

A STATISTICAL STUDY ON V-GUARD WIRES AND CABLES

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Abstract: In this paper we have discussed, how Statistics is applied in V-Guard Wires and Cables Division. The price of different type of wires manufactured by the company of V-Guard are taken into study and the variation in the price of the wires of 2017 and 2018 are observed and calculated using index numbers and the optimal price fluctuation is obtained. An index number is a statistical measure designed to show changes in a variable or group of related variables with respect to time, geographic location or other characteristics such as income, profession etc., four distinct methods of finding index numbers in statistics are involved and applied and of those, fisher's method is proved to be comparatively accurate.

Key Words: V-Guard wires and cables, statistics, index numbers, types of index numbers, factor reversal and time reversal test.

1. INTRODUCTION:

V-Guard Industries Limited is a household name across India, a Kerala based company, manufacturing and marketing electronic and electrical products. ISO 9001 certified electrical cable division located at Coimbatore, facilitating the manufacturing of electrical cables starting from 0.25sq.mm size to 10sq.mm with high quality standards, manufacturing house wiring cables, flat cables, round cables, submersible cables and power cables.

A wide range of knowledge about index numbers, statistical index numbers and its issues in consumer price index were studied from the journal of Economic perspectives published by Diewert, W. Erwin. In the year of 1998, Economic theory of index numbers was taken under study from the journal 'Economica' published by Allen, R. G. D in the year 1949, Asymmetric Price Adjustment and Economic Fluctuations were observed from Ball, L. and Mankiw, N. G. in the year 1994, Monetary Aggregation Theory and Statistical Index Numbers were learnt from the publication of Federal Reserve Bank of St. Louis Review by Richard G. Anderson, Barry Jones, Travis Nesmith, The Aggregation of Broadly Comparable Items were obtained through various statistical publications, books and web page links.

2. MATERIALS AND METHODS:

2.1 INDEX NUMBER

Index numbers are specialized averages. Index numbers are intended to measure the degree of economic changes over time. These numbers are values stated as a percentage of a single base figure. In simple terms, an index (or index number) is a number displaying the level of a variable relative to its level (set equal to 100) in a given base period.

Bowley stated that "Index numbers are used to gauge the changes in some quantity which we cannot observe directly". Index numbers are usually applied in statistical device to measure the combined fluctuations in a group related variables.

5.1 INDEX NUMBERS AND ITS TYPES

1. Unweighted index number or simple Aggregative method
2. Weighted index number by Laspeyre's method
3. Paasche's method
4. Fisher's ideal method

5.2 SIMPLE AGGREGATE PRICE INDEX

This is the simplest method of constructing index numbers. When the method is used to construct a price index, the total of current year prices for the various commodities in question is divided by the total of base year prices and the quotient is multiplied by 100.

Symbolically:

$$p_{01} = \frac{\sum p_1}{\sum p_0} \times 100$$

Σp_1 = total of current year prices for various commodities.
 Σp_0 = total of base year prices for various commodities.

5.3 WEIGHTED AGGREGATE PRICE INDEX

The ratio of sum of weighted prices of the current and base time periods multiplied by 100 is called weighted aggregate price index. This index is calculated after allocating weights to each commodity on the basis of their relative importance. Weights of these commodities are then multiplied by the price of base and current time periods. These prices are called weighted prices.

$$p_{01} = \frac{\sum p_1 q}{\sum p_0 q} \times 100; \text{ where } q = \frac{q_0 + q_1}{2}$$

5.4 LASPEYRE'S METHOD

The Laspeyre's Price Index is a weighted aggregate price index, where the weights are determined by quantities in the base period. The formula for constructing the index is:

$$p_{01} = \frac{\sum p_1 q_0}{\sum p_0 q_0} \times 100$$

5.5 PAASCHE'S METHOD

The paasche price index is a weighted aggregate price index in which the weights are determined by quantities in the given year. The formula for constructing the index is:

$$p_{01} = \frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$$

5.6 FISHER'S IDEAL METHOD

Prof. Irving Fisher has given a number of formulae for constructing index numbers and of these he calls one as the 'ideal' index.

