Gold in a multicurrency reserve system

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Executive summary

The international monetary system is constantly evolving, reflecting the rise and fall of economic powers, changing economic relations between nations and lessons learned from various crises.

For many decades, the US dollar has been the main reserve currency worldwide and it still accounts for 50%-60% of international reserves. However, its share has been gradually declining, as allocations to the euro, and more recently the RMB, have grown.

This paper examines recent developments in economic power and the complexities and adjustments associated with it. In particular, we examine the tectonic shift from West to East, and the slowdown in world growth and policy divergence that has arguably resulted from the shortcomings of the existing system, and ask what the implications are for reserve asset policy and allocations to gold.

We construct an econometric model to explain reserve asset allocation. We believe this is the first study of its kind that has been done for gold.

We find the currency composition of international reserves is a function of: (i) the size of the issuing countries, (ii) the use of currencies in global banking transactions and (iii) economic policy in advanced economies.

We further find that the share of gold in reserves is a function of: (i) world economic growth, (ii) world inflation; (iii) the volatility of global financial markets and (iv) the price of gold.

We then use the model to conduct a series of simulations that allows us to estimate the impact on the composition of international reserves, including gold, of three likely macro-economic scenarios: the internationalisation of the RMB, a lower world economic growth scenario (the "new normal") and the divergence of monetary policies and rising fiscal vulnerabilities in the US and Euro Area.

The model suggests that Scenario 1 will have important implications for gold, with developing economies holdings estimated to increase significantly. In Scenario 2, the model suggests that if world output slows by 1 percentage point, developing countries could increase their gold holdings by around 1 percentage point. Scenario 3 is not found to have any meaningful impact for gold allocations.
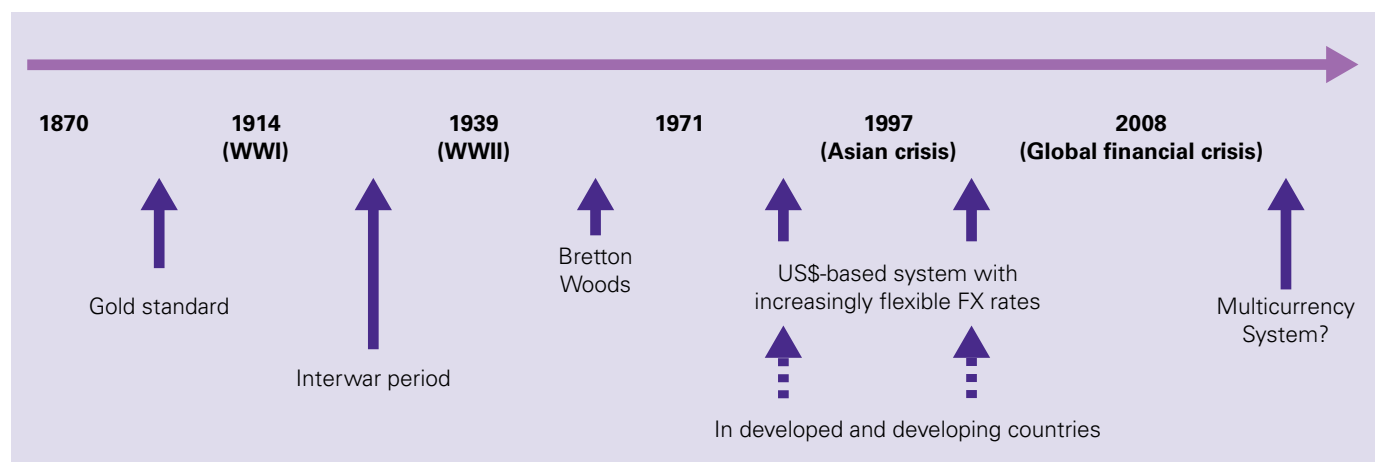
I: The evolving landscape of the international monetary system

This paper examines the future of gold in the international monetary system.

The role of gold in the international monetary system has evolved over time. Since the middle of the 19th century, the international monetary system has gone through several phases:[1] the gold standard that prevailed until the start of World War I; the interwar period; the post-war Bretton Woods system; and the current floating rate dollar-based system that started in 1973. The introduction of the euro in 1999 marked a further significant change to the international monetary system.

In general, the evolution of the international monetary system has been a result of the rise and fall of economic powers, changing economic relations between nations and lessons learned from various crises (that in several instances were a consequence of the design of the international monetary system itself).

