Dialogue Social Science Review (DSSR)
www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 6 (June) (2026)

The Impact of Global Gold Price Volatility on Exchange Rate Fluctuations and Inflation in Pakistan (20152024)

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ABSTRACT
In this study, global gold price volatility and its impact on the exchange rate and consumer price inflation in Pakistan has been investigated for annual data over the period of 20152024. The findings reveal that all the three variables global gold prices, PKR/USD exchange rate, and consumer price index (CPI) are significantly related to each other and that the higher the global gold prices, the faster the depreciation in the PKR rate and the more the widening of current account deficit (CAD), the two indicators of economic stability. There is a clear long run relationship between gold prices and inflation, but a relatively modest short run impact on inflation due to the influence of many factors on prices at the same time. Higher gold prices are a warning sign for policy makers in terms of exchange rate pressures, and may indicate the need for proactive foreign exchange reserves management (State Bank of Pakistan, 2023; Khan et al., 2023).

Keywords: price volatility of gold, exchange rate fluctuations, inflation, macroeconomic instability, economy of Pakistan, commodity shocks.

INTRODUCTION

One of the most external economic shocks for many developing countries is fluctuations in the price of gold in the world. It is not different from other countries in South Asia, Pakistan consumes a lot of gold, people use gold for making jewellery, keeping them as a savings investment, and as a village or city investment. The international prices for gold are always quoted in USD so, if the international price rises by a certain amount, the price of gold in Pakistan automatically increases by the same amount which requires that Pakistan needs more foreign exchange to buy the same quantity of gold. That pressure will not remain in check. It exerts downward pressure on Pakistani Rupee (PKR) and bleeds over into inflation in the domestic economy (Iqbal, 2017; Shahbaz et al., 2014). Therefore, it is not only an academic issue of how gold price volatility is translated into exchange rate and inflation in Pakistan, but also a real policy concern.

This is particularly an interesting time to consider for the 2015-2024 period. This period saw gold prices reach their highest levels ever, in response to COVID-19, the Russia-Ukraine war, widespread global inflation, and heightened geopolitical tension overall (Baur & McDermott, 2010; Raza et al., 2016). Meanwhile, Pakistan's own economy was on a tight rope the PKR had been devalued drastically against the dollar,

ISSN Online: 3007-3154
ISSN Print: 3007-3146

inflation had reached multi-decade highs and the country was in the throes of successive IMF negotiations (State Bank of Pakistan, 2023). The two factors combined with the impact of global shocks on top of Pakistan's already weak economic position make this a good time to examine the transmission of gold price shocks to the exchange rate and inflation.

Though there is ample of research from across the world on the relationship between gold prices, exchange rates and inflation, studies on the Pakistan context are limited to this recent tumultuous period. Pakistan is a peculiar situation as the cultural demand for gold is great, the currency has been structurally weak over years, inflation issues have been prevalent for years and the dependency on imports is high. Combine these with one another and it would seem that gold price shocks have impacted Pakistan's macroeconomy to a greater degree and more directly than in a more advanced and self-sufficient economy (Hussain & Bashir, 2022; Khan et al., 2023). To address this gap, this study attempts to provide specific empirical evidence for these relationships in the case of Pakistan for 2015-2024.

1.1 Research Gap

The study of gold prices and macroeconomic implications continues on the international front but some gaps clearly exist for Pakistan. The existing literature on the gold-exchange rate focuses on the advanced economies (the United States, the EU, and Japan) and the transmission of gold prices to the broader economy is not the same in an import-reliant developing economy such as Pakistan (Reboredo, 2013; Tully & Lucey, 2007). A few studies have focused on gold and inflation in Pakistan specifically (Shahbaz et al. 2014; Iqbal 2017). However, there have not been any studies to look into the relationship between gold price volatility and exchange rate fluctuations and domestic inflation simultaneously during this volatile decade of 2015-2024.

The years of this period have seen a series of unusual global shocks such as the pandemic, record gold prices and a key geopolitical disruption and these could have altered the relationship between gold prices and the macroeconomic variables that are important for developing economies. Prior to these events, studies simply could not account for their effect (Nawaz et al., 2021). This study aims to fill this void by presenting an empirical, up-to-date and country-specific analysis of the impact of global gold price volatility on exchange rate variability and inflation during 2015-2024 in Pakistan.