The Fisher's Ideal Index is given by the formula:

$$p_{01} = \sqrt{\frac{\sum p_1 q_0}{\sum p_0 q_0} \times \frac{\sum p_1 q_1}{\sum p_0 q_1}} \times 100$$

It shall be clear from the above formula that Fisher's Ideal Index is the geometric mean of the Laspeyre's and Paasche's indices. Thus in the Fisher's method we average geometrically formulae that err in opposite directions.

The above formula is known as 'Ideal' because of the following reasons;

- (I) It is based on the geometric mean which is theoretically considered to be the best average for constructing index numbers.
- (ii) It takes into account both current year as well as base year prices and quantities.
- (iii) It satisfies both the time reversal test as well as the factor reversal test as suggested by Fisher.
- (iv) It is a free bias. The two formulae (Laspeyre's and Paasche's) that embody the opposing type and weighted biases are, in the ideal formula, crossed geometrically. The result is the complete cancellation of biases of the kinds revealed by time reversal and factor reversal tests.

3. PROBLEMS ON THE BASIC CONCEPTS

3.1 INDEX NUMBER

The following table lists out the price of different type of wires manufactured by V-Guard and construct an unweighted index number using Simple aggregate method.

TABLE:I Index Number Using Unweighted Index Number

S.No	Commodity	Price 2017	Price 2018
1	Flexible cable	1340	1450
2	Co-axial cable(RG6 series)	1180	1313
3	LAN cable(CAT6 series)	6220	6300
4	Telephone cable	2220	2390
5	CCTV Cables	1100	1250

UNWEIGHTED INDEX NUMBER CALCULATION

$$p_{01} = \frac{\sum p_1}{\sum p_0} \times 100$$

$$p_{01} = 105.3$$

The following table lists out the price of different type of wires manufactured by V-Guard and construct a weighted index number using Laspeyre’s method, Pasche’s method and Fisher’s method.

TABLE: II Index Number Using Weighted Index Number

S.No	Commodity	Price 2017	Quantity 2017	Price 2018	Quantity 2018
1	Flexible cable	1340	4	1450	3
2	Co-axial cable	1180	4	1313	3
3	LAN cable (CAT6 series)	6220	11	6300	11
4	Telephone cable	2220	3	2390	3
5	CCTV Cables	1100	3	1250	3

WEIGHTED INDEX NUMBER BY LASPEYRE’S METHOD CALCULATION

$$p_{01} = \frac{\sum p_1 q_0}{\sum p_0 q_0} \times 100$$

$$p_{01} = 103.1$$

WEIGHTED INDEX NUMBER (PASCHE’S METHOD)

$$p_{01} = \frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$$

$$p_{01} = 103$$

WEIGHTED INDEX NUMBER (FISHER’S METHOD)

$$p_{01} = \sqrt{\frac{\sum p_1 q_0}{\sum p_0 q_0} \times \frac{\sum p_1 q_1}{\sum p_0 q_1}} \times 100$$

$$p_{01} = 1.02$$

4. RESULTS:

From the above tabulations done by using various methods, it is clear that

- The price in 2018 is **5%** higher than the previous year by simple aggregate method.
- The price in 2018 is **3%** higher than the previous year by Laspeyre’s method.
- The price in 2018 is **3%** higher than the previous year by Paasche’s method.
- The price in 2018 is **2%** higher than the previous year by Fisher’s method.

Among all the results, Fisher’s method is accurate because it is ideal and satisfies time reversal and factor reversal test. Therefore it is found that the price is 2% higher than the previous year.

5. CONCLUSION:

Brands are now a central feature for consumer marketing and people feel comfortable with the brand name of V-Guard for its quality. The price of the product is affordable and improves customer care. From my inference, I found that the price of the wires was quite high compared to the previous year.

I suggest that the company should stock the raw materials especially copper so as to avoid the continuous price fluctuations. It’s better to establish own wholesale shops so that the intermediates can be reduced. These are some of the ways to prevent the wires from price hike.

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