

Interplay between Statistics and Transfer Pricing

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Arm's length principle is the bedrock of Transfer Pricing (TP). The arm's length principle requires taxpayers and tax administrations to evaluate uncontrolled transactions and business activities of independent enterprises and compare with transactions between related parties. This requires data, which is often voluminous, incomplete and difficult to obtain. The objective hence is to find a reasonable estimate of arm's length outcome based on reliable information. TP is not an exact science and requires exercise of judgement in arriving at the arm's length price^[1].

In order to ensure that these judgments are rational, various statistical techniques could be employed in TP. Statistical techniques have proven to be useful tools for estimates and are capable of providing greater degree of accuracy and reliability.

Currently, there is limited guidance in Indian TP regulations and in the Organisation for Economic Co-operation and Development (OECD) Guidelines on use of statistical techniques in TP. This article covers various aspects on application of statistics, permitted by the current regulations / OECD guidelines, methods adopted by tax authorities and interpretations by the courts. This article also provides various areas where statistics can be more effectively used in TP.

Reference to statistical techniques under the existing laws/Guidance

Guidance available on usage of statistics either in the TP guidelines issued by the OECD or other guidances, have focused only on the below aspects:

a) Computation of arm's length price

The Indian TP regulations permit application of traditional statistical methods such as mean, median and percentiles in computing the arm's length price / range.^[2] OECD and UN TP Guidelines refer to statistical measures such inter-quartile range for arriving at the arm's length range.

b) Financing Transactions

The OECD in its recent guidance on Financial Transactions states that concept of probability of default can be used to calculate approximate credit ratings in determining arm's length price for guarantees^[3].

c) Comparability Analysis

Recently, OECD issued Guidance on Transfer Pricing implications of the COVID-19 pandemic that cites use of statistical methods such as regression, in support of comparability analysis during the ongoing crisis.^[4]

d) Singapore tax authority, IRAS has, in the context of the current pandemic, issued guidance on additional information to be included in TP documentation viz., statistical methods such as regression and variance analysis, to predict extent of variance of dependent variable based on independent variable (i.e., predicting the response of corporate profits to estimated GDP movements).

Practical Application

a) India

Indian TP regulations give limited guidance on use of statistics. Nevertheless, taxpayers and tax authorities have adopted certain statistical measures to defend their positions. Some commonly used measures are:

i. Box plot

Box-plot is a method for graphically depicting groups of numerical data through their quartiles. This method was used by taxpayers to identify and eliminate companies which are outliers, (i.e., earning very high margins) using interquartile range and therefore functionally non-comparable^[5].

ii. Regression analysis

In the case of an Indian subsidiary of a MNE Group, the Transfer Pricing officer (TPO) attributed a notional income to the taxpayer on account of compensation for deemed brand development services rendered by the taxpayer for its foreign parent company i.e., benefit accruing to the foreign parent company as a result of increased brand value due to sale of its branded products in India. TPO used statistical methods - non-linear regression using a third-degree

polynomial fit to establish the correlation between market capitalization and the brand value, based on which an adjustment for brand building activity was made. However, the Tribunal ruled that brand building exercise is not an international transaction and hence computational limb was not considered / disregarded[6].

iii. Correlation

Tax Tribunals have ruled that there is no correlation (linear relationship) between turnover and profitability and hence companies cannot be rejected for high turnover. However, High Courts have ruled that high turnover companies cannot be comparable, though not based on arguments on correlation[7].

iv. Probability of default

TPOs during recent audits have used probability-based models such as Hull-White Model to determine arm's length guarantee fees by equating corporate guarantee with Credit Default Swaps. The expected loss or loss given default was arrived using the model and substituted as guarantee fees to be received by the Indian HQ taxpayer for the guarantee given to its foreign subsidiaries.

b) Global Experience

i. Mutual Agreement Procedure (MAP): Indian competent authorities and US IRS in 2015, used regression analysis of financial ratios while drafting the framework agreement to expedite resolution of MAP cases of IT/ITeS captive services providers.

ii. Evidence during Financial Crisis: In 2009, the EU Joint Transfer Pricing Forum discussed an analysis which linked variation in the profitability of routine service providers in Europe with the health of the European economy[8].

