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GOLD INVESTMENT ATTITUDES OF INDIVIDUALS-TURKEY EXAMPLE

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Gold Investment Attitudes of Individuals-Turkey Example

Bireylerin Altın Yatırım Tutumları-Türkiye Örneği

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## **LIST OF ABBREVIATIONS**

ANOVA	Analysis of Variance
B.C.	Before Christ
BRSA	Banking Regulation and Supervision Agency
BOP	Balance of Payment
CBRT	Central Bank of Republic of Turkey
ETF	Exchange Traded Fun
FED	Federal Reserve
GBP	Great Britain Pound
GDP	Gross Domestic Product
IMF	International Monetary Fund
OTC	Over-the-counter
UAE	United Arab Emirates
USD	United States Dollar
WW2	World War 2

## **ABSTRACT**

Throughout history, the gold has been a commonly-used precious metal demanded for an instrument of payment, a substance for jewelry manufacture, an industrial output and particularly an investment tool in recent years. Both the earmarks of gold itself and the investor profile play a crucial role in the gold investment attitudes. Starting from the point of view that not only rationality but genetic, psychological, demographical, or sociological facts bias individuals' investing decisions, in this study, the tendency of individual investors in Turkey while investing in gold and the reasons that they consider while investing in gold will be presented by survey method and examining the relations between their perceptions and preferences with their demographics by one-way ANOVA and t-test and whether there is a relation between the perceived benefits and demographical traits of individuals and investment behavior and strategies of individuals via Structural Equation Modeling.

**Key Words:** Gold, Investment, One-way ANOVA, Rationality, Structural Equation Model.

## ÖZET

Tarih boyunca altın, bir ödeme aracı, mücevherat, endüstriyel girdi ve özellikle son yıllarda yatırım aracı olarak kullanılan değerli bir metaldir. Altın yatırımına ilişkin tutumlarda gerek altının kendine has özellikleri, gerekse yatırımcıların profilleri etkin rol oynamaktadır. Bu çalışmada, bireylerin yatırım kararlarında yalnızca rasyonellik olgusunun değil genetik, psikolojik, demografik ve sosyolojik gerçekliklerin de etkili olduğu görüşünden hareketle, Türk yatırımcısının altın yatırımına olan eğilimi ve altına yatırım yapmasında rol oynayan etkenlere ilişkin veriler anket yöntemiyle toplanarak yatırımcıların algıları ve tutumları ile demografik özellikleri arasındaki ilişkiler tek yönlü ANOVA testi ve t istatistiği ile bireylerin algıladıkları fayda ve demografik özelliklerinin altına yönelik yatırım tutumlarında etkisi olup olmadığı ise Yapısal eşitlik modeli ile araştırılacaktır.

**Anahtar Kelimeler:** Altın, Yatırım, Tek Yönlü Varyans Analizi, Rasyonellik, Yapısal Eşitlik Modeli.

# **1. INTRODUCTION**

According to World Gold Council (2020), as of 2019-year end, the consumer demand for gold in Turkey has the highest fifth rank in the world following India, China, United States, and Germany. Gold is used both as jewelry and saving instrument by Turkish households who have accumulated at least 5,000t of “under-the-pillow” gold worth USD 310 billion as of 2020 July which counted up to almost 40% of Turkey’s GDP by the end of 2019 (İstanbul Altın Rafinerisi A.Ş., 2020). Thus, the main object of this project is to highlight which factors play a crucial role in the investment decisions of individuals, why they usually opt for holding gold-based assets and what the underlying reasons for this tendency are. There should be several sociological, psychological and demographical factors which resulted in a high gold demand in Turkey. In this study, attitudes of Turkish investors were investigated via conducting a survey of 22 questions with 930 respondents. The survey results were analyzed with SPSS and STATA program in order to find out whether there is a significant relation between the demographic traits or behavioral manners with investment tendencies of individuals.

In this chapter, principles of gold market will be detailed by its history, usage, pricing patterns and the gold investment avenues and behavioral finance which gives rise to shape decision making process of individuals in terms of the biases that people are influenced. In the second chapter, my study on tendencies of individual investors toward gold investment will be conveyed and importance, hypotheses and methodology of the research will be clarified while in the third chapter, findings related to my research will be suggested. Finally, I will conclude my research with the conclusion remark.

## **1.1. PRINCIPLES OF GOLD MARKET**

### **1.1.1. Historical Development of Gold**

‘Gold’ is an enduring material which is convenient to make coins and jewelry from past to today. Limited supply, substantive and non-perishable chemical and physical traits and being commonly-held by all civilizations throughout history made gold preferable to the other mines. ‘Gold’, which possesses a 7,000-year background, represented power, superiority, vanity and prosperity throughout history. The earliest gold-producers were

Egyptians that used gold for knickknackery and dental plate production while Assyrians used it for the purpose of jewelry making. Jewelry ruins were found inherited from B.C. 2000's. In B.C. 3000's, gold was started to be used as an instrument of payment. Aztecs, Incas, Persians, Lydians, Assyrians and Sumerians were interested in gold mining. Gold was firstly used in dentistry in B.C. 600's and coinage was firstly conducted in those years by Lydians. In the following years, the Roman Empire became the leading gold manufacturer and captured the two-thirds of global gold production. The gold was standardized by Lydians since it was exposed to cheating and trickery as a medium of exchange. In 16th century, the Kingdom of Spain adopted expansionist policies towards American Continent and commenced to bring gold to the country. In former times, whereas metallic currencies were made manually by Lydian and Greeks, in 1600's, first in UK, they are started to be minted by machines (Bernstein, 2008). As from 1663, the UK proceeded to strike 'Guinea' coin manufactured by the gold mine coming from Africa and determined the gold standards by specifying the description of 'pure gold' and in 18<sup>th</sup> century. In 1800's, 'Gold Rush' took place in California by more than 300,000 people coming from who extracted gold from the rivers and grounds. As of 1870, the world's leading countries except China carried into 'Gold Standards' determined by the UK lasting until the end of First World War. After 1880's, the methods of gold manufacture changed dramatically which paved the way for a tremendous increase in supply of gold and switch of world leadership to South Africa by distilling small particles from boulders. Gold mining is now mostly carried out in Australia, Canada, Russia, China, Mexico, USA and South Africa by virtue of their geographic features that set ground for gold formation. Currently, the gold is not used as instrument of payment by virtue of its limited availability but as an investment tool and industrial input. The central banks are albeit sustaining gold reserves even though the convertibility of currencies to gold is not in force anymore. The world official gold holdings are 35,244 tonnes as of March, 2021 (World Gold Council).

#### **1.1.1.1. Gold Standard**

It showed up as a monetary system that specifies the value of currencies in terms of gold coins. Therefore, fixed exchange rates emerged between the currencies of different countries. The states did not intervene in the exchange rates and free trade between the countries but in the gold market by trading gold. Indeed, the value of 1 troy ounce 22-

carat gold had been set at 3.17 GBP those days and continued for 200 years. The Gold Standard enabled the countries to maintain their Balance of Payment. A BOP deficit used to result in gold outflow and decline in the money supply and finally decrease in prices and import volumes and vice versa. As a consequence, BOP used to reach an equilibrium by itself by courtesy of Gold Standard.

The standard collapsed during inter-war period because the countries printed unbacked money to finance war expenditures. This development resulted in lack of confidence in local currencies and rise in importance of gold again.

### **1.1.1.2. Bretton Woods System**

In 1944, just before the end of war, numerous countries gathered and agreed upon a new monetary system called ‘Bretton Woods’ or ‘Adjustable Peg Exchange Rate System’ since the Great Depression and long-lasting wars gave rise to reduction in the economic interaction between countries. Indeed, the new system technically showed similarity to the ‘Gold Standard’. Nevertheless, the key currency was US dollar and exchange rates were again fixed but adjustable in necessary cases. US dollar was gold-indexed while other currencies was USD-indexed. 1 troy ounce was pegged at USD 35 with this implementation. Moreover, IMF and World Bank were established as a consequence of this agreement. IMF was evaluating the devaluation or revaluation necessities of a country’s currency in case of a balance of payments disequilibrium by just allowing 1% fluctuation around the predetermined exchange rates. After the WW2, globalization arose and USD started to be used as a common currency for trading activities. USA took advantage of this privilege and issued too much USD to finance its trade deficits. This was the main reason for downfall of Bretton Woods System and convertibility of USD-gold abolished in 1971.

## **1.1.2. Demand for and Supply of Gold and Patterns of Pricing**

### **1.1.2.1. Gold in The World**

#### ***1.1.2.1.1. Demand for Gold***

Gold is used as an input in electronic, defense, medicine, space technology sectors beside ornament and investment areas thanks to the non-corrosive, indefectibility, allergen-free, deformability and conductive and seldomness properties of goldmine. Aircraft engines, electronic circuits, dental veneers, modern medical devices and metallic

currencies are made of gold. Thus, total global demand of 4,355t consists of 2,107t for jewelry purposes, 262t for electronics and 13t for dentistry by 2019 year-end. Investors across the world also demanded 1,271t gold as of 2019 year-end. In China, India, US and Turkey, gold currently acts as a gift, a store of value, a mark of affluence or a commodity that merchants trade.

Global gold demand as of 2020 year-end showed the lowest performance over the last 11 years by reason of COVID-19 pandemic. Demand for jewelry which represents the second largest component of total global demand declined by 34% compared to the previous year mainly arising from the slump in India and China.

**Table 1. Demand for Jewelry Purposes**

Tonnes	2019	2020	Year-on-year % change
World total	2.122,7	1.411,6 ▼	-34
India	544,6	315,9 ▼	-42
China, P.R.: Mainland	638,0	415,6 ▼	-35

Source: Metal Focus, Refinitiv GFMS, ICE Benchmark Administration, World Gold Council

The gold amount demanded for investment purposes was the only positive contributor to the total global demand. The investors that reacted the economic slump, ambiguity and low yields directed their investments towards gold-related instruments.

**Table 2. Demand for Investment Purposes**

	2019	2020	Year-on-year % change
<b>Investment</b>	1.269,2	1.773,2 ▲	40
Total bar and coin demand	870,9	896,1 ▲	3
Physical Bar demand	580,5	529,5 ▼	-9
Official Coin	224,0	297,6 ▲	33
Medals/Imitation Coin	66,4	69,1 ▲	4
ETFs & similar products*	398,3	877,1 ▲	120

Source: Metals Focus, Refinitiv GFMS, ICE Benchmark Administration, World Gold Council

Despite the increase in the procurement of electronic devices owing to work at home, the demand for gold used as manufacturing input persisted in falling in consequence of lockdowns across the world.

**Table 3. Demand for Technology Purposes**

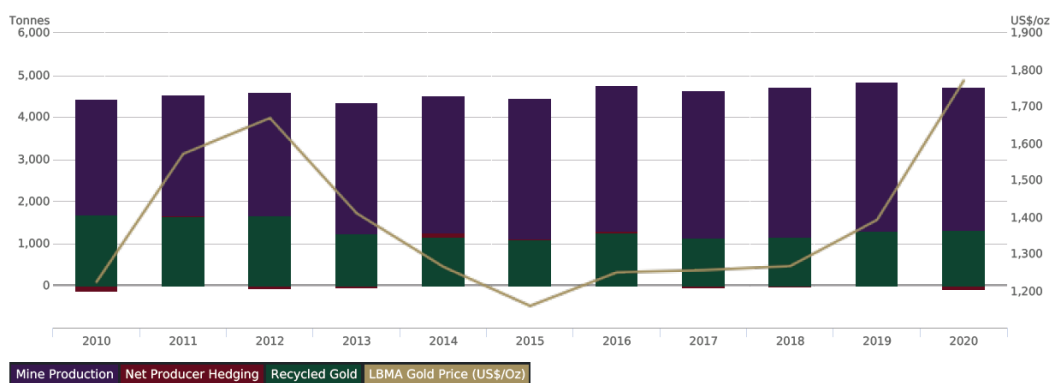
Tonnes	2019	2020	Year-on-year % change
Technology	326,0	301,9	▼ -7
Electronics	262,3	248,1	▼ -5
Other Industrial	49,8	42,0	▼ -16
Dentistry	13,9	11,9	▼ -15

Source: Metal Focus, Refinitiv GFMS, ICE Benchmark Administration, World Gold Council

### 1.1.2.1.2. Supply of Gold

The primary sources of gold manufacture can be sorted as gold mining, scrap gold and trade of public enterprises. The lion’s share is attributed to the gold mining as can be seen from below table. The recycled gold is produced by means of decomposition of previously-used gold materials. It is predicted that roughly 198,000 tonnes of gold was mined until the end of 2019, mostly performed after 1950’s. Each year, nearly 2,500-3,000 tonnes of new stocks accrued to this amount. The amount to be extracted from the ground is 54,000 tonnes. (World Gold Council, n.d.)

