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Do Bubble Behaviour Exists in Gold Price? An Assessment of Political and Economic Factors

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Abstract: The bubbles in the gold price(GP)are investigated whether the GP shows multiple bubbles by employing the Generalized Supremum ADF test from 2000:01 to 2020:04. The finding shows five GP bubbles driven by specific reasons; it is possible to gather them into three general broad groups: the first one is about seeking a safe haven during the market turmoil periods such as war, financial crisis and natural disaster times; the second group is the quantitative easing policy periods of central banks, and the last one is about establishing new gold exchanges and launching new investment vehicles based on gold. Suitable policies should be implemented to decrease devastating results in the case of bursting a price bubble burst. Investors can make rational investments using the paper's results since it gives insight into the real gold market conditions.

JEL code: E3; G11; G12.
Keywords: Gold Price Bubble**;** Generalized sup ADF; Precious Metals.

1. Introduction

Price bubbles are a common phenomenon in real industries and financial markets (Khan *et al.*, 2020a), which have profound effects on the economy and are frequently emphasized by the economic and financial authorities (Khan *et al.*, 2020a). We can explain price bubbles as the difference between current and fundamental prices. If the opening price increases rapidly and decreases suddenly over time, a price bubble exists (Lind, 2009; Khan *et al.*, 2020b).It shows that prices are not always in their fundamental value, which is the central paradigm and the most powerful assumption behind traditional finance theories(Köseoğlu, 2019).The financial crises, such as the great depression of 1929 and the subprime mortgage crisis in 2008,are caused by bubbles that usually occur in the prices of financial assets (Ahamed, 2009; Khan *et al.*, 2020 a). The growth led to stock and credit speculation backed by financial instruments, which resulted in the bubble burst in 1929 (Galbraith, 2009). Similarly, the sub-prime mortgage crisis in 2008 originated from an asset price bubble that has affected the entire world

(Öztürkand Gövdere, 2010). The crisis starts in the financial sector and reflects in the real sector, causing most countries to enter the recession process. If assets form a price bubble, these assets are more attractive to investors, so demand increases, and asset prices rise further. The bubble will disappear if buyers believe prices are no longer rising, which will reduce demand and may trigger a crisis (Case and Shiller, 2003; Shiller, 2003; Khan *et al.*, 2020a). Therefore, price bubbles have an essential influence on the financial and real markets and are worthy of study.

This paper aims to evaluate whether the GP shows multiple bubbles. Gold plays a vital role in the real estate and financial markets and uses attractive savings and investment tools. It is used as a hedging and a reserve tool by governments and central banks, especially in economic uncertainty periods (Baur and McDermott, 2011; Chan *et al.*, 2015). However, these characteristics make gold vulnerable to economic and political turmoil, which can lead to major fluctuations (Gökdemir and Ergün, 2007). As gold is a hedging instrument and the demand for gold increases rapidly during a volatile market, investors face the risk of GP bubbles. The process of GP will be formed according to important global political and economic events. Although this seems to be a safe-haven tool, investors face the risk of enormous losses as the price plummets. It has lost its function as an investment tool due to the rapid development of the financial market in the 1980s. However, gold remains in the background as an investment choice and fluctuated a little until the beginning of the 2000s. Thus, detecting bubbles in GP is a critical topic discussed by decision-makers and academicians.

The main contribution of this paper is as follows. First, the article evaluates the GP bubble and its factors to label the association between bubbles and crises. Numerous political and economic events result in GP fluctuation, which translates into bubbles. Moreover, repeated policy changes and random structural breaks cause speculative proceedings that can substantially influence GP. Hence, the study of bubbles, their contributory features, and their ramifications are vital to be assessed. The outcomes evidence that GP has multiple bubbles driven by speculative events (Khan *et al.*, 2020).Second, there is another addition in terms of the methodology Supremum Augmented Dickey-Fuller (SADF) and GSADF to detect GP bubbles. It is essential that evaluating a bubble phenomenon can offer valuable evidence to different market participants. These tests more effectively capture bubbles than conventional techniques (Phillips *et al.*, 2011; Khan *et al.*, 2020a). It can catch bubbles in the entire sample and support relevant observations to hold assessment efficiency. Moreover, the current study proposes a unique technique for backward SADF. The method has the distinction of detecting a higher number of bubbles because of ex-ante and ex-post characteristics and offers a pre-emptive action for applying the policy. The GSADF approach is appropriate for multiple bubble detections in GP, and the outcomes highlight six bubbles that support the asset price model (Gürkaynak, 2008). The first reason for the GP bubble is about seeking a safe haven during the market turmoil periods such as war, financial crisis, and natural disasters times; the second reason for the GP bubble is the quantitative easing policy periods of central banks, and the third reason for GP bubble is about establishing new gold exchanges and launching new investment vehicles based on gold. In addition, investors can make rational investments using

the paper's results as they understand the actual gold market conditions and risks. As a result, they can implement essential policies to reduce the dramatic results of bursting price bubbles.

