



INDIA  
GOLD POLICY  
CENTRE

# **Gold Saving and Investment behaviour of Indian Households**

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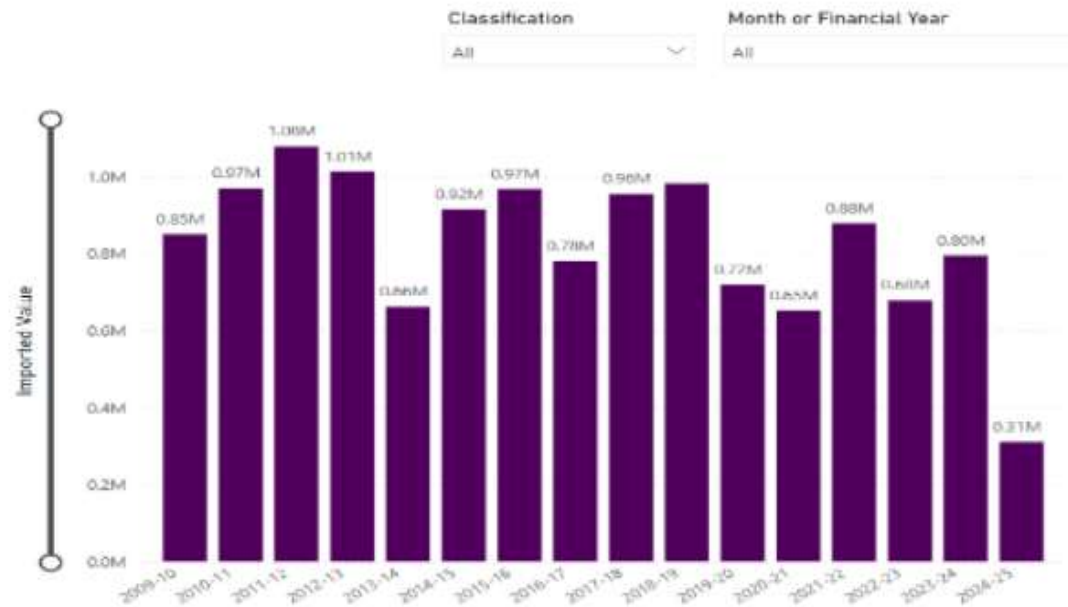
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## INTRODUCTION

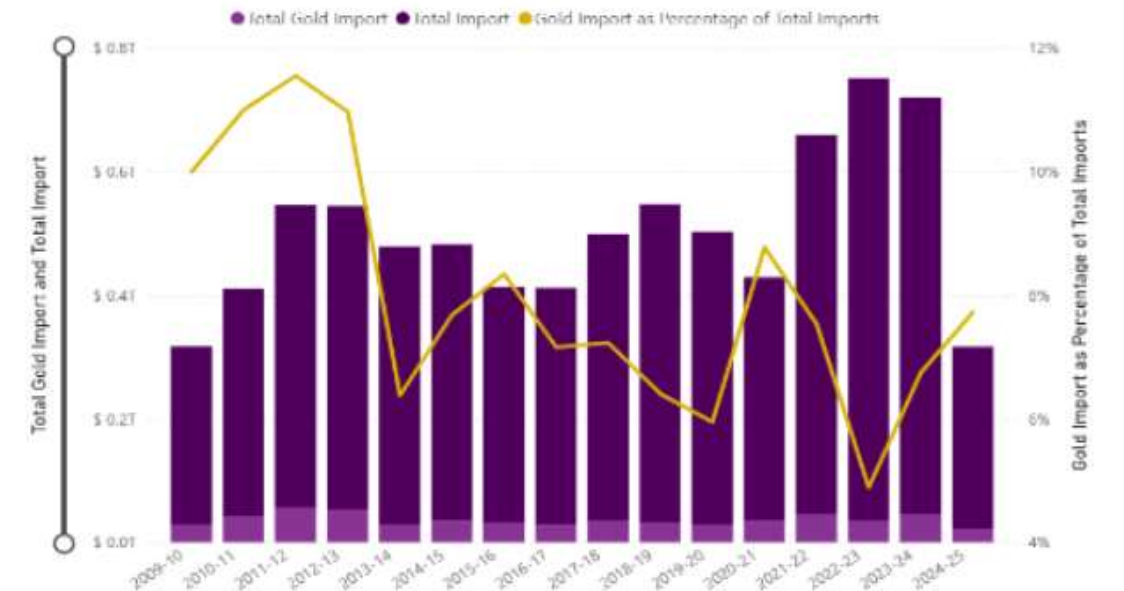
- India is the second largest consumer of gold after China. Gold ranks among the top imports for India as it produces only 0.5 percent of its annual gold consumption (WGC, 2010) and has a bearing on the country's current account deficit and a large part of it lies idle in the economy.
- With rising prices, the import of gold also surged in the last financial year, which is of concern; the gold saving and investment behaviour seems key to understanding household welfare.
- Knowledge of household saving and investment behaviour in demand for gold is important for a wide range of macroeconomic policy development questions and decision-making.
- It is important to have a realistic consumer demand estimates to plan the gold related policies. With increasing gold prices, it is important to have a view of the changing consumption pattern and their responsiveness.
- Using QUAIDS Estimation method, the expenditure elasticities have been calculated given the structure of relative prices faced, income level, education level, occupational status and geographical environment (rural or urban).