1.2 Research Objectives

1. To examine the impact of global gold price volatility on exchange rate fluctuations in Pakistan from 2015 to 2024.
2. To analyze how global gold price volatility contributes to domestic inflation in Pakistan over the same period.

1.3 Research Questions

1. How does global gold price volatility affect exchange rate fluctuations in Pakistan during the period 20152024?
2. What are the underlying mechanisms by means of which rising global gold prices contribute to inflation in Pakistan?

1.4 Research Hypotheses

H1: Global gold price volatility has a significant positive impact on exchange rate fluctuations in Pakistan, such that rising gold prices are associated with greater PKR depreciation.

H2: Higher global gold prices meaningfully contribute to domestic inflation in Pakistan by increasing import charges and raising the local price level.

Dialogue Social Science Review (DSSR)
www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 6 (June) (2026)

1.5 Significance of the Study

This study offers some important contributions.

First of all, this provides timely and local evidence of the impact of volatility of gold prices on domestic macro-economic instability, which is crucial because Pakistan's economy is in a precarious state of instability right now. It could assist the State Bank of Pakistan and Ministry of Finance in preparing and responding to the impacts better, especially in terms of exchange rate policy and monitoring inflation (State Bank of Pakistan, 2023).

Second, it contributes to the literature by focusing on a direction of causality which is much less explored in developing economies: moving from global gold prices to exchange rates and inflation. The focus of the study is on the country of Pakistan, which is a gold importing developing country, and could be relevant for other countries in South Asia and around the world that are in a similar position (Hussain & Bashir, 2022; Jain & Biswal, 2016).

Thirdly, consideration of economic cycles in 2015-2024 brings a dimension which is missing from most of the earlier studies of Pakistan's economy. A detailed comparison of the transmission of gold price changes during the pre-pandemic years, the COVID-19 period, different phases of the IMF program, and the post-recovery period provides a more comprehensive picture that may guide the policy design of the occurrence of global commodity price shocks (Nawaz et al., 2021; Ahmed et al., 2023).

1.6 Scope of the Study

This study spans 10 years (2015-2024) for Pakistan. The major factor (independent variable) is the Global Gold Price Volatility (measured in international gold prices in USD per troy ounce). The main variables included in the analysis are the exchange rate of the PKR in relation to USD, which reflects the movement in the exchange rate, and the Consumer Price Index, which reflects domestic inflation. The analysis is done in the bivariate sense.

Future research may extend this to include other control variables such as the price of oil, interest rates and foreign exchange reserves. The data presented here is totally secondary derived from State Bank of Pakistan, Pakistan Bureau of Statistics, World Bank, IMF and World Gold Council. It does not try to make cross-country comparisons, but it may have some useful information for other gold-importing developing nations in a comparable situation.

2. Literature Review

The existing literature on the volatility of the gold price and its transmission to macroeconomic variables such as exchange rates and inflation is reviewed in this section so as to create the background for the analysis of the Pakistani economy.

2.1 Gold as a Global Commodity and Its Price Drivers

Gold is a bit of a hybrid in the world economy, being a commodity, and also a financial asset. Its price is determined globally, and follows global inflation, geopolitical events, the strength of the USD, the US central bank's level of reserves and the appetite for risk among investors (Baur & McDermott, 2010). It is a time when people prefer to buy safe assets like gold and push prices higher. It was early on that Baur and McDermott (2010) discovered that gold is a safe haven during periods of extreme market stress primarily for investors of developed economies. The issue is that when the world is in its worst state (when the demand for safe haven is at its heaviest), so are international economies like Pakistan's most vulnerable to external shocks, with gold prices rising accordingly.

Tully and Lucey (2007) examined the drivers of gold price volatility via GARCH

ISSN Online: 3007-3154
ISSN Print: 3007-3146

modelling, and they concluded that macroeconomic news particularly news around US monetary policy and strength of the dollar drives short-term price movements. In a similar vein, Raza et al. (2016) discovered that negative gold price changes have a greater impact on emerging market economies than positive ones, with the impact being more severe and lasting. This is significant for Pakistan as it indicates that gold price shocks in the world market may affect the import bill, exchange rate and inflation of Pakistan disproportionately.