Chart 1: International monetary system over time

| 1870 | 1914 (WWI) | 1939 (WWII) | 1971 | 1997 (Asian crisis) | 2008 (Global financial crisis) |

Gold standard

Interwar period

Bretton Woods

US$-based system with increasingly flexible FX rates

In developed and developing countries

Multicurrency System?

1 Sapir, 2012.

Shift from West to East

Over the last 15 years the world has witnessed the centre of economic gravity shifting from West to East, signalling a rise of new economic powers.[2] In line with this shift, there has been a gradual transformation of the international reserve system, which may eventually become a multicurrency reserve system (with the US$, the EUR and the RMB playing the role of the main reserve currencies). Such a transformation is a complex process that is likely to fuel uncertainty and could trigger crises. For many observers, the 2008 financial crisis and the subsequent and seemingly lasting slowdown in world growth was the result of the repeatedly – emphasised shortcomings of the current monetary system. To combat the effects of the financial crisis, monetary and fiscal authorities have implemented unprecedented measures, though US and Euro Area authorities now face diverging monetary prospects.

The role of official reserves

The ultimate goal of the international monetary system is to facilitate international trade, cross border investment and the reallocation of capital between nations. Consequently, according to the IMF central banks maintain reserves for several purposes:[3]

1   to support the monetary and exchange rate policies of the country, including via interventions in the foreign currency markets,

2   to provide liquidity assistance to banks during times of crisis or limited access to liquidity,

3   to boost the confidence of the market in the ability of the country to meet its external obligations,

4   to demonstrate the backing of the currency by foreign assets, and

5   to maintain a reserve for national disasters and emergencies.

The reserves are mostly maintained in those currencies that ensure that available resources are available for meeting the above objectives, and in such assets that can rapidly be converted into liquid assets. While almost all countries regularly disseminate data on the volume of their reserves, details on the structure of reserves are confidential. The IMF releases aggregate quarterly data on the composition of foreign reserves distinguishing between holdings in: US dollar, euro, pound sterling, Japanese yen, Swiss franc, Canadian dollar, Australian dollar, and other currencies. The data are published for the advanced economies and the emerging and developing countries in aggregated formats – so as not to reveal individual country information.

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2   The BRICS economies alone (Brazil, Russia, India, China and South Africa) have more than doubled their share of global GDP.

3   IMF, 2014.

Chart 2 shows the composition of international reserves for the advanced economies and the emerging markets as of 2014. Developing countries hold the vast majority of official reserves – about two thirds of the world total – as they continue to buffer their economies against external shocks. Our analysis shows that developing countries are much more sensitive to global developments than developed countries. Therefore, the subsequent scenario analysis will predominantly focus on the results for developing countries. This is also constituent with what most market participants understand regarding reserve practices – that developing countries are more active in their investment policies than advanced – economy central banks.
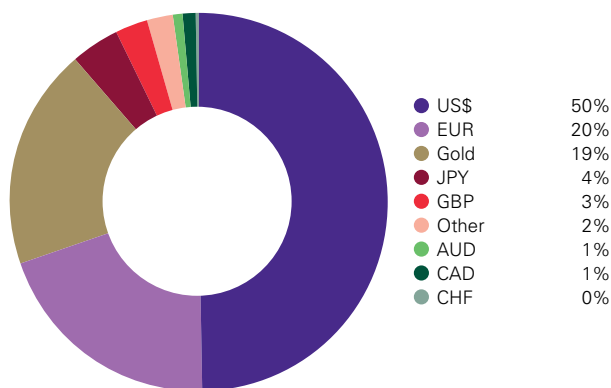
The US dollar remains the main reserve currency, both in the advanced and the developing countries. Although its share in the international reserves has been gradually declining, about 50-60% of international reserves are still maintained in the US$. The euro is the second largest reserve currency, both in the advanced and the developing countries, accounting for about 20% of international reserves. Gold is the third most popular asset in the advanced countries (about 20% of international reserves), while the pound sterling is the third largest asset in the emerging markets (about 4% of total reserves). The individual shares of other currencies (as classified by the IMF) – and among them the Chinese RMB – amounts to about 2% of reserves in the developed countries, and 4% of reserves in the developing countries.
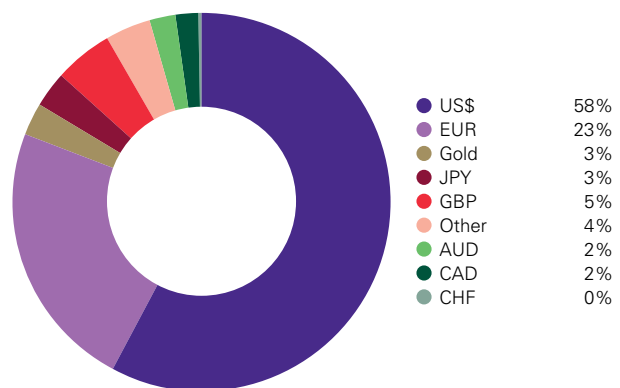
In 2014, central bank reserves, both foreign reserves and gold, totalled about US$12tn which is equivalent to about 15% of world GDP. This makes central banks, as a group, important players both in the foreign financial markets and in the gold market.[4]