Figure 1: Imports of Gold in India by Quantity (KG)



Source: WGC

Figure 2: Indian Gold Imports as a percentage of Total Imports, USD



Source: WGC

## LITERATURE REVIEW

- The research on household savings and investment in different gold products is scarce and limited.
- A research work has shown that **gold often serves as a safe haven during financial crises** Baur and McDermott (2010); Bredin et al. (2015) and stock market crashes Ming et al.(2020).
- A study by Dasgupta and Ponnathpur (2021) shows that Dvara Smart Gold (a micro-savings product) is a financial instrument mainly for low-income Indian households. The study concludes that households from smaller families and higher income quintiles have tended to invest more in the product.
- A similar study by Chatterjee et al. (2024) based on an extensive household survey found that districts with a higher incidence of COVID-19 have shifted toward more investments in gold among other assets in portfolio allocation of gold. This shift was accompanied by a shift away from other financial assets (mainly cash).
- Though few papers **have tried to assess price and income elasticities of gold** across different demographic characteristics using primary surveys with limited number of respondents.
- Few studies have calculated the price and income elasticity of gold demand.

## LITERATURE REVIEW

- One study by **Kanjilal and Ghosh (2014)** found **the income and price elasticity of gold import demand** in India using a threshold and ARDL bounds cointegration test. It was found that the long-term income elasticity of gold import demand is highly elastic, whereas the short-run price elasticity is highly elastic.
- Immanuvel and Lazar(2020) examines **long run and short run price, income elasticity relationships for gold for four major countries**, using the period 2000 to 2017 using Cointegration and Error Correction Model.
- Another paper by **Mukherjee and Das(2017)** estimates **price and income elasticities of physical import demand for gold in India** using dynamic demand models based on distributed lags.
- However, there isn't any paper that discuss about expenditure elasticity of demand for gold.
- Such elasticities allow enable to predict consumers respond to changes in consumer spending, which in turn is crucial for pricing strategies, and market demand analysis in gold market in India.
- Thus, in this **paper the elasticities are worked out using the QUAIDS model which is in addition to the literature of elasticity's** used by the policy makers to project demand for different time periods across income groups.

# DATA AND DESCRIPTIVE STATISTICS



- **DATA:** The IGPC-PRICE (People Research on India's Consumer Economy) is a robust platform that collects bi-annual household-level information on the consumption of gold and jewellery, from 40,000 households in India, covering almost all states and union territories.
- The survey data is meticulously collected to understand the saving and investment behaviour of households in India, capturing other relevant demographic characteristics, consumer sentiments, and expectations.
- For this research, we propose to use the most recent data from 2022-23, ensuring the relevance and reliability of our findings.