The prominent factors influencing the amount of gold manufacture are cost of production, spot prices of gold, expectations of manufacturers, methods of mining process.



Data as of 31 December, 2020

Sources: ICE Benchmark Administration, Metals Focus, Refinitiv GFMS, World Gold Council; [Disclaimer](#)

**Figure 1. Gold Manufacture in the World**

As of 2019 year-end, global gold mine production was approximately 3.500 tonnes and more than half of the production stemmed from the production of the countries shown in below table.

**Table 4. Global Mine Production by Countries (Tonnes)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
China	351,1	371,2	413,3	438,4	462,0	460,3	463,7	429,1	404,1	383,2
Russia	203,1	211,6	233,4	248,5	252,7	255,3	262,4	280,7	295,4	329,5
Australia	256,7	258,7	250,4	267,1	274,0	279,2	287,7	292,5	317,0	325,1
United States	231,3	233,9	234,6	230,1	210,0	216,7	229,1	236,4	225,0	200,2
Canada	102,1	102,0	106,4	131,4	151,2	157,7	163,1	171,2	188,9	182,9
Peru	184,8	183,8	189,8	182,4	171,1	170,5	166,0	166,6	157,6	143,3
Ghana	94,3	96,8	106,0	105,8	106,3	95,4	131,4	133,3	149,1	142,4
South Africa	210,0	205,3	179,8	179,5	168,6	162,0	162,6	154,0	128,0	118,2
Mexico	78,7	94,4	107,5	107,1	113,4	131,6	130,7	119,5	118,4	111,4
Brazil	71,5	77,7	80,2	89,3	90,4	95,4	95,9	95,4	96,7	106,9

Source: Metals Focus

In 2020, with destroyer impacts of COVID-19 pandemic, aggregate global supply of gold descended by 4% compared to the last year. Mine production was directly influenced by the pandemic while the limited increase in recycled gold volume despite the high prices was attributed to the sanitary obstacles that the gold investors face when they desired to sell their gold instruments.

**Table 5. Global Supply of Gold by Methods**

	2019	2020	Year-on-year % change
<b>Supply</b>			
Mine production	3.531,8	3.400,8 ▼	-4
Net producer hedging	6,2	-65,1 ▲	-
Recycled gold	1.281,9	1.297,4 ▲	1
<b>Total supply</b>	<b>4.819,9</b>	<b>4.633,1 ▼</b>	<b>-4</b>

Source: Metals Focus, Refinitiv GFMS, ICE Benchmark Administration, World Gold Council

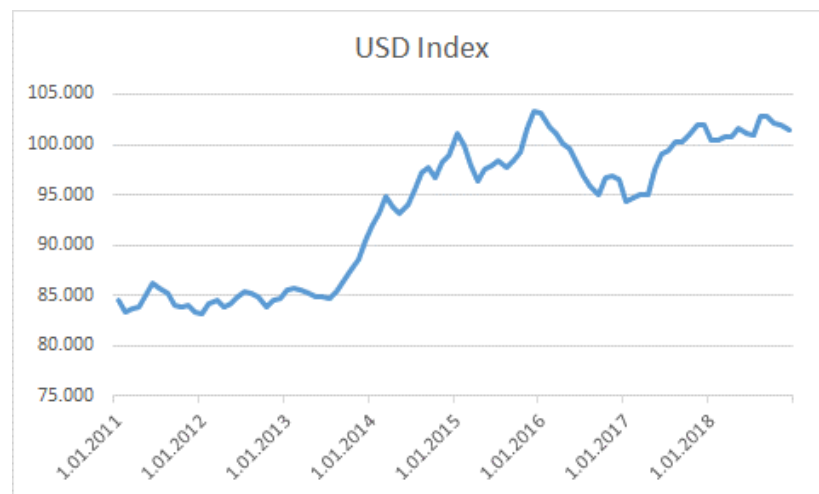
### 1.1.2.1.3. Patterns of Pricing

Gold is equipped with a numerous benefit that appeal the investors such as being a secure zone in the setting of war, inflation, currency crisis, political or social deadlocks; having no default risk; not being correlated with any other asset price and being a leading role in world's common monetary systems as Arayssi (2013) remarked in his study. Gold prices which are not necessarily sensitive to the short-run supply but to the demand side are daily determined in London Bullion Market Association. Nonetheless, in the long run, supply-side variables that influence the gold prices can be listed as world's gold manufacture, production costs, political environment in gold-producer countries, sales made by central banks (Vural, 2003). The value of gold is not determined by only the intrinsic value of itself in contrast to the values of other assets (Arayssi, 2013). The research of Wang and Chueh (2013) revealed that interest rates and the value of USD negatively affects the gold prices while oil and gold prices move in the same direction. They are mainly driven by the values of currencies in such a way that if the value of USD weakens, then the investors will probably opt for holding gold since it is regarded as a

cheap asset. In other words, gold is considered as one of the most efficient tools enabling a store of value (Gold Price, n.d.). As below tables indicate, these two assets are negatively correlated.



**Figure 2. 10 Year Gold Price in USD/oz**



Source: [www.macrotrends.net](http://www.macrotrends.net)

**Figure 3. 10 Year USD Index**

Secondly, gold prices may be driven by macroeconomic developments such as uncertainty and economic growth (World Gold Council, n.d.). They are also stimulated by global demand for gold. In a nutshell, social and political stability, resilient banking industry, well-developed capital markets, interest rate hikes, non-inflationary environment end up with low gold prices by depressing the gold demand. (Korkmaz, 2009)

As shown in below table, gold prices started to increment as from 1970's because of the oil producing countries' interest in the gold market, political tension in Middle East region and high inflation rates in US (Güvenç, 2006).



**Figure 4. Gold Price in USD/oz**

In 2000's, prices started to get into motion by virtue of September 11 attacks and peaked in 2011 because an economic stimulus package was in question in U.S. meaning a USD depreciation that resulted in a flow of investments to gold. In 2016, FED's interest rate rise and the signals for further rises, neither Brexit issue nor Trump's election in US did not cause the gold prices to climb. In 2020, due to COVID pandemic, the investors streamed into gold as is seen below and the price of gold even reached the all-time high level of US\$2,067.15/oz during the year.

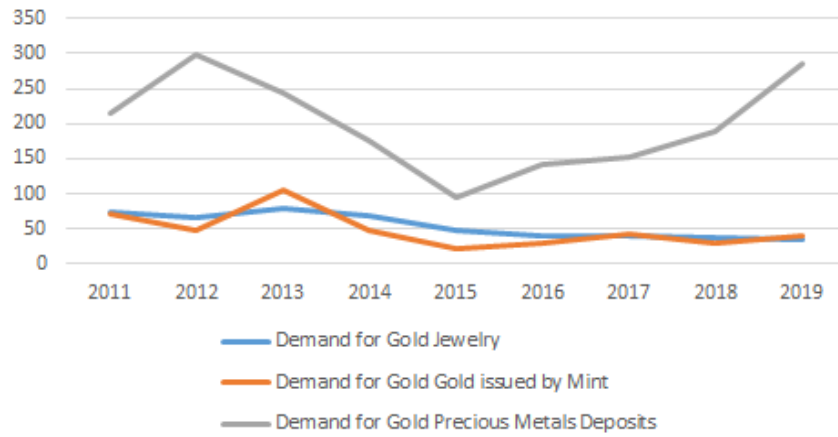
**Table 6. 10 Year Gold Price in USD/oz**

Annual average prices												Year-on-year % change
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
US\$/oz	1.224,5	1.571,5	1.669,0	1.411,2	1.266,4	1.160,1	1.250,8	1.257,2	1.268,5	1.392,6	1.769,6 ▲	27

Source: ICE Benchmark Administration, Refinitiv Datastream, World Gold Council

### 1.1.2.2. Gold in Turkey

Turks were using gold for both adornment purposes and pecuniary means in both Great Seljuk and Ottoman Empire eras. Nowadays, traditions and beside the investors' point of view that gold is safe during a time of crisis lead savers to demand for gold.



Source: Thomson Reuters Gold Survey, BRSA, Royal Mint

**Figure 5. Demand for Gold in Turkey**

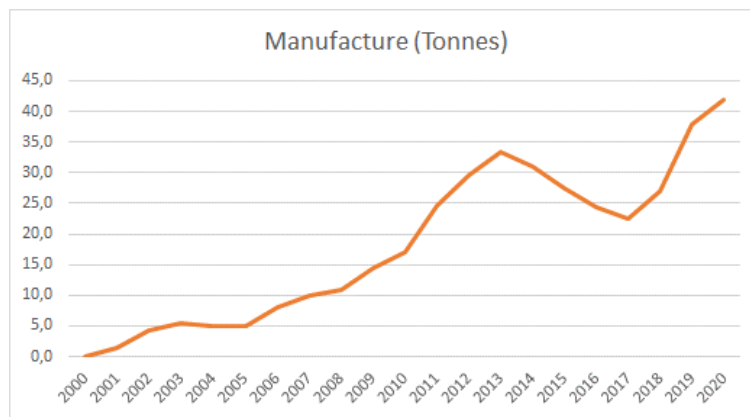
Turkey’s gold demand predominantly stems from the jewelry manufacture while some other countries need gold for industrial production. Top 5 countries that demand gold for jewelry use.

**Table 7. Top 5 Countries Demanding Gold for Jewelry Use (Tonnes)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Year-on-year % change
China, P.R.: Mainland	461,9	557,2	599,4	938,8	806,8	767,4	644,8	665,2	686,3	638,0	415,6	▼ -35
India	661,7	619,3	595,2	617,4	627,5	662,3	504,5	601,9	598,0	544,6	315,9	▼ -42
United States	122,3	115,9	107,1	112,5	116,6	119,5	118,8	123,7	128,4	131,1	118,2	▼ -10
Russian Federation	60,3	64,4	67,7	79,7	67,6	43,1	38,3	39,8	43,0	44,5	33,3	▼ -25
Turkey	67,9	73,6	65,9	79,9	68,1	49,0	40,8	41,2	36,4	36,7	26,0	▼ -29

Source: Metals Focus, Refinitiv GFMS, ICE Benchmark Administration, World Gold Council

‘Gold Exploration and Exploitation’ and ‘The Institute of Mineral Research and Exploration’ was established in order for the underground sources to be researched and mined systematically by the required mining methods in 1933 and 1935, respectively. Over the last two decades, 382 tonnes of gold has been manufactured in Turkey by reaching a record high in 2020.



Source: Turkish Gold Miners Association

**Figure 6. Turkey’s Gold Manufacture**

It is known that there are 1,500 tonnes below ground gold reserve and 18 mines that have been worked out in Turkey as of 2020.

**Table 8. Active Mines in Turkey**

Mine	Mining Company	Activation Year
İzmir-Ovacık	Koza	2001
Manisa-Sart	Pomza	2002
Uşak-Kışladağ	Tüprag	2006
Gümüşhane-Mastra	Koza	2009
İzmir-Çukuralan	Koza	2009
Erzincan-Çöpler	Alacer	2010
İzmir-Efemçukuru	Tüprag	2011
Eskişehir-Kaymaz	Koza	2011
Niğde-Bolkardağ	Gümüştaş	2012
Gümüşhane-Midi	Yıldızbakır	2012
Kayseri-Himmetdede	Koza	2013
Fatsa-Altıntepe	Bahar	2015
Sivas-Bakırtepe	Demirexport	2015
Konya-İnlice	Esan	2015
Balıkesir-Kızıltepe	Zenit	2017
Çanakkale-Lapseki	Tümad	2018
Balıkesir-İvrindi	Tümad	2019
Kayseri-Öksüt	Öksüt	2020

Source: [www.altinmadencileri.org.tr](http://www.altinmadencileri.org.tr)

Total expenditure pertaining to the gold mining activities, prospecting activities and plant investment amount of which were USD 1.5 billion and USD 4.5 billion was USD 6 billion in 2019. These activities contributed to Turkish economy amounting to USD 1.7 billion ([www.altinmadencileri.org.tr](http://www.altinmadencileri.org.tr)).

Turkey's gold bullion import and export volume are USD 25.1 billion and USD 2.7 billion as of 2020 year-end, respectively. Top five trade partners are pointed out below.