2.2 Gold Price Volatility and Exchange Rate Fluctuations

A great deal has been done internationally on the relationship between gold prices and exchange rates, but largely in reverse direction, that is, from the exchange rates to the gold prices, rather than from the gold prices to the exchange rates. Reboredo (2013) discovered that there was a strong negative correlation between the dollar exchange rate and gold prices gold prices tend to increase when the dollar exchange rate drops. However, the opposite is true in other countries, including Pakistan, which imports gold using foreign exchange; the higher the price of gold, the higher the demand for foreign exchange to buy the gold, which in turn directly lowers the value of the PKR (Iqbal, 2017; Hussain & Bashir, 2022).

Jain and Biswal (2016) examined the dynamic relationships between gold prices, oil prices, exchange rates and stock markets in India, which shares many similarities with Pakistan in terms of gold import reliance. They discovered the existence of the reverse causality as well, between gold prices and exchange rates, thereby reinforcing the fact that gold price shocks indeed get transmitted into movements in exchange rates in import-dependent economies. In Pakistan, Khan et al. (2023) discovered that commodity prices play a significant role in determining the stability of the exchange rate, and external price shocks have a significant and persistent effect on the PKR. This provides a solid empirical foundation for the direction of causality for this study.

2.3 Gold Price Volatility and Domestic Inflation

The debate in Pakistan regarding gold prices and domestic inflation has been largely in terms of gold as a safeguard against inflation. Shahbaz et al. (2014) employed co-integration analysis and identified a significant long-run relationship between the gold prices and consumer price inflation in Pakistan; that is, over time, they tend to move together. In fact, their question basically was whether gold is a hedge against inflation, but the answer is that high inflation is correlated with high gold prices as well, particularly in an economy where gold imports constitute a significant portion of overall import spending.

In their study, Hashim et al. (2022) discussed the macroeconomic determinants of gold price fluctuations and cited exchange rates and inflation as two of the key factors affecting the movements in gold prices, mentioning that the relationship is bidirectional. In import-dependent economies, the gold price contributes to inflation again by increasing the import taxes, and by exerting pressure on the domestic currency. Similarly, Ahmed et al. (2023) have observed that global commodity price shocks, including gold price volatility, played a significant role in the inflation episodes from 2020 to 2023 in Pakistan. These studies support the main thesis of this analysis.

2.4 Macroeconomic Context: Pakistan 20152024

The macroeconomic dynamics of Pakistan in the period 2015-2024 were from relative calm to exceptional stress and volatility. COVID-19 contraction in 2020 and a rapid, yet unsustainable recovery in 2021 and 2022, respectively (State Bank of Pakistan, 2023). Russia-Ukraine war in 2022 triggered a hike in commodity prices globally, particularly affecting Pakistan as a net importer of both oil and gold. The inflation rate reached multi-decade highs, PKR hit historic lows against the USD, and foreign exchange

ISSN Online: 3007-3154
ISSN Print: 3007-3146

reserves came down to critically low levels that compelled the government to approach the IMF in an emergency mode (Hussain & Bashir, 2022).

Nawaz et al. (2021) noted that low reserves and high import dependency of the economy made it extremely vulnerable to external commodity price shocks, particularly during this period, when Pakistan was in that situation. The price of gold in the country rose sharply due to the weak PKR and record gold prices globally, which had knock-on effects on savings, jewelry consumption and overall price levels. All these make 2015-2024 an interesting period to examine the impact of gold price volatility on the exchange rate and inflation regime in Pakistan.

2.5 Summary of Literature

The literature reviewed here provides a useful theoretical and empirical foundation for this study. Volatility is transmitted to developing economies via import prices, foreign exchange demand, and inflation and global gold prices are sensitive to safe-haven demand, geopolitical uncertainty, and dollar dynamics. Considering Pakistan specifically, as prices of gold continue to rise worldwide, the demand for dollars grows, the PKR depreciates, the import prices increase and inflation rises. These are the factors that need to be considered in a time of stability (2015-2024), an unprecedented pandemic shock, and significant domestic stress that followed. This research combines all these pieces, in a way that no study has done so far in Pakistan during this exact time frame.

