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International Reserves Management Report

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International Reserves Management Report

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Executive summary

Over the last few years, the Central Bank of Brazil (BCB) has sought to expand the transparency of the international reserve management process. This publication is the sixth volume of the *International Reserve Management Report* and describes in detail the evolution of the Brazil's international reserves, as well as the changes made to its management throughout the year 2013.

The international reserves management is based on a sound governance framework, which comprises the hierarchy defined among the decision levels, as well as an IT system with daily performance control and evaluation, and investments monitoring. For this end, a framework based on three pillars was conceived: i) benchmark portfolio; ii) operational limits; and iii) performance evaluation. In addition, the market risk, credit risk, liquidity risk and operational risk are also monitored on a daily basis.

The Board of Directors is responsible for establishing the strategic goals and the risk-return profile of the international reserves. In accordance with the guidelines defined by the Board, the strategies of diversification and hedge of the foreign exchange exposure of the foreign debt were kept in place in 2013.

On 12.31.2013, Brazil's international reserves amounted to US$ 375.79 billion, according to the concept of international liquidity. The average market risk of the investments, which takes into account both interest rate and foreign exchange components, was 2.62 % in 2013, similar to those in the three previous years. With the goal of reducing the sensitivity of the portfolio to interest rate movements (particularly the United States' interest rates), the benchmark index of the main portfolio was chosen to be the 1-3 year index as opposed to the 1-5 year index previously in place. Consequently, the average term of investment of the portfolio was decreased from 2.79 years in 2012 to 2.02 years in 2013.

The signaling of the reduction of monetary stimulus in the US (known as tapering), on May 22nd 2013, resulted in a large increase in the volatility of the global financial markets. Due to this volatile environment, the US dollar has appreciated against the other currencies in the reserves and the interest rates in some of the central economies have increased. Therefore, the combined effect of these movements caused the consolidated result of the international reserves, once marked to market, to be -1.38% in 2013.

The International Reserves Management Report is divided into five chapters. The first chapter presents the foundations on which the international reserves

management is based. Chapter 2 describes the investment policy of the reserves. The third chapter discusses the several risks involved in these investments. On the fourth chapter, we describe the investment and risk management policies of the assets managed externally. The last chapter describes the aggregate results of the reserves, allowing us to verify the adequacy of the strategies vis-à-vis the long-term objectives defined by the BCB. The Report also contains an Annex with data from which the graphs are derived, as well as a glossary with the main terms used throughout the document.

1 Management of the international reserves

This chapter presents the foundations on which the international reserves management is based.

1.1 Introduction

The growth of the global economic activity was uneven among the main economies, but was relatively stable when compared to 2012. Table 1.1 presents the values of real GDP growth for 2012 and 2013. The world economy grew 3.2% in 2013, against 3.5% in 2012.

Table 1.1 – Real GDP growth (%)

Period	2012	2013
World	3.5%	3.2%
Advanced Countries	1.4%	1.3%
USA	2.8%	1.9%
Euro Zone	-0.7%	-0.4%
Japan	1.4%	1.5%
Emerging Markets[1/]	5.1%	4.7%
China	7.7%	7.7%
Brazil	1.0%	2.5%

1/ The group includes developing economies
Source: International Monetary Fund.

In the US, despite the fiscal tightening that occurred this year, some signs of consolidation of the economic growth could be observed, resulting in more optimistic projections for 2014. In May 2013, the FOMC signaled that it would start to reduce the pace of asset purchases, in a move widely known as tapering. Such announcement spurred a significant increase in the long-term interest rates in the US, and consequently a rise in the volatility of financial markets around the world, with negative reflexes on several asset classes. In the midst of such a turbulent environment, the committee postponed the start of tapering to 2014, which contributed to contain the volatility in the asset prices.

Despite the perception of the end of the recession, GDP growth in the Euro Zone has remained negative, the unemployment rate remained high and the banking system was the focus of attention in 2013. The monetary stimulus program in Japan has improved the expectations and the short-term economic and financial indicators, but its medium and long-term effects are still uncertain.

The financial markets in emerging economies were significantly affected by the signaling of the tapering in May 2013: several currencies suffered strong devaluation, the equity markets fell and the interest rates on sovereign bonds increased. Over the year, the growth forecast of these countries was revised systematically downwards. According to the World Economic Outlook (WEO) report by the International Monetary Fund (IMF), the aggregate GDP growth forecast for the emerging economies in 2013 went from 5.5% in January to 5.0% in July and 4.5% in October. The final number for the aggregate economic growth of the emerging markets in 2013 (4.7%) was slightly inferior to that of 2012(5.1%, although still significantly greater than that of the developed countries (1.3%). Despite the turbulences, GDP growth in Brazil in 2013 was greater than in 2012 (2.5% against 1.0%). The Chinese economy grew 7.7% in 2013 and there is an expectation of a *soft landing*, considering the base scenario in which the government is able to manage successfully the transition of the economic model, although some fiscal and financial risks remain in the outlook.

The risks to the full recovery of the global economy in the short term at the end of 2013 were: i) fragility of the recovery in the Euro Zone, along with the risk of deflation in the region; ii) greater deceleration than desired in China given the need to contain the growth of both financial and fiscal risks; iii) exchange rate volatility and a decrease in the capital flows to emerging markets, caused by the uncertainties about the future of the US monetary policy.

1.2 Governance

According to Law 4595, from December 31st 1964, the BCB has the exclusive responsibility to be depositary of the gold, foreign currency and special drawing rights (SDR) reserves. In the BCB, it is responsibility of the Board of Directors to establish the strategic objectives and the profile of risk and return of the country's international reserves.

The reserves governance structure is supported by an integrated risk management policy of the BCB. The investments are made according to guidelines established by the BCB Board of Directors, who defines the risk and return profile through an appropriate benchmark portfolio, the operational limits for the authorized deviations from this benchmark portfolio and the performance evaluation criteria. The organizational structure reinforces the controls and information flow mechanisms, enabling the institution to have an investment process focused on an appropriate risk management.

The BCB Board of Directors defined, in June 2000, a risk management and strategic asset allocation framework based on the best international practices. This modeling was subject to the IMF audit in 2002, which highlighted the excellence of the work performed.

In 2006, with the setting up of the Executive Office for Monetary Policy Integrated Risk Management (Gepom), an additional important step was taken to extend the transparency and improve the governance in the international reserves management process.

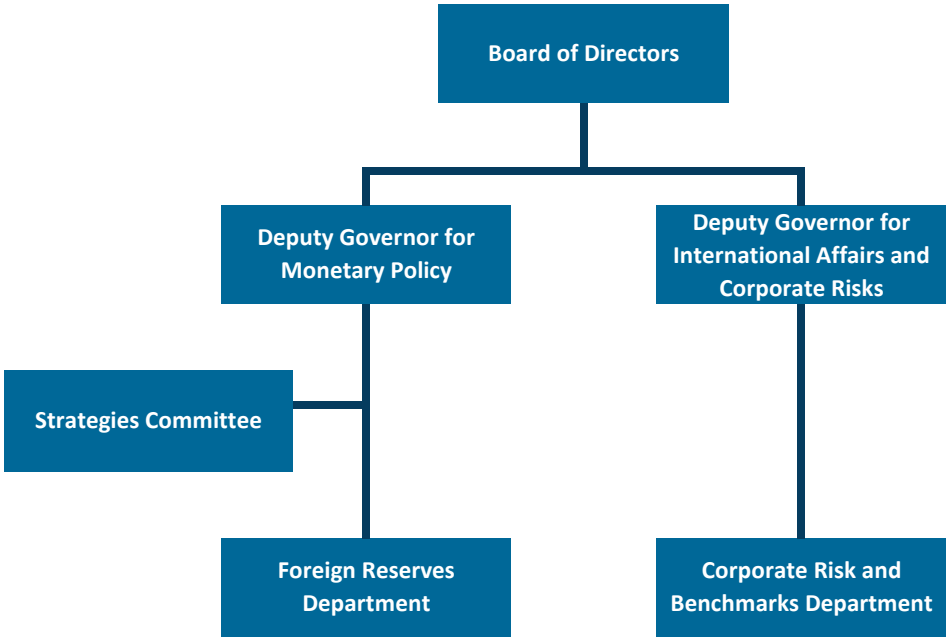
In May 2011, the BCB Board of Directors extended Gepom's role, which took the responsibility of integrating the risks for the whole institution and after that was called Executive Office for Corporate Risks and Benchmarks (Geris). The area is subordinated to the International Affairs and Corporate Risks Deputy Governor (Direx), with more independence of the operational areas. Finally, in February 2013, Geris became a department named Corporate Risks and Benchmarks Department (Deris).

