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# Gold as a Factor of Change in Central Bank Reserves in Periods of the Financial Markets Turbulence: the Case of Kazakhstan

**Abstract**: The article examines the impact of changes in the gold part of the reserves of the National Bank of Kazakhstan on their total volume with an emphasis on the factor of changes in the price of gold. The value of the factor of the price of gold increases during periods of global financial crises when Kazakhstan, as an oil exporting country, is under strong pressure on the current account and the exchange rate of the tenge due to a decline in oil prices. During these periods, the National Bank conducts foreign exchange interventions to support the tenge exchange rate and spends its reserves, which increases the relevance of their safety. The paper tests the hypothesis that in such periods, the rise in the price of gold, due to its function as a safe haven asset, can compensate expenditures on foreign exchange interventions for the central banks and increase the stability of reserves. From this point of view, the article examines three periods of high turbulence in world markets of the 2000s and changes in the National Bank's gross reserves, as well as the influence of the gold factor on these changes. It was revealed that during the crisis periods, the rise in the price of gold contributed to the stability of the gross reserves of the National Bank, and the effectiveness of this factor was directly proportional to the gold share in the reserves.

**Keywords**: gold reserves, gold price, financial crisis, safe heaven asset, foreign exchange market interventions.

**JEL Classification:** E58.

## Introduction

The increasing volatility of world markets, more frequent financial crises, and volatility of commodity markets increase the relevance of the problem of safeguarding the reserves of central banks of developing countries, which are strongly influenced by external shocks. This is especially true for economies exporting raw materials since falling prices during periods of market turbulence hit their current account hard and cause currency weakening. In such conditions, many central banks in emerging economies are trying to stabilize the domestic foreign exchange market and support the exchange rate of national currencies with interventions, which leads to a reduction in reserves and, thereby, weakens the stability of the entire financial system of the country. In these conditions, the question of the composition of international reserves of central banks and the efficiency of their portfolio management becomes especially important. A separate problem in this regard is the presence of gold in the composition of reserves and its share, as well as the change in this share in different periods in terms of the "crisis" of financial markets.

The hypothesis proposed herein is that gold should be present in a central bank's international reserve portfolio, especially if it is the central bank of an economy dependent on commodity exports, which has a strong impact on the balance of payments and thus on the domestic foreign exchange market. This hypothesis is based on the assumption that gold, as a safe haven asset, increases in value during financial crises, and the resulting increase in the value of the gold portion of the central bank's reserves compensates for the decline in these reserves caused by interventions to support the exchange rate of the national currency. In accordance with this assumption, the gold portion of the central bank's reserves should increase during financial crises and the periods preceding them (if reliable forecasting is possible). The opposite tactics of managing international reserves are also advisable - reducing the share of gold in reserves during periods of stability and growth in world financial markets, when the gold loses its function of a safe haven and decreases in price, negatively affecting the state of gross reserves of the central bank.

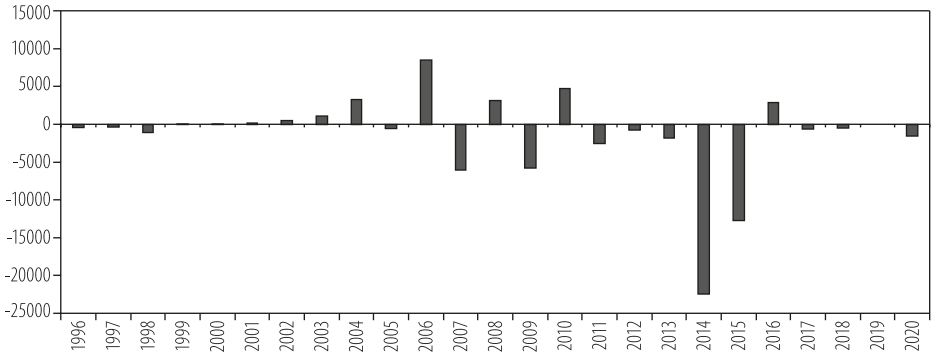
To test this hypothesis, the article examines the change in the international reserves of the National Bank of Kazakhstan in three periods - two crisis periods and one of stability and growth of world markets. The dynamics of changes in gross reserves and their gold part is analysed and the impact of changes in the price of gold on the volume of reserves is assessed, including in the context of the stabilizing effect of the gold factor on reserves during periods of foreign exchange interventions. The analysis carried out in general confirmed the hypothesis about the advisability of having gold in the reserves of the central bank in crisis and

pre-crisis periods, since the rise in the price of gold compensated for part of the losses in reserves from foreign exchange interventions during the periods of the two crises considered - the global crisis of 2008-2009 and the "coronacrisis" of 2020. The opinion about the negative impact of gold on the dynamics of reserves during periods of stability and growth of financial markets due to a decrease in its price was also confirmed on the example of the period 2011-2015, when a decrease in the price of gold had a negative effect on the state of reserves of the National Bank of Kazakhstan.