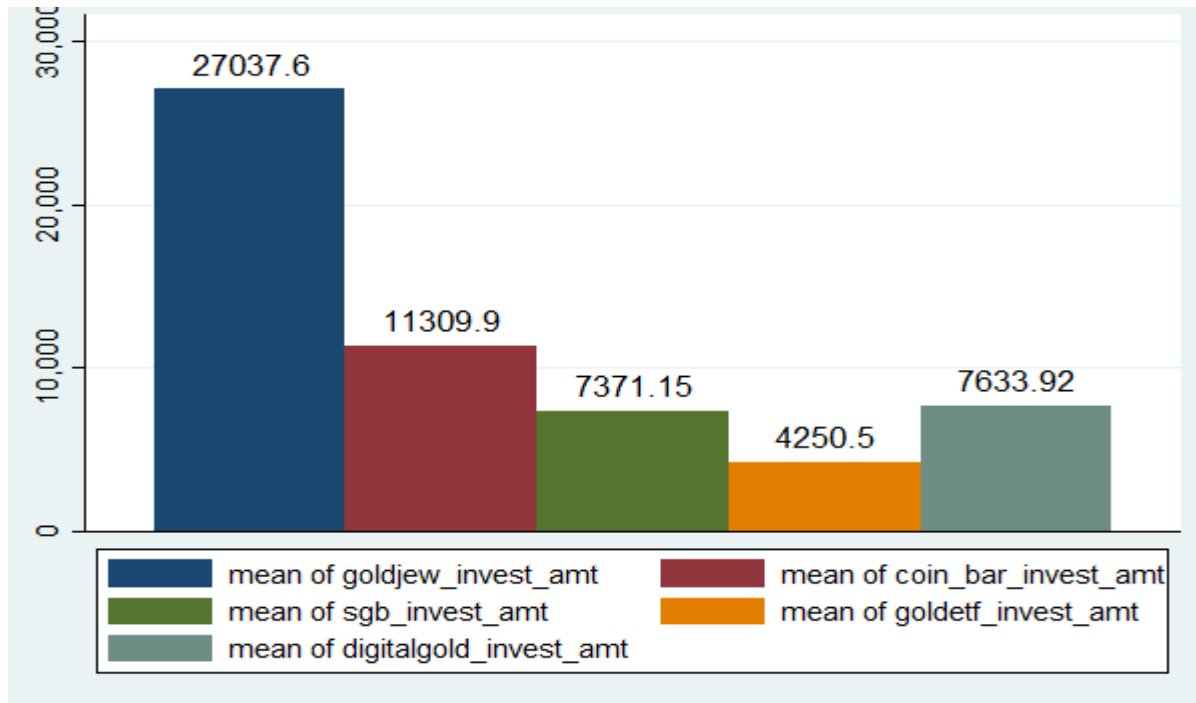


Figure 1: Average investments in gold products (for households that invest in at least one of the gold products).

