Collection Trends, Classification of Expense Heads and Avoidance of Fringe Benefits Tax

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The government claims that the Fringe Benefits Tax has been introduced to tax those kinds of fringe benefits which are collectively enjoyed by employees in the form of facilities/amenities and therefore difficult to identify, segregate and apportion among beneficiaries for taxation. Accordingly, the tax liability has been fixed on employers, and not on the employees.

FBT collection data for first two years (2005-06 and 2006-07) have been analysed to gain a deeper insight for fine-tuning. Some statistical tests have been conducted. The test of equality of two proportions for a large sample shows that the proportion of FBT collection under different heads has remained the same over the two years. The chi-square test for equality of proportion shows that this proportion has remained the same for most sectors. However, the chi-square test for homogeneity of sample data for each sector and each head indicates that sample data are not homogeneous. It points towards arbitrary booking of expenses under different heads, perhaps to avoid FBT.

The present article is a partial summary of an empirical research study on fringe benefits tax conducted by the author on sponsorship from the Central Board of Direct Taxes, Ministry of Finance. The article summarises the results of advanced data analysis and statistical tests of the research report. This follows another article published in EPW (16 August 2008).

The views expressed in this article are the personal opinions of the author and do not represent the views of the Government of India.

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1 Introduction

There is no universally accepted definition of "fringe benefits". It is generally accepted that fringe benefits provided by employer to employees cover all advantages, other then monetary salary and wages, in consequence to services rendered. Thus, they are part of employees' overall remuneration packages, but they are mostly not in the form of cash payments. Some exception can also arise, for example entertainment allowances or other cash expense allowance granted/reimbursed to an employee which exceeds his actual expenses incurred. Some time, an employer may have a statutory obligation also to provide a benefit (for example, the Employees Provident Fund contribution by employers). In some countries, including India, a distinction is made between wages/salaries in kind (often called perquisites in those countries) and other fringe benefits.

The meaning of the Fringe Benefits Tax (FBT), the tax payable, tax base and rates have been discussed in the article published in this journal on 16 August 2008. That article also discusses the research design and data collection of the larger study.

2 Research Approach and Collection Pattern

We discuss below the approach in this paper and the collection pattern.

2.1 Collection Summary

FBT collection was Rs 4,772.3; Rs 5,323 and Rs 6,743 crore in the first three years of its operations, the financial years 2005-06, 2006-07 and 2007-08, respectively. As a percentage of total direct tax collection, it translates only to around 2.8%, 2.3%, and 2.2%, respectively in the three years. But, for a resource starved country, an additional Rs 6,000-7,000 crore is not a small sum. Further, FBT collections show an ABC pattern, similar to that of corporate income taxes. The collection data was analysed by classifying business/economic activities into 22 sectors of the economy. Banking, petrochemical, infotech, and insurance are found to be some of the important contributing sectors. Similarly, "Employee Welfare", "Conveyance", "Telephone", "Running of Car", "Sales Promotion" are some of the important contributing heads. It has been found that overall, the top 10 "heads" are contributing more than 90% and that the bottom five "heads" are contributing around 2% of FBT collection. A "head-wise" and "sector-wise" summary has been incorporated in Tables 1 and 2 (p 61). A detailed analysis of sector-wise and head-wise FBT collection has already been done in a separate article (Kishore 2008).

3 Statistical Tests and Inferences

There are certain questions and issues which have arisen during the preliminary analysis of the collection data. Some of these are: Are the overall collection patterns of FBT in the two years of its operation similar? Are these patterns similar even for different sectors of the economy? Can we conclude something about the collection pattern with certainty using some statistical test? Is the collection of FBT from an individual taxpayer dependent on the "economy sector" or on "heads" or on both? What do the top 10 and bottom five "heads" signify? Can the bottom five heads be removed from the FBT system without affecting the collection? Can we infer something about booking of expenses and uniformity of sample data? To address most of these issues, certain statistical tests have been conducted to get some rigorous and dependable inferences.

Statistical tests were conducted at three levels of collection data of the FBT. First, at the level of overall FBT collection to check equality of collection pattern under each head for the first two years. Second, tests were conducted separately for each of the 'economy sectors' to test the equality of proportion of collection under each head for the first two years. To measure the interaction between the "economy sectors" and "FBT heads", a two-factor ANOVA was also conducted. Lastly, tests were conducted to see the homogeneity of proportion of collection in sample data for each combination of "head" and "sector". For all the tests, collection of FBT from each "head" was converted into proportion of total FBT collection. Some other modifications were also made in the data which are explained in the coming paragraphs.

4 Test of Equality of Proportion Over the Years

This section presents the results of test of equality over the two years, 2005-06 and 2006-07.