## Results

Kazakhstan, as an economy dependent on raw materials exports, is vulnerable to fluctuations in world commodity markets, primarily oil. Changes in oil prices entail sharp shifts in the balance of payments and in the current account, which, in turn, have a direct impact on the exchange rate of the national currency, the tenge. The tenge exchange rate has been adjusted by the National Bank for a long time due to its high social importance, which determines a significant share of imports in the domestic market. That is, the central bank of Kazakhstan regularly intervened in the domestic foreign exchange market to stabilize the tenge and inflation growth, like many other central banks (see, i.e., Yazdani and Nikzad (2021), Krušković (2022)), which in some years reached very significant volumes on the scale of the Kazakhstani economy (Figure 1).

**Figure 1: Net volumes of the National Bank interventions on the domestic foreign exchange market, US $ millions**




Source: Data on interventions of NBRK in the domestic foreign exchange market (on monthly basis). The National Bank of Kazakhstan. URL: https://old.nationalbank.kz/?docid=3236&switch=english.

The National Bank's interventions in the foreign exchange market increased during periods of oil price downturns when the situation with the balance of payments and current account worsened due to a decrease in the value of exports. This was, in particular, the situation during the global financial crisis and after a sharp drop in oil prices in 2014-2015. The National Bank's interventions to stabilize the tenge exchange rate entail a reduction in its reserves. Thus, in the second half of 2007 alone, they decreased by a quarter, from 23.4 to 17.6 billion US dollars. In this regard, the problem of the safety of the National Bank's reserves and their management, including the specifics of their allocation to various types of assets, is very relevant for Kazakhstan.

One of the assets in which the National Bank's reserves are invested is gold. Gold has an important impact on the state of reserves of central banks, which was noted by many researchers both of the dynamics of this part of reserve assets and the main factors of this dynamics. Oktay, Öztunç & Serin (2016) explore the determinants of gold reserves by central banks of the Group of Seven (G-7) countries, Ghosh (2016) finds that higher exchange rate risk and monetary policy instability significantly increase central bank's gold holdings while higher economic growth and financial development to reduce such share, and Sui, Rengifo & Cour (2021) find that gold can offer protection against currency movements and inflation fluctuation. Sun (2020) considered gold in the context of the impact of the People's Bank of China's balance sheet on its financial strength.

Almost all works on this issue note a change in the attitude of central banks to gold. In the late twentieth and early twenty-first centuries, central banks were net sellers of gold, and the scale of sales in the 1990s became so great that they destabilized the market and necessitated the conclusion of the Central Bank Gold Agreement in 1999. From 2010 to date, the trend has changed and central banks have become net buyers of gold, although there are some exceptions - for example, the government of Canada sold its entire gold reserve in February 2016 (Russel, 2016). The transformation of central banks from sellers to buyers has led to an increase in the share of gold in the reserves of these institutions in most countries, both developed and developing. Chițu, Gomes & Pauli (2019) note that the ECB's current gold holdings represent about 26% of its total official reserves, compared with 15% in 1999. Price as a factor in the growth of the share of gold in reserves is also highlighted by Leyland (2010), adding that its performance during the crisis has been conclusive. Crisis as a turning point was also noted by Karunagaran (2011), Aizenman & Inoue (2012), Gopalakrishnan & Mohapatra (2018), Kutnik & Port (2019), and many others.

Among the factors that increase the attractiveness of gold as a reserve asset, various researchers distinguish many of the major ones with the diversification of the portfolio of reserves (Astrow, 2012; Chițu et al., 2019; Berłowska, Bezzubik & Żaczek, 2019) and the derivative hedging objective of declining values of reserve currencies (Capie, Mills & Wood, 2005; Wang & Freeman, 2013; Gopalakrishnan & Mohapatra, 2018) being some of those. In recent years, new factors have been added to the traditional ones. Growth in demand for gold from central banks linked to low and negative interest rates (Chițu et al., 2019), a de-dollarization policy (World Gold Council, 2019).

The last factor is typical primarily for developing countries whose central banks form the main demand for gold among monetary authorities. In 2018, 10 central banks of emerging economies bought 522.5 tons of gold from the total central bank purchases of 656.2 tons (almost 80%), while in 2019, the top 10 buyers (also only from developing countries) replenished their reserves with 620.6 tons out of 650.3 tons purchased by all central banks of the world. (World Gold Council, 2020) It can be noted that the largest buyer of gold in recent years has been Russia, which replenished its gold reserves in 2018 and 2019 with 274.3 and 158.1 tons, respectively. In this regard, it is appropriate to note the emergence of such a new factor in the investment policy of central banks, as a political one. The active growth of gold purchases by Russia (and some other states) began after the deployment of large-scale sanctions against it, as a result of which Russia reduced its investments in the U.S. Treasury bonds to a minimum. The bulk of this reduction occurred in 2018 (Dodonov, 2018), which also peaked in gold purchases by the Bank of Russia. That is, the reallocation of assets from the U.S. Treasury bonds in gold for political reasons (sanctions, the threat of arrest, etc.) also became one of the factors in the growth of gold purchases by central banks of individual countries.

