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Income From Hall Marking Of Bureau Of Indian Standards: Influencing Factors

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Abstract

Hallmarking has arisen as a core regulatory tool, which ensures the purity, quality, and standardization of precious metal like Gold and Silver and concurrently serving as a major important source of Income for Bureau of Indian Standards. In India, with the gradual transformation from voluntary to compulsory Hallmarking, the revenue flows are impacted through certification fees, licensing of Assaying and Hallmarking Centres, and testing services. Hence, analyzing the factors which are affecting the Income from hallmarking is essential for evaluating the financial Performance of Bureau of Indian Standards.

This paper focuses on analyzing the various factors which are influencing the Income from Hall Marking of Bureau of Indian Standards.

Key Words: Assaying and Hall Marking Centres, Registered Jewellers, Number of Articles Hall Marked, Gold and Silver Fee Structure and Income of Hall Marking.

Introduction

The Income from Hallmarking is one of the major contributors for Income from sales and services of Bureau of Indian Standards. There are various factors affecting the Income from Hall Marking. some of the most important variables are Number of Registered Jewelers, they are registered with BIS, under Hallmarking scheme to sell the Hallmarked Articles; Number of Assaying & Hallmarking Centre, it is the official laboratory recognized by BIS to test the Purity of Metals (Gold & Silver); Number of Articles Hall Marked, it means that articles are been tested in laboratory for purity and certified with BIS Hallmark; Fee Structure (Gold & Silver) are the charges which have to paid for getting articles Hallmarked.

Present study is to analyze the Impact of Independent Variables (Number of Registered Jewelers, Number of Hallmarked Articles, Number of Assaying & Hallmarking Centre and Fee Structure of Gold and Silver) on Dependent Variable (Income from Hall Marking).

Review of Literature

Fazal P, Dr. Mohanadasan T. A, (2024)[1] focuses on examining the purchasing behavior of gold consumers in Koduvally, Kerala, often referred to as the "Golden City." The study has identified the factors that influence the behavior of gold consumers in Koduvally is a mix of personal, economic, cultural, social, and psychological factors. Considering these elements helps the marketers and jewelers in tailoring their offerings to meet consumer needs efficiently.

Mrs.K.Janakipriya, Dr.S.Chandramohan, (2019)[2] the study has examined and described the consumer purchase preference and behavior of consumers in buying process. The findings showed that the most preferred occasion for purchasing jewellery is during wedding seasons, followed by birthdays and festivals. Besides that, the research also highlights the importance of store attributes such as ambiance, payment options, and promotional offers also influencing the consumer choices.

Ajai Krishnan G, Dr. M. Nandhini, (2017)[3] has aimed to study the factors which leading customers to purchase gold jewellery with special reference to working women. The study recommends valuable observations into the factors that influence consumer behavior in the jewellery market like Purity and Quality, Advertisement, Variety, Price, Brand Name, Social Status and Occasions, Investment Potential etc, particularly among working women, highlighting the importance of brand awareness, quality, and cultural significance in purchasing decisions. These factors are combinedly shaping the purchasing behavior of working women in Kerala, indicating a blend of personal preferences, social influences, and economic considerations.

Kirti Arekar, Swati Godbole, (2016)[4] the study focuses on understanding the various factors that influence the gold buying behavior of retail consumers in India. It identifies the individual factors such as risk and return, market information, motives, security, opinions, and benefits, which play a significant role in shaping the investment decisions of buyers, regardless of their age. Furthermore, it highlights the importance of financial planning and awareness regarding investment options, noting that gold remains a preferred investment in India due to its cultural and historical significance.

Kumaran Thayumanavan, Dr. R. Moses Daniel, (2016)[5] describes about the impact of visual merchandising on consumer behaviors in the context of jewellery retailing in Madurai, Tamil Nadu. Window Displays, Behavior of staff and interaction with customers, roper store layout and strategic lighting, are found to be the most key factors influencing impulse buying. It delivers valuable insights into

the importance of visual merchandising as a competitive tool for jewellery retailers, especially in markets experiencing heavy competition from larger brands**.**

Research Gap

This study was undertaken based on the review of the literature available, which revealed that research has not been conducted on factors affecting the Income of Hall Marking. Hence, the present study is expected to fill this research gap by presenting the impact of various factors affecting the Income from Hall Marking of BIS.

Research Questions

1. What are the factors affecting the Income of Hall Marking?
2. What is the impact of Independent Variables on Dependent Variable i.e., Income from Hallmarking?