Chart 2: The structure of international reserves (2014)

Advanced countries

● US$	50%
● EUR	20%
● Gold	19%
● JPY	4%
● GBP	3%
● Other	2%
● AUD	1%
● CAD	1%
● CHF	0%

Developing countries

● US$	58%
● EUR	23%
● Gold	3%
● JPY	3%
● GBP	5%
● Other	4%
● AUD	2%
● CAD	2%
● CHF	0%

Source: IMF; World Gold Council

4 Wooldridge, 2006.

II: Constructing a Model: analysing the drivers of international reserves

Using this data,[5] we construct an econometric model to describe central banks' behaviour. We estimated equations for the eight main reserve currencies – US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB[6] – and gold, differentiating between developed and developing countries.[7]

The model used in this study allows us to draw the following observations:

- **Foreign currency allocation**

  The main drivers of whether a currency plays a bigger role in global reserves are relatively intuitive and include: (i) the size of the issuing country's GDP (ii) the use of currency in global banking transactions, and (iii) policy factors (relative benchmark interest rates, and public debt indicators).

- **Gold allocation**

  The share of gold in central bank portfolios primarily depends on global factors such as: (i) world economy growth, (ii) world inflation, (iii) volatility in global financial markets and (iv) the price of gold.

For a more detailed discussion of the model construction please review the Appendix.

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5 IMF COFER data – aggregated, end-of-period quarterly data on the currency composition of official foreign currency reserves.

6 Throughout the paper the share of RMB is approximated by the share of other currencies.

7 9 equations for the advanced countries (8 equations for currency shares and 1 equation for the share of gold), and 9 equations for the developing countries (8 equations for currency shares and 1 equation for the share of gold).

III: Macroeconomic scenarios: gold in the international monetary system

We then use the model to conduct a series of simulations that allows us to estimate the impact on the composition of international reserves, including gold, of three likely macro-economic scenarios:

- Scenario 1. The growing importance of China and the internationalisation of the RMB.
- Scenario 2. A "new normal" lower growth rates for the global economy.
- *Scenario 3. Diverging monetary policies and fiscal vulnerabilities in the US and the Eurozone.*

As with any model, our model has limitations. However, this paper is this first of its kind that we are aware of to simulate the impact of the changing global macroeconomic landscape on the structure of international reserves, with a particular emphasis on gold. Its objective is to help us to systematise and organise our thinking about what the current global developments may mean for the gold market.

Scenario 1: The internationalisation of the RMB – and the impact on gold demand

The past 15 years have witnessed a transformation in China's economic strength. Having become the world's second-largest economy and its largest exporter, China has also become an increasingly important player in global financial markets. Although China's financial development still lags its economic development (**Chart 3**; the RMB is not freely convertible into other currencies and the Chinese financial system remains subject to various controls), progress has been made. It is impressive how much the RMB is being accepted as a minor reserve currency even before full convertibility has been achieved; precedent suggests that as the Chinese authorities make the RMB easier for international investors to access, its use and so percentage share of world reserves could increase relatively rapidly. The process of enhanced representation of the RMB in international economic relations is likely to continue for several reasons.
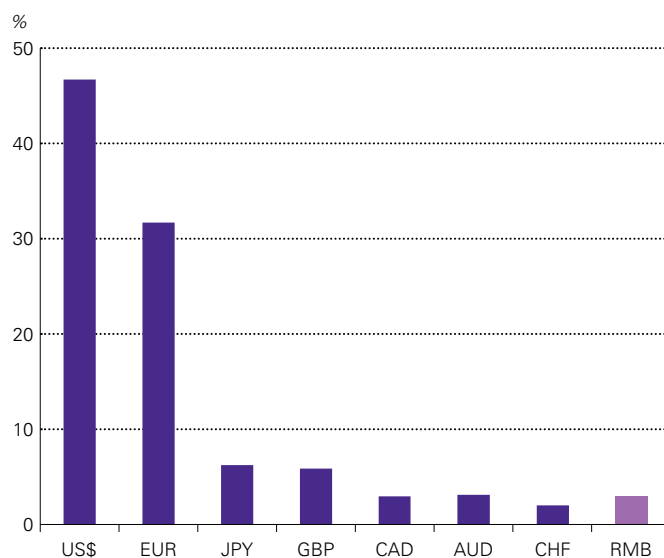
Chart 3: The economic and financial standing of China – global comparison