4.1 The Test

The first statistical test is a comparison of total FBT collection under each head for first two years to check whether the proportion contribution by each head has statistically remained the same. A hypothesis test called "large sample test for the difference between two population proportions" has been used. It is a parametric test which checks whether there is statistically significant difference between two population proportions.

The raw data of FBT collection for two years are not strictly comparable. This is due to change in provisions relating to expense head "Contribution to Superannuation Fund" and due to breaking up of the head "Conveyance, Tour and Travel" into two heads, namely, "Conveyance" and "Tour and Travel" with a reduced base of 5%. Therefore, before conducting the tests, the data has been modified in the following way:

- Collection from the head contribution to Superannuation Fund has been taken out from the data before calculating the proportion and the proportions have been calculated on the reduced total.
- To take care of second issue, the figures for 2006-07 for the head tour and travel was multiplied by four and then added to the collection figures of the head conveyance. In this way, the collection figures/proportions of 2006-07 under the heads conveyance and tour and travel become comparable to the

Table 1: Results of 17 Tests for Equality of Proportion for Each Head of FBT

Sr No	FBT Heads	Percentage Contribution in Total Collection*		Test Statistics (Z)	Null Hypothesis Ho: $p_1=p_2$
		2006-07	2005-06		
1	Employee welfare	22.1	10.7	0.3638	Accepted
2	Conveyance, tour and travel	20.6	18.2	0.1785	Accepted
3	Rep, runn, dep on car	9.3	4.7	0.1066	Accepted
4	Telephone	9.3	5.2	0.2568	Accepted
5	Sales promotion (and publicity)	8.9	4.9	0.5311	Accepted
6	Use of hotel, boarding	8.5	3.2	0.0155	Accepted
7	Gifts	5.5	2.2	0.0672	Accepted
8	Conference	3.8	1.7	0.9169	Accepted
9	Rep, runn, dep on aircraft	1.6	0.7	0.2063	Accepted
10	Hospitality	1.4	0.6	0.1396	Accepted
11	Entertainment	1.4	0.7	0.6027	Accepted
12	Maintenance of guest house	1.2	0.6	0.0085	Accepted
13	Scholarships	0.7	0.4	0.0609	Accepted
14	Other club	0.4	0.3	0.0846	Accepted
15	Festival celebration	0.4	0.2	0.2115	Accepted
16	Free/concessional ticket	0.3	0.2	0.5336	Accepted
17	Health club	0.1	0.1	0.0832	Accepted

* The figures are rounded and are also adjusted to the extent that "Conveyance, Tour and Travel" has been two separate heads in 2006-07, percentage contribution by head "Contribution to Superannuation Fund" was 4% and 45% during 2006-07 and 2005-06 respectively, which is not reflected in the table above. It should also be noted that these percentage figures are not the same as p_1 and p_2 used in conducting the tests.

collection figures/proportions of the head conveyance, tour and travel of 2005-06.

These two adjustments have made data fully comparable and has given 17 heads on which a test of equality of proportion has been performed. The sample size is large enough (350 each in both the years) so that the distribution of proportions of FBT from each head as a per cent of total FBT can be approximated by a normal distribution. Therefore, the difference between two sample proportions (for the two years under consideration) is also approximately normally distributed and this gave rise to a test of equality of sample proportion based on the standard normal distribution.

We take p_1 = proportion of FBT collection from a head to total FBT, for the year 2006-07 and p_2 = Proportion of FBT collected from a head to total FBT, for the year 2005-06.

Then, we have the null hypothesis, $H_0: p_1 = p_2$ and the alternate hypothesis, $H_1: p_1 \neq p_2$ [1]

4.2 Test Results and Conclusions

This test was conducted for each heads of FBT separately, thus totalling 17 tests. The results of these tests are shown in Table 1. (The table also shows percentage contribution by each head of FBT in the total collection for the financial year 2006-07 and 2005-06, although with some adjustments.) It can be seen that the null hypothesis is accepted in case of all the heads of FBT. This means that in totality, the proportion of contribution by each head of FBT in the total FBT collection is not significantly different for both the years. Further, the value of Z statistics is always less then 1.00 and in many cases it is even less than 0.50. This means that the null hypothesis would be accepted even at a stronger level of confidence. Therefore, it can be said that the proportion of collection by different heads in the two years has remained the same and statistical evidence to support this hypothesis is very strong.

This means that we have strong statistical evidence to conclude that the proportion of collection of FBT from different heads has remained same over the two years. This points towards an overall stability in FBT regime and FBT collection from the very first year of its operation.