The COVID-19 pandemic, has been a catalyst for adoption of various statistical techniques in TP, be it for forecasting comparable data for the future years or computing COVID related adjustments.

In the forthcoming sections, we will explore some statistical techniques which may be applied to provide solutions to complex issues on data availability / comparability:

Scenarios where statistical techniques could be applied in Transfer Pricing

A. Alternative to fixed cost adjustment – using Regression and CVP analysis

Taxpayers in their initial years of operations and those operating in competitive sectors, typically face unanticipated reduction in demand. Sales close to break-even levels are not met resulting in the taxpayer incurring losses. However, due to lack of information in general databases, comparable companies may be selected from allied industries, which would not have experienced such market conditions.

In such circumstances, the taxpayer would have incurred losses or registered lower levels of profits vis-à-vis comparable companies, resulting in adjustments being made during the course of TP scrutiny, without considering the level of operations between comparable companies and taxpayer.

The OECD Guidelines state that to be comparable, none of the differences between the situations being compared, could materially affect the condition being examined or reasonably accurate adjustments can be made to eliminate the effect of such differences[9].

From FY 2011-12[10], disclosing information on installed capacity and actual production was not mandatory (Revised Schedule VI) resulting in difficulty for effecting an accurate fixed cost adjustment. Taxpayers have adopted various ways of computing capacity adjustment either by considering fixed cost as a percentage of sales, or by reference to RBI report on average capacity utilization, or by adopting ratio of depreciation to average written down value of assets between taxpayer and comparable companies and recomputing fixed cost of comparable companies based on fixed overheads to sales ratio of taxpayer[11].

Where information on capacity utilized vs installed capacity is available for comparable companies, then the fixed cost adjustment for the taxpayer helps in addressing the question "What if the taxpayer operated at the level of comparable companies?" In case of adoption of CVP (Cost-Volume-Profit) analysis combined with regression analysis, the question "What if comparable companies operated at the level of taxpayer?" can perhaps be answered.

The following concepts in CVP analysis can be applied. Costs are bifurcated into fixed and variable. Contribution margin is excess of sales over variable costs. With increase in the quantity of sales, contribution margin would set off fixed costs, assuming that total fixed costs remain constant. At certain level of sales, contribution margin would be equal to total fixed costs which is break-even point (no-loss no-profit). With further increase in sales, contribution margins would become profits. In order words, farther the actual sales are from break-even sales on the positive side, greater will be the profits. Difference between actual sales and break-even sales is known as margin of safety (MoS).

Using CVP analysis, a close approximation for capacity utilization can be arrived.

MoS is an absolute value and may not be an appropriate measure to be adopted as an independent variable for regression analysis. Comparable companies having higher sales volume may have higher MoS, though they would have only marginally exceeded the break-even level. To eliminate this anomaly, a ratio needs to be arrived at. The ratio of MoS/Break-even sales can be used in this connection. Differences in capacity utilization would be reflected through differences in actual sales, resulting in differences in MoS.

The above ratio will indicate how far comparable companies and taxpayers have moved away from break-even points. Prima facie comparison of the ratios of comparable companies and the taxpayer itself, would show that an adjustment is warranted, to eliminate material differences.

It is a logical extension that greater the ratio of MoS/break-even sales, greater will be the profitability of a business. However, this will have to be proved statistically through correlation / R². by establishing relationship between MoS/break-even sales and the profit level indicator (assuming operating profit / operating income or OP/OI).

Once a statistically strong relationship is established, a model will have to be created to numerically bridge capacity utilization (MoS/ break-even sales) and profitability. This can be achieved through regression analysis.