Objective of the study

The objectives of the study are:

- ✓ To analyze the various factors affecting the Income from Hall marking of Bureau of Indian Standards.
- ✓ To analyze the impact of Independent Variables on the Income from Hallmarking.

Research Methodology

Period of study

The period of the study is for Eight years i.e., from 2016-17 to 2023-24. The starting period is taken as 2016-17, as it marks the transition to the new BIS Act 2016, wherein key initiatives like Gold Hallmarking Centre's, expanded Product Certification were launched, which have an impact on revenue from Certification fees and Hallmarking fees.

Sample Selection

The Sample Selection relating to the Certifying Agency Selection and Selection of Hallmarking Income is given below.

a) Certifying Agency Selection

There are Eleven Certifying Agencies Namely, Directorate of Marketing and Inspection of the Government of India, Bureau of Indian Standards, Ministry of Food Processing Industries, Ministry of Agriculture and Farmers Welfare, Agricultural and Processed Food Products Export Development Authority, Bureau of Energy Efficiency**,** Silk Mark Organization of India, Textile Committee, Wool mark Company, Ministry of Health and Family Welfare, Government of India and Central Pollution Control Board of India, giving Certification Marks for the various products, as given in Table 1.

Table 1: Certification Marks in India

S.NO	CERTIFICATION MARK	CERTIFYING AGENCY	PRODUCT CATEGORY	YEAR
1	AGMARK	Directorate of Marketing &Inspection, Government of India	Agricultural Products	1937
2	ISI Mark	Indian Standards Institution (Bureau of Indian Standards)	Industrial products	1955 (1987)
3	FPO Mark	Ministry of Food Processing Industries	Processed fruit products	1955
4	Toxicity label	Ministry of Agriculture & Farmers Welfare	Pesticides	1971
5	Eco-Mark	Bureau of Indian Standards	Eco friendly products	1991
6	India Organic Mark	Agricultural &Processed Food Products Export Development Authority	Organically farmed food products	2000
7	Hall Mark	Bureau of Indian Standards	Gold & Silver	2000 & 2005
8	BEE Star Label	Bureau of Energy Efficiency	Electrical appliances	2002
9	Silk Mark	Silk Mark Organization of India	Silk textiles	2004
10	Handloom Mark	Textile Committee	Handloom products	2006
11	Wool Mark	Wool mark Company	Woolen products	2007
12	FSSAI mark	Ministry of Health & Family Welfare, Govt of India	All food products	2011
13	Non-Pollution Vehicle Mark	Central Pollution Control Board of India	Automobiles	-

Source: Compiled from various Websites (https://www.bis.gov.in/, https://www.dmi.gov.in/)

It is only the Bureau of Indian Standards (BIS), which is giving three Certification Marks namely, ISI Mark, Eco Mark and Hall Mark, which is highest number of Certification Marks compared to the other Certifying Agencies. Bureau of Indian Standards (formerly Indian Standards Institution) is one of the oldest Certifying Agency next to AGMARK. As BIS is giving a greater number of Certification Marks, oldest and is of national importance, therefore BIS is been taken up for the study.

b) Selection of Hallmarking Income: Among the major Sources of Income of BIS, (namely Income from sales and services, Fees and Subscriptions, Income from Investments, Income from Royalty and Publications, Interest earned and other Income). Income from Sales and Services is the major Source. Among the components of Income from Sales and Services (Product Certification, Compulsory Registration Scheme, Hallmarking, Management Systems Certification Services and Income from Testing), Hallmarking is unique because it reflects BIS's Consumer Protection mandate, rather than a purely commercial service. Therefore, the study is on Income from Hallmarking.

Sources of Data

The study is based on the Secondary Data collected from the websites and Annual Reports of Bureau of Indian Standards.

Hypotheses of the Study

The main hypothesis is:

H_0: There is no significant impact of Independent Variables on Dependent Variable i.e., Income from Hall Marking

H_1: There is a significant impact of Independent Variables on Dependent Variable i.e., Income from Hall Marking

The sub-Hypotheses are:

1. H_0: There is no significant impact of Number of Registered Jewelers on Income from Hall Marking.

   H_1: There is a significant impact of Number of Registered Jewelers on Income from Hall Marking.

2. H_0: There is no significant impact of Number of Assaying & Hallmarking Centre on Income from Hall Marking.

   H_1: There is a significant impact of Number of Assaying & Hallmarking Centre on Income from Hall Marking.