5 Chi-Square Tests

This section carries out a test of equality of proportion over the years for each economy sector.

5.1 The Test

The next logical step in this direction is to test the equality of proportion of FBT for each head over the two years, as done previously, but separately for each of the 22 sectors of the economy. In this way, we would be attempting to ascertain as to whether the collection pattern of FBT for each head over the two years has statistically remained the same or not, separately for each of the economy sectors.

At first instance, it would appear that the same test as done previously can be conducted in this case also, separately for all the 22 sectors of the economy. However, doing the same test as in the previous section is not appropriate in the present situation because the sample size for each sector of economy is small, often less then 30 which violates the presumption of large sample size and assumption of resultant normality of distribution. Further, sample sizes are also not equal for different sector of the economy as well as across years for each sector of the economy. Therefore, a non-parametric test, the chi-square test for equality of proportion has been conducted. Many of these stringent assumptions of parametric tests are not necessary in chi-square test and it is more appropriate in the present situation.

Table 2: Summary Results of Chi-Square Test for Equality of Proportions of Head-wise FBT Collection for Each Economy Sector

Sr No	Economy Sector	Percentage Contribution in Total Collection (2006-07)	X^2 Statistics	Null Hypothesis Ho: $p_1 = p_2$
1	Banking	15.5	2.2030	Accepted
2	Petrochemical	8.7	4.1032	Accepted
3	Infotech-software	8.5	5.9995	Accepted
4	Infotech-ITES	6.5	19.7771	Accepted
5	Insurance	6.1	29.0183	Rejected
6	Elect/electronics manufacturing	5.4	3.9897	Accepted
7	Services-financial-consultancy	5.2	3.3607	Accepted
8	Telecom service	5.1	9.2342	Accepted
9	Engg manufacturing	4.4	43.1121	Rejected
10	Pharma-drugs-biotech	4.1	15.0360	Accepted
11	Power-energy	3.9	41.4008	Rejected
12	Diversified	3.8	4.6591	Accepted
13	Automobile-ancillary	3.3	7.7707	Accepted
14	Minerals-metals	3.3	3.3925	Accepted
15	Steel	2.7	1.6843	Accepted
16	FMCG-consumer goods	2.5	4.9539	Accepted
17	Transport-hotel-storage	2.3	17.9197	Accepted
18	Agro-food-beverage	2.3	6.8788	Accepted
19	Construction	2.0	16.3344	Accepted
20	Trading-retail	1.5	5.4992	Accepted
21	Media-entertainment	1.4	10.2717	Accepted
22	Chemical-fertiliser	1.3	5.8329	Accepted

Twenty-two separate chi-square (X^2) tests have been conducted, one each for each of the sectors of the economy. For each test, in this model, there are two populations, being the proportion of FBT for two years and there are 17 categories of proportions within each population, one each for each head of FBT. Null hypothesis in this case is that the proportion of each head of FBT is equal across both the populations. The alternative hypothesis is that not all proportions are equal across all populations.[2]

In the present analysis, confidence level of 95% is taken and the critical value at this confidence level with 16 degrees of freedom is 26.2962. Thus, if the test statistics, i e, X^2 value calculated is less then the critical value, the null hypothesis is accepted, otherwise it is rejected. When the null hypothesis is accepted for a particular sector of economy, it is concluded that the proportion of FBT collection for each head is statistically same for both years being compared. Otherwise, it is not the same.

Here again, before conducting the tests, the collection data has been modified in the same way as done in the previous test to make the figures/proportion of collection of two years comparable.

5.2 Test Results and Conclusions

Separate tests have been performed for each sector of the economy. Thus, in effect, 22 chi-square tests were conducted. The results are summarised in Table 2. (The table also incorporates percentage contribution by each sector of the economy in total collection of FBT for the financial year 2006-07.) It is found that in 19 sectors, the null hypothesis has been accepted whereas it has been rejected only for three sectors. Therefore, it can be concluded that the proportion of collection form different heads of FBT has more or less remained the same over the two years even when the data is examined for each of the economy sector separately.

The null hypothesis has been rejected for insurance, engineering manufacturing' and the power-energy sectors. It points towards the fact that for these sectors of the economy, FBT collection data for different heads of expenses are showing a large variation in two years thereby leading to more variability. A further look into major contributor for the high value of X^2 statistics has shown the heads gifts, employee welfare and sales promotion with major fluctuation in per cent contribution, year to year, thereby contributing to rejection of null hypothesis for these three economy sectors. Further, the least value of X^2 statistics has been found for sectors like steel, banking, minerals and metals, services-financial-consultancy, which imply that FBT collection pattern under different heads has shown very strong homogeneity during the two years for these sectors.