This study is outlined as follows: Section 2 reviews the literature. Section 3 explains the methodology. Section 4 outlines the data. Section 5consists of empirical analysis. The last section 6gives the conclusions.

2. Literature Review

Blanchard and Watson (1982) use run tests to analyze the presence of GP bubbles and find out that there are no bubbles in GP. Dibaand Grossman (1984) use the frequency analysis, conventional unit-root and cointegration tests and state that there is no substantial evidence that price bubbles in GP. Besides, they conclude that GP fluctuates strongly depending on market conditions. Pindyck (1993) applies the Granger causality tests and vector autoregressive (VAR) models for GP bubbles. The study calculates the gold's fundamental value based on the discounted present value model. Went *et al.* (2009) conducted a convenience yield model and duration dependence test and the finding suggests a bubble in GP. Khalifa Miao and Ramchander (2011) analyze the presence of gold, silver, and copper price bubbles in the precious metal markets using the GARCH method. The finding suggests that there are unusual distributions in the prices of the relevant metals and price bubbles exist. Lucey and O'Connor (2013) use the Markov Switching Augmented Dickey-Fuller method and stated some findings on the formation of bubbles in GP.

Bialkowski *et al.* (2015) show that inflation and gold ETF demand has substantial power over GP bubbles. Bialkowski *et al.* (2015) examine whether the increasing investment and findings trigger the GP bubble, suggesting that GP has not deviated from its actual price. Baur and Glover (2015) report the explosive behaviour of GP and exhibits enormous growth because of excessive speculation. Beckmann *et al.* (2015) conclude that gold has twin characteristics of hedge instruments and is a safe haven during extreme market conditions. Zhao *et al.* (2015) detect multiple GP bubbles driven by investors' safe haven strategy in the crisis. Korkmaz *et al.* (2018) use the SADF, and GSADF approaches to study GP bubbles and determine the existence of bubbles in GP. Pan (2018) tests the emergence of bubbles in GP, and the outcome confirms that GP experiences bubbles. Çelik*et al.* (2019) analyze the presence of the price bubble in GP and other precious metals. The finding shows that GP as well as precious metals have a bubble. Gold is a scarce resource, and GP can experience bubbles due to excess liquidity investment in the gold market.

Numerous studies attempt to employ different methodologies to analyze the potential price bubbles. However, conventional unit-root and cointegration tests or volatility models cannot find periodical bubbles that burst properly. Furthermore, these methods lack the power to detect the specific points of the bubble. Numerous studies apply the unit root test for bubbles investigation, which is inappropriate to highlight the price bubble because of its low power (Evans, 1991). Likewise, due to low power, the Markov Switching model estimates inaccurate bubbles and the beginning and end of bubbles (Shi, 2011; Khan *et al.*, 2020a). Moreover, these approaches are subject to the subjective judgment of deviations from the

fundamental positions. Thus, a concern about the validity and reliability of these techniques has been raised by numerous studies (Su*et al.*, 2017). Homm and Breitung (2012)term that the Phillips *et al.* (2011) procedure has greater performance than traditional recursive practices for structural changes and bubble detection algorithms. The SADF method is a recognized test to observe the existence of a bubble and is effective if the sample data contain a single bubble (Phillips *et al.*, 2011). On the other hand, multiple bubbles can occur in the long sample period and are more complicated to detect by the econometric approach because weak detecting power of the existing method (Khan *et al.*, 2020a). The GSADF test investigates the issue to evaluate the occurrence of possible multiple price bubbles. This approach has the benefit of allowing a changeable window width in the recursive regression that helps to increase the detecting power and dating methods (Khan *et al.*, 2020a). Likewise, it is more appropriate to examine any frequency data. Consequently, the method is more advantageous than previous methodologies in observing multiple bubbles. To eliminate these problems, it has been used SADF and GSADF tests in the literature. The present article employs the SADF and GSADF tests to inspect bubbles in GP.