A. Shares in world GDP, 2014
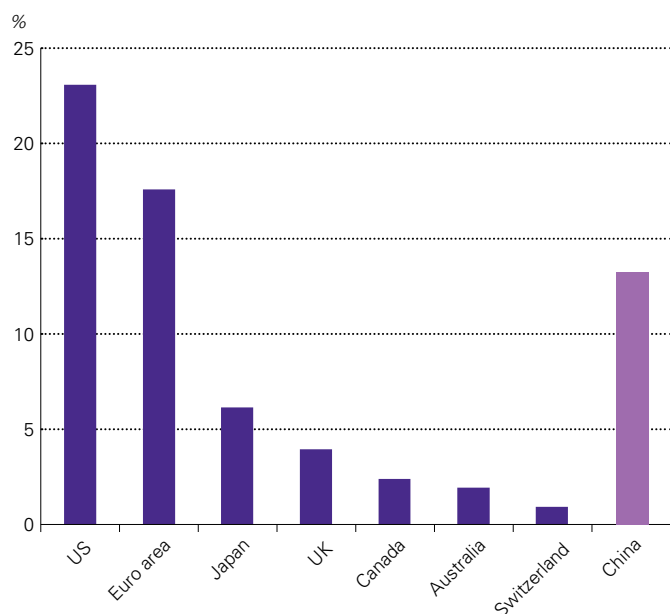
Source: IMF; World Gold Council

B. Currencies in global banking transactions, 2014

Source: BIS; World Gold Council

Economic and financial integration has intensified across Asia, more than half of all trade is intraregional and the RMB has now overtaken the US dollar to become the reference currency across the region.[8] In addition, the Chinese authorities have undertaken a series of initiatives to enhance the role of the Chinese currency in the international monetary system. These include the creation of an offshore RMB market in Hong Kong; using the RMB in cross border trade settlements and establishing swap lines between the People's Bank of China and other central banks. As the regulatory environment evolves, the RMB will become an increasingly viable and efficient currency for cross border trade and investment. In the process, it is expected to become a reserve currency.

Assumptions

Our first scenario analyses how China's economic and financial development may impact the composition of central bank reserves, and in particular central bank RMB and gold holdings.

We examine the impact of two factors. First, we assume that China's share of global GDP increases by 10 percentage points. Second, we assume that RMB usage in global banking transactions increases by 10 percentage points.

Over the last 15 years China has been growing at a pace exceeding that of major advanced economies. As a result, China's share of world GDP increased from 3.6% in 2000 to about 13% in 2014. This growth in GDP "marketshare" has been largely gained at the expense of declines in the US and Europe – that now account for around 23% and 18% of global GDP, respectively (**Table 1**). Below we assume that China continues to grow and the share of China's GDP in the world total increases by another 10 percentage points, alongside a continued decline in other parts of the world.[9]

In 2000, the RMB accounted for 1.6% of global banking transactions. By 2010, the figure had risen to 2.3% and it is now more than 3%.[10] At the same time, the RMB has entered the top ten most traded currencies on foreign exchange markets. In other words, the RMB has become an international currency, a development described as the most significant in global financial markets since the creation of the euro in 1999.[11] This trend is likely to continue or even accelerate. Below we assume that the usage of RMB in global banking transactions increases by 10 percentage points. This would come at the expense of other currencies, and probably the US$ and euro in particular.

Table 1: Global players – their economic and financial standing

China	2000	2010	2014
Currency usage in banking transactions	1.6%	2.3%	3.0%
Share of world GDP	3.6%	9.2%	13.1%
US	**2000**	**2010**	**2014**
Currency usage in banking transactions	47.1%	44.4%	45.9%
Share of world GDP	31.3%	23.2%	22.9%
Euro area	**2000**	**2010**	**2014**
Currency usage in banking transactions	29.0%	37.1%	32.7%
Share of world GDP	19.7%	19.5%	17.6%

8 Campanella, 2012.

9 This is a stylised scenario. In reality the relative standing of China against other countries can be different. The 10 percentage point shock is introduced instantaneously.