3. Methodology

3.1 Research Design and Data

The purpose of this study is to review the effects of gold price volatility in the world on the exchange rate and the rate of inflation in Pakistan during the period 2015-2024 using secondary data of Pakistan. These data are drawn from two sources: The World Bank, World Development Indicators and The World Gold Council. Gold price (in Pakistani Rupees per troy ounce) is taken as independent variable and is averaged over the year. The dependent variables are official PKR/USD exchange rate, annual inflation rate, Consumer Price Index, GDP growth, total foreign exchange reserves in PKR billion and the current account balance (in percentage of GDP). While exchange rate volatility is treated as a high-frequency series in short-term trading analysis, as in the case of prices, it is treated as an average series in broad macroeconomic transmission analysis, consistent with the findings of Serenis and Tsounis (2012).

This 10-year period was not selected by chance. It encompasses various economic circumstances in Pakistan, including mid-2010s economic stability, the shock of Covid-2020, a significant depreciation period, and the record high inflation period of 2022-2023. It is this diversity that makes the data set valuable for this type of analysis. The range of relationships would not be as evident in a shorter or calmer window.

3.2 Analytical Approach

The present study is of a quantitative type. A sequence of three analytical methods is used. The association between gold price and each dependent variable is first examined by using Pearson correlation analysis to determine the direction and strength of the association. This is a preliminary indication of which relationships will be examined further before conducting any regressions.

Second, a level OLS regression is performed. This is a test of the explanatory power of the absolute price of gold on the level of each factor. The general form of the model is:

$$Dependent\ Variable = \beta 0 + \beta 1\ Gold\ Price + \varepsilon$$

Third, a first-difference regression is applied. This will result in all variables being expressed as year-on-year changes and re-run the regression on the changes. This second model is more appropriate in assessing the short run effect since it eliminates the effect of

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www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 6 (June) (2026)

long run trends that may lead to higher R^2 values and thus mask true relationships. The two models have a p-value threshold of 0.05 for statistical significance and 0.10 is considered as marginally significant.

4. Results and Discussion

4.1 Descriptive Statistics

Table 1 provides an overview of key characteristics of the data by year for 2015-2024. The average price of gold in PKR in 2024 was 312,345 per troy ounce, though the range is more significant as it has fluctuated from PKR 119,219 in 2015 to PKR 664,802 in 2024. The gold prices have increased by five times in the decade, as have the value of the Rupee.

The average exchange rate was PKR 167.34/USD in 2022, with a peak of 280.36 in 2023. In 2023, the average inflation was 10.85 percent, with the highest rate of 30.77 percent in decades. The average growth of GDP was positive 3.65 percent, but decreased to -1.27 percent in 2020 due to the pandemic. During the period, there were significant fluctuations in both foreign exchange reserves and the current account balance. Together these numbers portray an economy that is constantly and repeatedly stressed the very environment in which gold price shocks are likely to have an impact.

Table 1: Descriptive Statistics (20152024)

Variable	Mean	Median	Std. Dev.	Min	Max	Unit
Gold Price	312,345	250,724	186,102	119,219	664,802	PKR/troy oz
Exchange Rate (PKR/USD)	167.34	156.94	65.25	102.77	280.36	PKR
Inflation	10.85	9.62	8.72	2.53	30.77	%
CPI (2010=100)	211.2	192.7	79.4	145.3	386.8	Index
GDP Growth	3.65	4.22	2.74	-1.27	6.57	%
Total Reserves	2,743	2,398	1,128	1,442	5,128	PKR Billion
Current Account Balance	-2.31	-2.48	2.04	-5.30	0.13	% of GDP

Source: World Bank WDI (2024); World Gold Council (2024). All PKR values calculated using annual average exchange rates.

4.2 Correlation Analysis

Pearson correlation between gold price and dependent variables is presented in Table 2. Two numbers stand out right away. The exchange rate is well associated with the gold price (0.983), as well as with the CPI (0.996), with both relationships being significant at the 1 percent level almost perfect relationships. It's not rocket science: gold is priced in dollars worldwide, and a weaker Rupee will directly impact PKR costs of importing the yellow metal; the CPI will receive that pressure through increased import costs across the price line.