Based on the OP/OI and MoS/break-even sales data of comparable companies, the regression equation will have to be derived. This equation would estimate profitability at a given level of MoS/ break-even sales. In other words, this equation would answer what comparable companies would have earned had they operated at the level (MoS/ break-even sales) of taxpayer. The regression equation for the given data points can be derived. The regression would be:

$$Y (\text{OP/OI}) = a + (b * (\text{MoS/Break-even sales})) \text{ [12]}$$

Based on the equation, the MoS/ break-even sales of the taxpayer can be updated and the arm's length operating profit margin (OPM) obtained. The arm's length OPM so arrived at can be compared with that of the actual OPM of the taxpayer. The above analysis can be used to substantiate that the taxpayer has earned similar or greater profits as compared to profits earned by comparable companies, had they operated at the level of taxpayer.

Sample set of actual data of comparable companies have been used to compute the above-mentioned ratios to prove the existence of the theoretical relationship between MoS/BEP and OP/OI.

Particulars	MoS	BEP	Total Sales	MoS/BEP	OP/OI
Comp. A	51.30	360.33	411.63	14.24%	3.16%
Comp. B	-0.40	9.57	9.17	-4.19%	-2.03%
Comp. C	8.11	18.17	26.28	44.62%	9.20%
Comp. D	394.02	922.82	1316.84	42.70%	5.22%
Comp. E	126.59	233.75	360.34	54.15%	8.58%
Comp. F	31.27	71.04	102.31	44.02%	8.94%
Comp. G	247.29	548.97	796.26	45.05%	7.36%
Comp. H	43.92	82.81	126.73	53.04%	6.32%
Taxpayer	5.99	139.08	145.07	4.30%	1.74%

The arm's length range based on the above comparable companies is 5.22% to 8.58% and the taxpayer margin i.e., 1.74% is not at arm's length. However, on analysis of the MoS/BEP sales, we can identify that the comparable companies achieved higher level of MoS Sales /BEP Sales (40-50%) as compared to taxpayer (4.30%).

Based on the above data points, the contrast in the level of operations of comparable companies and the tested party, can be brought out, thereby requiring an adjustment to be made. Regression analysis can be used to plot the revised profitability of the comparable companies which can defend taxpayers' transfer prices. However, one needs to bear in mind the adoption of sufficient sample size meeting significance tests, to ensure that the regression model adopted is robust.

In most cases there are differences in the sub-industry / sector between comparables and the taxpayer, due to limitation of data availability. The above analysis brings out such differences to warrant comparability adjustment. Further a detailed note on non-availability of close competitors in the database or their rejection due to various quantitative filters, identification of sub-industry of the comparable companies (through extracts of the industry overview documented in the annual report of the comparable companies) and comparing with the taxpayer, would provide credence to the analysis.

Tax authorities could possibly dispute the above approach in instances where sales are to related parties and that lower the MoS/BEP is attributed to reduction in selling price, while the production and sales volume would have taken place at or beyond break-even level. This could be rebutted by supplementary analysis of the contribution margin (CM) percentage of comparables and taxpayer. Where the CM% of the taxpayer is within range or beyond the 65th percentile of comparables, it can be proved that there is no intention of profit shifting by manipulating the inter-company selling price.

B. Use of regression in TP – General

Regression can be used when causation exists between two variables and numerical relationship is required to be established statistically to accurately predict the value of the dependent variable given an independent variable. Few other areas where this approach could fit are provided below:

a) Ex-Ante Analysis:

Relevant regression models can be used to arrive at the margins of comparable companies using macro-economic indicators such as GDP[13], equity return index, bond yield movement, which can be used as ex-ante analysis for substantiating the arm's length prices.

b) Ex-post Analysis:

The following can be considered while undertaking an ex-post analysis to substantiate the arm's length price where data of comparable companies is not available. However, they need to be applied depending on the factual circumstances around the case and other relevant factors.

- Due to COVID-19 pandemic, if a taxpayer wants to estimate the margins of comparable companies based on the decrease in sales volumes, an elementary way is establishing a relationship between costs and revenue for comparable companies based on past year data, and factor the decrease in sales of the taxpayer to estimate the cost of comparable companies based on the regression equation, to arrive at profit margins of comparable companies[14].
- Where taxpayer makes sales to associated enterprises as well as to third parties, but at different price points due to volume discounts; there is an inverse linear relationship between price and volume. In

such cases, a regression equation can be established between volume and price. Based on the regression equation, the arm's length price can be arrived based on quantity sold to AEs.