10 Bank for International Settlements.

11 At the centre of RMB internationalisation, *A brief guide to offshore RMB*, Deutsche Bank.

Results and implications for gold

Our simulations suggest that a 10 percentage point increase in Chinese GDP as the world total would increase the RMBs share in developing countries reserves by around 3 percentage points.[12] However, if the growth in Chinese economic power is accompanied by a 10 percentage point rise in the Chinese currency's usage globally we could see an additional 6 percentage point increase in the RMB as the share of developing country central bank reserves.[13]

Overall therefore, one could assume a 10 percentage point rise in Chinese GDP as a share of the world total and a 10 percentage point increase in global banking transactions executed in RMB could prompt central banks in developing countries to increase their allocation to the RMB by around 10 percentage points[14] (from about 4% to 14%).[15]

The increasing importance of the RMB and the transition to a multicurrency system is also expected to drive a significant increase in developing countries' gold reserves.[16] According to our model, a 10 percentage point rise in the economic power of China, accompanied by a 10 percentage point rise in the financial power of China, and a subsequent 10 percentage point rise in RMB as

a share of international reserves would result in a five percentage point increase in gold as a share of developing country central bank international reserves.[17]

Therefore, for every one percentage point increase in the RMB as a share of international reserves, gold's share would increase by approximately 0.5 percentage points. The rationale behind this is consistent with central banks' behaviour and gold's inherent value as a portfolio diversifier. An increase in RMB weightings would doubtless see a decrease in US$ allocations. To hedge against potential uncertainties arising from this shift, central banks would look to gold – the global safe haven asset.[18]

The impact would be significantly greater on developing countries because they manage their portfolios more dynamically and their current allocations of gold are low – just 3% compared to 20% among developed nations. It should be noted however, that developing economies' reserves – at US$7.9tn – are more than double those of developed countries. Given the rapid growth in China's economic and financial strength over the past decade, developing countries could, in time, more than double their gold holdings to 8% of total reserves.

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12 The share of RMB in developed country central bank portfolios would increase by about two percentage points.

13 It would prompt a 2.5 percentage point increase in RMB as a share of international reserves in developed countries.

14 Allocations to RMB in developed countries would increase by about five percentage points (from 2% to 7%).

15 This is a stylised scenario, results correspond to average impacts over the first five years after the shock (that is following an instantaneous 10 percentage point change to China's and US's GDP shares in world GDP and an instantaneous 10 percentage point change to shares of RMB and US$ in global banking transactions).

16 Our model suggests that developed countries would not increase their gold reserves significantly.

17 Average impact over the first five years after the shock.

18 OMFIF, 2013.

Scenario 2: The 'new normal' – and gold's role in a low-growth environment

The financial crisis prompted a slowdown in global economic growth. Traditionally, even though crises bring on recessions, output tends to return to pre-crisis levels. This does not appear to be the case with the most recent financial crisis (**Chart 4**). Indeed, it now appears that the crisis has left a long-term scar on world output.[19] Strong economic expansion could push potential output back to the pre-crisis path, but for the last couple of years, average global economic growth has been slower than before the crisis.[20]

Assumptions

In the second scenario, we analyse how continued weak growth, or a new normal growth rate that is one percentage point lower than before the crisis, could impact gold allocations.

Results and implications for gold

Our econometric modelling shows that there is a strong, direct link between global GDP and central banks' gold reserves (see Appendix, **Tables 3** and **4**). As world economic prospects decrease, demand for gold increases.

Our simulations suggest that if world output grows by one percentage point more slowly than before the crisis, developing countries would increase their gold holdings by about one percentage point over a five-year period.[21] If the effects of the crisis are long lasting, central banks in developing countries would adjust the composition of their international reserves even more.[22]