The BCB's risks management considers several dimensions, such as financial, strategic, reputational, legal, operational and institutional business continuity. The Enterprise Risk Management (ERM) contributes significantly to the continuous improvement of BCB's tasks, optimizing allocation of institutional, human and financial assets. Besides that, it makes things clear on respect to the institution's risk profile and helps to adequate it according to BCB's strategic goals.

Adopting a new integrated and structured risk management model, the BCB is aligned with the best international practices, consolidating its excellence position on the theme. The participation of BCB in technical cooperation actions and international forums, together with other central banks, confirms its relevant position on the risk management area. In this process, the operational references proposed by Deris and established by the Board of Directors are essential to achieve those goals.

Concerning the governance's structure, the reserves management is organized according to Figure 1.1.

Figure 1.1 – Governance Structure of the international reserves



At the highest level of the structure, there is the BCB's Board of Directors, which is responsible for defining the long term strategies through a benchmark portfolio, for evaluating the results obtained in the reserves investment and for defining the operational limits to which the investment policy operators are subject.

The effective management of the resources is divided in two levels. The first level is the long-term management, which, ultimately, is responsible for a large part of the reserves' total return. Deris is responsible for developing the models of strategic asset allocation, as well as for proposing to the Deputy Governor for Monetary Policy (Dipom) and the Deputy Governor of International Affairs and Corporate Risks (Direx) the benchmark portfolio, the operational guidelines and the performance evaluation criteria that are subject to the Board of Directors appreciation. The Department of International Reserves (Depin) collaborates with the process providing operational and market information.

In the second level, there is the short-term management. The Strategies Committee, chaired by the Deputy Governor for Monetary Policy, holds quarterly meetings and establishes benchmark deviation strategies, observing the defined limits. This practice is defined as active management and its main objective is the improvement of total return, taking advantage of eventual market opportunities. The Depin is responsible for proposing the short-term strategies that are validated by the strategies committee. Moreover, as a result of Depin's daily monitoring of the market, the Department may propose, at any time, changes in the active strategies adopted.

Deris is responsible for defining and developing the risk models and the performance evaluation methodologies. This department also prepares quarterly risk and performance reports to the Board of Directors.

An internal management system was developed internally in order to monitor the investment parameters and criteria. The control procedures are performed daily and occasional breaches of the established limits are automatically informed by the system to all the members of the Board of Directors.

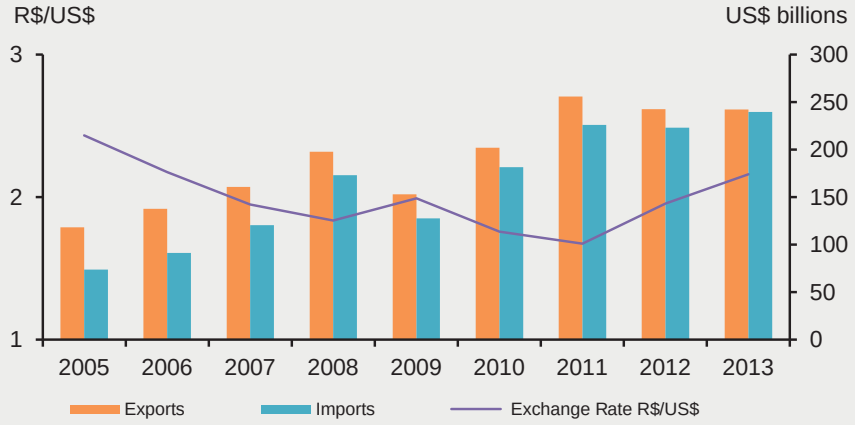
With regards to operational aspects, the process of investing the international reserves is comprised of the investment, compliance and settlement tasks. Compliance and settlement are critical procedures since they affect security, liquidity and profitability given that the reserves are operated in an environment of multiple currencies, regions and time zones.

Finally, the international reserves administration process is subject to five different types of control: i) internal control by the Depin's Monitoring Division (Dimon). ii) internal control of the BCB's Audit; iii) external control to the BCB, however internal to the Government performed by the Office of the General Comptroller (CGU); iv) external control by The Brazilian Court of Audit (TCU); and v) external control performed by independent auditor.

1.3 Economic Indicators

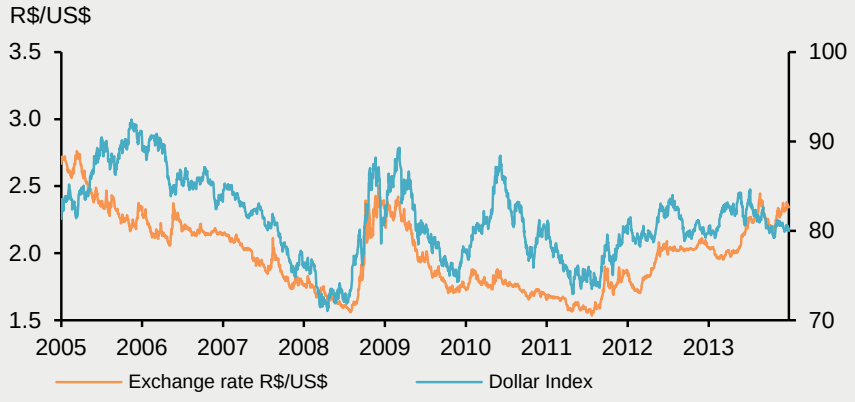
On Graph 1.1, we show the behavior of exports, imports and the foreign exchange rate from 2005 to 2013. The exports remained relatively stable in 2013 when compared to 2012 (a variation of -0.2%), whereas the imports rose by 7.4%. Nevertheless, the trade balance ended 2013 with a surplus of US$ 2.4 billion. The exchange rate continued the trend from last year, with a depreciation of the real against the US dollar, as seen on Graph 1.1. The nominal exchange rate was 14.6% higher at the end of 2013 when compared to the end of 2012, with an increase of 10.5% when the average rates are compared. It should be noted that the depreciation of the real has a strong positive correlation with the increase of the US dollar index, which is composed of a basket of developed country currencies, as shown in Graph 1.2. The exchange rate also has a high (in this case, negative) correlation with the CRB commodities index, as shown in Graph 1.3.

Graph 1.1 – Trade Balance and exchange rate (R$/US$)



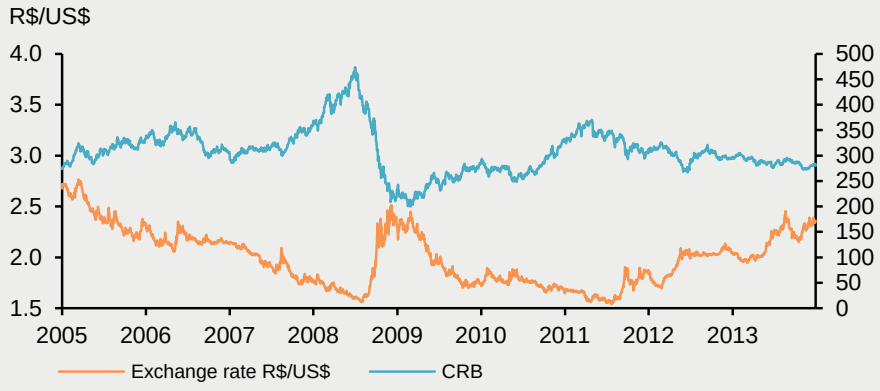
Source : Central Bank of Brazil

Graph 1.2 – Exchange rate (R$/US$) and Dollar Index



Source: Reuters

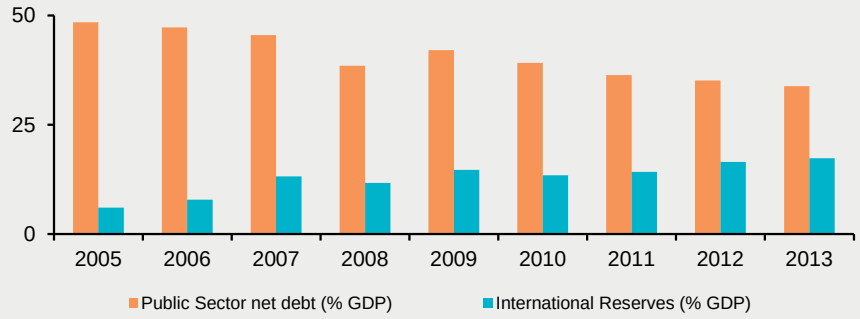
Graph 1.3 – Exchange rate(R$/US$) and CRB



Source: Bloomberg

The Brazilian Gross Domestic Product (GDP) advanced 2.5% in 2013, at a higher pace of growth than in 2012. As we can see in Graph 1.4, the Net Debt of the Public Sector has remained on a downward path, while the international reserves have remained stable.