- Usage of SG&A/turnover ratio as opposed to AMP/Sales in the case of distributors would help understand the intensity of functions undertaken. This approach can be substantiated by establishing a correlation and fitting a regression line for Gross Profit and SG&A, which can predict the arm's length gross profits at specific levels of SG&A incurred by the tested party.[\[15\]](#)

C. Justifying Full-Range using Confidence Interval

The OECD guidelines provide that where data points in a range are equally reliable, the 'full range' can be considered[\[16\]](#). However, the guidelines also state that when there are sizeable number of data points and some unidentified / unquantifiable comparability defects, statistical measures such as mean, median, interquartile range or percentiles can be used to narrow the range,[\[17\]](#) which tax authorities generally prescribe. Transfer pricing regulations in India do not permit use of 'full-range' concept. However, the full range concept can be considered as a corroboration to other positions taken by the taxpayer to defend transfer prices.

In one of its rulings, the Swedish Supreme Court decided that companies beyond the interquartile range, were as comparable as those within the range and hence full-range has to be adopted against the contention of tax authorities to use interquartile range[\[18\]](#).

Due to COVID-19, MNEs would require undertaking a benchmarking study, as part of ex-ante analysis. However, as databases would not have been updated with latest information, the comparable companies used for the earlier year might be rolled forward or searched using the earlier year data.

In such cases and where all the comparable companies can be proved to be equally comparable, a full range can be adopted as against interquartile range, based on the OECD Guidance. To add credence, the concept of confidence intervals can be used.

Traditionally, confidence intervals are used where samples are selected from a population and an estimate is needed on whether the population mean occurs within the range constructed from the sample mean based on a specified probability, or whether the population mean is within acceptable threshold limits with generally acceptable levels of confidence[\[19\]](#).

Deploying confidence intervals, a range can be constructed using the arrived mean / median at the required confidence level.

Below is an example of how confidence intervals can be used to substantiate adopting full-range. The margins of comparables have been estimated for FY 2020-21. Based on 'back-of-the-envelope' calculations, the comparable companies are assumed to follow normal distribution[\[20\]](#). Since the statistics of the population is unknown, t distribution has been considered.

Particulars	OP/OC
Comp. A	2.23%
Comp. B	0.94%
Comp. C	-0.15%
Comp. D	5.40%
Comp. E	4.77%
Comp. F	5.96%
Comp. G	9.55%
Comp. H	11.21%
Average	4.99%
Median	5.08%
35th Percentile	2.23%
65th Percentile	5.96%

As the number of comparable companies are 8, range was computed.

Now computing the confidence intervals for the mean using 99% confidence level, we would arrive at the range 0.06% to 9.92%[\[21\]](#). Assuming that we compute using 99.5% confidence level, the interval would be -0.69% to 10.67%, which is approximately the full range.

However, the moot point in the above discussion is the assumption of normal distribution. Generally, it is assumed that margins of companies follow normal distribution. There are also discussions that operating margins follow gamma[\[22\]](#) or lognormal distribution. As gamma and lognormal can be applied only for positive data points, it can perhaps be argued that at times of a downturn or during COVID-19 pandemic, not considering non-positive data might be unrealistic. Perhaps these distributions can be considered for license rates such as royalty rates, which cannot be non-positive.

Conclusion

Since TP is not an exact science, appropriate statistical techniques can be deployed on a case-to-case basis. However, before applying any statistical technique, the assumption of the respective technique needs to be tested for the data on which the technique is to be used, This also needs to be documented on a contemporaneous basis.