**Table 9. Turkey's Gold Bullion Trade**

GOLD BULLION (2020 YE)			
Export (USD)		Import (USD)	
<b>UK</b>	1,478,548	<b>Iraq</b>	7,940,023
<b>USA</b>	586,712	<b>Switzerland</b>	6,136,319
<b>UAE</b>	398,4	<b>UAE</b>	5,102,193
<b>Switzerland</b>	185,824	<b>Libya</b>	1,312,380
<b>Malaysia</b>	30,253	<b>Germany</b>	923,903

Source: Trade Map

Turkey is a substantial jewelry gold manufacturer and net exporter. As of the end of 2020, the export of jewelry made by gold was USD 3.3 billion while the import was approximately USD 670 million. Turkey’s top five jewelry trade partners are listed below.

**Table 10. Turkey’s Top 5 Jewelry Trade Partners**

GOLD JEWELLRY (2020 YE)			
Export (USD)		Import (USD)	
<b>Iraq</b>	873,893,895	<b>India</b>	293,459,076
<b>UAE</b>	482,021,148	<b>Italy</b>	170,479,133
<b>Germany</b>	431,524,950	<b>UAE</b>	113,554,353
<b>USA</b>	312,746,924	<b>Iran</b>	31,848,047
<b>Hong Kong</b>	181,485,250	<b>Bolivia</b>	22,925,452

Source: Turkish Statistical Institute

Turkey is also one of the foremost countries, the consumer demand per capita of which is relatively high as indicated below.

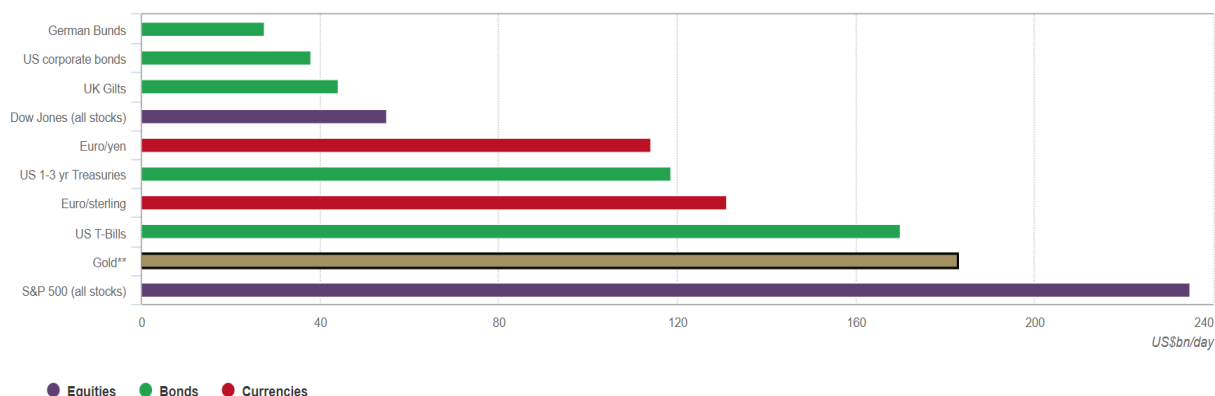
**Table 11. Consumer Demand per capita in Selected Countries (Grams)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Switzerland	11,2	12,3	7,8	7,7	5,9	6,1	5,5	5,0	4,3	3,5	5,0
Kuwait	2,9	2,6	2,4	4,0	4,4	3,9	3,5	3,7	3,7	3,3	2,7
UAE	9,3	8,0	6,8	8,7	7,1	6,3	5,2	5,2	4,0	3,6	2,4
Hong Kong SAR	3,4	6,2	6,9	11,9	8,5	7,2	5,8	6,2	7,0	5,3	2,4
Germany	1,7	1,9	1,5	1,8	1,4	1,5	1,5	1,4	1,3	1,2	2,1
Turkey	1,5	1,9	1,5	2,4	1,5	0,9	0,9	1,2	0,9	1,1	1,7

Source: Metals Focus, Refinitiv GFMS

### 1.1.3. Gold-Related Investment Tools

Global daily average trading volumes of several assets during 2020 are displayed below.



Sources: Bloomberg, Bank for International Settlements, UK Debt Management Office (DMO), Germany Finance Agency, Japan Securities Dealers Association, Nasdaq, World Gold Council; Disclaimer

**Figure 7. Global Daily Average Trading Volumes**

The gold trade is mainly executed in the over-the-counter markets like in London, Zurich and New York by clearing the transactions in London Bullion Market Association or in the exchange markets such as Commodity Exchange Inc., London Metal Exchange, Shanghai Gold Exchange, Shanghai Future Exchange, Tokyo Commodity Exchange. Physical delivery is only available in LBMA, Istanbul Gold Exchange and Dubai Multi Commodities Centre.

**Table 12. Daily Gold Trade Volume in the World**

2020 FY Trading Volume (Daily Average\$ in USD billion)		
<b>OTC</b>	LBMA	63,07
	Non-LBMA	47,3
	<b>Total</b>	<b>110,37</b>
<b>Exchanges</b>	COMEX	54,4
	SFE	6,19
	SGE	6
	LME	0,16
	All other exchanges	2,34
	<b>Total</b>	<b>69,09</b>
<b>Gold ETF's</b>	North America	2,61
	Europe	0,14
	Asia	0,51
	Other	0,03
	<b>Total</b>	<b>3,29</b>
<b>GLOBAL GOLD MARKET LIQUIDITY</b>	<b>TOTAL</b>	<b>182,75</b>

Sources: Bloomberg, COMEX, Dubai Gold & Commodities Exchange, ICE Benchmark Administration, London Metal Exchange, Multi Commodity Exchange of India, Nasdaq, Shanghai Gold Exchange, Shanghai Futures Exchange, Tokyo Commodities Exchange, World Gold Council

Central Bank of Republic of Turkey is responsible for holding required amount of gold reserves which can be regarded as a support in tougher times like economic slumps or conjuncture with high volatility thanks to its high liquidity potential and being a power indicator of capability of debt payments. As of March 2021, Turkey has been placed on the 12<sup>th</sup> in the ranking of world total gold holdings with 526.9 tonnes (World Gold Council, n.d.). Almost the half of gold reserves of CBRT are held at foreign banks and used for swap transactions. In 1989, gold import was allowed by Central Bank of Republic of Turkey and immediately after the liberalization of gold trade in 1993, Istanbul Gold Exchange went into action in 1995, now operating under the Istanbul Stock Exchange as Precious Metals Markets. Spot transactions and futures are conducted at the market. General Directorate of Mint and Stamp Print House is empowered to print physical gold. Istanbul Gold Refiners is active in converting of scrap gold to bullion gold.

Grand Bazaar is a place where the gold is manufactured and wholesaling operations are carried out. The gold manufacture complex shifted to Kuyumcukent which is located on a gigantic areas and has approximately 25,000 employees. Banks started to collect the gold deposits especially after the CBRT stated that the gold-related instruments have been accepted as required reserve.

There are several ways of investing in gold in Turkey which are detailed below.

### 1.1.3.1. Gold Deposit Accounts

Especially after the 2008 Global Crisis, the gold was considered as a safe-haven instrument. Furthermore, CBRT's allowed banks for holding gold as a required reserve. Therefore, both demand and time gold deposit accounts attracted the attention of households and banks.

**Table 13. Gold Deposit Volume in Turkey**

Date	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gold Deposit Account (Thousand TRY)	2.155.861	10.945.992	14.584.725	17.415.542	13.726.110	9.819.801	15.617.791	20.747.749	32.621.747	64.143.087	219.961.354

Source: CBRT Electronic Data Delivery System, www.tcmb.gov.tr

### 1.1.3.2. Physical Gold

24-carat and 995 fine gold bullions and gold jewelry can be traded in jewelry stores and exchange offices. These products can also be banked and withdrawn.

### 1.1.3.3. Gold Funds

As of March 2021, there are 15 private pension funds of TRY 32 billion including gold. The funds that largely comprises gold bullion and stocks or bonds of gold mining companies and can be preferred by investors thanks to low cost and liquidity advantages are called mutual funds. Gold exchange traded funds provide yield on the actual physical gold similar to the usual stocks and are traded in stock exchange. There are 16 mutual funds and 2 gold exchange traded funds amounting to TRY 6.8 billion in Turkey. As of 2020 year-end, the regional distribution of ETF's across the world is presented below.

**Table 14. ETF Volume in the World**

Region	USD bn	Holdings (tonnes)
North America	121.8	2,003.2
Europe	95.6	1,572.1
Asia	7.2	115.2
Other	3.7	61.0
<b>Total</b>	<b>228.2</b>	<b>3,751.5</b>

Source: World Gold Council

#### **1.1.3.4. Gold Derivatives**

Organized derivatives such as gold futures and options are dealt at Derivatives Market and Precious Metals and Diamond Markets under Istanbul Stock Exchange and OTC derivatives such as forwards and options can be executed via banks in Turkey.

#### **1.1.3.5. Gold Bonds and Gold Certificates**

Ministry of Treasury and Finance initiated gold certificate and bond issuance in 2017 in Turkey. 12,800 investors showed interest to the issuance and mattress gold saving of 2.5 tonnes was incorporated in Turkish economy (İstanbul Altın Rafinerisi A.Ş., 2020).

### **1.2. LITERATURE REVIEW ON INVESTMENT-DECISION PATTERNS OF INDIVIDUALS**

#### **1.2.1. The Determinants of Decision-Making Process of the Investors**

There are several works on what factors drive investment decisions of individuals. In general, the researches focus on the effects of psychological tendencies and social & demographic factors on the investment decisions of individuals. Literature on the link between these factors and investment tendency of individuals will be anatomized in detail.

##### **1.2.1.1. The Influence of Demographical Traits on Investment Decisions of the Individuals**

İslamoğlu et. al. (2015) investigated the general financial behavior of bankers by analyzing the data gathering by survey method via Factor Analysis model. Several factors consisting of income level, past investment experiences, opinions of other investors and experts and financial stability that influence behavior of investors were detected.

Anbar and Eker (2012) stated in their research that the risk perception of the individuals can vary from the psychological, sociological, demographic factors, and characteristics of each individual. Women, elder people, married people, wealthy or high-income people, high educated people and financial literates mostly have higher risk tolerance compared to others.

Furthermore, İçellioğlu (2015) concluded that the demographic factors such as gender, education, income, age and occupation have impact on the investment decisions of the households following the survey conducted to 784 people in Istanbul and testing the relation by Chi-square test.

As Hallahan et.al. (2004) argued, demographic traits such as gender, marital status, age, wealth, income, education and number of dependents have a relation with the risk tolerance of the individuals in consequence of the regression analysis implemented on survey results.

Geetha and Vimala (2014) identified the relation between the demographic factors of investors and their investment avenue choices by applying Chi-square test to the survey results.

Income level, age, gender and profession of individuals were to be the determinants of investors perceived risk as Gümüş and Dayıoğlu (2015) suggested based on 100 observations by testing with one-way ANOVA test.

Donkers et al. (2001) demonstrated by estimating a structural model applied on 253 respondents, females and older people were claimed to be reluctant to take risk whilst education and income level are in a positive relation with the risk behaviors of individuals.

By linking measured risk aversion and characteristics of individuals via regression analysis, Hartog et al. (2002) elucidated the public officials, females, employees, low-income or poorly educated people are likely to avoid risk.

Saraç and Kahyaoğlu (2011) examined the effects of socio-economic and demographic traits on decision-making with a survey of 31 individual investors testing by one-way ANOVA. It was elicited that the elder investors, retired investors and men tend to take more risk.

By performing an experiment with 325 subjects in Beijing, Chew (2012) revealed that biological differences may play a role in risk-taking patterns of individuals such that dopamine D5 receptor gene and estrogen receptor beta gene influence ambiguity perception of women.

Fish (2012) worked through the impacts of gender on investment decisions and found out that women are more risk-averse than men in his research done with college students.

As demonstrated in the results of the survey of 35,000 households, since men are regarded as more overconfident in contrast with women, men are observed while trading more than women would (Barber&Odean, 2001, p. 289).

Sah (2017) worked on the investment patterns of working women living in a city of India and profound that women prefer less risky assets such as bank deposits and gold and bonds demonstrated by the descriptive statistics of questionnaire results of 80 respondents.

Arti and Julee (2011) reported that females in India depict more cautious attitudes in their investment decisions than males by surveying with a sample of 200 females.

Davar and Gill (2007) conducted a survey of 500 investors and put forward that women are less confident while making investment decisions than men testing by one-way ANOVA.

Naik (2014) tried to shed light on the variables that may have an impact on the investment decisions of individuals living in Goa with a sample size of 1,500 investors testing by ANOVA, t-test, Chi-square analysis and correlation and regression techniques. Older investors were found to invest in gold for their children and all the investors care for security issues while saving.

Gangwani and Al Mazyad (2020) concentrated on the investment preferences of working females in India by showing descriptive statistics, frequency analysis and percentage and person correlation coefficient analysis of survey data of 200 participants.