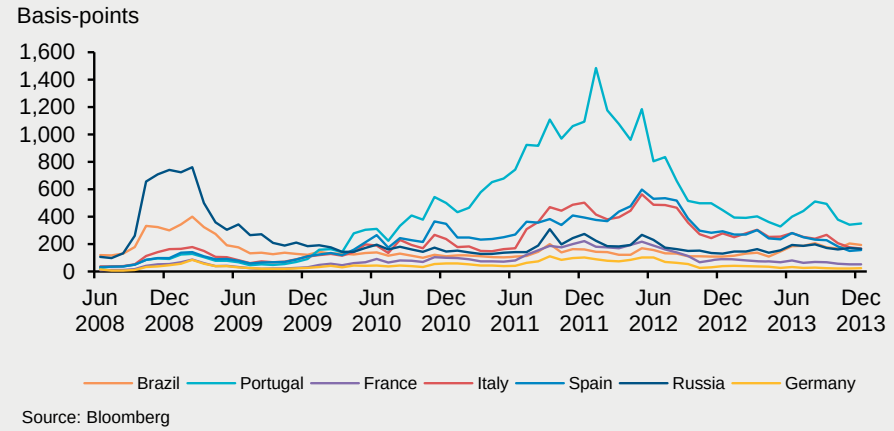
Graph 1.4 – Public sector net debt and international reserves (% GDP)



Source: Central Bank of Brazil

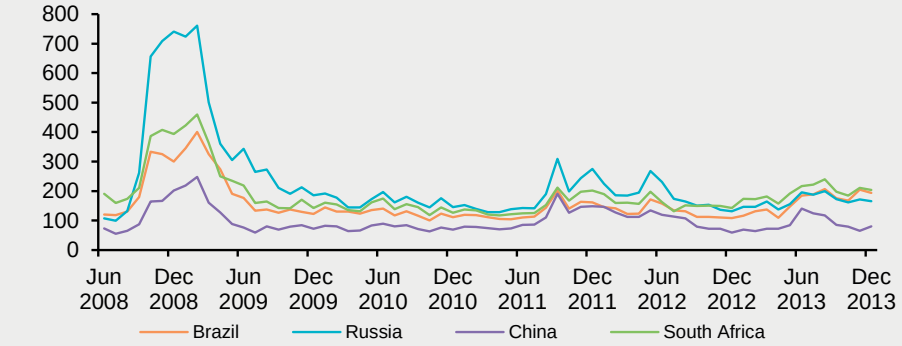
Graph 1.5 shows the evolution of the Credit Default Swap (CDS) spreads for Brazil as well as for several European economies. We can see that the movement of deterioration of the credit quality in the Eurozone has subsided, and indicators pointed to the direction of a recovery of these countries in recent years. The quality of credit for Brazil suffered some loss when measured by the CDS spread, compared to 2012. At the end of 2013, the Brazilian CDS spread was below that of Portugal and similar to that of countries such as Russia, Spain and Italy. In comparison to emerging economies, Brazil had a larger CDS spread than China and Russia, and slightly lower than that of South Africa, as shown in Graph 1.6.

Graph 1.5 – Sovereign CDS spreads (5 years)



Source: Bloomberg

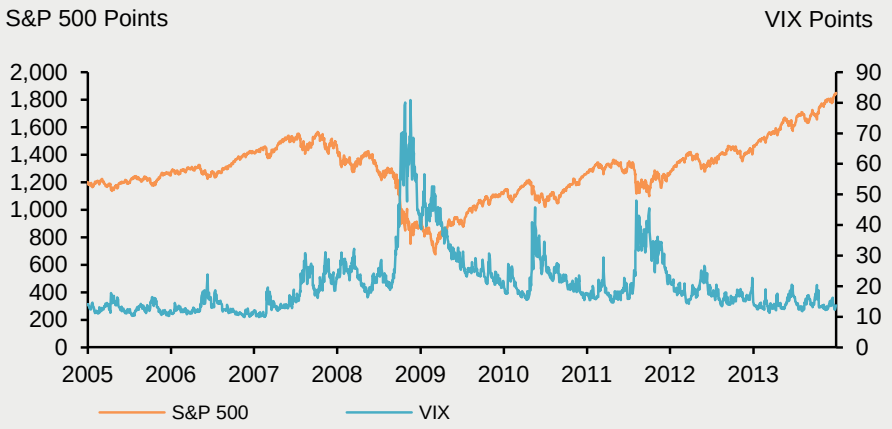
Graph 1.6 – Sovereign CDS spreads (5 years) – emerging markets



Source: Bloomberg

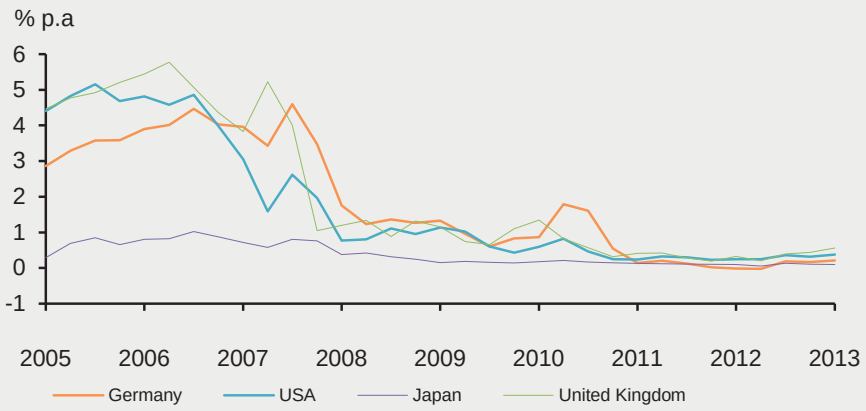
2013 was a year of recovery for the US equity market. The S&P500 index increased by 28%, in a consistent fashion, surpassing the pre 2008 crisis peak, as we can see in Graph 1.7. The VIX volatility index remained around the 15 p.p. level on a yearly basis, without any significant spikes during this period, as shown in the same graph. The yields on the 2-year sovereign bonds of the main developed countries remained in historically low levels throughout the year 2013, as we can observe in Graph 1.8. At this level of interest rates, below 0.5%, we have a highly asymmetric risk situation for the returns on these assets, as there is no room for the rates to be lowered, while strong increases would cause returns to be negative.

Graph 1.7 – S&P 500 and VIX



Source: Bloomberg

Graph 1.8 – Sovereign Yields (2 years)[1/]



Source: Bloomberg
1/ Quarterly data.

2 Investment policy

The investment policy reflects the risk preference of the Central Bank of Brazil

The Board of Directors defines the investment policy as a function of the long-term strategic objectives of the international reserves. Therefore, the concern with sovereign liabilities and with reducing the country's exposure to foreign exchange fluctuations has led the BCB to adopt a policy of currency coverage for the gross external sovereign debt. Once this covering policy is met, the allocation of the international reserves is based on criteria of safety, liquidity and profitability, prioritized in this order.

The Board defines a benchmark portfolio as reference for the allocation of the reserves according to a long-term strategic profile that reflects the institutional preferences of the BCB when it comes to risk and return. Short-term fluctuations in variables that affect the asset prices, such as interest and exchange rates, are not considered in the long-term decisions.

Intentional deviations from the benchmark portfolio as a function of oscillations in market conditions can be made and are monitored on a daily basis by internal control systems. In other words, the international reserves are actively managed, being allowed to marginally deviate from the benchmark portfolio within operational limits previously defined by the Board of Directors.

In the year 2012, the BCB reestablished the outsourcing of the management of part of the international reserves. The aim of this initiative is to diversify investments, to provide the reserve management process with more flexibility, and to promote an effective exchange of knowledge of financial markets.

Also in 2012, the BCB initiated investments in equity and commodity indices. Nevertheless, as can be seen in Chapter 3, the risk of such operations is relatively small, due to the low financial exposure when compared to the total risk of the international reserves.

In the year 2013, we highlight the Board of Directors' decision to decrease the mean duration of the international reserves, with the goal of lowering the sensitivity of the market value of the portfolio to adverse movements in the international yield curves. This change in strategy reduces the amplitude of potential losses associated with parallel shifts in the interest rate curves of central economies.

In the following sections, we describe fundamental aspects of the investment policy of the international reserves. In general, this policy can be segmented in terms of distribution by currency, distribution by asset class and average term of investment.