The correlation for inflation is significantly positive at 0.740 and for total reserves, it is 0.857, again significant at 1 percent. Its correlation with the current account balance is only 0.589 and weak, slightly significant at 10 percent. The only exception is GDP growth with a correlation of -0.449 and not statistically significant with the gold price. Which in a sense makes sense. Pakistan's production is not based on the fluctuation of gold

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www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 6 (June) (2026)

market, rather it is based on agriculture, industry, remittances and public spending. This economy is a cost economy, not an input-output economy.

Table 2: Correlation with Gold Price

Exchange Rate	0.983	0.000**	Strong positive — significant
Inflation	0.740	0.014**	Positive — significant
CPI	0.996	0.000**	Strong positive — significant
GDP Growth	-0.449	0.193	Not significant
Total Reserves	0.857	0.002**	Positive — significant
Current Account Balance	0.589	0.073*	Weak positive — marginally significant

*** significant at 1% level; * significant at 10% level.*

4.3 Level OLS Regression Results

Table 3 shows the level OLS results. The exchange rate model produces a gold coefficient of 35.405 which is significant at 1 percent and an R^2 value of 0.967. The above shows that a rise in PKR gold price will cause the exchange rate to rise by approximately 35 Rupees per unit. The CPI regression is even more powerful - coefficient 44.875, R^2 0.991. The vast majority of the CPI fluctuation within the past 10 years tracks that of gold.

It is also noteworthy that inflation experienced here is also high with a coefficient of 3.442 and an R^2 of 0.547. Total reserves at 516.660 are significant at 1 percent and years with higher gold prices are typically years with larger reserve balances, but it is likely more of a reflection of broader currency and monetary dynamics than a direct linkage to gold. The current account is somewhat irrelevant. Again, there is no change in GDP growth.

These level-model results are good, but with a caveat! Two series which move upwards over the same period are likely to be perceived as correlated even if the real correlation is not present. It is possible for level regressions to have high R^2 values simply because of common trends. That's why the first difference model follows.

Table 3: Level OLS Regression Results

Exchange Rate	35.405	0.000**	0.967	Significant positive effect
Inflation	3.442	0.014**	0.547	Significant positive effect
CPI	44.875	0.000**	0.991	Significant positive effect
GDP Growth	-0.657	0.193	0.201	Not significant
Total Reserves	516.660	0.002**	0.735	Significant positive effect
Current Account Balance	0.609	0.073*	0.347	Weak positive effect

*** significant at 1% level; * significant at 10% level.*

4.4 First-Difference Regression Results

The first difference results are presented in Table 4. This model removes the common trends and only focuses on the movements from year to year and therefore the results are

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www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 6 (June) (2026)

more conservative, but the important relationships remain the same.

The exchange rate remains important, with a coefficient of 30.373 and a p-value of 0.037. Gold prices surged in a particular year, the corresponding year's PKR rate falls drastically. CPI is also strongly significant coefficient of 38.992, R^2 of 0.850. Both of these are still present in both models, so they're more believable. They're not simply a result of common fads.

However, the significance of inflation is lost here: p-value is 0.917, R^2 value is only 0.002. This matters. It suggests that, although gold price and inflation move together over the long run, gold price changes in the short run are not a good predictor of inflation changes in the short run. At the same time, oil prices, food supply shocks and government subsidy policies and monetary policies influence the annual inflation rate in Pakistan. All these can overpower the gold price signal in a particular year.

The current account balance is the only one result that turns out to be stronger here, with a coefficient of 2.919, a p-value of 0.018 and an R^2 of 0.574. That makes a lot of sense if you think about it: When the price of gold rises globally, the price of gold imports into Pakistan will rise as well in that year and that will directly increase the current account deficit. A mechanical effect in real time that only becomes apparent after removing the trends. There is still little improvement in total reserves and GDP growth.