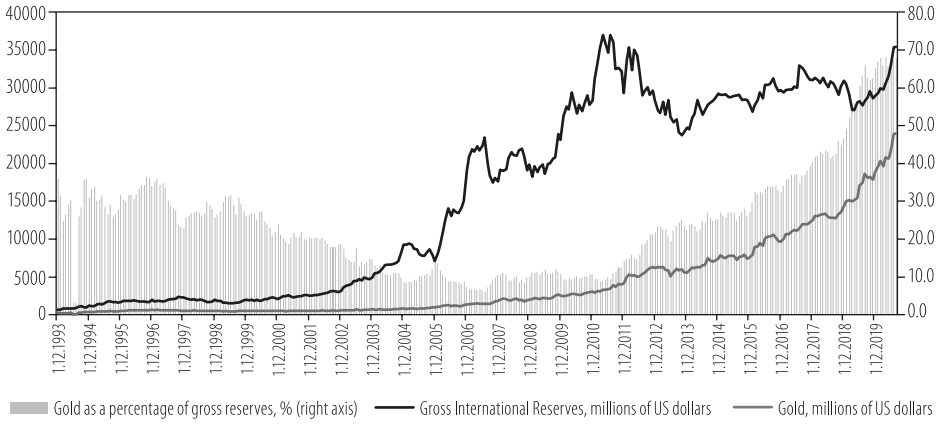
Many researchers note not only an increase in the share of gold in the structure of reserves of central banks in developing countries but also the specifics of the factors that determine this growth. Some researchers associate the growth of reserves in general and their gold part, in particular, with an increase in the volume of exports and current account surplus (Dooley, Folkerts-Landau & Garber, 2003; Jeanne, 2007) although other authors note that the growth of reserves of developing countries also occurred in economies that are not export-led (Cunha, Prates and Ferrari-Filho, 2011), or during periods when exports did not grow (Aizenman & Lee, 2007). Among the factors explaining the sustainability of the growth of reserves in developing countries are financial liberalization (Spanò, 2012), a sharp rise of emerging countries economic power (Aizenman & Inoue, 2012), structural changes in the international monetary system (World Gold Council, 2019) and so on.

Despite the advantages of gold as a reserve asset, it also has disadvantages, the main of which is the higher volatility compared to traditional assets for a conservative portfolio and the problem of its profitability. This deficiency has also been noted in a number of studies. World Gold Council (2010) notes this risk and that central banks are typically far less risk-tolerant, Liste & Manuel (2019) claim that most countries display negative sovereign gold reserves financial performance. Bernholz (2002) draws attention to the fact that the return on gold reserves is usually lower than that on foreign exchange reserves. The problem of the impact of asset revaluation on the financial performance of central banks was studied by Dalton & Dziobek (2005), Stella & Lönnberg (2008), Sweidan (2011), Benchimol & Fourçans (2019).

In this regard, of interest is the impact of the gold component in the Kazakhstan's reserves on their safety during periods of international financial crises and, in general, assessing the impact of changes in the price of gold on the reserves of the central bank of a country with a high and growing share of gold in reserves.

The situation with the gold reserves of the National Bank of Kazakhstan as a whole developed in line with global trends. The volume of gross international reserves grew for a long time although this growth was interrupted during periods of global crises. The value of gold in reserves also rose, but this growth was marginal before the start of the global financial crisis in 2007, and the share of gold in gross reserves was declining (Figure 2).

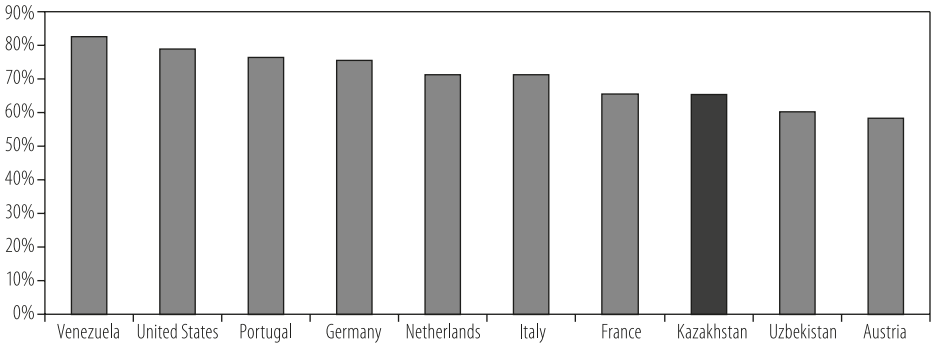
**Figure 2: Gold in the gross international reserves of the National Bank of Kazakhstan**