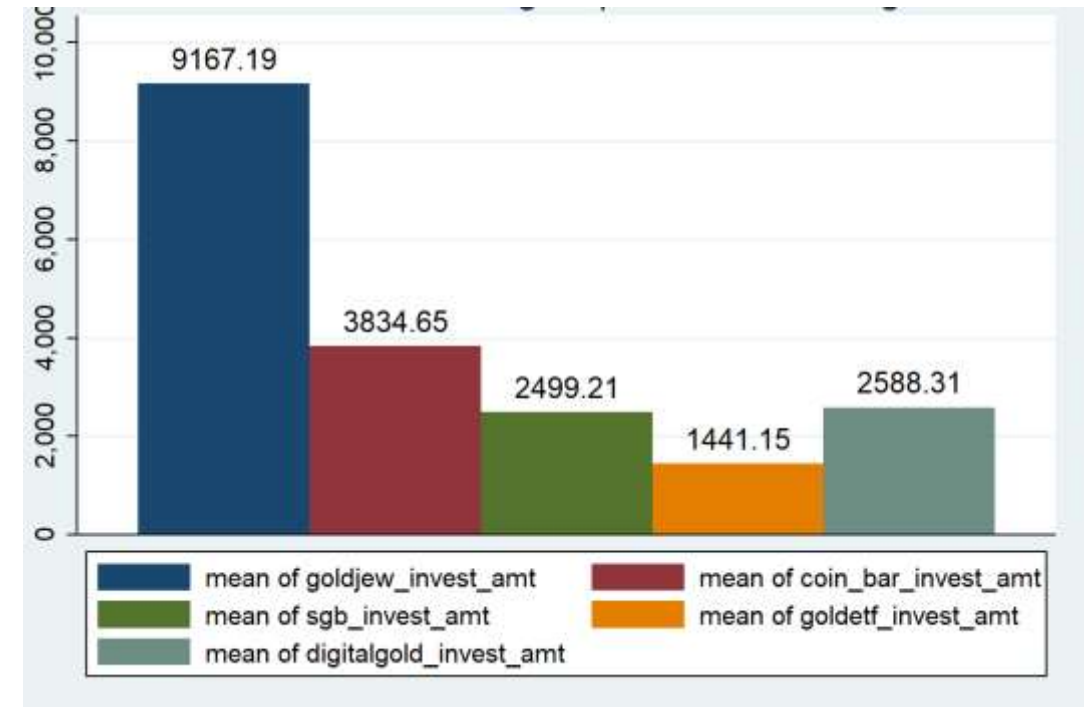


Figure 2: Average investments in gold products (for all the households).

**Table 1: Average Investment amount in gold products across different income levels.**

	goldjew invest amt	coin bar invest amt	sgb invest amt	gold etf invest amt	digitalgold invest amt	exp othergoods
1-2L	3691.701	1526.833	274.136	473.721	853.272	1.99
10-15L	3505.496	807.471	487.119	256.763	384.027	2.824
15-20L	4229.395	1362.319	855.660	828.46	931.88	3.452
2-3L	6201.579	1969.547	1167.340	738.824	1567.096	4.015
20-25L	9780.032	5156.529	2680.075	1448.761	2570.814	4.491
3-4L	11159.753	5626.59	4323.614	2192.437	4123.214	4.854
4-5L	17532.029	7116.423	4780.673	2361.185	4790.417	5.101
5-10L	19020.951	9885.99	7909.826	5141.418	8429.118	5.847
50-1L	18705.584	10362.944	10954.213	9238.579	10261.142	6.193
<50k	50743.59	5720.513	769.231	11025.641	4102.564	6.744
>25L	23253.731	6724.627	1731.343	447.761	4910.448	7.343