The literature has shown that there are many traditional ways to identify price bubbles. However, the approaches are unsuitable for finding the bubbles, mainly if the sample shows periodic collapsing behaviour (Evans, 1991). Thus, Phillips *et al.* (2011a) came up with the SADF test used to inspect the existence of price bubbles. The method underlying the forward recursive regression employs a unit root test of the order to examine the periodic behaviour. Compared with conventional techniques, this method is highly recommended for evaluating bubbles (Homm and Breitung, 2012). The can be defined as follows:

$$\Delta g_t = \phi + \varphi_{z_{t-1}} + \sum_{i=0}^{k} \lambda_i \Delta g_{t-1} + \varepsilon_i, \varepsilon_i \sim NID(O, \sigma^2) \qquad (1)$$

where g_{t-1} is the gold price and k is the lags number. The null hypothesis is =1 recommends that g_{t-1} is the unit root procedure i.e., Δg_{t-1} is stationary. However, the alternative hypothesis $\beta > 1$ implies that g_{t-1} is explosive. The process of a unit root to a slightly explosive or vice versa is caused by the discriminatory power of the test (Phillips and Yu, 2011).The conventional unit root tests ineffective regulate the bubbles (Evans, 1991), and this concern is resolved by the recursive ADF *t*-statistics suggested by Phillips and Yu (2011). It is determined by the periodic approximation of the ADF model on a forward increasing sample sequence, and the test is achieved as the SUP value of the corresponding ADF statistic sequence. The window size n_w expands from n_0 to 1, where n_0 is the smallest window width and 1 is the biggest sample window width (Khan *et al.*, 2020a). The beginning point n_1 of the sequence is permanent at 0; therefore, at the ending point of each sample, n_2 equals, changing from n_0 to n_1. The ADF statistic for a sample that ranges from 0 to n_2 is indicated by $ADF_0^{n_2}$. The SADF statistic is estimated as follows:

$$SADF(\mathrm{n}_0) = \sup_{n_2} \in (\mathrm{n}_0, 1) \left\{ ADF_{n_2} \right\} \qquad (2)$$

SADF is more valuable when a single price bubble during the sample period, but GP can have multiple bubbles. Phillips *et al.* (2012, 2013) has shown problems in multiple price bubbles. This limitation occurred more during the long sampling period than the short, in volatile markets rather than stable markets, and in predicting more booms than one. The GSADF test solves these problems (Phillips *et al.,* 2012, 2013). It continuously makes a series of sample sequences created on the ADF test. The GSADF method alters the endpoint of the regression n_2 from n_0 to 1 and expands the sample coverage by changing starting and the ending point of the recursion over a workable range of flexible windows. More significantly, the GDSAF acknowledges the point n_1 to change from 0 to $n_2 - n_0$. Phillips *et al.* (2012, 2013) define the GSADF statistic to be the largest ADF statistic over the feasible ranges of n_1 and n_2; they denote this statistic as $SADF(r_0)$, as follows:

$$GSADF(\mathrm{n}_0) = sup_{r_2} \in (\mathrm{n}_0, 1), \mathrm{n}_1 \in (0, \mathrm{n}_2 - n_0) \left\{ ADF_{n_1}^{\ n_2} \right\} \qquad (3)$$

The null hypothesis of the random walk with an asymptotic regression model and specified the limit distribution of the GDSAF test statistics:

$$\sup_{n_2} \in (\mathrm{n}_0, 1), \mathrm{n}_1 \in (0, \mathrm{n}_2 - n_0) \left\{ \frac{\frac{1}{2} n_w \left[w(\mathrm{n}_2)^2 - w(\mathrm{n}_1)^2 - n_w \right] - \int_{n_1}^{n_2} w(\mathrm{n}) d_n [w(\mathrm{n}_2) - w(\mathrm{n}_1)]}{n_w^{\ 1/2} \{ \mathrm{n}_w \int_{n_1}^{n_2} w(\mathrm{n})^2 d_n - [\int_{n_1}^{n_2} w(\mathrm{n}) d_n]^2 \}^{1/2}} \right\} (4)$$