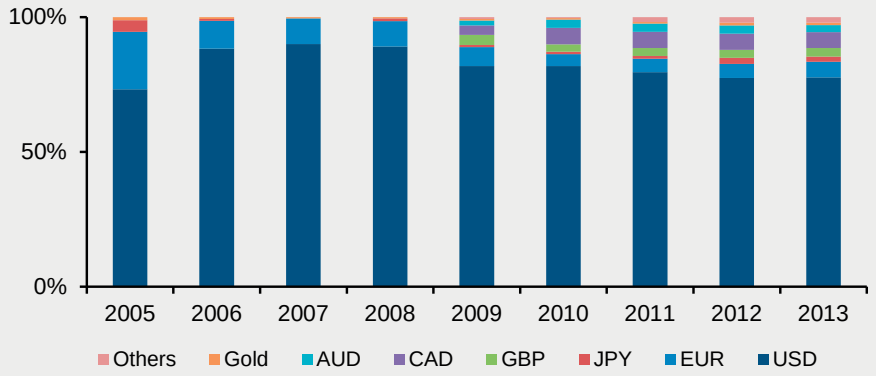
2.1 Distribution by currency

As previously mentioned, one of the goals of the international reserves management is the reduction of the country's exposure to exchange rate risk. Thus, the BCB seeks to build a diversified portfolio that ensures, as a priority, the hedging of the exchange rate risk of the gross external debt. In December 2013, the currency allocation of the reserves was the following: 77.7% in US dollar, 5.8% in Canadian dollar, 5.7% in Euro, 3.2% in sterling pound, 2.7% in Australian dollar, 2.0% in yen, 0.8% in gold and 2.1% in other currencies, such as Swedish crown and Danish crown. Graph 2.1 shows the evolution of the currency allocation at the end of each year.

We can see in Graph 2.1 that the US dollar consolidated its position as the main currency in the international reserves between 2005 and 2006. This trend, which started in 2004, reflected the liquidation of the IMF loan denominated in SDR, the Fund's benchmark basket of currencies. Its complete liquidation caused an even greater part of the external debt to be denominated in US dollars, and therefore impacted the currency allocation of the reserves.

In 2009, the BCB initiated a policy of currency diversification in the international reserves. In 2013, this policy was kept in place, although no significant changes were made in terms of currency allocation in comparison with 2012.

Graph 2.1 – Foreign Currency Allocation[1/]



Source: Central Bank of Brazil
1/ Reserves in cash concept (end of period data)

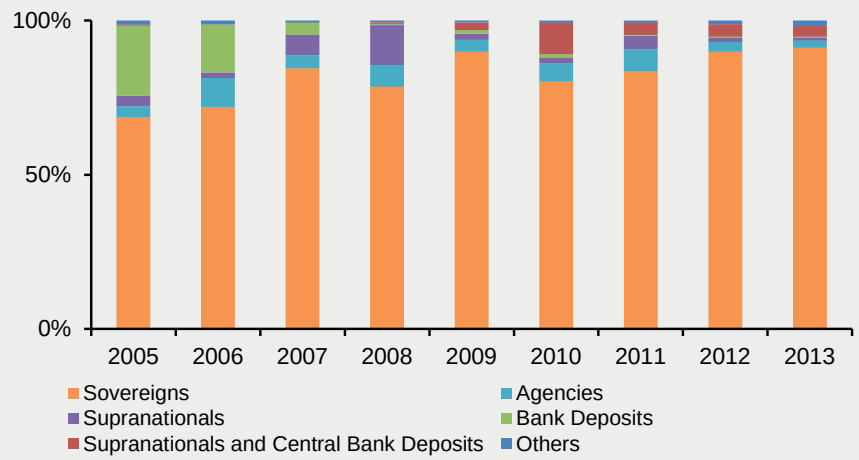
2.2 Asset Classes

The international reserves are primarily invested in fixed income instruments, especially in sovereign bonds, agency bonds from several countries, bonds issued by supranational organizations and fixed-term bank deposits. In December 2013, the allocation was as follows: 91.2% in sovereign bonds; 3.5% in deposits in central banks and supranational organizations; 2.3% in agencies; 1.0% in supranational bonds; 0.3% in deposits in commercial banks; and 1.7% in other asset classes, such as gold.

Graph 2.2 shows the asset class distribution, in the period from December 2005 to December 2013 (data from end of period). Note the growth in the bond portfolio in detriment of the deposit portfolio, which is a result of the investment policy and the preference of decreasing the exposure to credit risk of the banking sector.

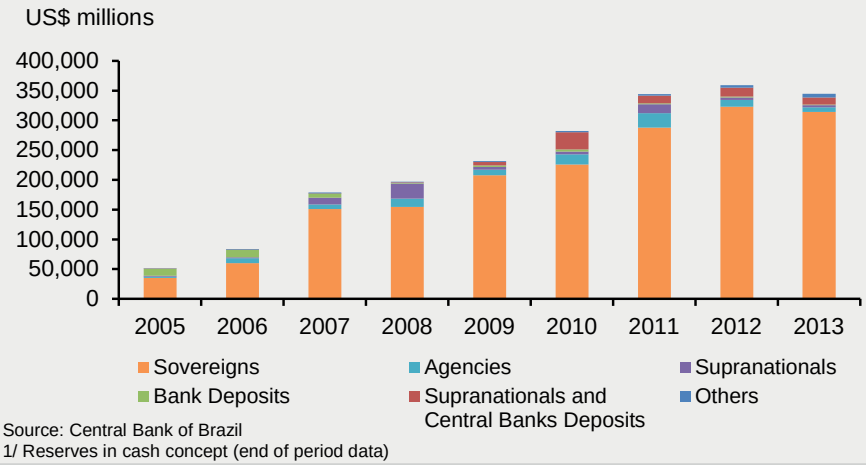
In the year 2013, there was a slight increase in the allocation of the reserves to sovereign bonds, in detriment of agencies and supranational organizations. This is caused by more conservative criteria in terms of liquidity, which reflect an overall adjustment to a more conservative level of risk. Graph 2.3 shows the distribution in terms of financial volume allocated to each asset class(data from end of period).

Graph 2.2 – Asset Allocation[1/]



Source: Central Bank of Brazil
1/ Reserves in cash concept (end of period data)

Graph 2.3 – Asset Allocation[1/]



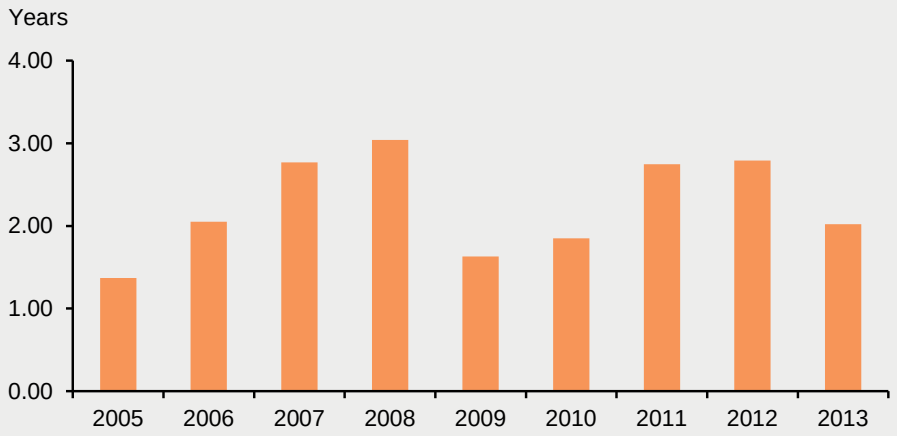
Source: Central Bank of Brazil
1/ Reserves in cash concept (end of period data)

2.3 Average term of investment

The choice of the average maturity of investment of the international reserves reflects the risk preferences of the Board of Directors. It is aligned with criteria of safety, liquidity and profitability, in this order. Graph 2.4 shows the evolution over time of the average term of investment for the period from December 2005 to December 2013 (data from end of period).

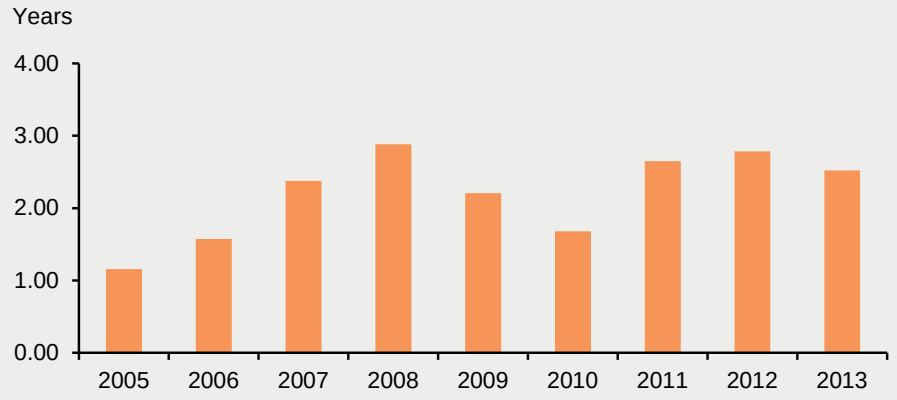
In 2013, with the aim of reducing the sensitivity of the portfolio to interest rate movements (particularly to US interest rates), the benchmark index for the main portfolio was reduced from 1-5 years to 1-3 years. The average term of investment was lowered from 2.79 years in 2012 to 2.02 years in 2013. We can also observe this decrease when the yearly mean of the average term of investment is considered (graph 2.5). In 2013, the average term of investment was 2.52 years, whereas it was 2.78 years in 2012.