Figure 3: Gold Investments across different income levels

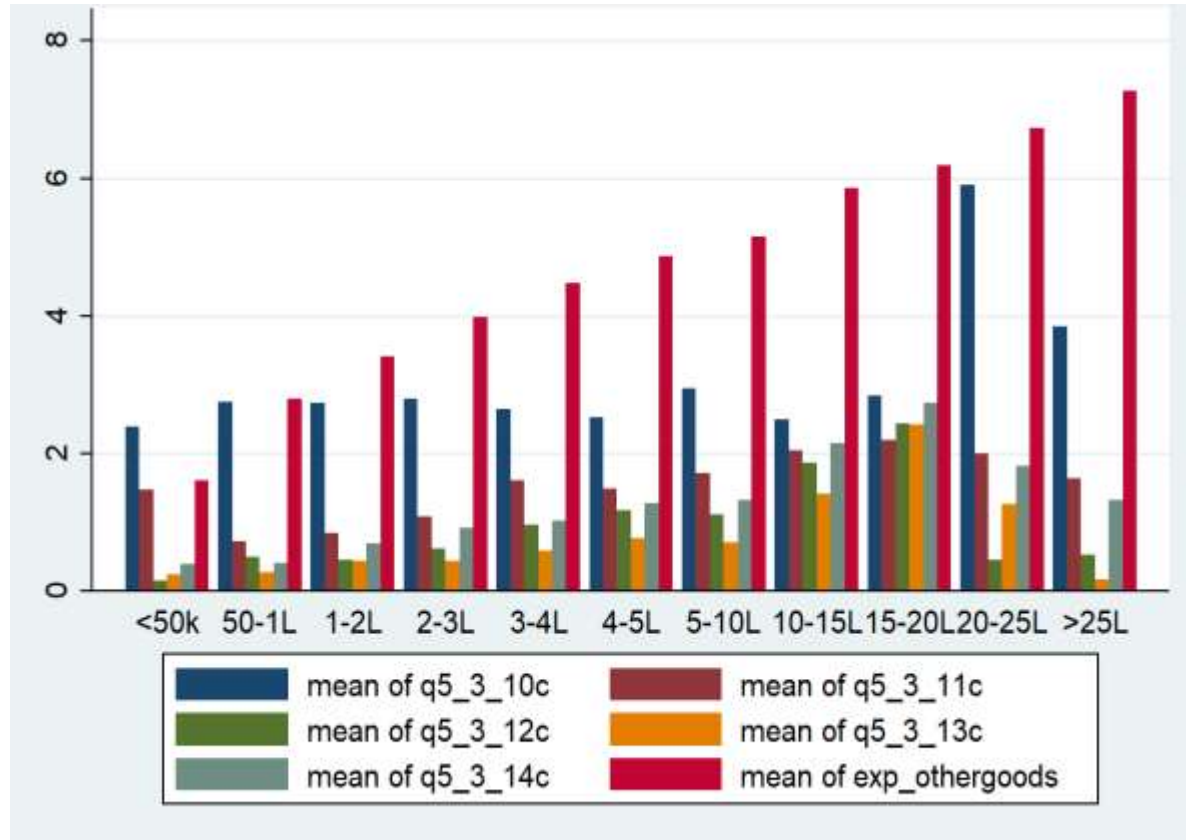


Figure 4: Gold Investments across different occupation groups.