6 Test of Homogeneity of Sample Data

This section presents the analysis of variance (ANOVA) and chi-square test for the economy sectors and FBT heads.

Table 3: Banking Sector – Summarised Results of Chi-Square Tests for Homogeneity of Sample Data

Sr No	FBT Head	X^2 Statistics	Null Hypothesis: $p_0 = p_1 = \ldots = p_n$
1	Employee welfare	231.53	Rejected
2	Conveyance	241.82	Rejected
3	Telephone	139.04	Rejected
4	Rep, runn, dep on car	221.23	Rejected
5	Sales promotion (and publicity)	204.17	Rejected
6	Use of hotel, boarding, etc	467.94	Rejected
7	Tour and travel	73.21	Rejected
8	Gifts	337.39	Rejected
9	Contribution to Superannuation Fund	1388.68	Rejected
10	Conference	133.67	Rejected
11	Rep, runn, dep on aircraft	–	–
12	Entertainment	231.53	Rejected
13	Hospitality	241.82	Rejected
14	Maintenance of guest house	139.04	Rejected
15	Scholarships	221.23	Rejected
16	Festival celebration	204.17	Rejected
17	Other club	467.94	Rejected
18	Free/concessional ticket	73.21	Rejected
19	Health club	337.39	Rejected
	Sample size (n) = 38	Degrees of Freedom = (n-1) = 37	
	Critical value of X^2 at 95% confidence level = 52.16		

6.1 Chi-Square Test for Each Combination

The first two levels of tests have shown broad homogeneity of collection data. The last levels of tests have been conducted to check the homogeneity of collection proportion in case of individual samples in a particular combination of sector and head. All 22 economy sectors are taken one by one and chi-square test for homogeneity of sample data has been conducted for each of its 19 FBT heads. It has been checked whether individual FBT payers in a particular combination of the economy sector and FBT head have a statistically similar pattern of contribution. For example, in the automobile-ancillary sector, wherein the sample consisted of data from 17 individual FBT payers, it is checked whether per cent contribution[3] from a FBT head, say employee welfare from each of these 17 taxpayers in sample, is statistically homogeneous or different. In essence, it is tested whether the FBT collection proportion shown by individual samples in a particular combination of sector and head are statistically equal to the average proportion of that particular combination. Since same types of business generally have similar kind of expense patterns, in the ideal situation, the sample data are expected to show some statistical homogeneity.

6.2 Two-Factor ANOVA

However, before doing these chi-square tests, a two factor ANOVA has been conducted to test whether there are differences in proportion of FBT collection from different heads and from different economy sectors – being two factors. The main idea is to test whether there are differences in proportion of FBT collection from different heads and from different economy sectors. In effect, it has been tested as to whether collection of FBT from a taxpayer is dependent on "economy sectors" or on FBT heads or on both and it what fashion. For this purpose, a two-factor ANOVA with different observation per cell has been conducted. The combined effect of both these factors, beyond what is expected from the consideration of each effect separately, called the interaction effect, has been found by calculating mean squares of two factors and mean squares error.

The F-ratio for interaction effect has been calculated as 10.002. The critical value of F-ratio has been found to be 1.22 at the 0.05 level of significance, with the given level of numerator and denominator degrees of freedom.[4] Thus, test statistics of F ration of 10.002 indicated a very strong interaction effect among the two factors – sector and head, leading to separate chi-square tests for all possible combinations of these two factors.

6.3 Classification of Expenses

The chi-square test is relevant in analysing another significant issue being classification and booking of expense. As of now, there is no standard procedure or classification system for booking of expenses and its accounting treatment by business organisations. It depends solely on the accounts/finance department to devise/determine a head, and book an expense under a head. No guidelines or accounting standard have been issued by Institute of Chartered Accountants of India (ICAI) for this purpose. What is generally found in the books of account of large organisations is a broad four or fivefold classification of all expenses into manufacturing, selling, employees, administrative and miscellaneous expenses heads. These broad heads are then subdivided into various specific heads for booking of expense and there is no uniformity even for naming of such a specific head. This gives complete discretion to an organisation for classifying and booking an expense. The classification issue is a complex one. It should also be realised that due to complex nature of modern business enterprises and diversity in nature and type of expenses incurred in the course of business, it is

Table 4: Petrochemical Sector – Summarised Results of Chi-Square Tests for Homogeneity of Sample Data