Graph 2.4 – Average term of investment[1/]



Source: Central Bank of Brazil
1/ Reserves in cash concept (end of period data)

Graph 2.5 – Average term of investment[1/]



Source: Central Bank of Brazil
1/ Reserves in cash concept (annual average)

3 Risk management

Market risk, credit risk, liquidity risk and operational risk are daily monitored in the international reserves investment process.

The risk analysis related to the investment process is a key aspect to understand the financial performance and to make the benchmark portfolio adequate to the investment objectives.

As mentioned before, the different risks assumed in international reserves investments are controlled daily by a management IT system developed internally by the Central Bank of Brazil (BCB). This system includes the market, credit and liquidity risks calculations, operational losses registration, and several other operational limit controls.

The market risk of a portfolio is the risk of financial loss due to market price variations of portfolio's assets.

Liquidity risk refers to the risk of not being able to sell an asset or closing a position when desired, without incurring in significant costs.

The credit risk is the risk of an institution not being able to meet payments due to the securities issuance, deposits or any other contractual obligation or financial commitments made to investors.

The operational risk may be defined as risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events.

3.1 Market Risk

There are several sources of market risk related to the international reserves management. The main sources are the risk of change in exchange rates and interest rates. It is important to highlight that the reference currency (*numéraire*) used by BCB for the international reserves management is the US dollar. In order to measure the reserves market risk, the BCB uses the Value at Risk – VaR, as can be seen on next section. Additionally, stress tests are used for measuring the reserve's sensitivity to risk factors, as can be seen on section 3.1.2.

3.1.1 Value at Risk

The main market risk metric used by the BCB for the international reserves is the Value at Risk (VaR), which represents the loss of a portfolio below which the probability of occurrence is defined by a confidence level for a given time horizon.

The BCB computes daily the reserves and active management VaR for the time horizon of one day and a confidence level of 95%. Besides computing the total VaR, the BCB also calculates its interest rate and foreign exchange rate components.

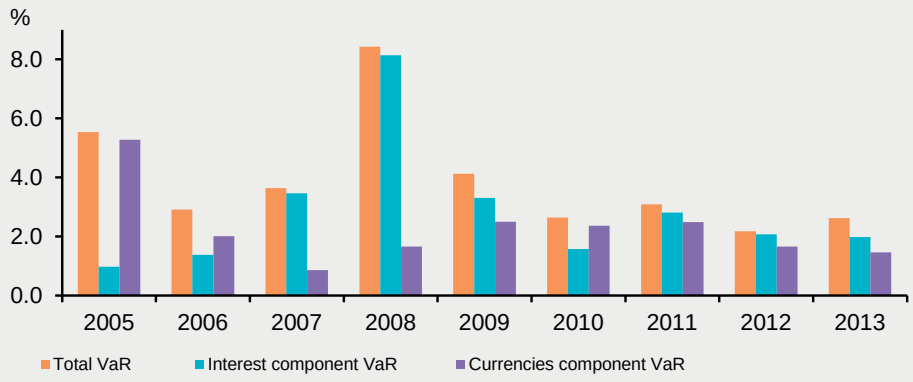
Graph 3.1 shows the annualized VaR of the international reserves in percentage terms. The graph also shows the interest rate and foreign exchange components. The total VaR reached 2.62% a year on average, a value close to that of the previous three years.

The yearly average of the interest rate component of the VaR was 1.98% in 2013, lower than the 2.07% registered in 2012. The exchange rate component of the VaR was also lower, changing from 1.7% to 1.5%.

Although both the interest rate and exchange rate components of the VaR fell in 2013, the total VaR was larger than in 2012. This is due to a reduction in the diversification effect of the assets in the portfolio, caused by an increase in the correlation between interest and exchange rate movements in 2013.

As mentioned previously, in May 2012 the international reserves started to have some exposure to risk factors related to equity and commodities. However, this exposure was small compared to the total risk. In fact, the yearly average of the annualized VaR of the equity and commodities components was less than 0.01% in 2013.

Graph 3.1 – International reserves VaR[1/]



Source: Central Bank of Brazil
1/ Yearly average of the annualized daily VaR

3.1.2 Stress tests

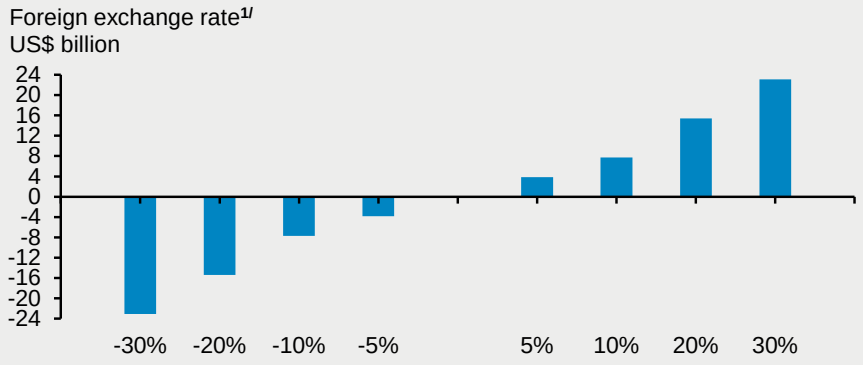
The stress test is another tool used for measuring the market risk of the international reserves holdings. It seeks to quantify the negative impact of shocks and events that are unfavorable to the BCB's positions. Thus, the stress/crisis scenarios are designed to evaluate the potential financial losses caused by an adverse shock to each of the risk factors to which the reserves are exposed.

The tests are performed considering the BCB's positions at the end of 2013, and the risk factors used in these tests are the exchange rates of the US dollar against the remaining currencies in the reserves, as well as the yield curves. Graph 3.2

shows the impact of the fluctuation of all the other currencies against the US dollar on the result of the reserves, varying in amplitude from -30% to 30%.

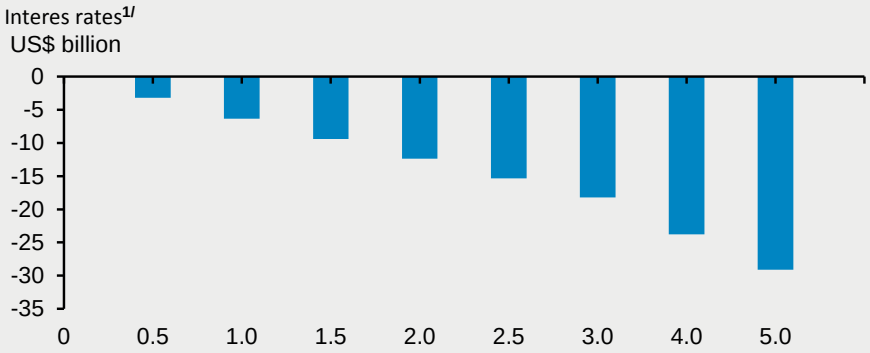
Graph 3.3 shows the results of parallel shifts of 0.5 to 5.0 percentage points to the yield curves of the markets where the reserves are invested. The larger the shift in the international interest rates, the larger the negative effect on the market value of the reserves.

Graph 3.2 Currencies stress test



Source: Central Bank of Brazil
1/ Impact of foreign exchange variation on the market value of the reserves, in 12.31.2013.

Graph 3.3 – Interest rates stress test



Source: Central Bank of Brazil
1/ Impact of parallel shifts to the yield curves on the reserves, in 12.31.2013.

3.2 Liquidity Risk

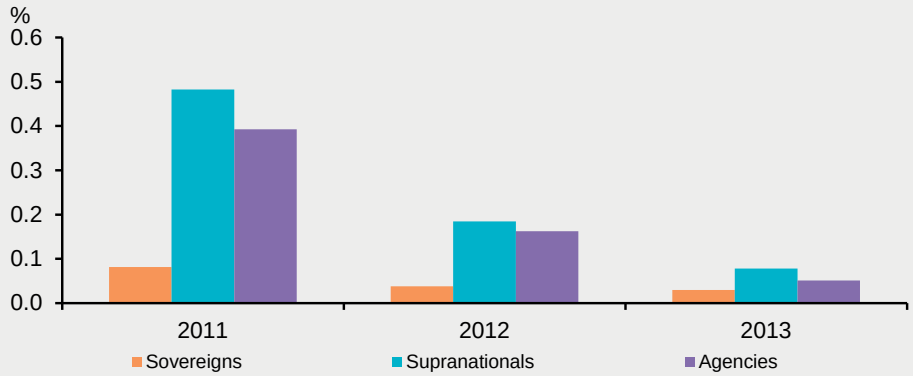
One of the pillars of the investment policy of the international reserves is liquidity. Therefore, restrictions in terms of asset classes are taken into account in the allocation in order to mitigate liquidity risk. Liquidity risk corresponds to the risk of not being able to sell an asset or to close a position without incurring significant costs.