Source: International Reserves and Assets of the National Oil Fund of the Republic of Kazakhstan. The National Bank of Kazakhstan. URL: https://nationalbank.kz/en/international-reserve-and-asset/mezhdunarodnye-rezervy-i-aktivy-nacionalnogo-fonda-rk

As in many other countries, the global crisis became a turning point for Kazakhstan, after which a steady and outstripping growth of gold in reserves began. Kazakhstan is one of the leading gold-mining countries and the National Bank has received the priority right to purchase gold from mining enterprises since 2012, in some years purchasing the entire volume of mined gold or most of it. The implementation of this policy led to rapid growth in the gold portion of the National Bank's reserves. If at the end of 2011 Kazakhstan had 82 tons of gold, with which it had ranked 35th in the world, then at the end of the second quarter of 2020 it ranked 15th with 378.5 tons of gold in reserves (CentralBankGold, n.d.). In terms of the share of gold in the reserves of the central bank, Kazakhstan is in the top ten countries (Figure 3) and ranks second among developing economies by this indicator.

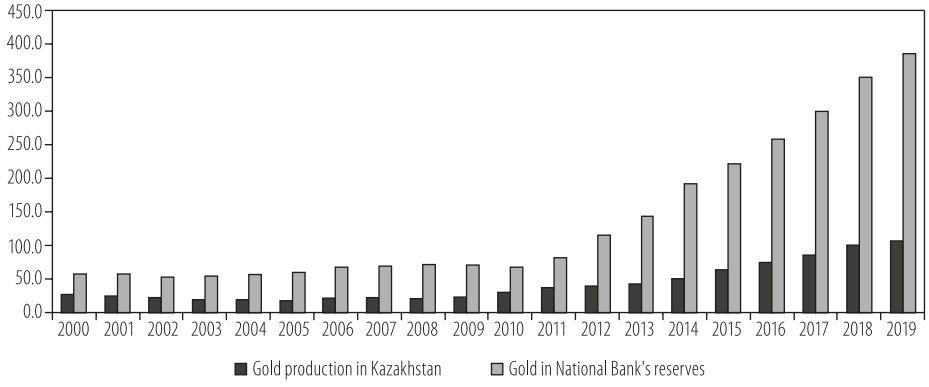
**Figure 3: Top 10 countries by the gold share in the central bank's reserves**




Source: Quarterly times series on World Official Gold Reserves since 2000. CentralBankGold. https://centralbankgold.org/reserve-statistics.

After the change in legislation and the start of the buyout of gold produced in Kazakhstan by the National Bank in 2012, there was not only an increase in the gold part of its reserves but also an increase in gold production (Figure 4).

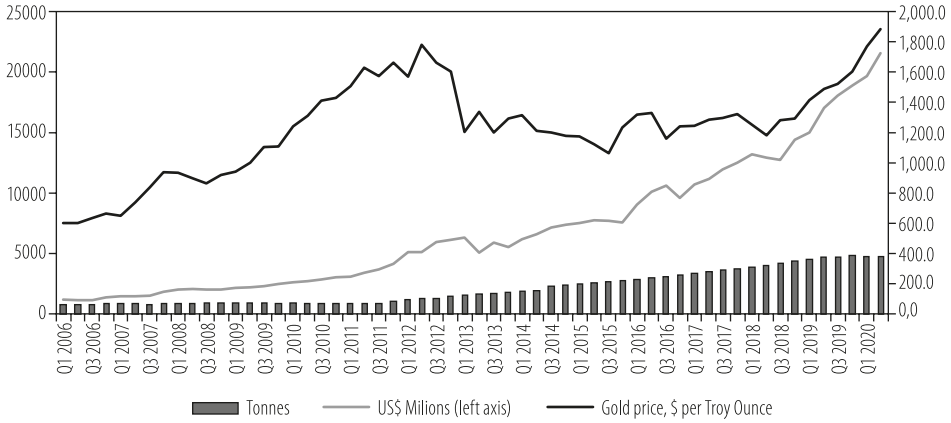
**Figure 4: Gold in the National Bank's reserves and gold production in Kazakhstan, tons**




Sources: Proizvodstvo promyshlennoy produktsii v obrabatyvayushchey promyshlennosti v Respublike Kazakhstan. Statistika promyshlennogo proizvodstva // Ministerstvo natsional'noy ekonomiki RK. Komitet po statistike. https://stat.gov.kz/official/industry/151/statistic/8; Quarterly times series on World Official Gold Reserves since 2000. CentralBankGold. https://centralbankgold.org/reserve-statistics.

At the same time, the growth in physical volumes of gold in reserves was not always accompanied by an increase in its value volumes, which was due to the high volatility of the gold price. It was after the change in Kazakhstani legislation and the start of the National Bank's purchase of gold mined in the country that a significant decrease in gold prices occurred, as a result of which the growth of its physical volumes in reserves was for some time accompanied by a decrease in their value (Figure 5). In the context of evaluating the impact of the gold component of central bank reserves on the change in their value, three noteworthy periods of this influence in Kazakhstan can be distinguished - the period of the global crisis of 2007-2009, the period of 2011-2015, and the period of the crisis caused by the COVID-19 pandemic in 2020.