Table 4: First-Difference Regression Results

Δ Exchange Rate	30.373	0.037**	0.486	Significant positive effect
Δ Inflation	0.592	0.917	0.002	Not significant
Δ CPI	38.992	0.000**	0.850	Significant positive effect
Δ GDP Growth	-3.370	0.204	0.219	Not significant
Δ Total Reserves	911.671	0.167	0.254	Not significant
Δ Current Account Balance	2.919	0.018**	0.574	Significant positive effect

*** significant at 5% level. Δ denotes first difference (year-on-year change).*

4.5 Hypothesis Testing Summary

The performance of the two hypotheses is summarised in table 5, using only the results of the first difference test. That model is the appropriate model on which to make those decisions because it removes the shared long-run trends and determines whether changes in gold prices are correlated with changes in the dependent variables on the year-on-year basis. A hypothesis is only supported if the coefficient is statistically significant in that model.

Table 5: Hypothesis Support

H1: The findings indicate that the existence of a significant positive relationship between the volatility of global gold prices and the fluctuations in the exchange rate in Pakistan, which means that the higher the price of gold, the more the PKR depreciates.	Supported
H2: Higher world prices of gold are significantly affecting inflation in Pakistan as they add to the cost of imports and keep the prices of gold high domestically.	Partially Supported

Hypothesis Testing Summary (Table 5). First difference regression results ($p<0.05$) used for decisions.

ISSN Online: 3007-3154
ISSN Print: 3007-3146

H1 is supported. The coefficient of the exchange rate is statistically significant for the first difference regression model ($p = 0.037$) and this indicates that year-on-year changes in the price of gold in PKR are related with measurable depreciation in the Rupee. This conclusion remains valid in both the level and first difference model, so it is unlikely that this result is purely due to a common upward trend in the two variables.

This is a partial H2 support. There is a strong relationship with gold price in the level model and inflation and CPI. In the first difference model, the CPI relationship is highly significant ($p = 0.000$, $R^2 = 0.850$) while inflation is not significant ($p = 0.917$). In short term, the CPI result validates the effect of gold price changes on the overall price level. On the other hand, the annual inflation rate is a summary measure which is influenced by the prices of fuels, food supply, government pricing and monetary policy in any given year, and which does not respond consistently over time to changes in gold prices. Thus, the price-level effect is proven to be real and significant in the short run, while the inflation-rate effect appears to take effect in the long run and over a period longer than one year.

5. Discussion

The impact of global gold price movements on two components of the Pakistani macroeconomy is clear-cut, namely exchange rate of PKR/USD and CPI. The direction both models are pointing are the same, and that's important. If a relationship appears in the level model but not in the first differences, it is likely that this is a statistical artifact. If one can survive both, it should be taken seriously.

It is easy to trace that the exchange rate mechanism works. A significant amount of gold is imported in Pakistan and gold is sold in dollars internationally. If global gold prices rise, then the same amount of gold will require more dollars for the importers in Pakistan, which will lead to the depreciation of the Rupee. In the context of this finding by Jain and Biswal (2016), they found that in India, gold price shocks cause the exchange rate to move in both directions in an import-dependent economy, which strengthens the notion that gold price shocks impact exchange rate in Pakistan as well. The findings concur with the Pakistan specific conclusion as well.

That exchange rate channel directly links to the result of the CPI. The depreciation of the Rupee doesn't only make gold more expensive but makes every other import more expensive and the overall increase in the prices is reflected in the CPI. This may be the most striking number in this entire analysis: The level model has a correlation of 0.996 between gold price and CPI. The R^2 of 0.850 is indicative that almost 85 per cent of the variation in the CPI in the first differences is being explained by the change in gold prices alone a very high result for a simple bivariate regression.

The inflation outcome is more muddied. In the level model, there is a strong association, but in the first difference model, there is none. This is consistent with the results of Shahbaz et al. (2014) who did not find any strong short run impact of gold prices on consumer prices in Pakistan but observed a long run co-integration relationship. Oil prices, food supply shocks, government price decisions and interest rate policy are all working on the inflation rate in the short run. This takes away the price for gold and makes it hard to see the price for gold as a definite year-on-year effect.

This GDP growth result is not surprising but it is clear to state that there is no significant relationship between economic growth of Pakistan and gold in any model. That's good sense in terms of economics. Rising import costs for gold are a second order effect that will be felt by the savings drain and the transfer of value from the domestic economy, and take several years to manifest, with intermediate links in the chain. The influx of commodity import prices does not contribute significantly to growth in Pakistan; it is rather mainly due to domestic agriculture, industry, and remittances.