Sr No	FBT Head	X2 Statistics	Null Hypothesis: $p_0 = p_1 = \ldots = p_n$
1	Employee welfare	85.96	Rejected
2	Conveyance	34.24	Rejected
3	Telephone	7.15	Accepted
4	Rep, runn, dep on car	104.00	Rejected
5	Sales promotion (and publicity)	891.79	Rejected
6	Use of hotel, boarding, etc	285.98	Rejected
7	Tour and travel	175.21	Rejected
8	Gifts	56.76	Rejected
9	Contribution to Superannuation Fund	2045.67	Rejected
10	Conference	54.83	Rejected
11	Rep, runn, dep on aircraft	98.02	Rejected
12	Entertainment	2.05	Accepted
13	Hospitality	22.51	Rejected
14	Maintenance of guest house	32.68	Rejected
15	Scholarships	15.94	Accepted
16	Festival celebration	7.25	Accepted
17	Other club	4.75	Accepted
18	Free/concessional ticket	47.80	Rejected
19	Health club	9.11	Accepted
	Sample size (n) = 10	Degrees of Freedom = (n-1) = 9	
	Critical value of X^2 at 95% confidence level = 16.92		

very difficult to have a practicable classification system and standardised booking of expense.

It has been noted during preliminary data analysis that out of the bottom five heads, four heads are those heads where the base/valuation rate is 50% of total expense. Further, these four heads are such where the expense made for these purposes can also be booked under other heads of expense, notably under employee welfare. The head employee welfare is a general type of head which can include expenses incurred for providing scholarship, festival celebration, etc, and doing so would perfectly be within the four corners of law. However, when done so, it will have the impact of reducing the FBT liability due to differential valuation base for these heads of expense. Prima facie, it may be the reason why the heads with 50% base are least contributing and also why the head employee welfare is the largest contributing head. However, it would have been too naïve to arrive at such a conclusion on the basis of above simplistic notion.

The present tests could give us the required insight. It is safe to assume that there would be a kind of homogeneity in the nature of expense incurred by entities engaged in same economic/business activity. That is, for infotech-ITES sector as a whole, it can be assumed that expenditure incurred on some head, say telephones as a proportion of total expense or some other similar parameter would be similar for many/most of individual taxpaying entities. Following this logic, if this being the case, collection of FBT from a head as a proportion of total FBT collection in case of each individual taxpayer in the sample should show statistical homogeneity/equality for each combination of head and sector. If this is not the case, there is some indication to believe that the sample data are heterogeneous and that perhaps booking of expense is arbitrary.

6.4 The Test and the Model

The chi-square test has been used again as test of homogeneity of sample data. The test has been conduced for the year 2006-07 only because the data for this year is more stable and balanced. The null hypothesis in this case is that the proportions of FBT collection from all individual taxpayers in the sample of a given combination of sector and head are statistically similar (to that of the average value). Alternatively, at least one sample proportions is not equal. Separate chi-square tests have to be conducted on sample data set/cells present in each possible combination of head and sector.[5]

We define p_o as the sample average of proportion of FBT collection for a particular combination of sector and head. p_o can also be called expected proportion or average proportion.

The chi-square (X^2) statistics is then calculated as follows

$$X^2 = \sum_{i=1}^{n} \frac{(p_i - p_o)^2}{p_o}$$

with (n–1) degrees of freedom.

The chi-square statistics calculated are compared with the critical value of chi-square distribution for the required degree of freedom and confidence level (taken to be 95% in this case). For each of the economy sectors, sample sizes are different which gave different n and different values for degree of freedom as (n-1). The sample size of different sectors of the economy varies between 38 (banking) and 7 (steel). Accordingly, the critical values of X^2 are different for different sectors of economy as they depend on size of sample also. Finally, if the test statistics, i e, X^2 value calculated is less than the critical value, null hypothesis is accepted, otherwise it is rejected.

6.5 Test Results and Findings

A total of 418 chi-square tests were to be conducted, one each for each possible combination of sector and head (22 sectors × 19 heads). However, in 18 instances involving the heads "Free ticket" and "Rep, Runn, Dep of Aircraft" for different economy sectors, there were no data points and therefore, no test could be conducted. Thus total number of chi-square tests actually conducted are (400 = (22 × 19) – 18).

Test results for two sectors of the economy banking (18 tests) and petrochemical (19 tests), being the two largest contributing sectors, for all the heads are given in Tables 3 and 4 (p 63). In case of banking, null hypothesis has been rejected in all the 18 tests, i e, for all the heads implying thereby that the sample data is not homogeneous even for a single combination. For the petrochemical sector, the null hypothesis has been rejected in 13 tests, i e, for 13 heads and accepted in six tests, i e, for six heads showing some homogeneity in sample data for accepted heads.