In order to guarantee an adequate liquidity to the international reserves, the BCB has guidelines that limit holdings' size and investment maturity. For sovereign, supranational and agency securities, there is a maximum purchasing limit over the total amount issued and a maximum ratio limit of each issuance in the portfolio.

These limits aim to make that an eventual sale of these securities by BCB do not severely change its price due to the lack of liquidity and also aim to limit the impact of a certain issuance in the portfolio's result.

In addition to the controls already mentioned, the BCB monitors the portfolio's liquidity risk using some liquidity cost scores. These scores consider the spread between the bid and ask values for all the portfolio holdings, and they are calculated for each type of bond issuer (sovereigns, supranationals and agencies).

Graph 3.4 – Liquidity Risk[1/]



Source: Central Bank of Brazil
1/ Values refer to the respective portfolios.

As we can see on Graph 3.4, the liquidity risk computed as the difference between bid and ask prices of the bonds decreased significantly at the end of 2013 in relation to the end of 2012. We can also note that the liquidity risk relative to assets issued by sovereigns is consistently lower than that of assets issued by agencies and supranational organizations. The liquidity risk measured for sovereign issuers was at 0.04% in 2012 and 0.03% in 2013, while it was 0.18% for supranational issuers in 2012 and 0.08% in 2013, and 0.16% in 2012 and 0.05% in 2013 for agencies. The decrease in liquidity risk is due primarily to the waning, along 2012 and 2013, of the Eurozone debt crisis, which had caused the spread between bid and ask prices of bonds in several markets to increase.

3.3 Credit Risk

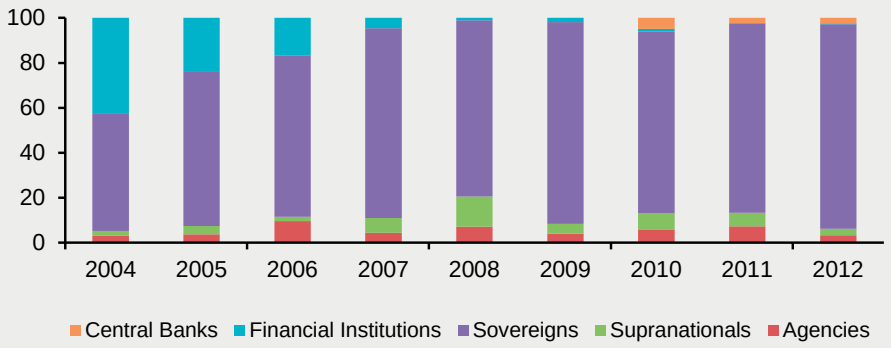
The aim of this section is to present the annual evolution of the exposure of the international reserves to credit risk since 2005, as well as the control mechanisms for such exposure. In addition, we present some concepts concerning credit risk and the asset distribution according to three criteria: type of issuer or counterparty, geographic region; and credit quality.

Credit risk is defined as the uncertainty related to the occurrence of a credit event (downgrading or default), in any counterparty, which results a loss in holdings linked to this counterparty. An event of credit occurs when a counterparty do not fulfill assumed obligations of payment. BCB's counterparties which are considered to have credit risks are the ones which have liabilities with the BCB, such as, agencies, central banks, central governments, financial institutions and supranational organisms.

Agencies are entities sponsored by a national government created with the objective of supporting certain sectors of the economy by the issuance of securities. The central governments issue sovereign debt securities for financing governmental activities. The supranational are multilateral organisms, such as the World Bank and the Bank for International Settlements (BIS), which issue bonds and, in some cases, act as financial intermediaries. The financial institutions' category includes commercial banks and investment banks. The following graphs show that most part of the international reserves is allocated in sovereign bonds, whereas, in this category, the US treasuries represent the largest part.

The evolution of the distribution by type of issuer and counterparty is shown on Graph 3.5. In the graph we can observe that the increase in the share of sovereign bonds occurred simultaneously with the reduction in the share of financial institutions. In 2013, the distribution was similar to that of 2012, with a relative increase in sovereign bonds in detriment of agencies.

Gráfico 3.5 – Allocation by asset class



Fonte: Banco Central do Brasil

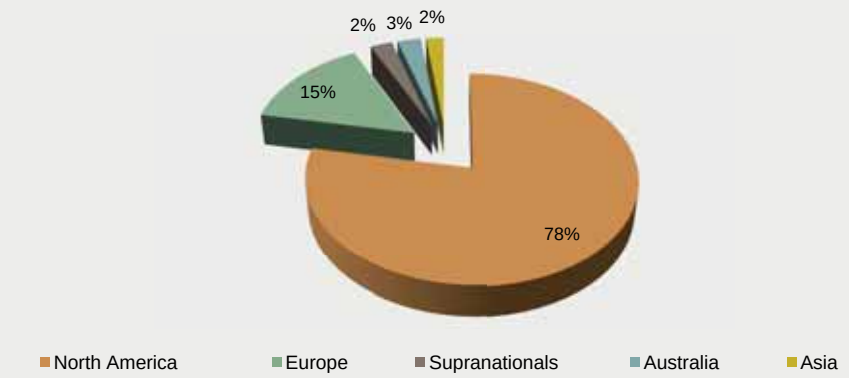
The portfolio's credit risk level is due to the composition of the portfolio and the counterparties' credit quality. The individual credit risk of agencies and supranational organisms authorized by BCB is low due to the limits established, which enable only investments in instruments of fixed income with the best possible quality of credit, according to a credit rating agency and internal analysis.

For the credit risk control of financial institutions, two types of limits were established: one per transaction and other for the portfolio as a whole. Each transaction is subject to operational limits that define the minimum credit quality, the maximum exposure per issuer and counterparty and the maximum term of each exposure. Market indicators and accounting information are also considered in the credit analysis of the counterparties and issuers of the bonds in the reserves' portfolio. The aggregate limits for the portfolio seek to restrict the total credit exposure. With this goal, the BCB employs a statistical model of credit risk developed internally.

Graphs 3.6 and 3.7 refer to the data from the end of 2013. The distribution of the assets with credit risk by geographic region is shown in Graph 3.6. Most of such assets (78%) are in issuers and counterparties in North America. As was mentioned previously, this is due to the exposure to USA bonds, as a consequence of the prevalence of assets denominated in US dollars in the reserves. Graph 3.7 shows

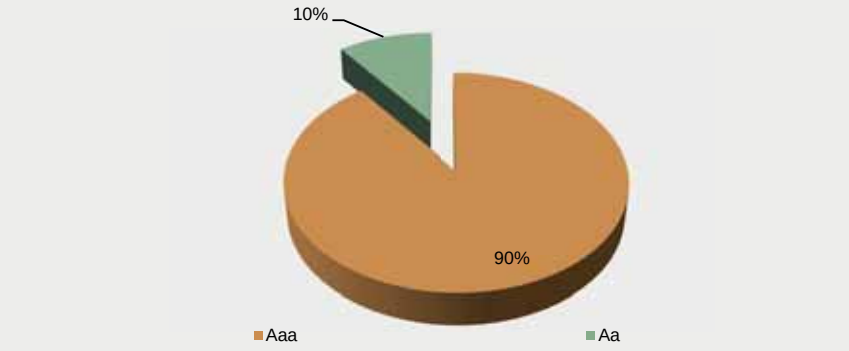
the average distribution of the assets by credit rating, and we can see that 90% of the exposure has a rating of Aaa, and 10% a rating of Aa.

