MEMORANDUM

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The Riksbank's use of the 'Central Bank Gold 'Agreement' in 2008

1. Introduction

The Riksbank has the opportunity, under the *Central Bank Gold Agreement* (CBGA), ref. no. 2004-219-MOP, to sell a total of 60 tonnes of gold over a five-year period and according to certain annual quotas.[1] The agreement came into force on 27 September 2004 and prior to each new year of the agreement the Executive Board decides how large a share of the allocated quota for that year will be used. The Executive Board decided prior to each of the four previous years of the agreement to use the entire quota. This memorandum concerns the use of the quota for the fifth and final year of the agreement, which extends from 27 September 2008 to 26 September 2009. The Riksbank has the possibility to sell a total of 15 tonnes of gold during this year.

Section 2 contains a brief description of the role of gold in the Riksbank's asset portfolio. Section 3 gives an account of the results of a quantitative analysis of the influence of gold on the expected return and risks in the gold and foreign currency reserve. The conclusions are summarised in Section 4 and form the basis of the proposed decision described in Section 5.

2. Background

The Riksbank's holdings of gold will amount to 140 tonnes at the end of the fourth year of the CBGA. Measured in terms of market prices as of 31 July 2008 the value of the gold holdings is approximately SEK 26 billion, which corresponds to 14 per cent of the total market value of the gold and foreign currency reserve of approximately SEK 182 billion.

The Riksbank's gold holdings are in many ways a historical remnant. During the 20th century gold periodically played an important role in various fixed exchange rate regimes, such as the gold standard and the Bretton Woods system[2]. Gold has also traditionally been regarded as a safe asset in crisis situations and as better protection

[1] The year periods in the agreement extend from 27 September to 26 September of the following year. The gold quota amounts to 15 tonnes during the first and the final years of the agreement and to 10 tonnes during the other years of the agreement.
[2] The Bretton Woods-system was abandoned in 1973.

against inflation than the other types of asset that central banks usually invest in (mainly different types of interest-bearing assets).

Now these arguments are not considered to be sufficiently relevant reasons for holding a gold reserve. It is not very likely that gold will once again take on the role of anchor in a fixed exchange rate regime, as in the Bretton Woods system. Not is it entirely clear why the central government would not be able to finance potential sudden expenses in connection with a serious crisis with the aid of other types of asset, such as government bonds.[3] With regard to protection against inflation, this need is considered to have declined as an increasing number of central banks around the world are using explicit inflation targets. Moreover, inflation-linked bonds could equally fulfil this function.

At present the element of gold in the Riksbank's asset portfolio is instead mainly justified by the possible contribution to improving the gold and foreign currency reserve's risk-adjusted return. However, the percentage of gold in the gold and foreign currency reserve has been assessed as too high from this perspective during the four previous years of the CBGA, and the entire sales quota allocated in the agreement has therefore been used.

3. Analysis

Table 1 provides descriptive statistics on gold and a portfolio corresponding to the composition of the foreign currency reserve. The statistics are based on weekly returns between 1 January 1995 and 1 August 2008, which is the longest period for which data are available. The data are taken from Bloomberg. Figure 1 gives a graphic illustration of the data.

Table 1. Statistics on gold and the foreign currency reserve, 1 January 1995 – 1 August 2008.

	Average return	Volatility	Correlation
Foreign currency reserve	6,09	6,45	0,37
Gold	6,03	14,81	

Note. Average returns and standard deviations are stated in per cent and in SEK and have been converted to an annual rate by multiplication by 52 and $\sqrt{52}$ respectively.

Table 1 above shows that the difference between the average returns for the foreign currency reserve and for gold amounts to 0.06 of a percentage point. This is a reduction compared with the previous year, when the difference amounted to 1.55 percentage points. The reduction is due to the price of gold in SEK having risen by around 22 per cent while the foreign currency reserve has risen by around 3 per cent since August 2007. Table 1 also shows that the average historical volatility of gold[4] is higher than that of the foreign currency reserve. Figure 2 shows how the volatility of gold has varied since 1995. One can see from this figure that volatility has risen in recent years and that it is now above the historical average. The fact that gold has had a relatively lower average return and relatively higher volatility than the foreign currency reserve thus still applies. In addition, the correlation between the gold reserve and the foreign currency reserve has been positive.