Table 5: Summary Results of 400 Chi-Square Test for Equality of Sample Proportion

Sectors of Economy	Heads of FBT																		
	EW	Cnv	Tel	Car	Slp	Hot	Tor	Gft	Sup	Con	Air	Ent	Hos	GH	Sch	Fes	OC	Tkt	HC
Bnk	R	R	R	R	R	R	R	R	R	R	x	R	R	R	R	R	R	R	R
Petr	R	R	A	R	R	R	R	R	R	R	R	A	R	R	A	A	A	R	A
Inf-S	R	R	R	R	R	R	R	R	R	R	x	R	R	R	R	R	R	R	A
Inf-I	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	x	R
Insur	R	R	R	R	R	R	R	R	R	R	x	A	R	A	R	A	R	x	R
EleM	R	R	R	R	R	R	R	R	R	R	x	R	R	R	R	R	A	x	R
SeFC	R	R	R	R	R	R	R	R	R	R	x	R	R	R	R	A	A	R	R
Tele	R	R	R	R	R	R	A	R	R	R	x	A	R	R	A	A	A	x	A
EngM	R	R	R	R	R	R	R	R	R	R	R	R	R	R	A	R	R	x	A
PhDr	R	R	R	R	R	R	R	R	R	R	R	A	R	A	A	A	R	x	A
PowE	R	R	R	R	A	R	R	R	R	R	R	A	R	A	A	A	R	x	R
Divr	R	R	R	R	R	R	R	R	R	R	R	R	R	A	A	A	A	R	R
Auto	R	R	R	R	R	R	R	R	R	R	R	R	R	R	A	A	R	R	A
MinM	R	R	A	R	A	R	A	R	R	A	R	A	R	A	R	A	A	A	A
Stl	R	R	A	R	A	R	A	R	R	A	R	A	A	A	A	A	A	x	A
FMCg	R	R	R	R	R	R	R	R	R	R	x	A	R	A	A	A	A	x	A
TrHC	R	R	R	R	R	R	R	R	R	R	R	R	R	R	A	A	A	R	A
AgFd	R	R	A	R	R	R	R	R	R	R	R	R	A	R	A	R	R	x	R
Const	R	R	A	R	R	R	A	R	A	R	R	R	R	R	A	R	A	x	A
TrRtl	R	R	R	R	R	R	R	R	R	R	R	A	R	R	A	A	R	A	A
MeEn	A	R	A	R	R	A	R	R	R	R	R	A	R	A	A	A	A	R	R
ChFrt	R	R	A	R	R	R	R	R	R	A	R	A	R	R	A	A	A	A	A

R = Null hypothesis Rejected
A = Null hypothesis Accepted
X = No test conducted due to absence of data

6.6 Summary of Results and Inferences

Thus, in total, 400 chi-square tests have been conducted for all combinations of sectors and heads. However, it is difficult to find meaningful patterns, inferences and insights form the results of such a large number of tests at first sight. Therefore, we look deeper into the results by summarising them. Table 5 (p 64) presents the results of all the 400 chi-square tests in the form of a matrix. The heads of FBT has been listed horizontally while the sectors of the economy have been shown in vertical fashion. Thus, each cell of the matrix represents the result of chi-square test for the sample data represented by that cell. R represents the cases when the null hypotheses have been rejected (and therefore, we concluded that the sample data is heterogeneous) whereas A represents the cases where the null hypotheses have been accepted (and we concluded that the sample data is showing homogeneity). X marks the cells where no test has been conducted due to lack of data. Out of total tests, in 99 instances, which is around 25% of total number of tests, the null hypothesis has been accepted. Therefore, overall, it can be concluded that there is not much statistical evidence to accept the null hypothesis and accordingly it is difficult to conclude that the sample data is homogeneous.

It is not the individual test results that are significant but the summary of these and the pattern of these results which throws valuable insights. From Table 5, we notice that the upper left corner has very few acceptances of null hypothesis whereas the occurrences of acceptances of null hypothesis increases in the right side of the matrix, which represents the least contributing heads, thereby implying that the sample data is more homogeneous for this portion of the matrix. We also note that the head-wise pattern is more discernible than the sector-wise pattern. Accordingly, Table 6 further summarises the occurrences of acceptance of null hypothesis in absolute and percentage terms for each of the FBT heads. The heads has been listed in decreasing order of their contribution in total collection. The table has been horizontally divided into two parts, thus listing the top 10 and bottom nine heads separately.

Now, two distinct patterns are clearly discernable. In the case of the top 10 heads, the occurrences of acceptance of null hypothesis are mostly between 0% and 15% except for the head Telephone. For this group of top 10 heads, overall, the null hypothesis has been accepted in 20 out of 220 (22 sectors × top 10 heads) instances of tests which give an acceptance of 9%. For the heads conveyance, gift and maintenance of car, the null hypothesis has not been accepted even once. This shows that for these heads of expenses, the data of individual taxpayers are very heterogeneous.