**Figure 5: Gold reserves of the National Bank of Kazakhstan and the gold price**




Sources: International Reserves and Assets of the National Oil Fund of the Republic of Kazakhstan. The National Bank of Kazakhstan. URL https://nationalbank.kz/en/international-reserve-and-asset/mezhdunarodnye-rezervy-i-aktivy-nacionalnogo-fonda-rk: Gold Fixing Price 10:30 A.M. (London time) in London Bullion Market, based in U.S. Dollars. FRED Economic Data. Federal Reserve Bank of St. Louis. URL: https://fred.stlouisfed.org/series/GOLDAMGBD228NLBM; Quarterly times series on World Official Gold Reserves since 2000. CentralBankGold. https://centralbankgold.org/reserve-statistics.

Each of these periods was distinguished by significant changes in the price of gold, which influenced the state of reserves of the National Bank of Kazakhstan. This influence was both positive and negative, depending on the direction of the gold price movement. At the same time, the role of the gold price factor grew during periods of financial crises - during the 2008 global crisis and during the COVID-19 pandemic. The rise in the gold price during crisis periods is determined by its role as a hedge and safe haven asset, which is recognized and confirmed by many studies. Baur & McDermott (2016) show that gold was a particularly strong safe haven in the aftermath of September 11, 2001 and the Lehman bankruptcy in September 2008. Coudert & Raymond-Feingold (2011) find that gold qualifies as a safe haven against stock indexes. Beckmann, Berger & Czudaj (2014) have shown that gold generally serves as a hedge and a safe haven, however, this ability depends on the specific economic environment. In recent years, a number of authors have had doubts about this role of gold - for example, Baur & Kristoffer (2012) demonstrate theoretically and empirically that investor behaviour has the potential to destroy the safe haven property of gold. Investing in gold for conservative purposes is also contested, including in certain emerging economies. Wei & Weber (2017) suggest that gold is a weak hedge and a diversifier but not a safe haven for both socially responsible investment and conventional investment in Korea.

In this regard, the experience of the National Bank of Kazakhstan's investment in gold can contribute to assessing the role of gold as a factor in the safety of reserves.

Considering the three selected periods with significant changes in the price of gold, it can be noted that in Kazakhstan, the effect of price changes was, on the one hand, somewhat blurred due to a significant change in the amount and share of gold in the reserves of the National Bank (which grew during all three periods) and on the other hand, the rise in the price of gold during the crisis periods allowed to reduce shocks for the volume of gross reserves (Table 1). It can also be noted that for a long period (from 2000 to 2020) the rise in the price of gold made a significant contribution to the increase in the total reserves of the National Bank.

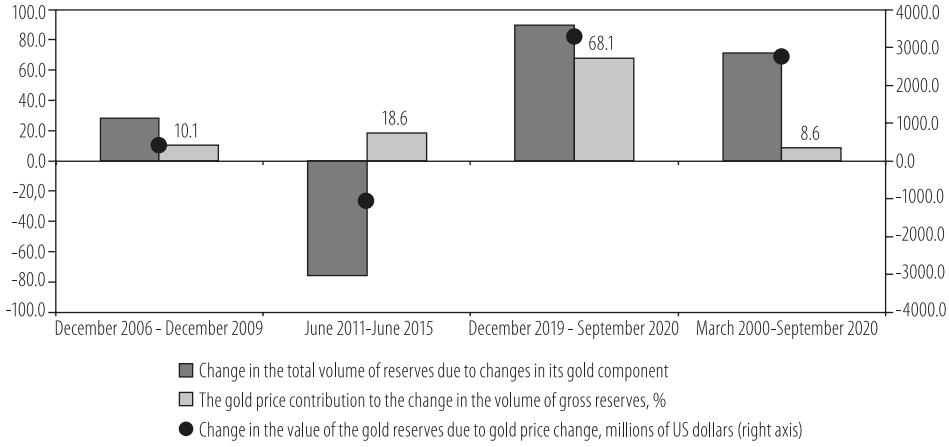
**Table 1: Changes in the volume of the National Bank reserves and the price of gold.**