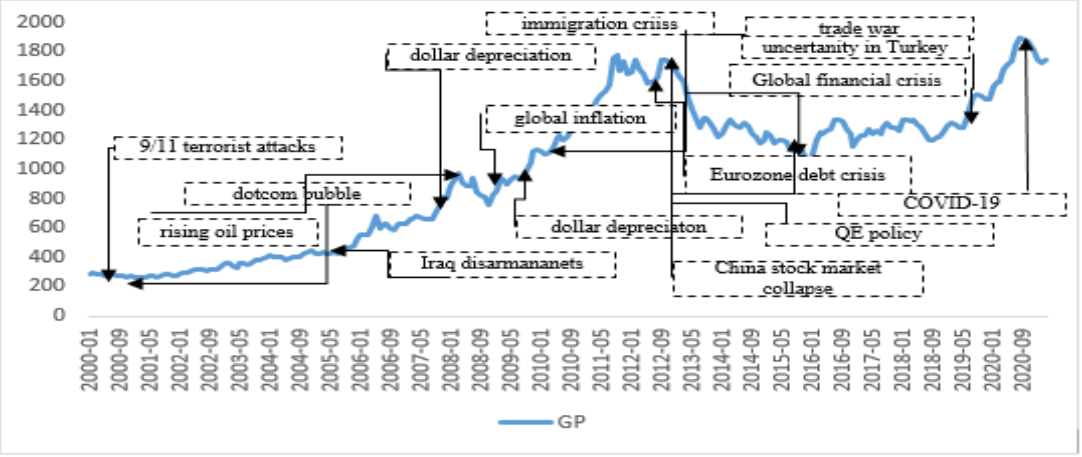
Phillips *et al.* (2012, 2013) discuss that GSDAF has accomplished the SADF test and has collected to the standard normal distribution offered that the true technique is a random walk. Then, Phillips *et al.* (2012, 2013), the simulation process is carried out to evaluate the asymptotic critical value of ADF statistical distribution under the null hypothesis that the real process is a random walk. The simulation starts with the standard wiener process, which has the characteristics of continuous and random.

3. Data

The study uses the monthly data from 2000:01 to 2020:10 for global GP bubbles. GP is denominated in U.S. dollars and taken from Federal Reserve Economic Database (FRED). The gold market witnessed a remarkable upward trend in early 2000 due to the burst of dotcom stocks and the internet sector. Moreover, the rising private debt and spending in the U.S. leads to a recession which weakens the GP. The period is important for GP because it rises in the 2000s. Similarly, the price close at $287 the day after the terrorist attack in 2001 because of the feature of being a reliable investment tool. The Shanghai Gold Exchange was established in 2002, an essential milestone in the global gold market, effective in price discovery, liquidity, and transparency (Dey, 2016). The Iraq war increased the U.S. public debt as a percent of GDP to 96.4 and its dollar index depreciated by 15% in 2003, resulting in the decline of GP in the short run. The terrorist attacks and the Iraq war in the early 2000s have turned the attention of investors to the GP increase in 2001. The volatile stock markets and the unstable Middle East contribute to GP (Jaffe, 1989). It reached its highest level in 2002-2006 because of higher geopolitical risks, the depreciation of the U.S. dollar, and the rise in oil prices (Khan *et al.*, 2020b). Figure 1 shows that during the global financial crisis in 2008, the bond and equities

generated negative returns, making gold attractive to global investors. GP rises considerably during the recession (Zhao *et al.*, 2015). Moreover, GP has increased because of global inflation and the falling dollar. The fact that commodities are viewed as a means of protection against inflation has increased the demand for all commodities, especially gold, while commodity prices have reached record levels (Tilbe, 2010). In line with the expansionary monetary policies applied worldwide, the low real interest environment supported GP upwards in this period. It touched the highest level of $1600 in 2011,driven by the debt worries in the U.S. and Europe, which are manifested in a strong desire to buy gold.