[1] Both tax administrations and taxpayers often have difficulty in obtaining adequate information to apply the arm's length principle. It is important not to lose sight of the objective to find a reasonable estimate of an arm's length outcome based on reliable information. It should also be recalled at this point that transfer pricing is not an exact science but does require the exercise of judgment on the part of both the tax administration and taxpayer. (OECD Guidelines, 2017 Para 1.13)

[2] Rule 10CA prescribes usage of arithmetic mean where comparable companies are less than 6 and 35th to 65th percentile in case of 6 or more comparable companies, with median as mid-point.

[3] Transfer Pricing Guidance on Financial Transactions - Feb 2020 (Para 10.72, 10.181)
<https://www.oecd.org/tax/beps/transfer-pricing-guidance-on-financial-transactions-inclusive-framework-on-beps-actions-4-8-10.pdf>

[4] Guidance on the transfer pricing implications of the COVID-19 pandemic : OECD, December 2020 (Para 11)

[5] Prudential Process Management Services India Pvt. Ltd. Vs. ACIT (ITA no.6857/Mum./2010) – AY 2005-06

DCIT vs Exxon Mobile Company India Pvt. Ltd., (ITA No.8798/Mum/2011) - AY 2005-06

[6] Hyundai Motor India Ltd. vs. Deputy Commissioner of Income-tax, LTU - II Chennai (IT APPEAL NOS. 739 & 853 (CHENNAI) OF 2014 563 & 614 (CHENNAI) OF 2015 AND 761 & 842 (CHENNAI) OF 2016) [2017] 81 taxmann.com 5 (Chennai - Trib.)

[7] Capgemini India Private Limited vs. ACIT (ITA No. 7861/Mum/2011)

CIT vs. Visual Graphics Computing Services India (P) Ltd (T.C.A. NO.414 OF 2018) (Mad - HC)

[8]https://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/company_tax/transfer_pricing/forum/jtpf/2009/jtpf_018_back_2009_en.pdf

[9] Chapter III – OECD Guidelines 2017, (para 3.47)

[10] http://www.mca.gov.in/XBRL/pdf/Guidance_Note_Rev_ScheduleVI.pdf

[11] DCIT vs Petro Araldite P Ltd (ITA No. 3782/mum/2011); M/s. Vishay Components India Private Limited vs. ACIT (ITA No.1198 and 1501/PUN/2018); Bonfiglioli Transmissions Private Limited vs. DCIT (ITA No. 2977/CHNY/2017)

[12] Where a is the Y intercept (the value of y when x = 0) and b is the slope of the line. Slope of a line quantifies the steepness and the direction in the equation of a line.

[13] <https://www2.deloitte.com/in/en/pages/tax/articles/in-tax-covid-19-impact-benchmarking-in-uncertain-times-noexp.html>

[14] A. Orlandi, R. Iervolino & M.C. Latino, Methodologies for Applying Transfer Pricing Adjustments to Comparable Companies Following the COVID-19 Economic Downturn, 27 Intl. Transfer Pricing J. 6 (2020), Journal Articles & Papers IBFD

[15] <https://www.taxsutra.com/tp/experts-corner/tp-during-and-post-covid19-batting-seaming-green-top-under-overcast-sky>

[16] Chapter III – Comparability Analysis (Para 3.62)

[17] Chapter III – Comparability Analysis (Para 3.57)

[18] <https://tpcases.com/sweden-vs-absolut-company-ab-june-2019-supreme-administrative-court-case-no-1913-18/>

[19] For example, a factory manufactures products weighing 145 grams and customers has a tolerance threshold of +/- 3 grams. In order to check whether the production is as per acceptance threshold, a sample can be drawn from a particular batch and the average and standard deviation of the sample would be computed. Assume that the mean and standard deviation is 145.59 and 1.76 grams respectively, the confidence interval at 99% would be 144.98 – 146.20 (meaning the factory / customer can be 99% confident that mean of the batch is within 144.98 -146.20). Since this range is within the threshold limits, the batch can be accepted.

[20] Shapiro-Wilk test – W Stat 0.952, p value – 0.736, alpha – 0.05, Skewness 0.34

[21] Computed using Excel function “=CONFIDENCE.T”

[22] <https://blog.royaltystat.com/operating-profit-margins-dont-obey-the-normal-distribution>