| | Gross International Reserves | Gold Reserves | Gold as a percentage of gross reserves | Gold Price, $ per Troy Ounce |
|---|---|---|---|---|
| Global financial crisis 2007-2009 | | | | |
| December 2006 | 19127 | 1376 | 7.2 | 1241.7 |
| December 2009 | 23091 | 2501 | 10.8 | 1604.65 |
| Change, volume | 3964 | 1125 | 3.6 | 363 |
| Change, % | 20.7 | 81.8 | 50.6 | 29.2 |
| Gold price declining period | | | | |
| June 2011 | 34615 | 3 415 | 9.9 | 1629 |
| June 2015 | 28891 | 7769 | 26.9 | 1122.5 |
| Change, volume | -5724 | 4354 | 17.0 | -507 |
| Change, % | -16.5 | 127.5 | 172.6 | -31.1 |
| Coronacrisis | | | | |
| December 2019 | 28958 | 18875 | 65.2 | 1604.7 |
| September 2020 | 33784 | 23212 | 68.7 | 1884.0 |
| Change, volume | 4826 | 4337 | 3.5 | 279 |
| Change, % | 16.7 | 23.0 | 5.4 | 17.4 |
| 2000-2020 period | | | | |
| March 2000 | 1873 | 497 | 26.5 | 289.2 |
| September 2020 | 33784 | 23212 | 68.7 | 1884.0 |
| Change, volume | 31911 | 22715 | 42.2 | 1595 |
| Change, % | 1703.7 | 4570.4 | 158.9 | 551.6 |

Sources: International Reserves and Assets of the National Oil Fund of the Republic of Kazakhstan. The National Bank of Kazakhstan. URL: https://nationalbank.kz/en/international-reserve-and-asset/mezhdunarodnye-rezervy-i-aktivy-nacionalnogo-fonda-rk; Gold Fixing Price 10:30 A.M. (London time) in London Bullion Market, based in U.S. Dollars. FRED Economic Data. Federal Reserve Bank of St. Louis. URL:https://fred.stlouisfed.org/series/GOLDAMGBD228NLBM.

In more detail, the contribution of gold and changes in its price to changes in the National Bank's reserves is illustrated in Figure 6, which shows three indicators for four periods - 2007-2009, the first half of 2011 - the first half of 2015, three quarters of 2020, and the period from the first quarter 2000 to third quarter 2020. The following indicators were chosen to illustrate the influence of the gold factor on the state of the gross international reserves of the National Bank: change in the total volume of reserves due to changes in its gold component (the ratio of changes in the value of the gold part of reserves and changes in the total volume of reserves in percent), change in the value of the gold portion of reserves due to changes in its price (the ratio of changes in the price of gold and the volume of the gold part of reserves for the period, billion dollars) and the gold price contribution to the change in the volume of gross reserves (the ratio of the previous indicator and changes in the volume of gross reserves for the period,%).

**Figure 6: Impact of changes in the gold portion of the National Bank's reserves on its total volume**




Sources: International Reserves and Assets of the National Oil Fund of the Republic of Kazakhstan. The National Bank of Kazakhstan. URL: https://nationalbank.kz/en/international-reserve-and-asset/mezhdunarodnye-rezervy-i-aktivy-nacionalnogo-fonda-rk; Gold Fixing Price 10:30 A.M. (London time) in London Bullion Market, based in U.S. Dollars. FRED Economic Data. Federal Reserve Bank of St. Louis. URL:https://fred.stlouisfed.org/series/GOLDAMGBD228NLBM.

The presented data demonstrate a high impact of changes in the gold portion of reserves on their total volume, a significant impact of the price factor on changes in the gold portion of reserves, and a fairly significant impact of the gold price on changes in the total volume of reserves. At the same time, the influence of

the price factor naturally increased as the share of gold in the reserves of the National Bank of Kazakhstan increased. It was minimal during the 2007-2009 global financial crisis when the share of gold in reserves was about 10%, and the maximum was during the coronavirus crisis since in 2020 the share of gold in reserves approached 70%. The rise in the price of gold during the crisis periods in the case of the National Bank of Kazakhstan made it possible to offset a significant part of the costs of foreign exchange interventions, which were carried out to stabilize the tenge exchange rate. In 2007-2009, the National Bank spent 8,714 million of US dollars on interventions, and the growth of the gold part of reserves at the expense of the price amounted to 402 million of US dollars, that is, 4.6% of the cost of stabilizing the exchange rate was compensated. This happened in the context of a low share of gold in the reserves of the National Bank, which at that time was from 8% to 12%. During the coronavirus crisis, in the first three quarters of 2020, the National Bank of Kazakhstan spent 1,582 million of US dollars on foreign exchange interventions, and the increase in reserves due to the rise in the price of gold amounted to 3,286 million of US dollars, that is, twice the cost of stabilization of the tenge exchange rate. This result was due to the high share of gold in the National Bank's reserves, which amounted to 66.9%. Thus, the rise in the price of gold in the crisis conditions compensated for the expenditure of reserves to stabilize the foreign exchange market in Kazakhstan, the efficiency of which was directly proportional to the share of gold in reserves.

## Conclusion

In general, the following conclusions can be drawn regarding the impact of the gold price on the National Bank's international reserves:

- during the crisis in the world financial markets, the rise in the price of gold had a positive effect on the National Bank's reserves, which made it possible to maintain their positive dynamics, despite the interventions in the foreign exchange market during these periods;
- during a period of stability and growth in world markets, when gold was not in demand as a safe haven and was declining in price, and that decline made a significant contribution to the negative dynamics of the international reserves of the National Bank;
- over a long period of time 2000-2020, gold had a positive effect on the state of the National Bank's reserves, which was due to the outstripping growth rates of gold prices, which ensured higher profitability compared to other assets in the portfolio.