Figure 1. gold price trend



GP fell to the lowest level in 2013, mainly caused by the Cyprus debt crisis, which pays off the debt by selling gold reserves. Central banks worldwide have implemented a quantitative easing policy during the crisis to overcome the liquidity problem. The interest rate cuts are made within the framework of traditional monetary policy to minimize the effects of the crisis. During the period, the quantitative easing programs increased the money stocks and decreased the interest rates further, leading to increasing GP. The demand for hedging assets increased in 2015 (Jamal *et al.*, 2018; Beckmann *et al.*, 2019) due to rising global uncertainty caused by the immigration problem in Europe and the stock market collapse in China (Blaschke, 2015; Davis, 2016; Adina, 2018). The Federal Reserve increases the interest rate, making gold less valuable, and people are willing to invest in dollars to avoid the risk (Su*et al.*, 2020c). The GP declined to $1200, mainly driven by the renewed strength in the U.S. dollar in 2018. Similarly, the volatile situation in Turkey, which is one top consumer countries of gold, has adversely impacted GP. The jewellery demand declines by 10% in Turkey due to political tension. Moreover, the Turkish lira has lost 40% against the dollar caused of the trade tariff by the U.S. and mounting debt. The mounting tension in trade between China and the U.S. since 2018, imposing higher tariffs on each other's goods. This leads to a slowdown of trade and economic activity, resulting in uncertainty, reflecting investors searching for safe-haven assets such as gold. Similarly, the renewal of the U.S. led sanctions against Iran can spur geopolitical tension (Su*et al.*, 2020c). A tightening monetary policy is followed by the U.S. Federal Reserve, which can tempt investors to take advantage of the higher returns. The higher demand for U.S. currency will likely continue, harming GP. Moreover, global events such as the Argentine exchange rate crisis, the Turkish debt problem, an attack on Damascus and the U.S.

government shutdown reason global uncertainty to rise. Global uncertainty increases the gold demand to manage the risk (Su*et al.*, 2020). It has to increase at the beginning of 2020 as COVID-19 started spreading in China and Europe, which fears investors of the global economic downturn. GP rises nearly 30% alongside economic uncertainty (Mensi *et al.*, 2020).Moreover, the Federal Reserve slashes the interest rates to a historical low to keep the economy afloat, creating more government debt. This drives investors to buy gold as a hedge against potential inflations by rising debt. We show the summary statistics in Table 1. It highlights the higher mean value and standard deviation, which is clear from the difference between maximum and minimum values. The skewness values show a rising trend. However, it is confirmed from the kurtosis value the GP is platykurtic distribution. Last, as per the Jarque-Bera test, GP is non-normally distributed.

4. Table 1. Descriptive Statistics.

Variables	Mean	Std. Dev	Skewness	Kurtosis	J-B
GP	982.065	490.846	-0.083	1.705	18.096***

Notes: *** is the significance level at 1%.

5. Empirical results

SADF and GSADF tests explore GP's bubble behaviour and the results are listed in Table 2. The null hypothesis is rejected, so GP is explosive in the sub-sample. Therefore, the results reveal the explosive characteristics in GP and emphasize detecting potential bubbles. We use the GSADF technique for GP bubble estimation, shown in Figure 2. The graph comprises three lines, one in the middle representing GSADF statistics with a threshold of 95% and one at the bottom representing test statistics (Khan *et al.*, 2020a). The entire sampling period shows five GP bubbles, involving the start and end of the bubbles. As per Phillips *et al.* (2013), performing GSADF is better than SADF tests in coverage of sub-sample data. The findings provide further details on the causes of the bubble factor.

Table 2. The SADF and GSADF tests

Gold price	SADF	GSADF
	4.262***	4.396***
Critical value		
90%	1.332	1.718
95%	1.707	2.067
99%	2.023	2.577

Note: *** shows significance at the 1% level.