Chart 4: World GDP scar

tr US$, 2010 prices

- - - Pre-crisis trend —— Actual GDP
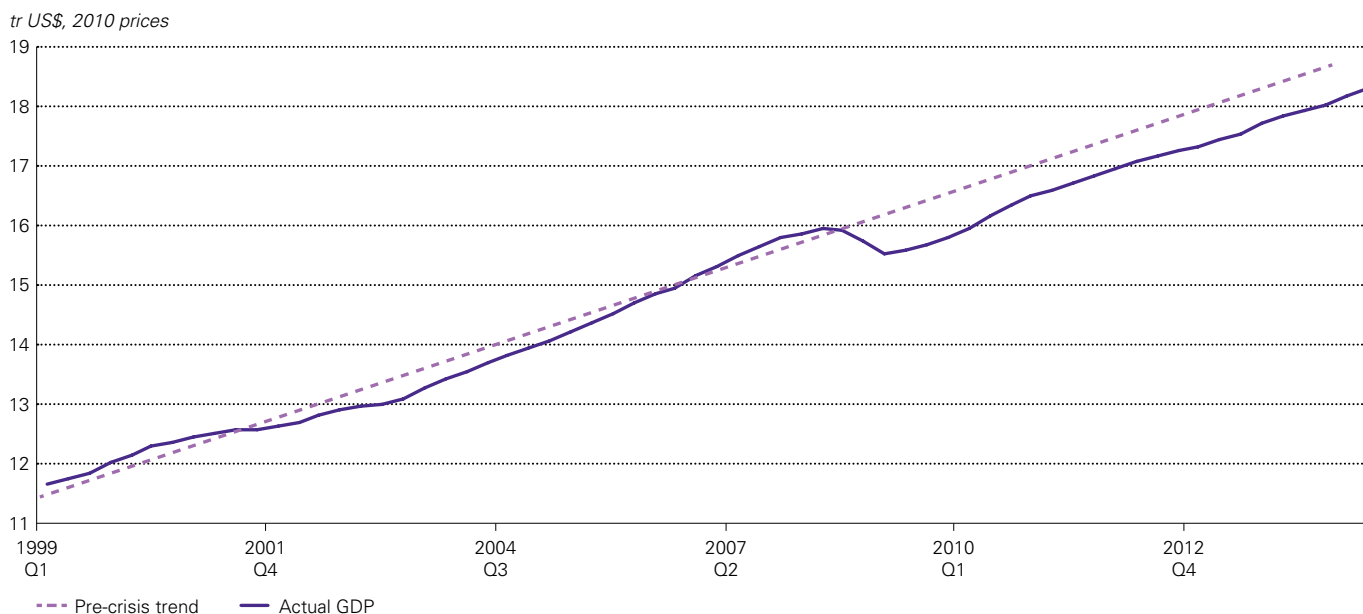
Source: IMF; World Gold Council

19 Barrell, 2009.

20 While directly before the crisis the global economy grew by about 4% per annum on average, after the crisis the global economy has expanded at about 3% per annum.

21 Central banks in developed economies would not increase their gold holdings significantly under this scenario, primarily because they are already far higher than those of developing nations.

22 As they have done since 2009.

Scenario 3: Diverging monetary policies and fiscal vulnerabilities – gold's role as a hedge against fiscal and monetary shocks

To combat the effects of the financial crisis, both monetary and fiscal authorities have implemented unprecedented policy measures. As a result, central banks' balance sheets have expanded significantly and the level of public debt has risen to unprecedented levels. Several years after the crisis, both monetary and fiscal policy parameters are still far from normal, with interest rates oscillating around zero and debt levels exceeding historical standards.

The US and the Euro Area, the biggest global players on the world economic stage, face diverging monetary prospects. US interest rates are expected to rise, while the ECB has embarked on a quantitative easing (QE) programme. At the same time, debt levels in both countries are unlikely to decrease in the near term.

Assumptions

This scenario examines the impacts of policy shifts on the composition of international reserves.

First, we investigate the effect on central bank holdings of USD, EUR and gold, if debt levels in the US and Euro Area increase by 10% of GDP.[23] Second, we examine what will happen to central bank US$, EUR and gold holdings if monetary policies diverge in the US and Euro Area. We assume that the US Fed will increase interest rates, while the ECB's QE programme will be equivalent to an interest rate reduction of about 2%.[24]

Results and implications for gold

We find that a 10 percentage point increase in debt-to-GDP levels in the US and Euro Area, would prompt central banks to reduce their holdings of the US$ and euro by about 0.5 percentage points, notable but not much.

If monetary policies in the US and Euro Area diverge, we may witness some intuitive reallocation of reserves towards the US$ and away from the EUR, of about 2% in developing countries (and about 1% in developed countries).

In order to assess the impact on gold, we examined how the prior two assumptions (monetary and fiscal policy shocks) could impact volatility and therefore as a consequence impact gold. Any policy changes in the US and Euro Area will not only have an impact on the USD and the EUR markets, they may also affect global volatility[25] and, by implication, the gold market.

When global monetary conditions change or the fiscal situation among the biggest global nations deteriorates, financial markets become more volatile. This tends to encourage investors to turn to gold, as a safe-haven asset.[26]

However, the impact of policy changes on gold is limited. If debt levels in the US and Euro Area increase by 10% of GDP, central banks would increase their gold holdings as a share of international reserves by about 0.1 percentage points in the short run.

If the US increased interest rates by about 2%, and the Euro Area decreased rates by 2%, central banks would increase their gold holdings as a share of international reserves by about 0.15 percentage points in the short term.