Graph 3.6 – Allocation by geographical areas



Source: Central Bank of Brazil

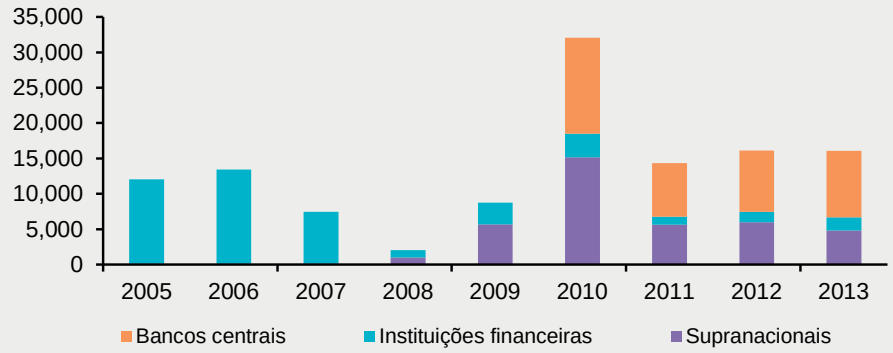
Graph 3.7 – Allocation by rating



Source: Central Bank of Brazil

Graph 3.8 shows the evolution of the total volume of the exposure to credit risk from money-market operations. It should be noted that this exposure comes from deposit operations, repurchase agreements and/or derivatives such as swaps and forwards with commercial banks, central banks and supranational organizations, and does not include bonds. In 2011, the worsening in the perception of the credit risk of issuers and counterparties, as well as the increase of the uncertainties in the international markets, caused the exposure to supranationals and financial institutions to decrease considerably. In 2013, on the other hand, the level of exposure to these counterparties remained near 2011 and 2012 levels.

Gráfico 3.8 – Exposição total a risco de crédito com operações de *money market*[1/2/]



Fonte: Banco Central do Brasil
1/ Valores em US$ milhões (dados de fim de período).
2/ Depósitos, compromisso de recompra, Forex.

3.4 Operational risk

Operational risk can be defined as the possibility of direct or indirect loss resulting from failure, deficiency or inadequacy of internal processes, systems or external events. In the past, this type of risk was controlled only with the use of qualitative management practices. Current practices, on the other hand, seek to measure operational risks by means of quantitative models as robust complements of internal controls.

With the implementation of an integrated non-financial risk at the BCB, Key Risk Indicators (KRIs) were developed for evaluation and monitoring of risk. The KRIs, computed in an automated fashion from data generated in the day-to-day execution of tasks, aim to be predictive tools. Since the KRIs are highly correlated with the risks, they help in measuring the level of exposure and in managing the risks themselves. When associated with pre-defined thresholds, they can trigger an alarm, and thus allow a timely implementation of control measures for the risk in question as well as its consequences. This risk management system also makes it possible to follow risk events and quasi-risk events, ensuring that incidents are monitored and risk trends are analyzed for the improvement of control systems.

When it comes to operational aspects, international reserves management involves trading, compliance and operations settlement processes. Compliance and settlement are considered critical as they may affect security, settlement and profitability in an environment with different currencies, countries and time zones.

For compliance and settlement processes, transactions volume and assets diversification are as important as the reserves amount. In 2013, turnover reached US$ 3.9 trillion, with 9,978 transactions, around 83,000 SWIFT messages and 674,570 accounting records.

Differently from the values registered in the contracts, which consider the trade value, the compliance and settlement processes consider all flows related to the transactions due to the operational risks.

4 International Reserves External Management Program (PGER)

This chapter details the allocation and risks related to the reserves portfolio externally managed.

The International Reserves External Management Program (Programa de Gerenciamento Externo das Reservas Internacionais – PGER) was re-launched in 2012, aiming to diversify allocations and promote more flexibility to the process of reserves management, and foster technology sharing and exchanging of international market knowledge between BCB and international reserve external managers.

On February 1st 2012, six external institutions began to manage US$ 1 billion portfolios each, in a total of US$ 6 billion allocated to the Program. The mandates were set following a selection process that took over one year, during which all applicants were thoroughly assessed as to their expertise in fixed income bonds, equities, commodities and currency management, including clients as central banks, sovereign wealth funds and other government institutions. At the end of 2013, the total amount allocated on PGER was US$ 6.33 billion.

Besides PGER, in the scope of externally managed assets denominated in foreign currencies, the BCB also invests in a BIS fund, known as BISIP-ILF1, with a portfolio composed of United States treasury inflation-protected securities (TIPS). At the end of 2013, the total amount allocated to this fund was US$ 241.22 million.

Since PGER and BISIP-ILF1 are part of the international reserves global investment policy, their performances are considered jointly with all the other portfolios (data discussed on chapter 5).

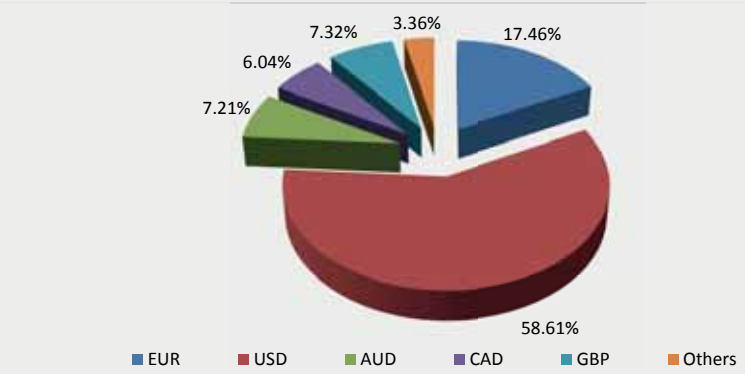
In the following section, we present PGER investment policy and data regarding its risk management.

4.1 Investment policy

At the end of 2013, the total amount of the investments in PGER was US$ 6.33 billion. Since its goal is to improve the diversification and to provide the reserve management process with greater flexibility, the composition of the PGER portfolio differs from that of the internally managed portfolio. In fact, at the end of 2013, the exposure to commodities and equity indices was 29.9% of the total amount managed by the program, while the remainder is concentrated in sovereign bonds from central economies.

The currency distribution of PGER is shown in Graph 4.1. We can observe that 58.61% of the exposure is in US dollars, 17.46% in euros, 7.32% in pound sterling, 7.21% in Australian dollar, 6.04% in Canadian dollar and 3.36% in other currencies, such as yen, Swedish crown and New Zealand dollar. Therefore, we see that the externally managed portfolio is less concentrated in US dollar than the internally managed portfolio.

Graph 4.1 – Foreign currency allocation (PGER)



Source: Central Bank of Brazil

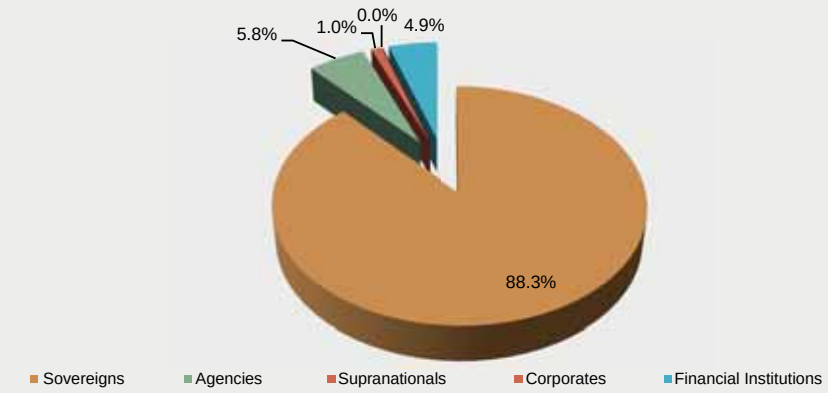
4.2 Risk management

During 2013, the PGER portfolio had an average annualized daily VaR of 6.04%, which is equivalent to US$ 373.30 million.

The credit risk associated with the assets under the external managers is calculated through the same methodology adopted for the internally managed reserves.

The distribution by type of issuer and counterparty is shown in Graph 4.2, where we can see that the exposure to sovereigns is the largest, and greater than the remaining types. The exposition to financial institutions is associated with positions in over-the-counter derivatives, with margins deposited in central counterparties and in cash deposited in financial institutions, while the exposure to companies is associated to the investments in Exchange Traded Funds (ETFs) based on corporate bonds.

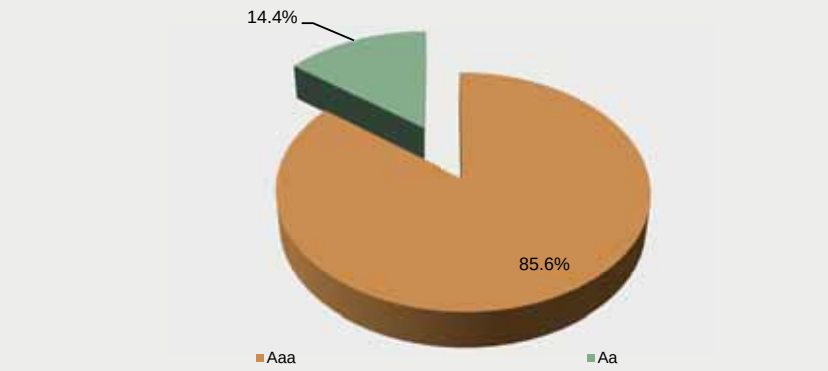
Graph 4.2 – Allocation by counterparty



Source: Central Bank of Brazil

The allocation by rating of the assets managed by the PGER participants is shown in Graph 4.3. Note that 85.6% of the resources are invested in counterparties of issuers with Aaa ratings.

