Barbadian Tourists	RealGDP(-2)	0.000409	0.0013	0.355	1.182
4	LBarbadian Tourists	LRealGDP	-1.979	0.3083	0.0432	0.908
5	LBarbadian Tourists	LRealGDP(-1)	4.0485	0.0097	0.248	1.212
6	LBarbadian Tourists	LRealGDP(-2)	4.430	0.0014	0.35	1.176

*L = log of variable

Chart 1

Travel Credits

(1997:1 – 2003:2)

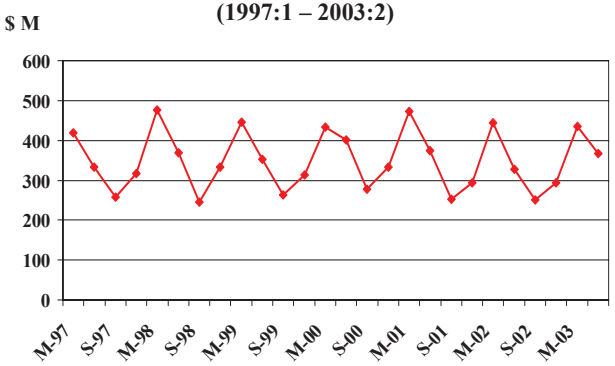

Chart 2

Long-Stay Arrivals

(1997:1 – 2003:2)

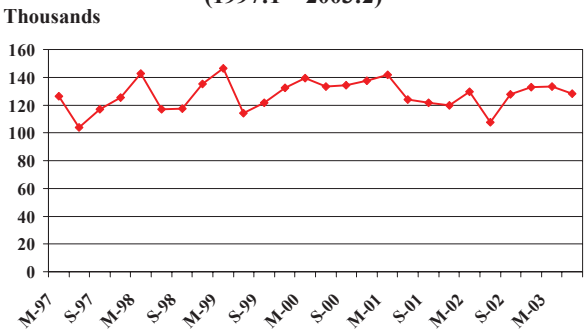

Chart 3

Cruise Arrivals

(1997:1 – 2003:2)

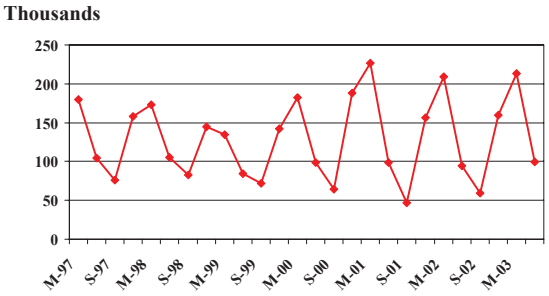

Chart 4

Total Arrivals

(1997:1 – 2003:2)

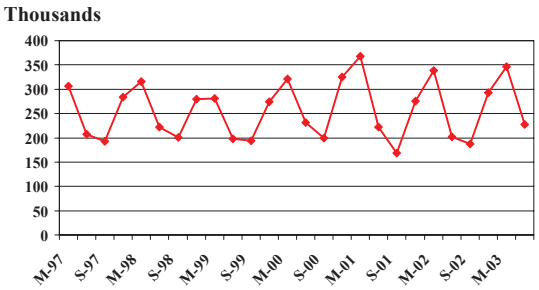

Chart 5

Domestic Exports
(1997:1 – 2003:2)

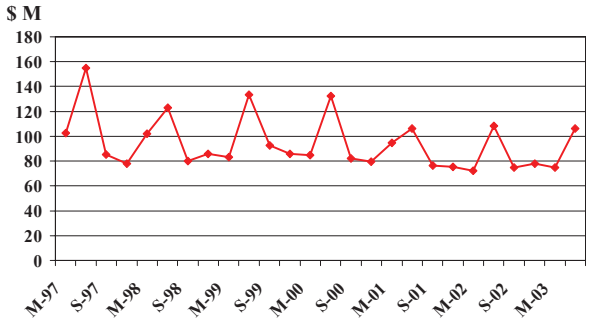

Chart 6

Foreign Exchange Sales to Barbadian Holiday and Business Travellers
(1997:1 – 2003:2)

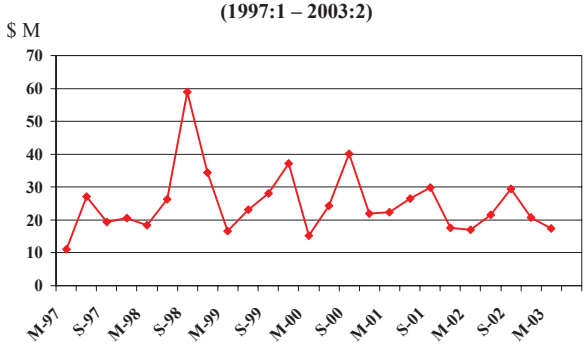

Chart 7

Barbadian Tourists
(1997:1 – 2003:2)

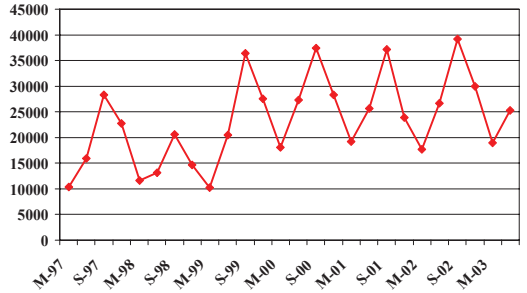

Chart 8

Travel Debits Forecasts (Old Methodology)
(1997:1 – 2005:4)

Thousands

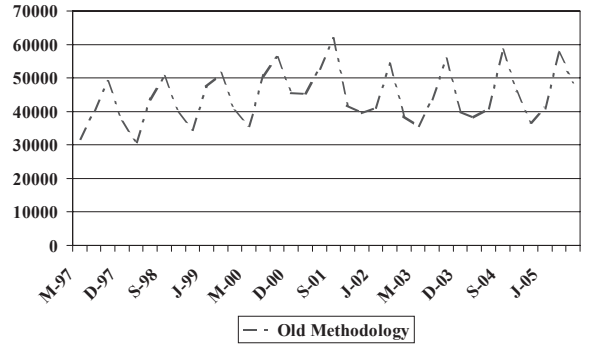

Chart 9

Travel Debits Forecasts (New Methodology)

(1997:1 – 2005:4)

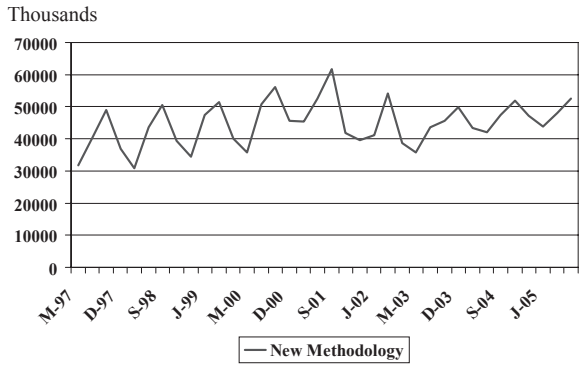

Chart 10

Comparison of Travel Debits Forecasts

(1997:1 – 2005:4)