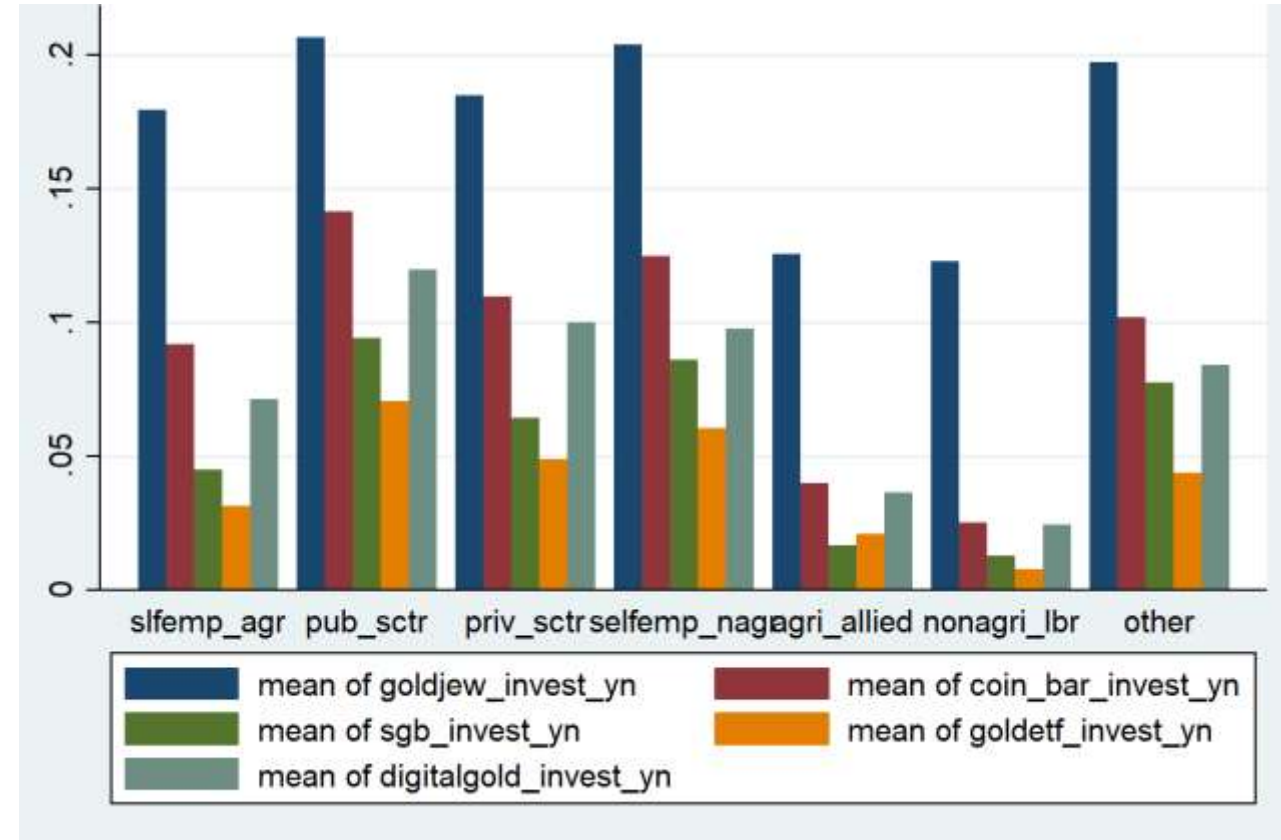
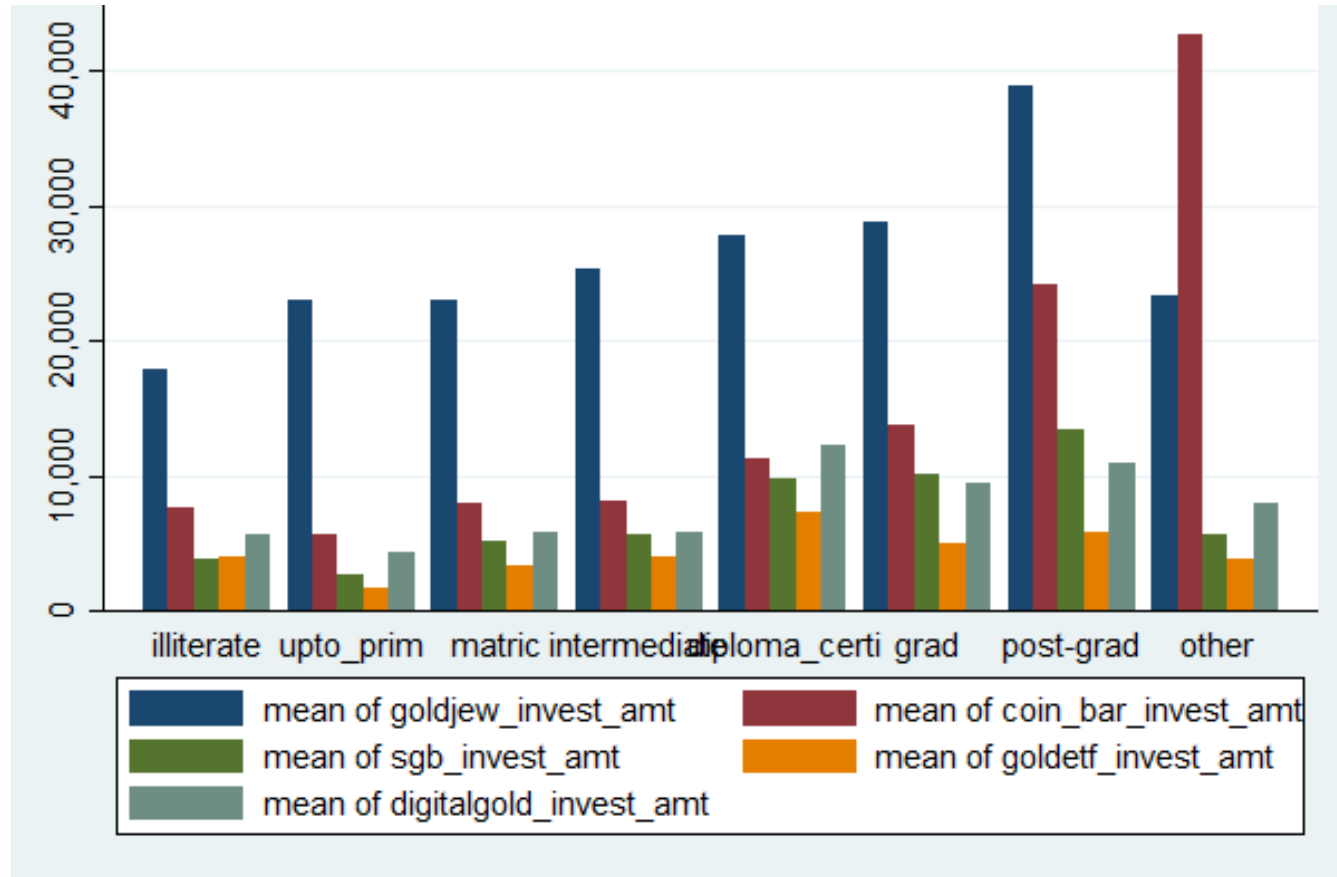




Figure 5: Gold Investments across different education levels.