Judging by history, then, the gold holding slightly reduces the expected return on the gold and foreign currency reserve.[5] Moreover, as the volatility of gold is relatively

[3] See, for instance, "The Riksbank's gold policy", 2001, by Annette Henriksson.
[4] Volatility, or standard deviation, is a measure of how the return has varied over time and is therefore a common measure of financial risk.
[5] Naturally, there are period when the then realised return on gold has been relatively high, for instance, the period since 2005 (see Figure 1). At the same time, there are other periods when it has been low. It is very difficult, if not

higher and as the correlation between the gold reserve and the foreign currency reserve is positive, there is little possibility for the Riksbank to diversify away risk by investing in gold. All in all, the percentage of gold should therefore be smaller than it is now.

Figure 1. Historical cumulative returns, 1 January 1995 – 1 August 2008.
Per cent, SEK

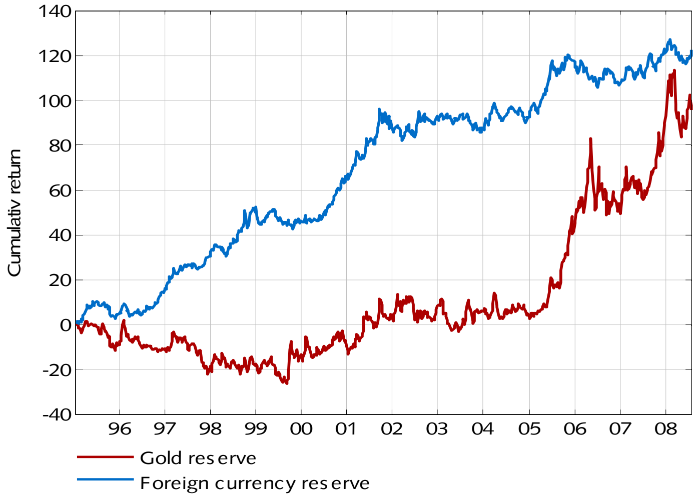
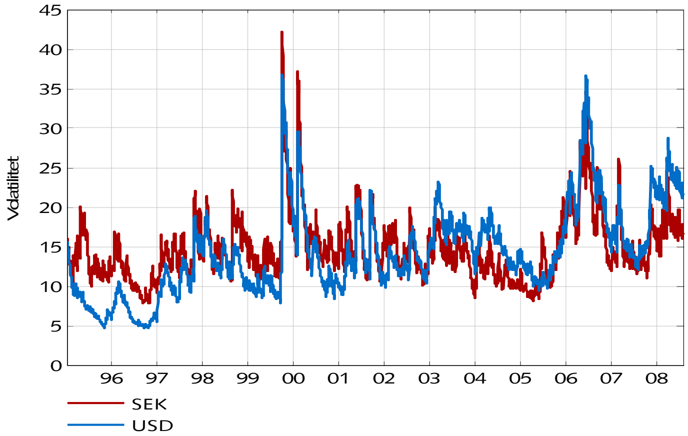


Figure 2. Gold volatility, 1 January 1995 – 1 August 2008.
Per cent



Note. Volatility is estimated on the basis of daily return data with a GARCH(1.1)-model converted to an annual rate through multiplication by $\sqrt{250}$.

