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Hedging exchange rate risk in the gold market: A panel data analysis[☆]

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ABSTRACT

This study examines whether gold is used to hedge against exchange rate risks globally or exhibits different properties in the major gold-producing, gold-consuming, and key currency countries. We apply panel data from January 1999 to March 2015 to test whether the effectiveness of gold in this regard differs for these three groups of countries. Our dynamic panel threshold model results show that exchange rate fluctuations result in threshold effects and influence the hedging effectiveness of gold. Additionally, we use weekly, monthly, and quarterly data to analyze the time horizon of the hedging properties of gold. Our findings reveal that except for the results for the quarterly data, the weekly and monthly data results show that the hedge effects in the major gold-consuming countries are greater than those in the major gold-producing countries.

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1. Introduction

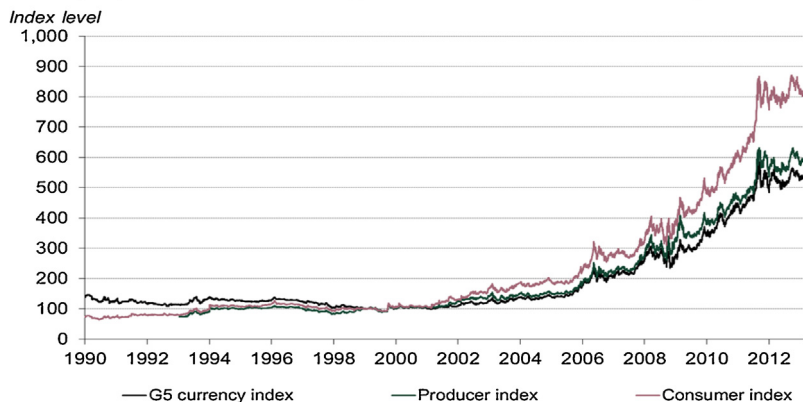
Why invest in gold? For individuals holding gold, such investment signifies a saving for the future—either a small saving or a more substantial long-term investment—and they buy gold or gold-backed financial products to protect their wealth and increase their risk-adjusted returns. Having a small amount of gold in a balanced investment portfolio may reduce their overall investment risk and help protect against market shocks. For institutional investors, investing in gold is an asset allocation strategy. However, according to the theory of portfolio risk management, the most compelling benefits of gold derive from its lack of correlation with other asset classes, making it a valuable tool for portfolio diversification and risk management in an asset allocation strategy. For investment managers in banks, gold can deliver a material downward impact on volatility and increase their risk-adjusted returns. In addition, gold has some unique characteristics as a portfolio diversifier: it is a hedge against inflation and an effective balance against currency risks (see [World Gold Council, 2013](#)).

Since gold is used as a hedging tool against other currencies, adding gold to an asset portfolio makes the portfolio more efficient. The ability of gold to hedge against exchange rate fluctuations and offset changes in the domestic purchasing power of a country's currency has two implications. First, when the domestic price index of a country goes up, the price of gold as measured in the local currency increases at the same time. If it increases proportionately, it is a perfect internal hedge. If the

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Gold spot price in G5 currencies, producer and consumer indices (01/01/1999=100)**Fig. 1.** the trends of the gold spot price in G5 currencies, producer and consumer indice.

ratio is less than 1, it is a partial internal hedge. Second, when an increase in gold prices (as measured in the local currency) is equivalent to a drop in the exchange rate of the local currency compared with a foreign currency, it is a perfect external hedge. When the ratio is less than 1, it is a partial external hedge. This study focuses on the second implication.

Research on currency hedging or the safe haven characteristics of gold has mostly concentrated on evaluations based on investor definitions, with the role of supply and demand in the gold market generally ignored. The World Gold Council (WGC) categorizes gold markets into three groups based on characteristics: G5 countries (those with key currencies), major gold-producing countries, and major gold-consuming countries. The difference in gold prices between these three groups is shown in Fig. 1.¹ The gold price indices of the three groups fell gradually from 1990 to 2000 and then rose rapidly from 2000 to 2012. Interestingly, before 2000 the gold price index of G5 countries was the highest and that of gold-producing countries the lowest, whereas after 2000 gold-consuming countries had the highest index and G5 countries the lowest. Hence, although the three indices generally followed the same trend, the upward momentum of each was apparently greater in gold-consuming countries than in the other two groups. The main topics of this study are thus whether the upward momentum of the indices was affected by the currency hedging characteristics of gold and whether the momentum worked in the same way for all three groups.

Why do we have to use different groups to analyze the exchange rate hedging properties of gold? The gold price is determined by supply and demand. Gold supply is driven by gold mining and recycled gold, while gold demand follows the needs of the jewelry industry, health needs, industrial demand, investment demand, and safe haven demand. Exchange rate changes, international gold prices, and production levels all affect supply and demand. Indeed, through the investment demand of gold associated with the major world currencies, especially exchange rate fluctuations (e.g., devaluation of the dollar) and diversification of these currencies (e.g., Yen and Euro), gold has become an important investment and hedging tool. In addition, the central bank gold sale affects the supply and demand of gold. In particular, central banks' control over exchange rates causes changes in gold prices.

The hedging ability of gold is not limited to specific currencies; its hedging aspects can also differ between gold producers (supplier) and consumers (demander). Gold-producing and –consuming countries are likely to consider the uncertainties arising from future changes in exchange rates, which could cause gold prices to fluctuate. Investors, hedgers, and central banks with national reserves must also consider the interaction between gold and the key currencies. Given the influence of expected uncertainties in exchange rate fluctuations, it would be more meaningful if the major gold-producing and –consuming countries as well as the countries with key currencies were taken into account, as they are in this study.

Guitian (1976) and Dornbusch (1988) found that the appreciation and depreciation of a currency affect the prices of domestic goods relative to foreign goods. Therefore, a country's industries have to compete internationally, which further affects its economic activities. Many studies have analyzed the outcomes of a country's exchange rate fluctuations from both the demand and the supply sides. Examples of the former include Diaz-Alejandro (1963), Krugman and Taylor (1987), and Barbone and Rivera-Batiz (1987), while examples of the latter include Bruno (1979), Van Wijnbergen (1989), and Gylfason and Schmid (1983). These studies point out that changes in currency valuations could lead to exchange rate fluctuations and risks.

Exchange rate fluctuations have important impacts on the decisions of gold producers, gold consumers, and investors to hold gold. Since the appreciation and depreciation of a country's currency lead to changes in the prices of foreign compared with domestic goods, the economic, production, and financial investment behavior of the country is directly stimulated,

¹ According to the categorization of the World Gold Council (WGC), the three types are divided based on the statistics of gold mining and sustainable development, supply and demand, jewelry, investment, technology, and reserve asset management. We established a simple theory-based elasticity model to analyze the difference in gold prices between these three groups of this study

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