It is important to note, that not only is the impact limited in both cases, but the effect on gold would be temporary, decaying over time. Comparing the results from this scenario to the two scenarios examined earlier (the rise of China and the new normal) we find that gold is a much better hedge against structural shocks than a hedge against policy shocks.

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23 This is a stylised scenario.

24 Ibid.

25 They may also affect world output and world inflation (however, analysing these impacts is beyond the scope of this paper).

26 We model the relationship between the VIX index and gold directly (see Appendix, tables 5 and 6). We also construct an auxiliary equation that models the relationship between policy shocks (monetary and fiscal policy changes) and the volatility in the financial markets directly.

IV: Conclusion

This paper is the first of its kind to quantify the impact of the changing macroeconomic landscape on central banks' gold reserves.

We find that as the international reserve system changes, developing countries could more than double their holdings of gold.

The most dramatic effect will occur as central banks allocate more of their reserves to the RMB and less to the US$. Under this scenario, our model indicates that for every one percentage point increase in RMB as a share of international reserves, developing countries' gold holdings could increase by 0.5 percentage points, as central banks hedge their portfolios against uncertainties arising from structural changes in currency allocations. As a result, developing country central banks may more than double their gold holdings from 3% to 8%.

Our model suggests that structural shifts may have a greater impact on gold demand than policy shocks. Since gold is a safe haven asset, potentially lower equilibrium growth of the world economy may result in an increased demand for gold over the long run. If world economic growth is one percentage point lower than before the financial crisis, developing countries will increase gold allocations by about one percentage point over a five-year period.

Policy shocks, such as diverging monetary policies and rising debt levels in the US and Euro Area will have a limited and temporary impact on gold reserves.

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VI: Appendix. Model details

The composition of international reserves is determined by a range of macroeconomic and structural factors.[27] We test the significance of individual variables using estimation techniques "from general to specific." We obtain the following model (**Table 2**).

Table 2: The model of the structure of international reserves

Advanced countries	Developing countries
$USD_{ADV} = f(gdp_{US}, bank_{US}, mon_{US}, fisc_{US})$	$USD_{DEV} = f(gdp_{US}, bank_{US}, mon_{US}, fisc_{US})$
$EUR_{ADV} = f(gdp_{EA}, bank_{EA}, mon_{EA}, fisc_{EA})$	$EUR_{DEV} = f(gdp_{EA}, bank_{EA}, mon_{EA}, fisc_{EA})$
$JPY_{ADV} = f(gdp_{JP}, bank_{JP})$	$JPY_{DEV} = f(gdp_{JP}, bank_{JP}, mon_{JP})$
$CHF_{ADV} = f(gdp_{SW}, bank_{SW})$	$CHF_{DEV} = f(gdp_{SW}, bank_{SW}, fisc_{SW})$
$GBP_{ADV} = f(gdp_{UK}, bank_{UK})$	$GBP_{DEV} = f(gdp_{UK}, bank_{UK})$
$AUD_{ADV} = f(gdp_{AU}, bank_{AU})$	$AUD_{DEV} = f(gdp_{AU}, bank_{AU})$
$CAD_{ADV} = f(gdp_{CA}, bank_{CA})$	$CAD_{DEV} = f(gdp_{CA}, bank_{CA})$
$RMB_{ADV} = f(gdp_{CH}, bank_{CH})$	$RMB_{DEV} = f(gdp_{CH}, bank_{CH})$
$gold_{ADV} = f(gdp_{world}, infl_{world}, goldp_{world}, VIX_{world})$	$gold_{DEV} = f(gdp_{world}, infl_{world}, goldp_{world}, VIX_{world}, RMB_{DEV})$

Where:

USD – denotes the share of the US dollar in international reserves	ADV – denotes advanced economies	gdp – is the share of a country's GDP in world GDP
EUR – share of euro	DEV – developing countries	bank – ratio of the value of transactions in a currency to the value of global banking transactions
GBP – share of British pound	US – United States	infl – inflation
JPY – share of Japanese yen	EA – Euro Area	VIX – VIX index
CHF – share of Swiss franc	UK – United Kingdom	mon – monetary policy indicator (difference between interest rates in currency issuer and the average interest rate in five biggest currency issuers)
AUD – share of Australian dollar	JP – Japan	
CAD – share of Canadian dollar	SW – Switzerland	
RMB – share of Chinese renminbi, gold – share of gold	AU – Australia	fisc – fiscal policy indicator (the ratio of public debt to GDP)
	CA – Canada	
	CH – China	

27 Our initial set of explanatory variables is the following: (i) in case of the eight main reserve currencies: the share of GDP of the currency issuer in world GDP, the share of currency in global banking transactions, currency issuer's trade openness, financial openness, inflation, nominal effective exchange rate, volatility of the exchange rate, debt to GDP ratio, difference between interest rates and the average interest rate in the five biggest currency issuers; and (ii) in case of gold: world gdp, world inflation, gold price, VIX, volatility of the US$ and the EUR, appreciation/depreciation of the US$ and the EUR, debt to GDP ratio in the US and the Euro Area. All data comes from Datastream and the period of the analysis is 1999-2014. To identify the set of drivers of the composition of official reserves we use from general to specific techniques of estimation.