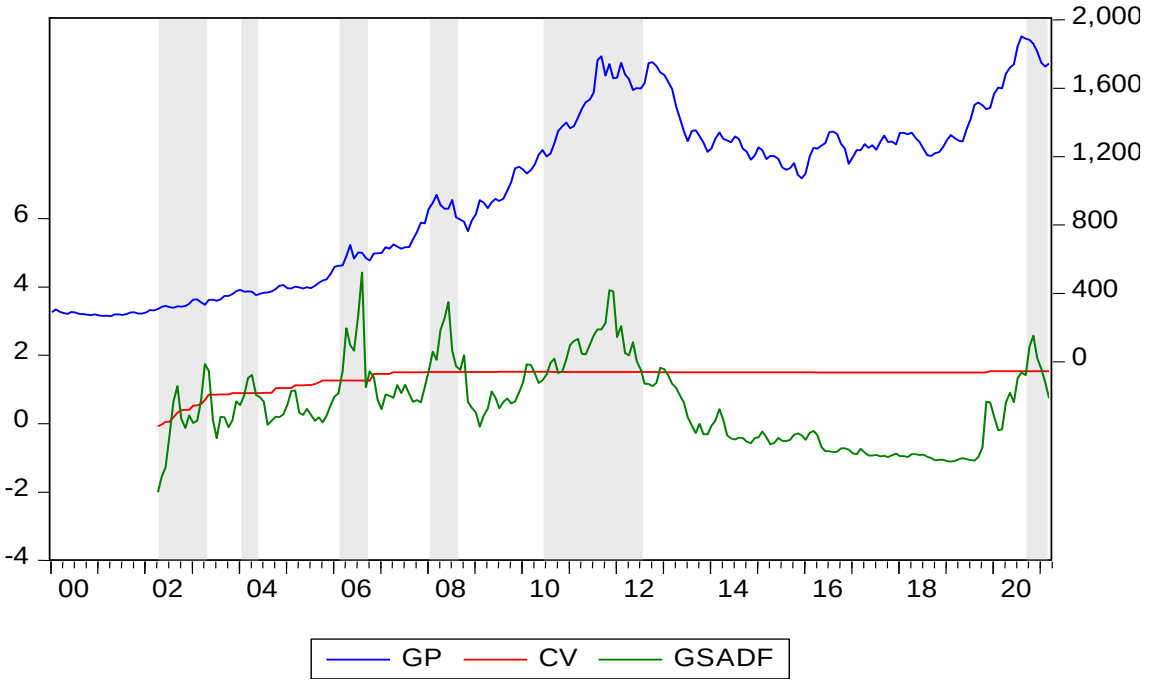
The first bubble startsin2002:04 and ended in2003:04.During this period,, several events have a significant impact on gold. As the world economy declines, investors suffer huge losses in the stock market, leading to the safety of flights in the gold market. It is considered a reliable investment instrument after the heightened insecurity caused by the terrorist attacks in the U.S. Therefore, in 2002, GP showed an upward trend because of the recovery in physical demand and investment transactions. The tension between the U.S. and Iraq in 2002 peak

geopolitical risks, the decrease of the U.S. dollar, and the rapid rise in oil prices cause a 26% increase in GP (Dey, 2016).Gold is the most profitable investment instrument in 2002.However, the GP declined due to the imminent Iraq war in 2003, the mounting debt to the GDP of the U.S. and the depreciation of the U.S. dollar index (Dey, 2016).

The second bubble existed from 2004:01 to 2004:05. The Shanghai Gold Exchange (SGE), now the largest physical gold exchange in the world, was established in 2002. After launching the SGE, the liquidity of the world gold market increased, and this also supported the global GP. In addition to the Gold Exchange effect, gold EFTs have affected global GP. The first gold ETFs were launched in March 2003 on the Australian Stock Exchange, followed by the New York Stock Exchange (NYSE). The Second Gold ETFs started to trade on the NYSE in 2004. Since then, many other countries have launched gold-based ETFs around the world. The gold ETFs led to the trade of gold on the widened channels. This product has provided a direct involvement in commodity markets. Since the first gold ETFs launched in 2003, $180 billion worth of investment has been attracted, which is equivalent to 650 metric tons of gold and a Then, the global GP increased to nearly double(Wang *et al.* 2010).

We observe the third bubble startsat2006:02 and endsat2006:09. It is primarily driven by concerns about inflation, which results in the rising interest rate of the dollar by the Federal Reserve Board (Zhao *et al.*, 2015).As a result of strong oil prices and worries about global inflation, GP hit a 24-year high of $536.50.Moreover, the weak dollar support boosted gold in 2006, and investors are moving into metals in anticipation of a collapse in the U.S. housing market. The U.S. sanctioned Iran in 2006 imposed a ban on imports and export to Iran. However, this crisis resulted in the dollar depreciating by almost 11% and GP appreciating by 14.6% (Dey, 2016). The continuing remarkable economic growth of the emerging economies and the recovery of Japan have fuelled the gold demand. However, jewellery production and consumption witnessed a big drop in price and GP fall in the last quarter of 2006. The fourth bubble occurs from 2008:01 to 2008:08. The financial recession begins during the period, which pushes the fund into the commodity market due to low risk. It has caused a bubble in the commodity market because of the increasing credit risk, and the interbank market has become dysfunctional in the advanced economies. GP witnessed a rapid rise from $660 in August 2007 to $1002, followed by a 10% drop due to the rising perception that recession has severe consequences for the global economy (Zhao *et al.*, 2015). It is predicted that the dollar value might decline due to the financial downturn, which results in an inflow of funds into the gold market. Likewise, the central bank monetary policy has adopted the quantitative easing policy, which significantly impacts asset prices and blowing bubbles (Eichengreen, 2013). This has plunged the dollar's exchange rate and investors' capital into gold, raw materials, and foreign currencies (Zhao *et al.*, 2015).