Tagtekin (2016) focused on the demographic characteristics and behaviors of gold investors in Turkey in a manner of behavioral finance testing the hypotheses via Chi-Square test and found that both demographic traits and psychological tendencies of individuals were influential on their gold investment choices.

As Nagabhushanam (2020) asserted in her research, preferences of individuals towards gold purchase is irrelevant to gender, marital status and age as a consequence of the analysis of 100 data collected from Chennai and tested by Chi-Square test.

Older people go for safer instruments since they are not willing to take risks compared to the younger ones as Verma (2008) put forward in his Kruskal-Wallis Test applied on the survey results with sample size of 500.

Elder people and females were found to be more likely to avoid risk as the study of Sashikala and Ravi (2010) set forth by implementing logit regression model.

Kıymaz et.al. (2016) applied ordered logit regression on the questionnaire results collected from two different groups of finance professionals in Turkey and reported that elder and highly educated people holds less equity in their portfolio.

#### **1.2.1.2.The Influence of Behavioral Finance on Investment Decisions of the Individuals**

People are assumed to make decisions unboundedly rationally within the framework of standard economic model. However, with the prominence of behavioral economics, people are accepted to be normal with cognitive errors, emotional decisions, biases or personal characteristics which may affect their financial decisions in an irrational way. To exemplify, even though the gold investment made by investors just because it is ‘halal’ according to Islamic rules is not a rational decision, many religious people may prefer holding gold-backed assets in their portfolio for this reason. Amin (2016) concluded that the higher religiosity the investors have, the more willing to invest in gold accounts they are. While rational investors make decisions about their investment preferences, they should be equipped with all financial resources and should process them properly, nonetheless, in real life these are not always eligible so that the investors are forced to cut across (Agrawal, 2012). However, one of the motivations behind the gold investment decision of the individuals might be general acceptance of its being a safe-haven instrument. It is not clear that all the investors really do a thorough analysis on whether it is practically the safest investment tool or does not cause huge losses during crisis, yet they continue to opt for gold in their investment portfolio.

Behavioral biases are classified into two different groups as Cognitive Biases and Emotional Biases. Framing, anchoring, mental accounting, ambiguity aversion, conservatism bias, representativeness bias, availability bias, familiarity bias, overconfidence bias, confirmation bias, hindsight bias, illusion of control, cognitive dissonance and self-attribution bias fall into the Cognitive Biases category while Emotional Biases contains loss aversion, endowment effect, status quo effect, self-control and over optimism. Basically, loss aversion and regret aversion are the main drivers of emotional biases.

Framing is that if the point of view of the individuals are changed, their decisions will change as well. Tversky and Kahneman (1979) conducted an experiment by offering the

participants the same treatment methods in different expressions and observed that two distinct groups preferred different options with the same result. When people decide upon the very first information they obtain by assigning it as starting point, this is called anchoring. Mental accounting is individuals' tendency to separately categorize their earnings and expenditures in their minds. Therefore, they neglect to handle their account as a whole. An ambiguity averse investor favors a known risk to an unknown risk. Conservatism bias can be described as people are not sometimes inclined to keep up with the changes because of their conservatism bias and they try to hold the line by anchoring (Ritter, 2003). Representativeness bias is easily linked to the small number rules in psychology in a way that people are prone to form an opinion about an incident even if the sample size is not big enough to make any judgement. People's willingness to pay attention to the most convenient and easily accessible information while making decision points the availability bias. The risk of the familiar option is sometimes underestimated by individuals and this might lead them not to diversify their portfolios as required and invest in even riskier and low-yielding instruments simply because they are familiar with that option, this manner is the sign of familiarity bias. On the one hand, overconfidence bias is a behavioral flaw which may lead people to make mistakes in investing by overestimating the boundaries of their own knowledge, and talents. Confirmation bias is that the investors ignore new opinions or knowledge against their decision previously made. People care less for further feedbacks after they make their own choices. Hindsight bias appears when people sometimes feel like that they knew it was coming while illusion of control occurs even if people are not able to control the incidents, they feel like they can control. Cognitive Dissonance was theorized by Leon Festinger suggesting that human being avoids inner conflicts and tries to keep all of her beliefs and attitudes in a harmony. As Ricciardi and Simon (2000) asserted in their study, we either endeavor to justify our preferences or alter the attitudes that we developed in the past in order to abstain from these dissonances. Should people often attribute their successes to their heritable sides like ability and intelligence whilst the bad results are treated due to the exogenous factors such as luck or faith, it is called self-attribution bias.

Kahneman and Tversky (1979) shed light on the perception of loss and gain notions of individuals in the way that 'the value function is normally concave for gains, commonly convex for losses, and is generally steeper for losses than for gains.' Meaning

that people suffer more from a loss than they take pleasure in gain in equal measure of that loss which is called loss aversion. People face endowment effect while they estimate a higher price for the asset that they own compared to the ones they do not own. In case of status quo bias, investors exhibit a passive attitude toward the potential investment alternatives. They are simply blind to new opportunities and they tend to maintain their previous choices. Because human being is very short sighted and cannot develop a long-term vision in order to achieve his long-term aims, self-control bias manifests itself. Over optimism bias is the likelihood of a favorable evidence is overvalued by the investors independently of struggling for that evidence and vice versa. It manifests itself as only a belief about the possibility of that outcome to be real.

By conducting a poll on investors in Pakistani, Riaz and Iqbal (2015) found that the overconfidence bias, optimism bias and self-control bias are significantly effective on investment decisions of individuals.

With a survey of 13 questions toward psychological biases with 49 respondents, Zolghami and Matoussi (2009) put forward that the investment preferences of Tunisian investors are influenced by precaution, non-confidence, conservatism, exposure to whisperings and opportunism demonstrated by a univariate, a bivariate and a multivariate analysis with Factor analysis.

Athur (2014) ascertained the effects of behavioral biases on investors in Kenya by processing survey results on SPSS using descriptive statistics. Representativeness bias, illusion of control bias, cognitive dissonance bias and hindsight bias seemed to be significantly related to the investor behaviors while loss aversion bias, self-attribution bias, regret aversion bias, and over-optimism bias were not.

Bakar et.al. (2016) concluded that overconfidence bias, availability bias and conservatism were significantly effective on investors' decisions via survey method by running multiple regression analysis on SPSS.

Personal characteristics and psychological biases were linked as Kübilay and Bayrakdaroğlu (2016) engendered. It was also found that the psychological biases also had an impact on financial risk tolerance of individuals testing by logistic regression analysis considering a survey of 536 participants.

Risk aversion, regret aversion, overconfidence, anchoring and representativeness were found to have remarkable impacts on the investment decisions according to the research of Rehan and Umer (2017) done with a sample of 385 investors in Pakistan Stock Exchange and results were interpreted by descriptive statistics, correlations analysis and multiple regression analysis.

Pandit and Yeoh (2014) concluded that the psychological biases have a salient effect on the decision process of individual investors using moderated regression analysis on the data gathered from Indian investors.

Chaffai and Medhioub (2014) examined the behavioral biases' effects on stock market investors with the analysis of 193 respondents in Tunisia by performing univariate and multivariate analysis. It was found that the loss aversion, representativeness, availability and anchoring are prominent biases affecting the stock market.

## 2. RESEARCH

### 2.1. IMPORTANCE AND OBJECTIVE OF THE RESEARCH

Unlike past, people are not yet assumed rational agents to set financial and economic models. Hence, when individuals make investment decisions, the impact of behavioral finance is more significant hereafter. The influence of psychological and sociological determinants on the decision-making process is not undeniable. It was aimed to investigate the individuals' tendency in gold-investment by taking their justifications why they prefer this instrument to save and the demographic characteristics into account to help the government project Turkey's future gold demand, assign an efficient policy for gold import and direct the cushion of capital to the financial system while the financial institutions may develop new products for female customers so that these steps may result in a more developed system of gold. Moreover, in developing countries like Turkey which has quite floating agenda such as inflation, terrorism and political and financial crisis, the behaviors of investors should be investigated to contribute to the academic literature. Beside, investors can notice their tendencies and reshape their attitudes accordingly.

### 2.2. HYPOTHESES

The hypotheses tested by one-way ANOVA and t-test are following:

**H1a:** There is a relation between the education level of the investors and the weight of gold in their total portfolio.

**H1b:** There is a relation between the education level of the investors and their preference toward investing in paper-based gold investment tools to the physical forms of gold.

**H1c:** There is a relation between the education level of the investors and the factor that they follow the market conditions and assess all the investment avenues.

**H1d:** There is a relation between the age of the investors and the weight of gold in their total portfolio.

**H1e:** There is a relation between the age of the investors and their preference toward investing in paper-based gold investment tools to the physical forms of gold.

**H1f:** There is a relation between the marital status of the investors and their intent of gold saving for children.

**H1g:** There is a relation between the gender of the investors and the weight of gold in their total portfolio.

**H1h:** There is a relation between the gender of the investors and their preference toward investing in gold because it is less risky than other investment avenues.

**H1i:** There is a relation between the income level of the investors and their preference toward investing in gold because it is less risky than other investment avenues.

**H1j:** There is a relation between the occupation of the investors and their preference toward investing in gold because it is less risky than other investment avenues.

The hypotheses tested by Structural Equation Modeling are following:

**H2a:** There is a relation between the gender and gold investment attitudes of individuals.

**H2b:** There is a relation between the marital status and gold investment attitudes of individuals.

**H2c:** There is a relation between the educational attainment and gold investment attitudes of individuals.

**H2d:** There is a relation between the occupation and gold investment attitudes of individuals.

**H2e:** There is a relation between the age and gold investment attitudes of individuals.

**H2f:** There is a relation between the income level and gold investment attitudes of individuals.

**H2g:** There is a relation between the idea of gold investors that they prefer gold investment because of its liquidity and their gold investment attitudes.

**H2h:** There is a relation between the idea of gold investors that prefer gold investment because it is less risky than other investment avenues and their gold investment attitudes.

**H2i:** There is a relation between the idea of gold investors that they prefer gold investment because it is suited to the Islamic rules and their gold investment attitudes.

**H2j:** There is a relation between the idea of gold investors that they prefer gold investment because it is safe haven during tough times and their gold investment attitudes.

**H2k:** There is a relation between the idea of gold investors that they prefer gold investment because it is more profitable than other investment avenues and their gold investment attitudes.

### 2.3. RESEARCH METHODOLOGY

SPSS and STATA was used to analyze the data collected from the attendees older than 18 years in Turkey via survey method. Several questions were asked to the individuals to specify their demographic, decisional and perceptual information. The demographic questionnaire included gender, marital status, educational attainment, occupation, age, and income level of the respondents while perceptual questions require the participants to specify the advantages of holding gold-related assets in their portfolio arising from their self-perceptions. Also, in order to measure the attitudes of the investors toward gold investment, they were questioned by 5 Point Likert Scale questions relevant to the share of their gold savings in their total portfolio, the sources of gold investment motivation which they paid regard to, the purposes of investing in gold, the sales channel they opted for and their demand for physical or paper trading form of gold investment. After collecting the answers from 930 participants with distinct demographical characteristics, the answers were clustered by the SPSS program and reliability analysis of the questions was performed by Cronbach's  $\alpha$  test. Afterwards, the frequency distribution of the answers was determined. By using one-way ANOVA analysis and t-statistics since the data was distributed normally according to the research of George and Mallery (2012) that the skewness and kurtosis values should be between [-2, 2], it was tested whether there was a statistically significant relation between the demographic differences of the individuals and their gold investment tendencies. Finally, the effects of both demographical traits of the respondents and the benefits while investing in gold that the participants perceived to take on their gold investment attitudes were examined by Structural Equation Modelling via STATA.

### 2.4. DATA GATHERED

The survey which was lasting 2 minutes to complete was conducted between the dates of February 2021 and March 2021 by sending via multiple channels; voluntary responses of the participants were expected. At 5% significance level, a sample size of 384 participants would be sufficient for my ANOVA analysis and 1,474 respondents took the survey, since a number of missing answers were eliminated, analysis was carried out with 930 responses. For structural equation model, Kline (2015) suggested that the 20:1 case to parameter ratio would be perfect for sample size. In this research, required sample size was computed as  $46 \times 20 = 920$  so 930 responses were quite sufficient. Survey questions

were tested by Cronbach's Alpha and coefficient was found as 0.79 showing that the reliability of the scale is acceptable. Frequency distribution of the demographic traits of the sample can be seen below.