## CONCEPTUAL FRAMEWORK

- The demand for physical gold lies in the use or aesthetic value of the consumer. We assume that the consumer derives utility from both **consumption goods (C<sub>t</sub>)** and **physical gold (G<sub>t</sub>)**. Whereas the gold invested in digital and sovereign bonds (D<sub>t</sub>) offers interest returns.
- Let us try to derive the demand function for physical gold (in the form of jewellery and bars). A consumer derives utility from consumption goods and physical gold. **A representative consumer has an intertemporal expected utility function of the form**

$$U_t = E_t \sum_{s=t}^{\infty} \beta^{s-t} u \left( C_s, \frac{G_t}{P_t} \right)$$

- where, E<sub>t</sub> is the expectations operator at t; C is the real consumption of goods and services; G is the quantity of physical gold held by the household; P is the price level ; and u is a quasi-concave periodic utility function, which is homogeneous of degree one in its two arguments, consumption and physical gold. **The representative consumer maximizes its intertemporal utility function under the sequence of budget constraints**

$$C_t + \frac{G_t}{P_t} + \frac{D_t}{P_t} = Y_t - T_t + \frac{G_{t-1}}{P_t} + \frac{(1 + i_{t-1})D_{t-1}}{P_t}$$

- where Y is the real income of the consumer. T is the lump-sum tax. G is the nominal value of gold held by the consumer, and i represents the nominal interest rate. D represents the spending on interest-bearing gold.

- The Lagrange function to the problem can be written as:

$$E_t \sum_{s=t}^{\infty} \beta^{s-t} \left( u \left( C_t, \frac{G_t}{P_t} \right) + \lambda_s \left( \frac{M_{t-1}}{P_t} + \frac{(1+i_t)D_{t-1}}{P_t} + Y_t - T_t - \frac{M_t}{P_t} - \frac{D_t}{P_t} \right) \right)$$

- The first-order conditions for a maximum with respect to C, G and D represents

$$\lambda_t = \frac{\partial u}{\partial C_t}$$

$$\frac{\lambda_t}{P_t} = \beta(1+i_t)E_t \left( \frac{\lambda_{t+1}}{P_{t+1}} \right)$$

$$\frac{\lambda_t}{P_t} = \frac{1}{P_t} \frac{\partial u}{\partial G_t} + \beta E_t \left( \frac{\lambda_{t+1}}{P_{t+1}} \right)$$

- The last equation of the first-order condition represents that the marginal utility of physical gold equals the difference of the pure rate of time preference from the expected real return of gold, taking into account the expected inflation and capital gains from a change in  $\lambda$ .
- Let us assume that the per period utility function takes the form

$$u = \ln \left[ \gamma C_t^\epsilon + (1 - \gamma) \left( \frac{G_t}{P_t} \right)^\epsilon \right]^{1/\epsilon}$$

- where  $1/(1 - \epsilon)$  is the elasticity of substitution between consumption and physical gold, and  $1-\gamma$  captures the degree of preference from the physical gold. The preference depends on the aesthetic value attached to the gold. Using this specific utility function and the first-order condition, the demand for physical gold takes the form

$$G_t = \left( \frac{\gamma}{1 - \gamma} \frac{i_t}{1 + i_t} \right)^{\frac{-1}{1 - \epsilon}} P_t C_t$$

- **The demand function for physical gold depends negatively on the nominal interest rate** and positively on total expenses on consumption goods. The negative dependence on the nominal interest rate arises because, with higher nominal interest rates, the opportunity cost of holding physical gold compared to interest-bearing gold is higher, which reduces the demand for physical gold.
- Moreover, **the demand is determined by the relative preference for physical gold compared to the consumption goods,  $(1-\gamma/\gamma)$**  .
- This exercise shows why consumer holds physical gold when the interest-bearing gold offers a nominal return. It depends on how the physical goods add aesthetic value.