Figure 2. GSADF test of GP.



We observe the fifth bubble from 2010:06 to 2012:07. During the period, quantitative easing programs started, which increase the money stocks. However, the most important event was the Euro zone debt crisis which created concerns about the European banking system and exacerbated fundamental differences within the Euro zone (Belkin *et al.*, 2012).Starting in the second half of 2009, investors begin to worry about sovereign debt because of rising global private and government debt levels. The emergence of the financial recession increases uncertainty. During financial turmoil, inflation provides a safe haven for investors, avoiding inflation and currency hedging, leading to increased demand and a corresponding price surge. Market participants attribute the rise in inflation and the dollar's weakness to the expansionary monetary policies of advanced economies. Gold is an ideal investment during the financial crisis because it has been recognized globally as a currency with purchasing power, which dramatically improves GP (Zhao *et al.*, 2015).Investors flocked to gold as a safe haven investment because of the COVID-19 pandemic, which resulted in a complete standstill of global economic activity and GP hit a record high(Mensi *et al.*, 2020).Most of the world's central banks have accommodative policies, which are meant for a continued flow of money to the asset class. Moreover, the Federal Reserve slashes the interest rates to a historical low to keep the economy afloat, creating more government debt. This drives investors to buy gold as a hedge against potential inflations by rising debt. The bubble burst with the subsequent reopening of the economic activity, and the GP declines to around $1857. Moreover, the declining U.S. dollar rates and trade tension with China have contributed to the fall of GP. We can summarize the reasons for GP bubbles in the following ways. The first reason for the GP bubble is about seeking a safe haven during the market turmoil periods such as war, financial crisis, and natural disasters times; the second reason for the GP bubble is the QE

policy periods of central banks, and the third reason of GP bubble is about establishing new gold exchanges and launching new investment vehicles based on gold.

6. Conclusion and policy recommendations

This study investigates whether the GP shows multiple bubbles using the GSADF test. The finding detects six GP bubbles during this period for specific reasons. However, it has three broad groups: the first one is about seeking a safe haven during the market turmoil periods such as war, financial crisis, and natural disaster times; the second group is about the QE policy periods of central banks, and the last one is about establishing new gold exchanges and launching new investment vehicles based on gold. Investors can make more rational investment decisions depending on the paper's empirical results as giving them more insight into the real market situation and risks. In addition, they can implement policies to reduce dramatic developments during the potential bursting of price bubbles.

The study makes considerable contributions to policymakers in the following ways. First, since gold is becoming an essential metal in the markets, it is vital to devise suitable policies to mitigate the dramatic consequences of bursting GP bubbles. Therefore, buyers can avoid buying the metal and prevent themselves from huge losses during a bubble period in the gold market, and sellers can sell their assets to make profits before a drop in prices (Pan, 2018).Thus, the study is useful for policymakers and other market participants. Likewise, the reasons and effects of GP bubbles can be investigated by allowing for the time period of GP bubbles to prevent the bubbles. The information related to when, how long, why, and how the bubble exists helps the market participants how to behave and react in the future. In addition, all the evidence can be utilized as a tool for risk control in real industries. For instance, gold producers develop hedging strategies in derivative markets effectively. Market participants may make irrational investment decisions when there is a lack of information related to the actual market conditions and potential risks. Therefore, all information related to GP changes improves the buyers of rational investment decisions by allowing real market situations and risks, which can make the gold market more prosperous. Thus, overvaluations of GP can be reduced, and the crises penetrating the markets can be prevented. Last, a GP crisis affects many other industries, whether in the financial or real gold market, and can influence global markets. Thus, the empirical results of this article can play a role in stabilizing the gold markets. The crisis caused by bubble bursts in the worldwide market affects the entire world. It is expected to affect the world of a crisis in the gold market where precious metal is utilized in the financial market as an investment instrument and as an input in manufacturing. Hence, the important parameters of GP fluctuation should be monitored constantly, and they should implement essential monetary and fiscal policies to avert crises. For this reason, the leading indicators of GP crises for policymakers should be constantly monitored, and they need to take necessary actions to prevent crises.

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