**Table 15. Demographical Distribution of the Sample**

<b>Gender</b>	<b>Responses</b>	
Females	284	30.5%
Males	646	69.5%
<b>Total</b>	930	100.0%

<b>Marital Status</b>	<b>Responses</b>	
Married	678	72.9%
Single	252	27.1%
<b>Total</b>	930	100.0%

<b>Educational Attainment</b>	<b>Responses</b>	
No Education	-	0.0%
Elementary	12	1.3%
High-school	112	12.0%
Associate degree	163	17.5%
Undergraduate	493	53.0%
Postgraduate	150	16.1%
<b>Total</b>	930	100.0%

<b>Occupation</b>	<b>Responses</b>	
Unemployed	56	6.0%
Student	55	5.9%
Retired	330	35.5%
Civil servant	230	24.7%
Private sector employee	236	25.4%
Self-employed	23	2.5%
<b>Total</b>	930	100.0%

<b>Age</b>	<b>Responses</b>	
18-25	66	7.1%
26-40	322	34.6%
41-60	468	50.3%
Above 60	74	8.0%
<b>Total</b>	930	100.0%

<b>Monthly Income</b>	<b>Responses</b>	
TRY 0	44	4.7%
TRY 1-2,000	41	4.4%
TRY 2,001-4,000	89	9.6%
TRY 4,001-6,000	313	33.7%
Above TRY 6,000	443	47.6%
<b>Total</b>	<b>930</b>	<b>100.0%</b>

Survey questions and their abbreviations used in data analysis and factor measurement are as following:

**Table 16. Survey Items**

	<b>Item ID</b>	<b>Questionnaire Item</b>
<b>DEMOGRAPHIC QUESTIONS</b>	gen1	What is your gender?
	marit2	Are you single or married?
	educ3	What is your educational attainment?
	occup4	What is your occupation?
	age5	How old are you?
	income6	What is your monthly income?
<b>5 POINT LIKERT SCALE QUESTIONS</b>	att7	Gold constitutes more than the half of my entire portfolio.
	att8	Political developments play a crucial role in my gold investment decision.
	att9	I invest in gold in line with my previous experiences.
	att10	I invest in gold in line with the recommendations of my acquaintances.
	att11	I invest in gold in line with the expert opinions.
	att12	I follow the market conditions and assess all the investment avenues while investing in gold.
	ben13	I prefer gold investment because of its liquidity.
	ben14	I prefer gold investment because it is less risky than other investment avenues.
	ben15	I prefer gold investment because it is suited to the Islamic rules.
	ben16	I prefer gold investment because it is safe haven during though times.
	ben17	I prefer gold investment because it is more profitable than other investment avenues.
	att18	While gold shopping, I prefer using physical sales channels such as jewelry stores to the intermediaries and derivative markets.
	att19	I prefer investing in paper-based gold investment tools such as gold funds and gold deposits to the physical forms of gold.
	att20	I invest in gold for the future of my children.
	att21	I invest in gold for my wealth to increase.
	att22	I invest in gold for my retirement.

### **DEMOGRAPHIC TRAITS (DEM)**

DEM is the exogenous variable that was derived from the questions of gen1, marit2, educ3, occup4, age5 and income 6 to test H1a, H1b, H1c, H1d, H1e, H1f, H1g, H1h, H1i and H1j with H2a, H2b, H2c, H2d, H2e and H2f.

### **PERCEIVED BENEFITS (BEN)**

BEN is the exogenous variable that was derived from the questions of ben13, ben14, ben15, ben16, ben17 to test H2g, H2h, H2i, H2j and H2k.

### **GOLD INVESTMENT ATTITUDES (ATT)**

ATT is the endogenous variable that was derived from the questions of att7, att8, att9, att10, att11, att12, att18, att19, att20, att21 and att22 to test all the hypotheses that I constructed.

Pearson correlation coefficients calculated for the dependent and independent variables were shown below. There is no correlation coefficient above 0.70 which might lead to a multicollinearity problem between any two variables.

Table 17. Pearson Correlation Matrix

		gen1	man12	educ3	occup4	age5	income6	att7	att8	att9	att10	att11	att12	ben13	ben14	ben15	ben16	ben17	att18	att19	att20	att21	att22	
gen1	Pearson Correlation	1																						
	Sig. (2-tailed)		.247**	.036	.027	.291**	.278**	.055	.014	.024	.181**	.086**	.107**	.005	.008	.065	.013	.121**	.025	.027	.039	.093**	.077**	
man12	Pearson Correlation	.247**	1																					
	Sig. (2-tailed)			.213**	.015	.512**	.210**	.096**	.069**	.017	.020	.096**	.037	.081**	.011	.066	.034	.031	.078**	.119**	.322**	.154**	.067**	
educ3	Pearson Correlation	.036	.213**	1																				
	Sig. (2-tailed)				.000	.000	.000	.003	.007	.594	.538	.004	.254	.014	.730	.046	.307	.344	.018	.000	.000	.000	.041	
occup4	Pearson Correlation	.027	.015	.000	1																			
	Sig. (2-tailed)					.284**	.547**	.028	.007	.032	.009	.029	.024	.015	.019	.048	.025	.001	.071	.107	.047	.134**	.098**	
age5	Pearson Correlation	.291**	.512**	.000	.284**	1																		
	Sig. (2-tailed)						.184**	.013	.070**	.097**	.038	.138**	.057	.039	.081**	.037	.026	.026	.110**	.187**	.172**	.211**	.030	
income6	Pearson Correlation	.000	.000	.000	.000	.000	1																	
	Sig. (2-tailed)							.692	.034	.003	.246	.000	.082	.239	.014	.257	.428	.425	.001	.000	.000	.000	.364	
att7	Pearson Correlation	.055	.027	.028	.007	.032	.009	1																
	Sig. (2-tailed)								.018	.023	.082	.031	.069**	.011	.046	.022	.009	.087**	.101**	.173**	.047	.043	.014	
att8	Pearson Correlation	.014	.000	.000	.000	.000	.000	.000	1															
	Sig. (2-tailed)									.438	.275**	.410**	.286**	.217	.278**	.024	.330**	.251**	.092**	.142**	.179**	.223**	.184**	
att9	Pearson Correlation	.024	.000	.000	.000	.000	.000	.000	.000	1														
	Sig. (2-tailed)										.392**	.477**	.410**	.441**	.488**	.143	.537**	.505**	.177**	.156**	.312**	.279**	.248**	
att10	Pearson Correlation	.181**	.020	.008	.009	.000	.000	.000	.000	.000	1													
	Sig. (2-tailed)											.366**	.080	.310	.325**	.171	.311**	.394**	.214**	.019	.226**	.234**	.246**	
att11	Pearson Correlation	.086**	.004	.000	.000	.000	.000	.000	.000	.000	.000	1												
	Sig. (2-tailed)												.314**	.296**	.315**	.108**	.372**	.325**	.156**	.236**	.225**	.275**	.232**	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

		gen1	mar12	educ3	occup4	age5	income6	att7	att8	att9	att10	att11	att12	ben13	ben14	ben15	ben16	ben17	att18	att19	att20	att21	att22
att12	Pearson Correlation	.107**	-.037	.054	.024	-.057	.069	.172	.286**	.410	.080	.314	1	.295**	.311	.076	.318	.272**	.132	.209	.213	.245	.213**
	Sig. (2-tailed)	.001	.254	.100	.464	.082	.037	.000	.000	.000	.014	.000		.000	.000	.021	.000	.000	.000	.000	.000	.000	.000
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
ben13	Pearson Correlation	-.005	.081*	-.051	-.015	.039	-.011	.297**	.217**	.441**	.310	.296**	.295**	1	.494**	.274**	.472**	.403**	.255**	.077	.340	.174**	.319**
	Sig. (2-tailed)	.871	.014	.121	.655	.239	.731	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.019	.000	.000	.000
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
ben14	Pearson Correlation	-.008	.011	.015	.019	-.081*	-.046	.351**	.278**	.488**	.325**	.315**	.311**	.494**	1	.157**	.626**	.529**	.249	.054	.303	.215**	.239**
	Sig. (2-tailed)	.819	.730	.653	.560	.014	.160	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.098	.000	.000	.000
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
ben15	Pearson Correlation	.065	.066	-.054	-.048	.037	-.022	.203**	.024	.143	.171	.108	.076	.274**	.157**	1	.228	.185**	.205**	.010	.196	.030	.107**
	Sig. (2-tailed)	.048	.046	.102	.147	.257	.500	.000	.458	.000	.000	.001	.021	.000	.000		.000	.000	.000	.770	.000	.366	.001
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
ben16	Pearson Correlation	-.013	.034	-.013	.025	-.026	-.009	.391**	.330**	.537**	.311**	.372**	.318**	.472**	.626**	.228**	1	.574**	.228	.119	.364**	.234**	.284**
	Sig. (2-tailed)	.703	.307	.697	.439	.428	.786	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
ben17	Pearson Correlation	-.121**	.031	-.068	.001	-.026	-.087**	.386**	.251**	.505**	.394**	.325**	.272**	.403**	.529**	.185**	.574**	1	.273**	.062	.351**	.279**	.304**
	Sig. (2-tailed)	.000	.344	.037	.983	.425	.008	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.060	.000	.000	.000
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
att18	Pearson Correlation	.025	.078	-.152**	-.071	.110**	-.101**	.182**	.092**	.177**	.214**	.156**	.132**	.255**	.249**	.205**	.228**	.273**	1	-.268**	.249**	.048	.168**
	Sig. (2-tailed)	.455	.018	.000	.031	.001	.002	.000	.005	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.146	.000
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
att19	Pearson Correlation	-.027	-.119**	.235**	.107	-.187**	.173**	.014	.142**	.156**	-.019	.236**	.209**	.077**	.054	.010	.119**	.062	-.268**	1	.043	.203**	.089**
	Sig. (2-tailed)	.408	.000	.000	.001	.000	.000	.666	.000	.000	.563	.000	.000	.019	.098	.770	.000	.060	.000	.188	.000	.000	.006
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
att20	Pearson Correlation	.039	.322**	-.152**	-.016	.172**	.047	.285**	.179**	.312**	.226**	.225**	.213**	.340**	.303**	.196**	.364**	.351**	.249**	.043	1	.148**	.405**
	Sig. (2-tailed)	.238	.000	.000	.624	.000	.151	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.188	.000	.000	.000
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
att21	Pearson Correlation	-.083**	-.154**	.149**	.134**	-.211**	.043	.139**	.223**	.279**	.234**	.275**	.245**	.174**	.215**	.030	.234**	.279**	.048	.203**	.148**	1	.396**
	Sig. (2-tailed)	.005	.000	.000	.000	.000	.189	.000	.000	.000	.000	.000	.000	.000	.000	.366	.000	.000	.146	.000	.000	.000	.000
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930
att22	Pearson Correlation	-.077	.067	.011	.098**	.030	.014	.172**	.184**	.248**	.246**	.232**	.213**	.319**	.239**	.107**	.284**	.304**	.168**	.089**	.405**	.396**	1
	Sig. (2-tailed)	.019	.041	.744	.003	.364	.660	.000	.000	.000	.000	.000	.000	.000	.000	.001	.000	.000	.000	.006	.000	.000	.000
	N	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930	930

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

### 3. RESULTS

#### 3.1. ONE-WAY ANOVA ANALYSIS and T-TEST

Scales of measurement for variables that are used in econometric analyses are various such as nominal, ordinal and intervals. Nominal variables are simply categorical variables but do not have a rank between the groups such as gender, marital status. Ordinal variables, as its name signifies, are ordered variables such as Likert scale measuring the degree of a statement or a stage of an illness while intervals are numerical scales like age or length (McCrum-Gardner, 2008). One-way ANOVA test is basically used in order to compare at least three groups whilst the t-test is only proper for making comparison between two groups. Independent variables usually consist of binary variables at t-statistics and categorical variables at one-way ANOVA test. Both of two assume the normality of sample means by testing numerous methods such as e Shapiro-Wilk W, Jarque-Bera and Kolmogorov-Smirnov D. Otherwise, non-parametric tests should be applied to test the hypotheses (e.g. Kruscal-Wallis test, Kolmogorov-Smirnov test etc.) (Park, 2009). Homogeneity of variances implies that standard deviation of population should also be equal for different groups. Moreover, the observations should be independent of each other.