3. H_0: There is no significant impact of Number of Articles Hall Marked on Income from Hall Marking.

   H_1: There is a significant impact of Number of Articles Hall Marked on Income from Hall Marking.

4. H_0: There is no significant impact of Gold and Silver Fee Structure on Income from Hall Marking.

   H_1: There is a significant impact of Gold and Silver Fee Structure on Income from Hall Marking.

Tools for Analysis

Correlation and Regression are the tools used for the analysis of data.

Data Analysis

There are various factors affecting the Income from Hall Marking. some of the most important variables are:

- Number of Registered Jewelers: They are registered with BIS, under Hallmarking scheme to sell the Hallmarked Articles.
- Number of Assaying & Hallmarking Centre: It is the official laboratory recognized by BIS to test the Purity of Metals (Gold & Silver).
- Number of Articles Hall Marked: It means that articles are been tested in laboratory for purity and certified with BIS Hallmark.
- Fee Structure (Gold & Silver): They are the charges which have to paid for getting articles Hallmarked.

The other variables (non-numerical) are Government Policies related to BIS marks, the perception of the Traders and the Consumers. An analysis is carried out to assess the impact of the above Numerical Variables on the Income from Hall Marking. For this purpose, Income from Hall Marking is taken as Dependent Variable and Independent Variables taken are number of Registered Jewelers, number of Assaying & Hallmarking Centre, number of Articles Hall Marked and Fee Structure (Gold & Silver).

Table 2: Factors determining Income of Hallmarking

INDEPENDENT VARIABLES						DEPENDENT VARIABLE
Year	**No of Registered Jewellers**	**No of Assaying & Hallmarking Centre**	**No of Articles Hall Marked**	**Fee Structure**		**Income From Hall Marking**
				Gold	**Silver**	
2016-17	19,606	454	3,16,00,000	Rs.35	Rs.25	19,06,84,575
2017-18	23,342	608	4,17,00,000	Rs.35	Rs.25	25,10,53,677
2018-19	26,688	797	4,49,00,000	Rs.35	Rs.25	33,38,55,736
2019-20	30,626	915	3,89,00,000	Rs.35	Rs.25	33,37,71,737
2020-21	34,647	945	2,47,00,000	Rs.35	Rs.25	26,77,27,500
2021-22	1,37,315	1,079	8,72,00,000	Rs.35	Rs.25	45,55,73,988
2022-23	16,0,866	1,403	12,32,00,000	Rs.45	Rs.35	56,07,97,585
2023-24	1,87,936	1,540	14,96,00,000	Rs.45	Rs.35	72,03,44,935

Source: Annual Report of BIS (https://www.bis.gov.in/)

Descriptive Statistics relating to the Independent Variables and Dependent Variables is presented in Table 3.

Table 3: Descriptive Statistics

Descriptive Statistics			
Components	**Mean**	**Std. Deviation**	**N**
Income from Hall Marking	389226217	178442399.1	8
Number of Registered Jeweller	77628.25	71338.146	8
No of Assaying and Hallmarking Centres	967.62	369.382	8
No of Articles Hall Marked	67725000	46821232.97	8
Gold Fee Structure	37.5	4.629	8
Silver Fee Structure	27.5	4.629	8

Source: Test values of table 2

- ✓ Income from Hallmarking: Average income is about Rs.38.92 Crores with a large standard deviation (17.84 crores), indicating variability across observations.
- ✓ In case of Registered Jewellers, Mean is 77,628, with a huge spread (standard deviation~71,338), implying variability across observations.
- ✓ No of Assaying & Hallmarking Centres with a mean of 967.62 showed a moderate dispersion.
- ✓ With regard to number of Articles Hall Marked, the mean is about Rs. 6.77 crores with a second largest Standard deviation (4.68 crores), indicating a variation across the observations.
- ✓ Gold & Silver Fee Structures have a low variation with a Close means (37.5 and 27.5 respectively), indicating relatively stable fees.

It is further analyzed to see if any correlation exists between the dependent and independent variables. A correlation of 0.1, 0.2 & 0.3 reflects a low Correlation; 0.4, 0.5 & 0.6 reflect a moderate Correlation and 0.7, 0.8 & 0.9 reflect a high Correlation. A Correlation of 1.0 shows a perfect relationship, which means that a change in one variable results in the same amount of change in the other variable. A positive Correlation (+) shows that a change in independent variable results in a change in the dependent variable in the same direction, whereas a negative Correlation (-) indicates a change in the opposite direction in the dependent variable in response to the independent variable. The Correlation values are reflected in Table 4.