It is easy to notice that in case of the bottom nine heads, the occurrences of acceptance of null hypothesis have suddenly increased and are in the range of 30% to 70% for all the heads except for hospitality and rep, runn, dep on aircraft. Overall, for the bottom nine heads, 180 chi-square tests have been conducted out of which, in 79 instances (43%), null hypothesis of equality/homogeneity of sample data has been accepted.

Table 6: Chi-Square Test: Occurrence of Acceptance of Null Hypothesis for FBT Heads

Hd Rk	FBT Head	Valuation Base (As % of Expense)	No of Tests Conducted	Number of Instances of Accepting Null Hypothesis	Percentage of Acceptance of Null Hypothesis
1	Employee welfare	20	22	1	4.5
2	Conveyance	20	22	0	0
3	Telephone	20	22	7	31.8
4	Rep, runn, dep on car	20	22	0	0
5	Sales promotion (and publicity)	20	22	3	13.6
6	Use of hotel, boarding, etc	20	22	1	4.5
7	Tour and travel	5	22	4	18.2
8	Gifts	50	22	0	0
9	Contribution to Superannuation Fund	100@	22	1	4.5
10	Conference	20	22	3	13.6
	Total		220	20	9.1
11	Rep, runn, dep on aircraft	20	15*	0	0
12	Entertainment	20	22	11	50.0
13	Hospitality	20	22	2	9.1
14	Maintenance of guest house	20	22	8	36.3
15	Scholarships	50	22	15	68.2
16	Festival celebration	50	22	15	68.2
17	Other club	50	22	12	54.5
18	Free/concessional ticket	100	11**	3	27.3
19	Health club	50	22	13	59.1
	Total		180	79	43.1
	Grand total		400	99	24.7

*There are only 15 economy sectors for which this head has shown any collection and in none of the instances, the null hypothesis has been accepted.
** There are only 11 economy sectors for which this head has shown any collection and out of these 11 tests, in 3 instances, null hypothesis has been accepted.
@ Contribution up to Rs 1 lakh per employee per year exempt.

If we analyse the distribution of acceptance of null hypothesis for different sectors of the economy, it is seen that there are some sectors where the sample data has been found to be more homogeneous, for example in case of minerals-metals, steel, chemical-fertiliser, and media-entertainment sectors, where null hypothesis have been accepted in eight to 11 instances of test out of 19 tests, i e, about 50% times. For two sectors, namely, banking and infotech-ITES; the null hypothesis has not been accepted even once, showing high heterogeneity of sample data for these sectors.

However, it is the distribution of test results as per the heads of FBT which throws some interesting results. We have seen that for top 10 heads, sample data are not homogeneous whereas for the bottom nine heads, sample data are more homogeneous. Table 6 also shows the valuation base for each head of expense. It is also easy to note that in case of heads with 50% valuation base, most of which form the bottom five heads, occurrences of acceptance of null hypothesis are significantly more. Similarly, the top 10 heads, most of which have 20% valuation base, are most heterogeneous. The type of heterogeneity shown in the test by the top 10 heads is difficult to explain only on the basis of internal diversity and differences in individual organisations/taxpayers. What can we infer form this analysis?

It is natural for the taxpayers to attempt reducing their FBT liability, if that is possible within the four corners of law. Due to the available discretion for booking expenses under

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different heads, it is logical to expect that taxpayers would be motivated to book more and more expenses under those heads where the valuation base for FBT is lower. From the results of the chi-square test, this indeed appears to be the case. Taxpayers are perhaps taking benefits of absence of any standardised method for classification and booking of expenses. This is the reason data for heads with a lower base are the most heterogeneous representing arbitrary booking practices and are the largest contributing heads. Such a practice is not illegal and to some extent natural also since it is always possible that some particular expenses have the possibility of being included in more than one category. On the same logic, generally the heads with a higher valuation base are the least contributing and the individual sample data is also more homogeneous because these are not experiencing any arbitrary booking. It should also be noted that an heterogeneity/arbitrary pattern emerges due to the fact that not all taxpayers would be indulging in cross booking of expenses and that the cross booking/shifting of expense would be quite random.

Further, perhaps due to this reason, the head employee welfare which is a wider category and which can accommodate a large number of other expenses like gifts, other benefits, scholarships, etc, is the largest contributing head for FBT. Other heads in the top 10, like "conveyance", "sales promotion", "tour and travel" are also general in nature making it possible to book different kind of expenses under them and therefore, show high variability in booking practices.