Thus, the experience of using gold by the National Bank of Kazakhstan as a significant part of the portfolio of international reserves shows that gold proved to be a good defensive asset during the financial crises of 2008-2009 and the coronavirus crisis of 2020, but had a negative impact on the state of reserves during the period of stability of the world economy and markets in 2011-2015. The impact of gold on the total volume of reserves depends on its share in them; therefore, it is advisable to use a flexible approach to managing the gold part of the reserves - to increase it before the expected crises and reduce it before the periods of stability of the world financial markets. The positive impact of changes in the price of gold on the National Bank of Kazakhstan reserves in the period 2000-2020 was due to a significant increase in the number and intensity of financial crises and turbulence in markets during this period, which led to an increase in demand for gold as a safe haven asset and an increase in its price. The intensification of the crisis in financial markets has increased the role of gold as a defensive asset in the National Bank's portfolio, which allows us to conclude that it is advisable to maintain a high proportion of gold in the current conditions of growing uncertainty and high crisis expectations.

## References


1. Aizenman, J. and Inoue, K. (2012). Central Banks and Gold Puzzles. NBER WORKING PAPER SERIES. Working Paper 17894.
2. Aizenman, J. and Lee, J. (2007). International Reserves: Precautionary versus Mercantilist Views, Theory and Evidence. *Open Economies Review*, 18(2), 191-214.
3. Astrow, A. (2012). Gold and the International Monetary System. A Report by the Chatham House Gold Taskforce. Available at https://www.chathamhouse.org/sites/default/files/public/Research/International%20Economics/r0212gold.pdf
4. Baur, D. and Kristoffer, J. G. (2012). The Destruction of a Safe Haven Asset? *Risk Management eJournal*, n. pag.
5. Baur, D. and McDermott, T. (2016). Why is gold a safe haven? *Journal of Behavioral and Experimental Finance*, 10.10.1016/j.jbef.2016.03.002.
6. Beckmann, J., Berger T. and Czudaj R. (2014). Does Gold Act as a Hedge or a Safe Haven for Stocks? A Smooth Transition Approach. *Ruhr Economic Papers*, 502, Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI), Essen.
7. Benchimol, J. and Fourçans, A. (2019). Central bank losses and monetary policy rules: A DSGE investigation. *International Review of Economics & Finance*, 61, 289–303.
8. Berłowska, B., Bezzubik B. and Żaczek, M. (2019). Reserves accumulation and diversification: the case of Poland. *BIS Papers*, 104, 221-232.
9. Bernholz, P. (2002). Advantages and Disadvantages of the Holding of Gold Reserves by Central Banks - With Special Reference to the Swiss National Bank. Swiss *Journal of Economics and Statistics*, 138, 99-113.
10. Capie, F., Mills, T.C. and Wood, G.E. (2005). Gold as a Hedge against the US Dollar. *Journal of International Financial Markets Institutions and Money*, 15(4), 343-352.
11. CentralBankGold. Quarterly times series on World Official Gold Reserves since 2000. Retrieved from https://centralbankgold.org/reserve-statistics.
12. Chițu, L., Gomes, J. and Pauli, R. (2019). Trends in central banks' foreign currency reserves and the case of the ECB. *ECB Economic Bulletin*, 7. Available at https://www.ecb.europa.eu/pub/economic-bulletin/articles/2019/html/ecb.ebart201907_01~c2ae75e217.en.html#toc1
13. Coudert, V. and Raymond-Feingold, H. (2011). Gold and financial assets: Are there any safe havens in bear markets? *Economics Bulletin*, 31, 1613-1622.
14. Cunha, A. M., Prates, D.M. and Ferrari-Filho, F. (2011). Brazil Responses to the International Financial Crisis: A Successful Example of Keynesian Policies? *Panoeconomicus*, 58(5), 693-714.