As stated in the library of Kent State University, independent samples t-test is a parametric statistical test used for comparison of two means of two groups to identify if the population means from two different groups are the same. Independent samples basically refer to that any subjects in one group cannot be involved in the other group. The null and alternative hypotheses might be structured as follows:

$H_0: \mu_1 = \mu_2$  (the means of the populations of two groups are equal)

$H_1: \mu_1 \neq \mu_2$  (the means of the populations of two groups are not equal)

The homogeneity of variances assumption that both groups have the same variance, the hypotheses of which are as follows:

$H_0: \sigma_1^2 = \sigma_2^2$  (the population variances of group 1 and 2 are equal)

$H_1: \sigma_1^2 \neq \sigma_2^2$  (the population variances of group 1 and 2 are not equal)

In case that two independent samples are gathered from the populations with the same variances, t-statistics is calculated as:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$s_p = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

$\bar{x}_1$ : mean of first sample

$\bar{x}_2$ : mean of second sample

$n_1$ : number of observations of first sample

$n_2$ : number of observations of second sample

$s_1$ : standard deviation of first sample

$s_2$ : standard deviation of second sample

In the event of unequal variances, t-statistics is calculated as:

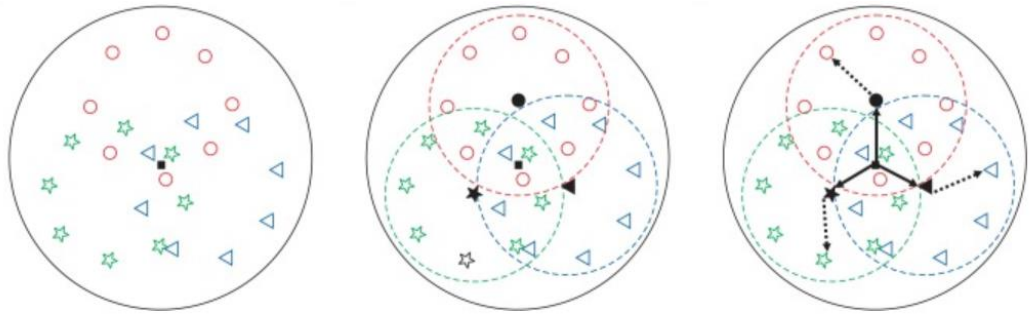
$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

One-way ANOVA test tries to examine a null hypothesis that there is no difference between the means of groups. Alternative hypothesis is that there is at least two group means which are statistically significantly different from each other. If any two groups' means are distinct from each other, then we should reject the null hypothesis (Kim, 2017).

$$H_0: \mu_1 = \mu_2 = \mu_3$$

$$H_1: \mu_1 \neq \mu_2 \text{ or } \mu_1 \neq \mu_3 \text{ or } \mu_2 \neq \mu_3$$

As Kim (2017) characterized in his study, the third figure signifies that the distance from the mean of each group to overall mean indicates the intergroup variance while the dotted lines implies the intragroup variances.



**Figure 8. Representation of Variance Differences of 3 Different Groups**

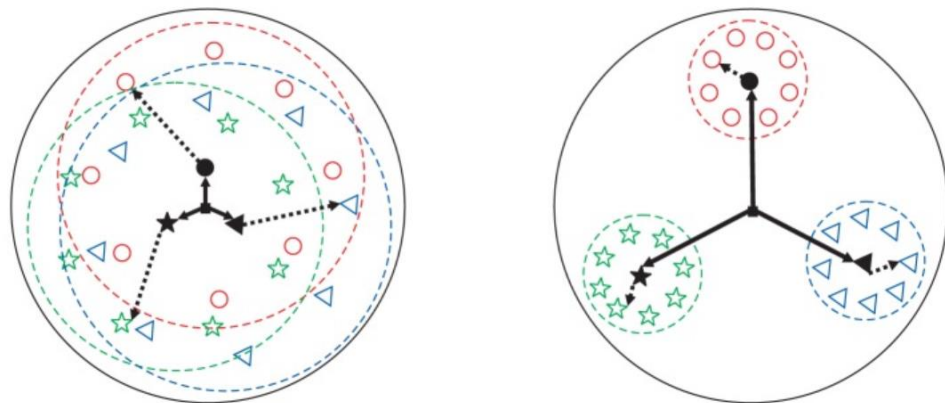
Inter-group variance is expressed as  $(\bar{Y}_i - \bar{Y})^2$ , the denominator of the equation for calculating the F statistic while  $(Y_{ij} - \bar{Y}_i)^2$  represents the numerator of F statistics. Since ANOVA is based on F-statistics, the variance of both the groups itself and the variances among each other are divided and a ratio is found and interpreted.

$$F = \frac{\text{Intergroup variance}}{\text{Intragroup variance}} = \frac{\sum_{i=1}^K n_i (\bar{Y}_i - \bar{Y})^2 / (K-1)}{\sum_{ij=1}^n (Y_{ij} - \bar{Y}_i)^2 / (N-K)}$$

**Figure 9. F-statistics**

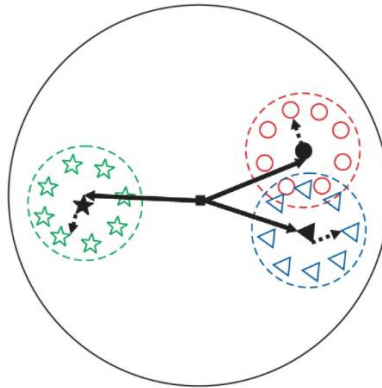
- $\bar{Y}_i$ : mean of the group i
- $n_i$ : number of observations of the group i
- $\bar{Y}$ : overall mean
- K: number of groups
- $Y_{ij}$ : jth observational value of group i
- N: number of all observational values

Below figure shows that the grouping in the first circle is not necessary since the intergroup variance is not as large as the intragroup variance and vice versa in the second one.



**Figure 10. Inter- and Intragroup Variances**

When we run the one-way ANOVA analysis, we only elucidate if there is a difference between the groups' means. So as to find out which groups differ from each other, we should carry out a post hoc testing. Post hoc testing is actually “the analysis after the fact” and means ‘after that’ in Latin. Researchers conduct post-hoc test when the null hypothesis is rejected because the population means of three mutually independent groups are equal each other meaning that at least one group may have difference but it does not provide any information relating to in which groups there are differences. This analysis is made by comparing two of the groups. As seen in below table, we should carry out a post-hoc analysis to unearth which groups differ in the event of a difference between the means of at least two groups. Different types of post hoc analysis may be performed such as Hochberg’s GT2, Tukey, Schéffe, Gabriel, Dunnett, Waller Duncan methods which are used when the equal variance condition is fulfilled. On the other hand, if the variances are not equal, Games Howell, Tamhane’s T2, Dunnett’s T3, Dunnett’s C methods might be implemented. Hochberg’s GT2 method is used when the observation number for each group is different from each other. Games Howell test is convenient to apply when the sample sizes are not equal.



**Figure 11. Scheme for necessity of post-hoc test**

In this study, one-way ANOVA test was implemented for more than two groups which satisfy the normality conditions. I tested the H1a, H1b, H1c, H1d, H1e, H1i and H1j.

T-test was used for examining the H1f, H1g and H1h by meeting normality conditions and the findings are detailed below.

**H1 Results:**

In order to test whether there is a relation between the education level of the investors and the weight of gold in their total portfolio, one-way ANOVA test was used and H1a was not rejected.

**Table 18. ANOVA Analysis of H1a**  
**ANOVA**

att7

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20,268	4	5,067	3,594	,006
Within Groups	1303,906	925	1,410		
Total	1324,173	929			

Hochberg's GT2 test was implemented since the variances of all groups were homogen and the group's sample size was not equal. According to the test results shown below, there is significant difference between the means of Associate Degree&Postgraduate. Associate degree investors' tendencies toward gold holdings in their portfolios are higher than the postgraduate investors.

**Table 19. Difference of Gold Weights in Terms of Education Level**

**Multiple Comparisons**

Dependent Variable: attitudes7

Hochberg

(I) education3	(J) education3	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Elementary	High-school	-,02976	,36063	1,000	-1,0417	,9822
	Associate Degree	-,02198	,35513	1,000	-1,0185	,9745
	Undergraduate	,25744	,34688	,998	-,7159	1,2308
	Post-graduate	,37000	,35618	,971	-,6295	1,3695
High-school	Elementary	,02976	,36063	1,000	-,9822	1,0417
	Associate Degree	,00778	,14572	1,000	-,4011	,4167
	Undergraduate	,28720	,12428	,191	-,0615	,6359
	Post-graduate	,39976	,14827	,069	-,0163	,8158
Associate Degree	Elementary	,02198	,35513	1,000	-,9745	1,0185
	High-school	-,00778	,14572	1,000	-,4167	,4011
	Undergraduate	,27942	,10727	,089	-,0216	,5804
	Post-graduate	,39198*	,13433	,035	,0150	,7689
Undergraduate	Elementary	-,25744	,34688	,998	-1,2308	,7159
	High-school	-,28720	,12428	,191	-,6359	,0615
	Associate Degree	-,27942	,10727	,089	-,5804	,0216
	Post-graduate	,11256	,11071	,975	-,1981	,4232
Post-graduate	Elementary	-,37000	,35618	,971	-1,3695	,6295
	High-school	-,39976	,14827	,069	-,8158	,0163
	Associate Degree	-,39198*	,13433	,035	-,7689	-,0150
	Undergraduate	-,11256	,11071	,975	-,4232	,1981

\*. The mean difference is significant at the 0.05 level.

Determining whether there is a relation between the education level of the investors and their preference toward investing in paper-based gold investment tools to the physical forms of gold, one-way ANOVA test revealed that the H1b was not rejected in line with the below results.

**Table 20. ANOVA Analysis of H1b**  
**ANOVA**

att19

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	75,685	4	18,921	14,079	,000
Within Groups	1243,128	925	1,344		
Total	1318,813	929			

Games-Howell test was applied because of the rejection of equal variances assumed. According to the test results shown below, there is significant difference between the means of High-school&Undergraduate, High-school&Postgraduate, Associate Degree&Postgraduate and Undergraduate&Postgraduate. Both postgraduate and undergraduate degree investors are more likely to invest in paper-based gold investment tools rather than the physical forms of gold compared to the high-school graduates. Similarly, postgraduate degree investors are likely to prefer paper-based gold investments tools to the physical forms of gold in comparison with the undergraduate and associate degree investors.

**Table 21. Difference of Paper-Based Gold Investment Preferences in Terms of Education**  
**Multiple Comparisons**

Dependent Variable: att19

Games-Howell

(I) educ3	(J) educ3	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Elementary	High-school	-,01488	,32726	1,000	-1,0434	1,0137
	Associate Degree	-,31237	,32721	,870	-1,3408	,7161
	Undergraduate	-,58097	,31722	,402	-1,5972	,4353
	Post-graduate	-1,00333	,32669	,057	-2,0311	,0244
High-school	Elementary	,01488	,32726	1,000	-1,0137	1,0434
	Associate Degree	-,29749	,13585	,187	-,6706	,0757
	Undergraduate	-,56609*	,10964	,000	-,8682	-,2640
	Post-graduate	-,98845*	,13461	,000	-1,3583	-,6186
Associate Degree	Elementary	,31237	,32721	,870	-,7161	1,3408
	High-school	,29749	,13585	,187	-,0757	,6706
	Undergraduate	-,26859	,10949	,105	-,5693	,0321
	Post-graduate	-,69096*	,13449	,000	-1,0600	-,3219
Undergraduate	Elementary	,58097	,31722	,402	-,4353	1,5972
	High-school	,56609*	,10964	,000	,2640	,8682
	Associate Degree	,26859	,10949	,105	-,0321	,5693
	Post-graduate	-,42237*	,10795	,001	-,7190	-,1257
Post-graduate	Elementary	1,00333	,32669	,057	-,0244	2,0311
	High-school	,98845*	,13461	,000	,6186	1,3583
	Associate Degree	,69096*	,13449	,000	,3219	1,0600
	Undergraduate	,42237*	,10795	,001	,1257	,7190

\*. The mean difference is significant at the 0.05 level.

In order to test if there is a relation between the education level of the investors and the factor that they follow the market conditions and assess all the investment avenues, one-way ANOVA analysis demonstrated that the H1c was rejected since the p-value (0,140) > 0,05 meaning that there is no statistically significant relation between the means of groups.

**Table 22. ANOVA Analysis of H1c**

**ANOVA**

att12

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8,038	4	2,010	1,735	,140
Within Groups	1071,558	925	1,158		
Total	1079,596	929			

While signifying if there is a relation between the age of the investors and the weight of gold in their total portfolio, one-way ANOVA was used and H1d was rejected since the p-value (0,830) >0,05 meaning that there is no statistically significant relation between the means of groups.

**Table 23. ANOVA Analysis of H1d**

**ANOVA**

att7

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,261	3	,420	,294	,830
Within Groups	1322,912	926	1,429		
Total	1324,173	929			

Determining there is a relation between the age of the investors and their preference toward investing in paper-based gold investment tools to the physical forms of gold, one-way ANOVA test disclosed that H1e was not rejected.