The heads which are least contributing like gift, scholarships, health club, etc, are specific in nature and it is difficult and too blatant to accommodate and book other expenses under these heads, though it is easy and perfectly legal to book such expenses under employee welfare. Further, there is no benefit of reduced tax liability by booking other expenses under these heads having a 50% valuation base. Similarly, the head telephone is quite conspicuous and specific and it would be very blatant to book other expenses under this head which is the reason for its high homogeneity, although it has a low valuation base of 20%.

On the basis of above analysis, one is tempted to conclude that perhaps there are deliberate booking of expenses in such a way to reduce the FBT liability by business organisations, which is being reflected in higher heterogeneity in sample data in case of wider FBT heads having 20% valuation base.

7 Conclusions

What has been done through statistical tests can be termed as an introductory data mining and the findings are only preliminary in nature. Although, at the aggregate level, the collection pattern has shown stability and homogeneity, at the level of individual taxpayers, the data is showing a high level of heterogeneity. It only indicates that there may be attempts by individual taxpayers to book expenses in such a way which reduces their total FBT liability. There is a vast opportunity to further dig into data to gain a deeper insight. However, one suggestion which could be made on the basis of the above analysis is to recommend a uniform valuation base for all heads of expenses to remove the opportunity of tax avoidance. However, it would bring into question the very basic logic of bring FBT in the present from as the valuation bases are stated to be decided taking into consideration the nature of the expense head. Further, recommending removal of the least contributing heads are not as easy because it may lead to shifting in the expense booking pattern to avoid FBT, thereby leading to a significant loss of revenue.

Some alternatives of FBT have been suggested like imposition of a flat rate of surcharge on corporate tax or making valuation rules of perquisite more comprehensive and incorporating FBT provisions in them, thereby only taxing employees and not the employers. All this requires further deliberation, informed discussion and empirical analysis of FBT collection data through involvement of all the stakeholders. Only then will it help in reform of the FBT regime and an overall improvement of tax policy formulation and taxation structure of our economy.

NOTES

1 We define $p = \frac{(n_1 p_1 + n_2 p_2)}{(n_1 + n_2)}$ where p is combined population proportion, n_1 = No of observation in 2006-07 = 350 and n_2 = No of observations in 2005-06 = 350. The sample standard deviation S is given by

$$S = \sqrt{p\left(1-p\right)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}.$$

We calculate Z statistics as $Z = \frac{(p_1 - p_2)}{S}$.

The *Z* statistic so calculated is then compared to the critical value of *Z* statistics. The critical value for a given level of confidence (it has been taken at 5% in this case) is found by looking at the normal distribution table. It is a two-tailed test of hypothesis and the corresponding critical value which leaves 5% area of the Standard Normal Distribution in each of its tails (thus keeping 90% area within the acceptable limits of critical value) is 1.645. Thus, if we have value of test statistics below the critical value (1.645), we accept the null hypothesis and if it is more than critical value, the null hypothesis is rejected.

2 Mathematically, H_o: $p_{1i} = p_{2i}$ for all i

H_1: At least one i not the same, where p_{1i} is the proportion of FBT collection for *i* th head for the year 2006-07, and p_{2i} is the proportion of FBT collection for the *i* th head for the year 2005-06, there are in total 17 heads, i e, *i* varies from 1 to 17.

Chi-Square (X^2) test Statistics is calculated as

$$X^2 = \sum_{i=1}^{n} \frac{(p_{1i} - p_{2i})^2}{p_{1i}}$$

with (*n*-1) degrees of freedom, where n is total number of FBT categories, i e, 17, and the degree of freedom, thus, is 16.

The X^2 statistics so calculated is compared from the critical value of chi-square distribution for given degree of freedom and confidence level.

3 "Per cent contribution" here means per cent contribution by a FBT head as a per cent of total FBT collection for a particular taxpayer. It has also been called "proportion of FBT collection" in subsequent paragraphs.

4 A detailed discussion of ANOVA is too complicated to be elaborated here. It would be sufficient to note that the ANOVA conducted in this case has indicated a strong interaction effect, which directed towards conducting one-way ANOVA or separate chi-square tests.

5 Mathematically, H_o: $p_1 = p_2 = p_3 = \ldots. = p_n$

H_1: At least one p_n not the same. Where p_n is the proportion of FBT collection from n th FBT payer in the sample for a particular combination of sector and head; and n is total number of FBT payers in the sample representing a particular combination of sector and head.

REFERENCE

Kishore, Praveen (2008): "Analysis of Fringe Benefits Tax and Its Collection Pattern", *Economic & Political Weekly*, Mumbai, Vol XLIII, No 33, Issue 16-22 August, p 41.