Table 4: Correlation between the select Independent Variables & Dependent Variables

Correlations							
		Income from Hall Marking	**Number of registered Jeweller**	**No of Assaying and Hallmarking Centres**	**No of Articles Hall Marked**	**Gold Fee Structure**	**Silver Fee Structure**
Pearson Correlation	Income from Hall Marking	1	.948**	.950**	.971**	.869**	.869**
	Registered Jewellers	.948**	1	.908**	.970**	.837**	.837**
	No of Assaying & Hallmarking Centre	.950**	.908**	1	.888**	.842**	.842**
	No of Articles Hall Marked	.971**	.970**	.888**	1	.905**	.905**
	Gold Fee Structure	.869**	.837**	.842**	.905**	1	1.000**
	Silver Fee Structure	.869**	.837**	.842**	.905**	1.000**	1
Sig. (1-tailed)	Income From Hall Marking	0	0	0	0	0.005	0.005
	Registered Jewellers	0		0.002	0	0.10	0.10
	No Of Assaying & Hallmarking Centre	0	0.002		0.003	0.009	0.009
	No Of Articles Hall Marked	0	0	0.003		0.002	0.002
	Gold Fee Structure	0.005	0.01	0.009	0.002		0

	Silver Fee Structure	0.005	0.01	0.009	0.002	0	
N	Income From Hall Marking	8	8	8	8	8	8
	Registered Jewellers	8	8	8	8	8	8
	No Of Assaying & Hallmarking Centre	8	8	8	8	8	8
	No Of Articles Hall Marked	8	8	8	8	8	8
	Gold Fee Structure	8	8	8	8	8	8
	Silver Fee Structure	8	8	8	8	8	8
**. Correlation is significant at the 0.01 level (2-tailed).							

Source: Test values of table 2

Correlation

- There is a positive Correlation of all the Independent Variables, with the Dependent Variable indicating that a change in the change in the Independent Variables results in a change in Dependent Variable in the same direction.
- There is a very strong positive correlation between income and the number of registered jewellers (r = 0.948), hallmarking centres (r = 0.950), and articles hallmarked (r = 0.971). This indicates there is a direct relationship as these counts increase, income also increases.
- Fee structures for gold and silver also have a high Positive correlation with income (both r = 0.869), showing that fee levels also influence the income from Hall Marking, though less strongly compared to the volume-related variables, namely number of registered jewellers, hallmarking centres & articles Hallmarked.
- There is a perfect correlation between gold and silver fee structures with r = 1.0 indicating that these fees move together.

The above analysis shows that all the Independent Variables are having a high impact on the Dependent Variable i.e., Income from Hall Marking.

Regression model is been applied to see if the model is fit. Coefficient of determination (R Squared) tells the extent of the variation in the Dependent Variable that is explained by the Independent Variable. If the value is high, it indicates a strong relationship. A usual notation is if the value is 1/3rd (0.0333), there is a weak relation and if the value is above 2/3rd (0.667), there is a strong relation. The results are shown in table 5.

Table 5: Regression Model

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.998[a]	.996	.991	17141386.744	2.424
a. Predictors: (Constant), Number of registered Jeweller, Gold & Silver Fee Structure, No of Assaying and Hallmarking Centres, No of Articles Hall Marked					
b. Dependent Variable: Income from Hall Marking					

Source: Test values of table 2

The Regression Model Summary is presented below:

- The multiple regression model explains 99.6% of variance in hallmarking income ($R^2 = 0.996$), showing that the Model is excellently fit. R^2 of 0.996 is above the prescribed norm ($2/3^{rd}$ i.e., 0.667) reflecting that there is strong relationship of Independent Variables with the Dependent Variable.
- Low standard error and Durbin-Watson statistic (around 2.424) indicates residuals are roughly independent and spread tightly.

Table 6: ANOVA

ANOVA						
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	222010347194466400.000	4	55502586798616600.000	188.895	.001[b]
	Residual	881481418552639.800	3	293827139517546.560		
	Total	222891828613019040.000	7			
a. Dependent Variable: Income from Hall Marking						
b. Predictors: (Constant), Number of registered Jeweller, Silver Fee Structure, No of Assaying and Hallmarking Centres, No of Articles Hall Marked						

Source: Test values of table 2

The model is statistically significant (F = 188.9, p = 0.001), confirming that collectively the predictors (Independent Variables) explain a significant portion of income variability. In other words, as p value 0.001 is < 0.05 null hypothesis is rejected. The F Statistics indicates that the regression model is statistically significant overall. Implying that the independent variables collectively have a significant impact on income from hall marking.