# ESTIMATION METHOD

- Using the IGPC-PRICE Household survey of Gold Consumption, the paper estimates the expenditure elasticities of different gold products in India.
- A two-stage Quadratic AIDS (QUAIDS) model is used to compute the coefficients and demand elasticities. The challenge that we face is that we are not available with the prices in the dataset.
- The demand estimations are made using the demand elasticities as will be derived from the QUAIDS model for the expenditure of  $i$ th gold products (out of five types).

$$s_i = \alpha_i + \sum_j \gamma_{ij} p_j + \beta_i \ln(M/a(p)) + \frac{\lambda_i}{b(p)} [\ln(M/a(p))]^2 + \delta_i d$$

- Adding up, homogeneity and Slutsky symmetry impose the requirements that

$$\sum_i \alpha_i = 1; \sum_i \beta_i = 0; \sum_i \gamma_{ij} = 0; \sum_i \lambda_i = 0$$

- where  $a(p)$  and  $b(p)$  are the Cobb-Douglas and trans log aggregators of individual prices, respectively.  $M$  represents expenditure, and  $d$  denotes household characteristics in terms of income groups, occupations, locations and education levels.

- **The expenditure elasticity of demand** measures the percentage change in the quantity demanded of a given good due to a 1 percent change in consumer expenditure.
- **Expenditure Elasticities for two different income groups.** Income groups were created based on different income levels.
- Low income group households are the ones who had income up to 3 lakhs. Correspondingly, high income households which have income more than 3 lakhs.
- **Expenditure Elasticities for different education levels.** Low-educated households are the ones where Chief Wage Earner (CWE) has education up to primary level.
- Moderately educated households where CWE is educated up to secondary level. Whereas High-educated households are the households where CWE is graduated or post-graduated.

# RESULTS

**Table 1: Expenditure Elasticities across different gold products for Low-income Households.**

Low-Income Households	Jewellery	Coins & Bars	SGBs	Gold Etf's	Digital Gold
Expenditure Elasticities	0.7944	1.3718	1.188	0.9438	1.0210

**Table 2: Expenditure Elasticities across different gold products for High-income Households.**

High-Income Households	Jewellery	Coins & Bars	SGBs	Gold Etf's	Digital Gold
Expenditure Elasticities	0.7290	1.1158	0.5963	1.46126	1.7580

**Table 4: Expenditure Elasticities across different gold products for Less-educated Households.**

Less-Educated Households	Jewellery	Coins & Bars	SGBs	Gold Etf's	Digital Gold
Expenditure Elasticities	1.1728	0.7959	0.8190	0.1889	0.2032

**Table 5: Expenditure Elasticities across different gold products for Moderately-educated Households.**

Moderately - Educated Households	Jewellery	Coins & Bars	SGBs	Gold Etf's	Digital Gold
Expenditure Elasticities	0.9171	1.1669	0.7931	1.1124	1.1180

**Table 6: Expenditure Elasticities across different gold products for Highly-educated Households.**

Highly - Educated Households	Jewellery	Coins & Bars	SGBs	Gold Etf's	Digital Gold
Expenditure Elasticities	0.7983	0.5274	1.7205	1.9686	1.3639



# CONCLUSION AND POLICY SUGGESTIONS

- This paper aims to investigate gold saving and investment behavior and their impact at the household levels across income groups, occupations, locations and education levels.
- The present study investigates the trade-off of investments in Gold in physical (jewelery and bar), asset (Gold ETF and SGB) and digital form (digital gold) in comparison to expenditure on other food and non-food consumption items and investigates the driving forces for these changes by computing the expenditure elasticities using the IGPC-PRICE household consumption data (Wave 2) for the year 2022-23.
- **The study reveals that the expenditure on the physical form of gold is substantially higher for all households** but found to be relatively higher among low-income and less-educated households to earn status value and serve as a cushion against household uncertainties.
- An intertemporal generation model is framed to explain the trade-off investment behavior for the returns in terms of social status and capital gains.
- It is important to have a realistic consumer demand estimates to plan the gold related policies. With increasing gold prices, it is important to have a view of the changing consumption pattern and their responsiveness.
- Extensions of the study: Long term and short term elasticities, cross-price elasticities, uncompensated and compensated elasticities, robustness checks, extension of the conceptual framework.
- This can also help formulate the medium and long term policies in better way.