Table 3 shows the results of estimation for the shares of individual currencies in international reserves for the advanced economies and **Table 4** – for the developing countries.[28] We use a panel modelling approach, and both our panel models – for the advanced and the developing countries – are estimated as error correction models. We include fixed effects.

In both cases all coefficients are highly significant and the models explain about 50% of the variability of the dependent variable. The signs of the coefficients are in line with expectations.

Table 3: Determinants of allocation to foreign currencies in advanced economies

Explanatory variable	Currencies	Coefficient	t-Stat
Lag of dependent variable	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	-0.096	5.76
gdp(-1)	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	0.021	1.72
bank(-1)	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	0.026	2.23
d(gdp)	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	0.185	3.77
d(bank)	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	0.415	12.36
fisc(-1)	US$, EUR	-0.0001	2.88
mon	US$, EUR	0.001	1.98

Where, as above: gdp – GDP share in world GDP, *bank* – currency share in global banking transactions, fisc – debt to GDP ratio, mon – difference between interest rates and the average interest rates in five biggest currency issuers. The following operators were used: (-1) – lagged by 1 quarter, and d – denotes first difference. Dummy variables not reported.

Table 4: Determinants of allocation to foreign currencies in developing countries

Explanatory variable	Currencies	Coefficient	t-Stat
Lag of dependent variable	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	-0.07	5.57
gdp(-1)	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	0.025	1.87
bank(-1)	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	0.056	3.23
d(gdp)	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	0.142	2.79
d(bank)	US$, EUR, GBP, JPY, CHF, CAD, AUD, RMB	0.339	9.17
fisc(-1)	USD, EUR, CHF	-0.0001	2.01
mon	USD, EUR, JPY	0.001	4.22

Where, as above: gdp – GDP share in world GDP, *bank* – currency share in global banking transactions, fisc – debt to GDP ratio, mon – difference between interest rates and the average interest rates in five biggest currency issuers. The following operators were used: (-1) – lagged by 1 quarter, and d – denotes first difference. Dummy variables not reported.

28 The long run coefficients were estimated within the short term model, thus the coefficient by the lagged dependent variable is the error correction term.

Table 5 and Table 6 show the results of estimation for the shares of gold in international reserves for the advanced and the developing countries. Both models are estimated as error correction models.

Table 5: Determinants of allocation to gold in advanced countries

Variable	Coefficient	t-Stat
Lag of dependent variable	-0.093	3.13
Log(goldp$_{world}$ (-1))	0.007	4.13
Log(gdp$_{world}$ (-1))	-0.003	5.14
dlog(goldp$_{world}$)	0.125	15.78
infl$_{world}$	0.002	4.04
VIX$_{world}$	0.0001	1.76

Where: the dependent variable is the share of gold in total reserves in advanced countries, goldp$_{world}$ – denotes the price of gold, gdp$_{world}$ – world GDP, infl$_{world}$ – world inflation, VIX$_{world}$ – VIX index. The following operators were used: log – natural logarithm, (-1) – lagged by 1 quarter, and d – denotes first difference.

Table 6: Determinants of allocation to gold in developing countries

Variable	Coefficient	t-Stat
Constant	0.29	1.66
Lag of dependent variable	-0.09	1.77
log(goldp$_{world}$ (-1))	0.002	1.89
log(gdp$_{world}$ (-1))	-0.019	1.69
RM$_{DEV}$ (-1)	0.099	1.85
dlog(gold$_{world}$)	0.031	15.62
VIX$_{world}$	0.00005	2.66
dlog(gdp$_{world}$ (-1))	-0.066	2.47

Where: the dependent variable is the share of gold in total reserves in developing countries, , goldp$_{world}$ – denotes the price of gold, gdp$_{world}$ – world GDP, RMB$_{DEV}$ – share of RMB in international reserves in developing countries, infl$_{world}$ – world inflation, VIX$_{world}$ – VIX index. The following operators were used: log – natural logarithm, (-1) – lagged by 1 quarter, and d – denotes first difference.