Table 7: Regression Coefficients

Coefficients										
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	225355995.1	75178449.62		2.998	0.058	-13895384.1	46460734		
	Number of registered Jeweller	-1547.377	491.797	-0.619	-3.146	0.051	-3112.493	17.74	0.034	29.32
	No of Assaying and Hallmarking Centres	295055.097	46623.695	0.611	6.328	0.008	146677.692	443432.502	0.142	7.066
	No of Articles Hall Marked	5.036	0.837	1.321	6.02	0.009	2.374	7.698	0.027	36.55
	Silver Fee Structure	-12457308.5	3996256.323	-0.323	-3.117	0.053	-25175179.7	260562.638	0.123	8.153
a. Dependent Variable: Income from Hall Marking										

Source: Test values of table 2

Regression Coefficients

- Registered Jewellers, Beta is Negative (B = -1547) with borderline significance (p = 0.051) and therefore, may indicate complex interactions or multicollinearity influencing the result.
- In case of Number of Assaying Hallmarking Centres, Beta is Positive and is a significant predictor (B = 295055, p = 0.008). More centres correspond strongly to higher income.
- Number of Articles Hallmarked, Beta is Strong positive and is a significant influence (B = 5.036, p = 0.009), indicating higher volume drives revenue.
- Silver Fee Structure is also having a Negative coefficient (B = -12457308) but only marginally significant (p = 0.053), suggesting higher fees might not always translate into higher income.
- Gold Fee Structure is excluded from the model, possibly due to multi collinearity with silver fees.

From the regression output regression equation is obtained as follows

$y = \alpha + (\beta 1 X1) + (\beta 2 X2) + (\beta 3 X3) + (\beta 4 X4)$

Where y = Income from Hall Marking

X1: Number of Registered Jewellers
X2: Number of Assaying & Hallmarking Centre's
X3: Number of Articles Hall Marked
X4: Silver Fee Structure

Gold Fee Structure was excluded due to multi-collinearity with Silver Fee Structure,

Substituting the values in Table we get:

Income from Hall Marking (Y)= 225355995.1− 1547.377X1 + 295055.097X2 + 5.036X3 − 12457308.5X4

Thus, the Income from Hall Marking can be estimated, given the values of Independent Variables.

Major Findings

- **Model Fitness:** The regression model fits the data very well ($R^2 = 0.996$). Almost all variations in hallmarking income are explained by the selected independent variables.
- **Significant Predictors:** Number of Assaying & Hallmarking Centre's and Number of Articles Hall Marked are statistically significant predictors ($p < 0.05$). These variables represent operational scale and throughput, which directly influence revenue.
- **Negative Predictors:** The Registered Jewellers variable shows a small negative coefficient (B = -1547.377), potentially due to saturation effects—more jewellers may dilute average volume per jeweller. The Silver Fee Structure also has a slight negative effect, likely because higher fees discourage submissions or reduce total transaction volume.
- **Multicollinearity:** High correlations (especially between gold and silver fees, r = 1.0) indicate redundancy. One of the fee variables (Gold) was excluded to avoid collinearity bias.
- **Hypothesis Testing Outcome:** Main Hypothesis (H_0): Rejected, since $p < 0.05$ for the overall model. Sub-Hypotheses: Rejected for "Number of Assaying Centre's" and "Articles Hall Marked." and not rejected (at 5% level) for "Registered Jewellers" and "Fee Structure," though trends are still visible.

Suggestions:

- ✓ Expand the network of Assaying and Hallmarking Centre's (AHCs) in high demand regions and improve on accessibility of the Hallmarking centres and reduce congestion in existing centres. Focus on capacity enhancement and digital modernization of hallmarking centres to ensure timely processing and transparent data tracking.
- ✓ Awareness programs to be launched for jewellers, artisans, and consumers to promote certified hallmarking
- ✓ Collaboration with NGO's, schools and media house, may be undertaken to improve grass root level understanding of quality standards.

Conclusion

The dominant drivers of hallmarking income are clearly the number of articles hallmarked and the number of assaying centres. The negative coefficient for registered jewellers implies that more jewellers don't always mean proportionally higher hallmarking income. Fee structures are less straightforward in impact when other variables are included, indicating that fee adjustments alone are insufficient without considering volume. This comprehensive analysis clarifies that volume of activity and facility availability most strongly determines hallmarking income, while fees and jeweller counts play nominal roles.

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