15. Dalton, J. and Dziobek, C. (2005). Central bank losses and experiences in selected countries. IMF Working Paper, 72.
16. Dodonov, V. Yu. (2018). Posledstviya Prodazhi Rossiyey Kaznacheyskikh Obyazatel'stv Ssha - Otsenka Vliyaniya Na Stabil'nost' Amerikanskikh Gosudarstvennykh Finansov. *Territoriya nauki*, 5, 62-69.
17. Dooley, M. P., Folkerts-Landau, D. and Garber, P. (2003). An Essay on the Revived Bretton Woods System. National Bureau of Economic Research Working Paper 9971.
18. Federal Reserve Bank of St. Louis. *FRED Economic Data*. Retrieved from https://fred.stlouisfed.org.
19. Ghosh, A. (2016). What drives gold demand in central bank's foreign exchange reserve portfolio? *Finance Research Letters*, 17, 146-150.
20. Gopalakrishnan, B. and Mohapatra, S. (2018). Turning over a golden leaf? Global liquidity and emerging market central banks' demand for gold after the financial crisis. *Journal of International Financial Markets, Institutions and Money*, 57, 94-109.
21. Gopalakrishnan, B. and Mohapatra, S. (2018). Global risk and demand for gold by central banks. *Applied Economics Letters*, 25, 835 - 839.
22. Jeanne, O. (2007). International Reserves in Emerging Market Countries: Too Much of a Good Thing? *Brookings Papers on Economic Activity*, vol. 38, issue 1, 1-80
23. Karunagaran, A. (2011). Recent Global Crisis and the Demand for Gold by Central Banks: An Analytical Perspective. RBI Working Paper Series W P S 14.
24. Krušković, B.D. (2022). Central Bank Intervention in the Inflation Targeting. *Journal of Central Banking Theory and Practice*, 1, 67-85. DOI: 10.2478/jcbtp-2022-0003.
25. Kutnik, L. and Port, E. (2019). The gold market during the 20 years of Central Bank Gold Agreements. Trends in central banks' foreign currency reserves and the case of the ECB. *ECB Economic Bulletin*, 7. Available at https://www.ecb.europa.eu/pub/economic-bulletin/articles/2019/html/ecb.ebart201907_01~c2ae75e217.en.html#toc1
26. Leyland, J. (2010). *The evolution in central bank attitudes toward gold*. Available at https://www.spdrgoldshares.com/media/GLD/file/WOR5821_The_Evolution_Document.pdf
27. Liste, S. and Manuel, J. (2019). Sovereign gold reserves management in developing and developed countries: a comparative study. Available at http://hdl.handle.net/10347/20352
28. Ministerstvo natsional'noy ekonomiki RK. Komitet po statistike. *Official Statistics by Industry*. Retrieved from https://stat.gov.kz/official/industry/11/statistic/6.

29. National Bank of Kazakhstan. *Statistics*. Retrieved from https://nationalbank.kz/en/page/statistika.
30. Oktay, B., Öztunç, H. and Serin, V. (2016). Determinants of Gold Reserves: An Empirical Analysis for G-7 Countries. *Procedia Economics and Finance*, 38, 8-16. DOI: 10.1016/S2212-5671(16)30172-1
31. Russell, A. (2016, March 4). Canada sells off remaining gold reserves; has just 77 ounces left, Global News. Retrieved from https://globalnews.ca/news/2557900/canada-sells-off-remaining-gold-reserves-has-just-77-ounces-left/
32. Spanò, M. (2012). Foreign Reserves as Hedging Instruments in Emerging Countries. *Panoeconomicus*, 2, Special Issue, 203-230.
33. Stella P. and Lönnberg A. (2008). Issues in central bank finance and independence. IMF Working Paper, 37.
34. Sui, M., Rengifo, E. and Cour, E. (2021). Gold, inflation and exchange rate in dollarized economies – A comparative study of Turkey, Peru and the United States. *International Review of Economics & Finance*, 71, 82-99.
35. Sun, L. (2020). On the People's Bank of China's Financial Strength and Policy Outcomes. *Journal of Central Banking Theory and Practice*. 3, 135-161. DOI: 10.2478/jcbtp-2020-0041.
36. Sweidan, O. D. (2011). Central bank losses: Causes and consequences. *Asian-Pacific Economic Literature*, 25(1), 29–42.
37. Wang, Y. and Freeman, D. (2013). The International Financial Crisis and China's Foreign Exchange Reserve Management. *Asia Paper*, 7 (2), 2-16.
38. Wei, R. and Weber, O. (2017). Is gold a hedge, a safe haven, or a diversifier in Korea? Empirical Analysis of Gold, Socially Responsible Investment and Conventional Investment. *ACRN Oxford Journal of Finance and Risk Perspectives*, 6.1, 55-69.
39. World Gold Council. (2019) *A Central Banker's Guide to Gold as a Reserve Asset. 2019 edition*.
40. World Gold Council. (2020) *Gold as a reserve asset*. Available at https://centralbankgold.org/gold-reserve-asset
41. World Gold Council. (2020) *Gold Demand Trends Full year and Q4 2019.*. Retrieved from https://www.gold.org/goldhub/research/gold-demand-trends/gold-demand-trends-full-year-2019/central-banks-and-other-institutions
42. World Gold Council. (2010) *The importance of gold in reserve asset management*. Available at: https://www.gold.org/goldhub/research/importance-gold-reserve-asset-management-video
43. Yazdani, M. and Nikzad, M. (2021). Output Losses from Currency Crises and the Role of Central Bank. *Journal of Central Banking Theory and Practice*. 3, 79-97. DOI: 10.2478/jcbtp-2021- 0025.