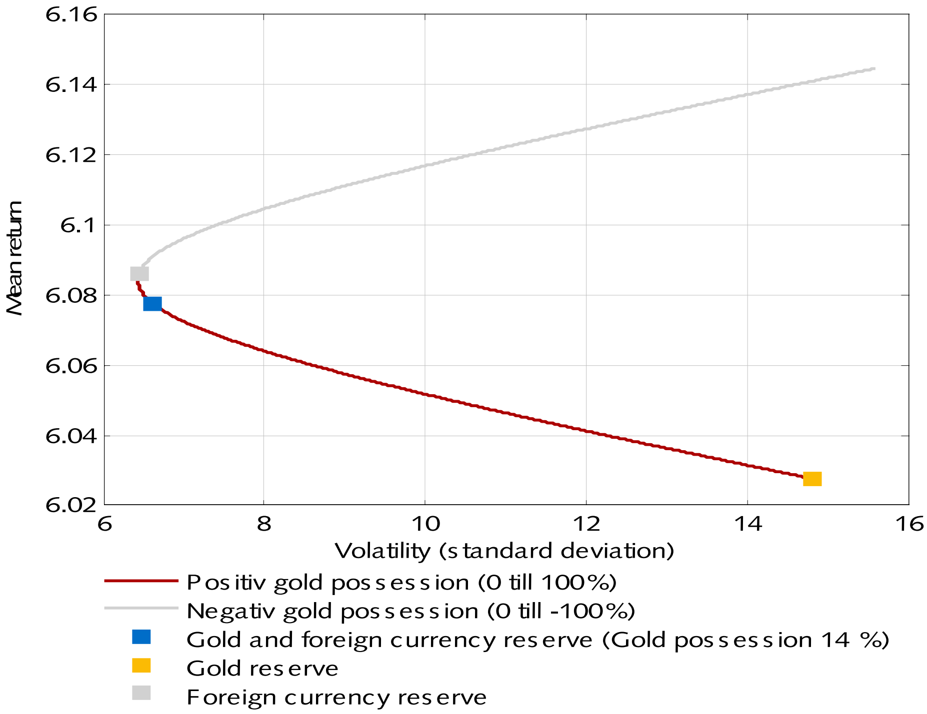
Figure 3 shows what is known as the historical portfolio frontier for the gold and foreign currency reserve, as a function of the percentage of gold (the foreign currency reserve's current strategic composition is held constant). With the current percentage of gold, the gold and foreign currency reserve is on what is known as the non-efficient part of the portfolio frontier, as it has been in previous years. This means that the gold and foreign currency reserve's expected risk-adjusted return can be improved, as the

impossible, to foresee in advance whether the return on gold will be high or low over the coming period. The decision on how large a percentage gold should have in the gold and foreign currency reserve should instead be based on the longest possible period of time.

volatility can be reduced with a retained or higher expected return, by changing the percentage of gold.

The interesting point on the frontier in this context is the one on the far left, which represents the percentage of gold that minimises volatility in the return on the gold and foreign currency reserve. The percentage of gold in this point is as expected small, more precisely 3.2 per cent, which is roughly one fifth of the current share of 14 per cent. A 99-per cent confidence interval[6] around the gold share of 3.2 per cent is [-0.2%; 7.0 %], which means that the share of gold most probably should be less than it is today, as 7.0 per cent is less than 14.0 per cent.

Figure 3. Historical portfolio frontier for the gold and foreign currency reserve, 1 January 1995 – 1 August 2008.
Per cent, SEK



4. Conclusions

The above analysis shows that gold is a relatively more volatile asset than the foreign currency reserve and at the same time has a relatively lower return. The analysis shows that the current share of gold (14.0%) in the gold and foreign currency reserve is too high to provide a positive contribution to the expected risk-adjusted return on the foreign currency reserve. A better share for this purpose is calculated at 3.2 per cent, with a confidence interval (99%) extending from -0.2 to 7.0 per cent.

Selling 15 tonnes of gold would, given the market prices on 31 July 2008, mean that the percentage of gold was reduced from around 14.0 to around 12.6 per cent.

All in all, the conclusion is that the allocated sales quota should be used to the maximum during the fifth year of the CBGA. As in previous years, the responsibility for

[6] The confidence interval is calculated by bootstrapping.

- how the sales are made should be delegated to the Head of the Asset Management Department.

5. Proposed decision

The proposed decision by the Executive Board is:

- to give the Head of the Asset Management Department the task of selling up to 15 tonnes of gold during the fifth year of the CBGA, which extends from 27 September 2008 to 26 September 2009;

- to also make public the fact that the Riksbank plans to sell up to 15 tonnes of gold during the fifth year of the CBGA.