**Table 24. ANOVA Analysis of H1e**

**ANOVA**

att19

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	75,046	3	25,015	18,624	,000
Within Groups	1243,767	926	1,343		
Total	1318,813	929			

In Games-Howell analysis, there can be seen a significant difference between the investors from above 60 age group and 18-25, 26-40 and 41-60 just as from 26-40 and 41-60 age group. Investors of above 60 age group are less likely to invest in paper-based gold investment tools compared to the investors of 18-25, 26-40 and 41-60 age group.

Likewise, the tendency to invest in paper-based gold investment tools of 41-60 age group is lower than the 26-40 age group.

**Table 25. Difference of Paper-Based Gold Investment Preferences in Terms of Age**  
**Multiple Comparisons**

Dependent Variable: att19

Games-Howell

(I) age5	(J) age5	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
18-25	26-40	-,33456	,16632	,192	-,7701	,1010
	41-60	,08236	,16333	,958	-,3459	,5106
	Above 60	,69902*	,18921	,002	,2061	1,1919
26-40	18-25	,33456	,16632	,192	-,1010	,7701
	41-60	,41692*	,08391	,000	,2008	,6330
	Above 60	1,03357*	,12713	,000	,7026	1,3646
41-60	18-25	-,08236	,16333	,958	-,5106	,3459
	26-40	-,41692*	,08391	,000	-,6330	-,2008
	Above 60	,61666*	,12320	,000	,2954	,9379
Above 60	18-25	-,69902*	,18921	,002	-1,1919	-,2061
	26-40	-1,03357*	,12713	,000	-1,3646	-,7026
	41-60	-,61666*	,12320	,000	-,9379	-,2954

\*. The mean difference is significant at the 0.05 level.

H1f was not rejected since the p-value (0,000) < 0,05 meaning that there is a relation between the marital status of the investors and their intent of gold saving for children.

**Table 26. T-test of Intent of Gold Saving in Terms of Marital Status**  
**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
att20	Equal variances assumed	2,316	,128	-10,356	928	,000	-,87611	,08460	-1,04214	-,71007
	Equal variances not assumed			-10,297	444,396	,000	-,87611	,08508	-1,04331	-,70890

As below table indicates, married investors are more likely to invest in gold for their children's future.

**Table 27. Intent of Gold Saving in Terms of Marital Status**

Group Statistics					
	marit2	N	Mean	Std. Deviation	Std. Error Mean
att20	Single	252	2,3333	1,15700	,07288
	Married	678	3,2094	1,14287	,04389

H1g that there is a relation between the gender of the investors and the weight of gold in their total portfolio was rejected since the p-value (0,092) >0,05 meaning that there is no statistically significant difference between the weight of gold in the portfolio of male and female investors.

**Table 28. T-test of Weight of Gold in Terms of Gender**

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
att7	Equal variances assumed	,383	,536	1,687	928	,092	,14325	,08492	-,02340	,30991
	Equal variances not assumed			1,682	537,223	,093	,14325	,08515	-,02402	,31053

H1h was rejected since the p-value (0,819) >0,05 meaning that there is no statistically significant difference between the preferences of females and males toward investing in gold because it is less risky than other investment avenues.

**Table 29. T-test of Reason for Gold Saving in Terms of Gender**

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
ben14	Equal variances assumed	1,247	,264	,229	928	,819	,01619	,07059	-,12235	,15473
	Equal variances not assumed			,235	572,949	,814	,01619	,06889	-,11912	,15149

While testing whether there is a relation between the monthly income level of the investors and the reason for their preference of gold investment because of its low-riskiness than other investment avenues, one-way ANOVA analysis was used indicating that the H1i was rejected since the p-value (0,663) >0,05 meaning that there is no statistically significant relation between the means of groups.

**Table 30. ANOVA Analysis of H1i**

**ANOVA**

ben14

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,357	4	,589	,599	,663
Within Groups	909,949	925	,984		
Total	912,306	929			

Testing the relation between the occupation and the reason for the investors' preferences of gold investment because of its low-riskiness than other investment avenues, one-way ANOVA analysis was used, H1j was rejected because p-value (0,194) >0,05 resulting that there is no statistically significant relation between the means of groups.

**Table 31. ANOVA Analysis of H1j**

**ANOVA**

ben14

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7,240	5	1,448	1,478	,194
Within Groups	905,066	924	,980		
Total	912,306	929			

### 3.2. STRUCTURAL EQUATION MODEL

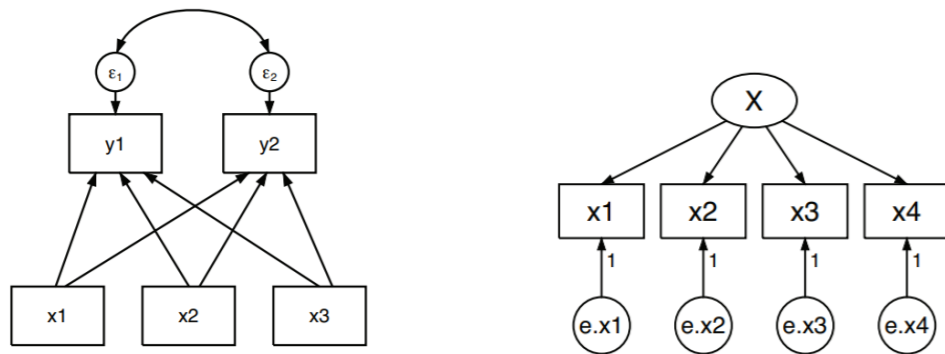
Structural Equation Model was firstly used by Sewall Wright, a biometrician, while trying to predict the animals' birth weights in association with the environmental and genetic factors.

Structural Equation Modelling provides the researchers to link a deal of independent and dependent variables at a time differently from regression analysis which models the effects of dependent variables on independent variables and ignores the indirect relations between the variables.

Charles Spearman developed a term named correlation coefficient in order to figure out whether the variables move in the same direction or not. His invention of correlation implied that the highly-correlated variables can be grouped into one common factor by underlying the 'Factor Analysis' method. Until the factor analysis was discovered, statistics only served for explanation of the observed variables. A factor can be described as an unobserved variable that affects more than 1 observed variable and explain the covariance between these variables. The variables which have high correlations are gathered together and forms a factor. In a word, the covariances among at least three measured variables imply latent variables.

SEM conceptually seems a combination of multiple regression in which several dependent variables are affected by the same exogenous variables and factor analysis that aims to establish a number of factors by explaining maximum variance.

A multivariate and a single factor model can be modelled as below diagrams:



**Figure 12. Multivariate Model vs. Single Factor Model**

In standard regression analysis, analysts need separate regression models to explain the associations between the variables while in SEM, they can form only one model by statistical programs such as LISREL, AMOS and STATA. Since SEM includes linear regressions in itself, the structure is similar in terms of explaining the relations between the dependent and independent variables but they are called endogenous and exogenous, respectively that have coefficients named ‘path coefficients’ or ‘regression weights’ (Reisinger and Turner, 1999).

SEM is particularly widely used in economics, psychology, marketing, health and so forth thanks to its ability to develop models of unobserved variables called ‘latent variables’ which might be measured by observed variables. Latent variables may be exemplified as attitudes, emotions, satisfactions and perceptions of individuals by measuring them with observed variables such as the responses to obtained from surveys.

Another advantage of using SEM is to take the measurement errors of observed variables into consideration while in traditional regression approach, the measurement errors of independent variables are overlooked. Those errors represent the variances which cannot be explained by factors.

The assumptions that should be satisfied to obtain accurate consequences by model:

*-Large sample size:* Kline (2015) recommended a sample size of 20 multiplied by the number of model’s parameters.

*-Multiple measurements:* Each factor should incorporate at least three observed variables.

*-Normality:* Data should come from a continuous and multivariate normal population for the usage of Maximum Likelihood Estimation. If the skewness and kurtosis of the data distribution lies between -2 and +2, the data is to be distributed normally.

*-Linearity:* Since SEM is a combination of factor analysis and regression analysis, as a crucial assumption of regression analysis, linearity between factors and between factors and manifest items are also required for SEM. (Civelek, 2018)

*-No multicollinearity:* There should not be any relation between the exogenous variables.

*-No correlation between error terms:* Although the model assumes no correlation between error terms, sometimes it may occur due to a variety of reasons such as pure randomness or similarities in questionnaire.

There are two types of SEM application in literature.

*-Maximum Likelihood:* Multivariate normality of observed variables is required to apply this method. The concept in ML method is that the probability of a sample is different for each distinct populations but it is higher in one of those populations compared to others. By using this method, we try to find the parameters of the model that enables the current observation most likely to happen. This technique provides the researchers with estimation of the parameters of a statistical model and fitting that model to data available.

*-Ordinary Least Squares:* By this method, we can determine the unknown parameters in a linear regression model. OLS technique is basically interested in finding regression coefficients rather than detecting an overall estimation process.

There are five fundamental steps of forming Structural Equation Modeling:

*-Model Specification:* A process in that we formed a theoretical model explaining the relation between more than one variable.

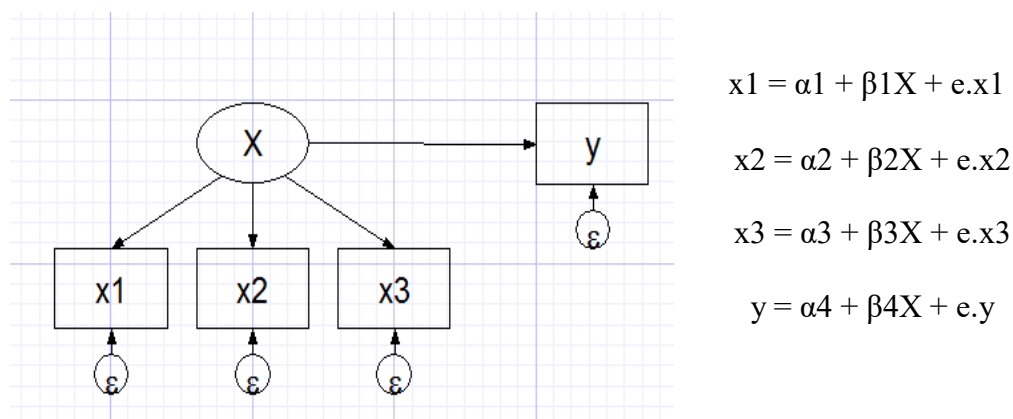
*-Model Identification:* The number of parameters that the model estimates should be equal or lower than the degree of freedom of the model meaning each latent variable should own at least three observed variables (Munro, 2005).

*-Model Estimation:* By using a computer program, estimates of population parameters are tried to be made with observed data (Munro, 2005).

-*Model Fit*: Whether the specified model fits the data or not should be tested via Root Mean Square Residual (RMR), Root Mean Square Error of Approximation (RMSEA) which are desirable when they are close to “0” or Goodness of Fit Index (GFI), Comparative Fit Index (CFI) that are ranged between 0 and 1 (Munro, 2005).

-*Model Modification*: In order to improve the fit of model, the model may need to be altered and reevaluated.

A sample diagram and equations from STATA program is shown below.



$$x1 = \alpha1 + \beta1X + e.x1$$

$$x2 = \alpha2 + \beta2X + e.x2$$

$$x3 = \alpha3 + \beta3X + e.x3$$

$$y = \alpha4 + \beta4X + e.y$$

Figure 13. A Sample Diagram

-Rectangular boxes corresponds to observed variables (indicators or manifest items).

-Circles corresponds to latent variables (factors, constructs or dimensions). Each factor should own at least 3 observed variables.

-One-way arrows imply that the first variable has impact on the second one. There are regression coefficients or factor loads above the arrows.

-Two-way arrows indicate covariance between the variables.

In this research, one of my ultimate aims was to examine the effects of some unobserved factors, the reasons why the investors choose gold investment, on the drivers they consider while making gold investment and the ways of investing in gold along with the demographic differences of the investors. In order to find out this relation, a single model that integrates all these variables in one analysis that accounted for measurement errors is used.

**H2 Results:**

As indicated in unstandardized results below, the measured variables associated with Demographic Traits factor and Perceived Benefits are significantly influential on Gold

Investment Attitudes. All of the latent variables are statistically significant with p-value<0.05.