ISSN Online: 3007-3154
ISSN Print: 3007-3146

The so-called current account balance effect only becomes meaningful when looking at the first difference of the model, so it is worth taking a closer look. It gives a point to point relationship, that is when gold prices rise, the current account deficit increases. This is a direct and real-time impact of the higher import cost and it is an actionable message for the decision makers of State Bank of Pakistan. A significant increase in gold prices on a worldwide level is not merely a financial market phenomenon, but a sign of the external account pressure which could warrant a policy response the same year.

5.1 Policy Recommendations

The results of this study have implications for the State Bank of Pakistan. First-difference results reveal that the first increase of the world price of gold causes a measurable depreciation in the real price of PKR in the same year, and a widening of the real current account deficit as well. The State Bank should incorporate into its early-warning monitoring of indicators that it already monitors, such as the price of gold, in the global market. The monetary authority should be aware of foreign exchange demand pressures in the near term if gold prices rise on foreign markets and adjust its foreign exchange reserve management accordingly. Having built up foreign exchange buffers during calmer times allows the central bank the flexibility to react in the event of a shock. Historically the pressure has always been greater, not less, with a reactive approach, waiting until the Rupee gets weaker before reacting.

This is likely the most actionable for the Ministry of Finance. The years on which gold prices shoot up in the world are the years on which Pakistan's external account position becomes clearly weak. A tiered import duty on gold which goes up as international prices rise above specific levels is one that needs to be considered. This would lead to a decrease in gold import volumes at a time when the foreign exchange cost of each unit is the highest. Based on evidence from India, where Mukherjee et al. (2017) estimate the elasticity of gold import demand and conclude that changing import volumes in response to price and duty changes is not just a shift of demand to the informal sector, but a real change in volumes, such a mechanism can have an actual impact. It would not remove gold imports; there is too much of it in the way of household saving and culture to remove it, but it would mitigate the external account shock during the gold price shock. The inflation finding necessitates a more concerted response although the gold price impact on the price level is through the CPI in the short run, price-stability policy must remain vigilant to imported cost pressures in the absence of tranquil headline inflation.

This study aimed to investigate the relationship between global price volatility of gold and exchange rate and inflation in Pakistan during 2015-2024, which analyzes the annual secondary data of the World Bank WDI and World Gold Council using Pearson correlation, level OLS regression and first difference regression.

Conclusion

The results are unambiguous on the key issues. The results suggest that the price movements of gold are significantly correlated with the price movements of PKR/USD and CPI, which are significant in both the level and the first difference model. The coefficient of exchange rate being of the order of 30 in the first-difference model indicates that year on year rise in the price of gold is accompanied by a reasonable Rupee depreciation of the same year. The correlation of the CPI is even higher with the R^2 of 0.850 in the first difference regression model.

While the long run association is significant, it is not significant in the short run first difference model. This is indicative of the number of factors that act simultaneously to create inflation, and also of the lag time between the price of gold and the impact on the system. The results indicate that GDP growth has no significant relation to gold price in

ISSN Online: 3007-3154
ISSN Print: 3007-3146

all models. The first difference model shows a balance of current account, which is the most prominent result: years in which gold prices have jumped also see a deterioration in Pakistan's external position clearly.

The results have some practical significance. The price of gold is an early warning sign of exchange rate and CPI pressures for monetary policymakers, and it is prudent to increase the buffers in the economy when price of gold is low and then release the cushion when prices are high. The findings validate the sentiments of many in Pakistan gold is not only a cultural asset but also linked to the macro-economic scenario and its fluctuations can be seen in the cost of living and the worth of the Rupee.

Some caveats exist. The length of 10 years of annual data is fairly short for econometric work, and annual observations fail to capture shorter run dynamics, which could be found using monthly data. The models presented here are bivariate, meaning they consider gold prices without accounting for factors such as oil price, interest rate or global risk sentiment. This could be explored in future research using monthly data that extends the time period, and with the inclusion of additional control variables in a multivariate context. The long-term and the short-term effects would be separated more cleanly by ARDL or VECM models, as done here. Despite these constraints, the evidence is rather uniform: price volatility of gold is a significant source of macroeconomic instability in Pakistan.

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ISSN Print: 3007-3146

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