**Tablo 31. SEM Results of Hypothesis**

<b>SEM RESULTS</b>			
	<b>STANDARDIZED ESTIMATES</b>	<b>UNSTANDARDIZED ESTIMATES</b>	
	<b>Coefficient</b>	<b>Coefficient</b>	<b>Std. Error</b>
<b>DEM --&gt; ATT</b>	<b>-0.07</b>	<b>-0.31**</b>	<b>0.13</b>
gen1	<b>0.29</b>	<b>1.00</b>	-
marit2	<b>0.51</b>	<b>1.70***</b>	<b>0.21</b>
educ3	<b>-0.41</b>	<b>-2.80***</b>	<b>0.38</b>
occup4	<b>-1.10</b>	<b>0.96***</b>	<b>0.31</b>
age5	<b>1.00</b>	<b>5.48***</b>	<b>0.88</b>
income6	<b>0.18</b>	<b>1.47***</b>	<b>0.32</b>
<b>BEN --&gt; ATT</b>	<b>0.85</b>	<b>0.78***</b>	<b>0.06</b>
ben13	<b>0.63</b>	<b>1.00</b>	-
ben14	<b>0.75</b>	<b>1.06***</b>	<b>0.06</b>
ben15	<b>0.28</b>	<b>0.51***</b>	<b>0.07</b>
ben16	<b>0.80</b>	<b>1.17***</b>	<b>0.06</b>
ben17	<b>0.72</b>	<b>1.09***</b>	<b>0.06</b>
att7	<b>0.53</b>	<b>1.00</b>	-
att8	<b>0.52</b>	<b>0.93***</b>	<b>0.08</b>
att9	<b>0.78</b>	<b>1.20***</b>	<b>0.08</b>
att10	<b>0.51</b>	<b>0.90***</b>	<b>0.07</b>
att11	<b>0.59</b>	<b>0.98***</b>	<b>0.08</b>
att12	<b>0.48</b>	<b>0.81***</b>	<b>0.07</b>
att18	<b>0.30</b>	<b>0.60***</b>	<b>0.08</b>
att19	<b>0.18</b>	<b>0.34***</b>	<b>0.07</b>
att20	<b>0.47</b>	<b>0.89***</b>	<b>0.08</b>
att21	<b>0.41</b>	<b>0.74***</b>	<b>0.07</b>
att22	<b>0.43</b>	<b>0.75***</b>	<b>0.07</b>

\*p<0.10, \*\*p<0.05, \*\*\*p<0.01

RMSEA=0.094; SRMR=0.086; CFI=0.703

As above table signifies, SRMR and RMSEA values are sufficient for model fit which are supposed to be close to '0' as far as possible.

My model, the degree of freedom of which is greater than '0' is overidentified to be executed.

$$\begin{aligned}
 df &= \# \text{ of observed variables} * (\# \text{ of observed variables} + 1) / 2 - \# \text{ of parameters} \\
 &= (22 * 23 / 2) - 46 \\
 &= 207
 \end{aligned}$$

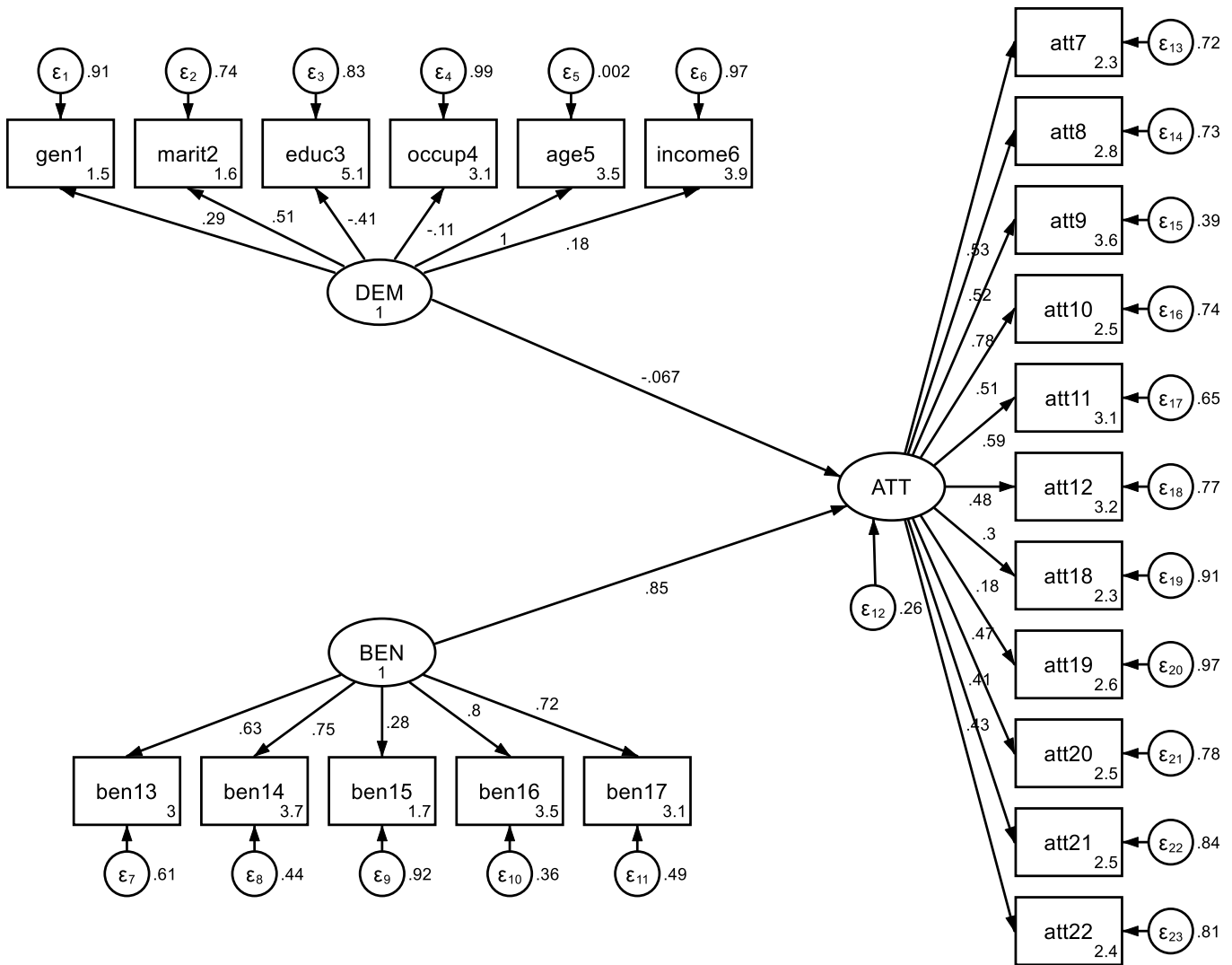


Figure 14. Structural Equation Model

Above results demonstrated that the variable of ‘Demographic Traits’ has a negative but weak influence over the ‘Gold Investment Attitudes’ whilst the ‘Perceived Benefits’ powerfully positively affects the ‘Gold Investment Attitudes’.

I fail to reject the H2a since there is a positive relation between the gender and gold investment attitudes of individuals. H2b was not also rejected because the coefficient of the marit2 is 1.69 meaning that a married investor will have an effect of 1.69 unit on their gold investment attitudes. Educational attainment and professions of investors have

negative influence over the gold investment attitudes (coefficient=-2.79 and -0.95, respectively). Age has the most powerful impact on the gold investment attitudes (coefficient=5.47) and income has relatively poor effect on it (coefficient=1.46). Hence, H2c, H2d, H2e and H2f were not also rejected.

Investors' preference of gold investment through its liquidity positively affects their gold investment attitudes positively so that H2g was failed to be rejected ( $\beta=0.63$ ). Similarly, the preference of the gold investors due to the low riskiness of gold investment in contrast with other investment avenues is in a positive association with the gold investment attitudes of the investors ( $b=1.06$ ,  $s.e.=0.05$ ,  $p<0.05$ ,  $\beta=0.75$ ). Thus, H2h was not rejected. Only the idea of gold's accordance with the Islamic rules did not influence the gold investment attitudes of the investors as much as other variables pertaining to the 'Perceived Benefits' factor, but still the path coefficient is positive and significant at 5% significance level, I failed to reject H2i ( $b=0.51$ ,  $s.e.=0.06$ ,  $p<0.05$ ,  $\beta=0.28$ ). The idea of gold holding because it is safe zone during hard times has a highly positive effect on the gold investment attitudes of investors ( $b=1.16$ ,  $s.e.=0.06$ ,  $p<0.05$ ,  $\beta=0.80$ ) so H2j was not rejected. The preferability of gold investment over other investment avenues thanks to its relative profitability has a remarkable effect on the attitudes of investors ( $b=1.08$ ,  $s.e.=0.06$ ,  $p<0.05$ ,  $\beta=0.72$ ).

#### 4. CONCLUSION

By this study, it was aimed to shed light that the investment behaviors of the investors can be differed by a deal of factors such as socio-economic features, psychological factors and behavioral biases that investors fall into. To make this possible, 2 types of econometric analysis were used to elucidate the relations between the demographics of the investors and their perception pertaining to the advantages of holding gold in their portfolio. In my first analysis which I used one-way ANOVA and t-test in SPSS, the impacts of independent variables on dependent variables were separately examined. In the second one, a Structural Equation Model was established and tested in STATA resulting in a mass analysis that contain both demographics and the perceived benefits of the participants in one model.

An extended survey was conducted via SurveyMonkey application and randomly distributed to 1,474 respondents. There were some missing questions on the questionnaire, therefore, 930 responses were remained after elimination of those. In conclusion, data could have a normal distribution to be used in my research. The responses were also independent of each other meaning that each participant took the survey only once. Reliability of the results were tested by Cronbach's Alpha. Questions on questionnaire reflected the demographic features of the sample and implied some behavioral biases to what benefits the investors perceive while making gold investment and also purposes of holding gold-related assets, considered factors while deciding to invest in gold or not, the shopping channel and the form of gold investment avenue preferred to measure their manner toward investing in gold. Queries excluding demographics essentially represents a group of behavioral biases aforementioned. To illustrate, 'I invest in gold in line with my previous experiences.' symbolizes overconfidence bias which is consistent with the findings of Baker et.al. (2019) that as the investment experience of the investors rise, overconfidence increases. Furthermore, 'While gold shopping, I prefer using physical sales channels such as jewelry stores to the intermediaries and derivative markets.' is an indicator of familiarity bias. In a similar way, 'I prefer gold investment because it is safe haven during though times.' could be interpreted as a symbol of ambiguity aversion bias and 'I prefer gold investment because it is more profitable than other investment avenues.' as an instance of overoptimism bias.

It was observed from the results of the research that the investment decisions of the individuals were considerably driven by both socio-economic factors varying from person to person and behavioral biases. In the one-way ANOVA analysis, it was found that associate degree investors are more likely to hold gold instruments in their portfolio than the post-graduate ones. Undergraduate and post-graduate investors seem to be more willing to invest in paper-based gold avenues compared to the high-school graduates. Furthermore, post-graduates hold more paper-based gold assets than both undergraduates and associate degree investors. These results are in parallel with the study of Tekçe et. al. (2016) suggesting that as the education level rises, familiarity bias diminishes. Likewise, 18-15, 26-40 and 41-60 age group are more likely to hold paper-based gold investment avenues in their portfolio in comparison with above the age of 60. In addition, 41-60 group is less likely to invest in paper-based tools than 26-40 group. These findings contradict the results of Tekçe et. al. (2016) which put forward that the young investors display more familiarity bias. The profession and monthly income level of the investors seemed to have no significant relation with the idea that investors' preference of gold investment since it is less risky than other investment instruments which is inconsistent with the study of Anbar and Eker (2012) that high-income people tend to take higher risks. According to t-statistics, married investors are more inclined to invest in gold for the sake of their children than the single ones. However, there is no significant difference between the men and women in terms of the weight of holding gold in their investment portfolio. This consequence contradicts the study of Sah (2017) that the working women in India opt for less risky assets just like gold. Besides, men and women are not differentiated in the matter of holding gold because of its low-riskiness. Structural equation model offers that both DEM factor consisting of gender, age, marital status, educational attainment, monthly income and occupation of the sample and BEN factor containing the benefits of gold holding perceived by investors because of its liquidity, its relatively low riskiness, its relatively high profitability, its fitness to Islamic rules and its credibility in tougher times have an effect upon the ATT factor including the purposes, drivers and methods of making gold investment by individuals. When DEM has a modest negative impact on ATT variable, BEN variable has an intense positive influence on ATT.

By this research, the consequences of analysis were hoped to help authorities understand the tendencies of individuals in the aspect of gold saving. To exemplify, aforementioned paper-based gold instruments such as gold funds, gold bonds and gold

derivatives might be introduced to the elder or low-educated investors. In a similar way, married investors could be tried to be attracted by new kind of innovative gold avenues for their kids' futures. These sort of actions may conduce to inject mattress saving of gold investors into the financial system.

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## **I. ETHICS BOARD APPROVAL**

Ethics Board Approval is available in the printed version of this dissertation.