Graph 4.3 – Allocation by rating



Source: Central Bank of Brazil

5 Results

The results evaluation allows the verification of the strategies suitability vis-à-vis *the defined strategic objectives.*

The analysis of returns arisen from international reserves investments must be done considering the different mechanisms used for the calculation. The Central Bank of Brazil (BCB) considers the accounting result to produce its balance sheet and the data from the management system developed internally to support the investment decisions and the internal controls.

The accounting result, however, is not the most appropriate metric by the point of view of investments decision making, as the returns are not calculated relatively to the amount invested, which changes due to purchases and sales of foreign currency. Besides, as the reserves are invested in the international market, the measures in Brazilian Real incorporates the foreign exchange rate fluctuation between the Brazilian Real and other currencies, which makes the analysis of profitability among the markets difficult. In order to solve these problems, the BCB calculates the reserves profitability using a managerial system internally developed, which allows the portfolio's evaluation on a daily basis, according to international standards, which enables the monitoring of strategic investments in different markets.

The reserves are invested in different currencies in the international market and the results of the management system are evaluated using as base currency (*numèraire*) the US dollar. Therefore, the adoption of this criterion implies that the returns calculated include the variation of the dollar exchange rates against other currencies of the international reserves.

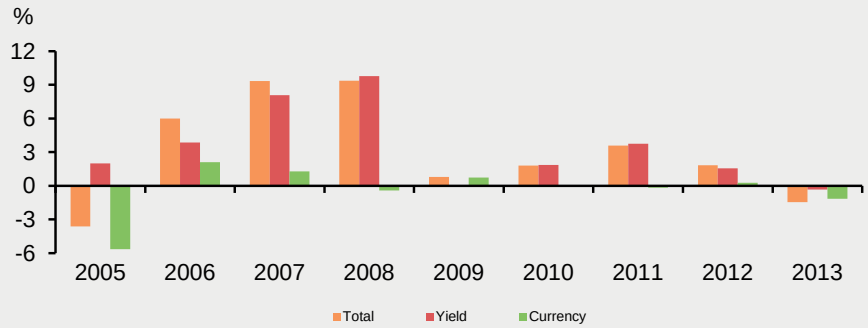
The signaling of the tapering of monetary stimulus in the USA on May 22nd, 2013, resulted in a significant increase in the volatility of the global financial markets. Because of this volatile environment, the US dollar appreciated against the other currencies and the interest rates of central economies increased, culminating in a consolidated result of the international reserves at -1.38% in 2013. This value includes the returns of the PGER and the BISIP portfolio, which recorded returns of 3.10% and -5.39% respectively in the period.

The positive returns achieved by PGER are due primarily to the investments in the equity market, which compensated the losses from fixed-income bonds. The BISIP fund, which is composed exclusively by treasury inflation-protected securities (TIPS), ended the period with a negative result, attributed to the shifts in the corresponding yield curves in the United States. It is worth noting that it is not possible to compare the results of those portfolios due to their distinct risk levels.

The generalized realignment of the asset prices and subsequent volatility should not be confused with vulnerabilities of economies, since they are typical of transition periods. Although not directly comparable, for the sake of reference, the return in 2013 of the *Global Treasury-GDP Weighted by Country* Index from Barclays, which aggregates fixed-income instruments issued by developed and emerging countries was -2.4%. The return of Barclay´s Global G7 index, composed of sovereign bonds issued by Germany, Canada, France, Italy, Japan, the United Kingdom and the USA, was -5.73%.

The return of the reserves managed internally, which account for 98% of the international reserves, are shown in Graph 5.1 for the period starting in 2005.

Graph 5.1 – International reserve returns[1/2/]



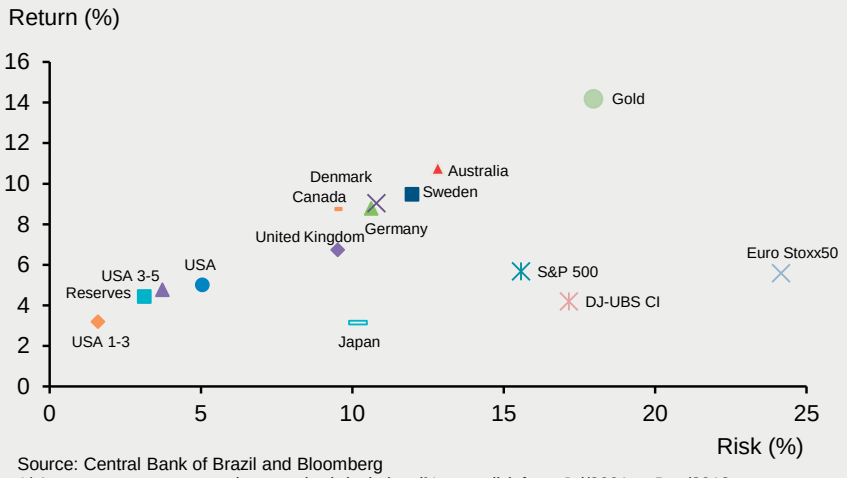
Source: Central Bank of Brazil
1/ Calculated from the managerial system.
2/ Only the internally managed reserves are considered here.

The result for 2013 was -1.46%, also due to the increase in the interest rates of the central economies as well as the appreciation of the US dollar.

5.1 Risk return profile

This section compares the risk and return profile of the international reserve investments in the period from July 2001 to December 2013 with some asset classes. The BCB has a long-term investment horizon and the analysis of the risk return profile is performed based on monthly values obtained from the management system. Graph 5.2 shows the annualized average return and the standard deviation for several asset classes. The US treasury bonds are represented by the 1-3 year maturity bond index (USA 1-3) , the 3-5 year maturity bond index (USA 3-5) and by the entire US yield curve (USA). Sovereign bond indices from Germany, the United Kingdom, Canada, Denmark, Sweden, Australia and Japan are also shown in the graph. In addition, the gold, S&P 500, Euro Stoxx 50 and DJ-UBS commodity indices were also included. In the graph, it is possible to analyze the risk-return profile of the reserves in relation to that of these indices, using the US dollar as the base currency. The results are consistent with the investment policies and with the risk and return preferences of the Board of Directors.

Graph 5.2 – Risk (%) *vs.* return (%) profile [1/]



Source: Central Bank of Brazil and Bloomberg
1/ Average return compared to standard deviation (% annually) from Jul/2001 to Dec/2013.
US dollar is the base currency.

Annex

Note

This annex presents tables with the data used for the graphs shown in this report. It does not include the data from chapter 1 and from section 5.1, as they can be obtained from historical series available to the public. The numbers of the tables are the same of the graphs presented in the report.

The tables use managerial data with respect to the operations performed in the international reserves management process.

Table 2.1 – Foreign Currency Allocation

Period	USD	EUR	JPY	GBP	CAD	AUD	Gold	Others
2005	73.2%	21.3%	4.4%	0.0%	0.0%	0.0%	1.1%	0.0%
2006	88.3%	10.3%	0.7%	0.0%	0.0%	0.0%	0.7%	0.0%
2007	90.0%	9.5%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%
2008	89.1%	9.4%	1.0%	0.0%	0.0%	0.0%	0.5%	0.0%
2009	81.9%	7.0%	0.8%	3.7%	3.5%	1.9%	0.5%	0.7%
2010	81.8%	4.5%	0.9%	2.7%	6.1%	3.1%	0.5%	0.4%
2011	79.6%	4.9%	1.0%	3.0%	6.0%	3.1%	0.5%	1.9%
2012	77.4%	5.2%	2.3%	3.0%	6.0%	3.0%	1.0%	2.1%
2013	77.7%	5.7%	2.0%	3.2%	5.8%	2.7%	0.8%	2.1%

Table 2.2 – Asset Allocation[1/]

Period	Sovereigns	Agencies	Supra-nationals	Bank deposits	Supra. deposits	Others
2005	68.6%	3.7%	3.4%	22.7%	0.3%	1.4%
2006	71.8%	9.5%	1.8%	15.4%	0.2%	1.2%
2007	84.4%	4.3%	6.5%	4.0%	0.1%	0.6%
2008	78.5%	7.1%	13.0%	0.4%	0.5%	0.6%
2009	89.8%	4.0%	1.9%	1.2%	2.4%	0.6%
2010	80.2%	5.9%	1.8%	1.2%	10.2%	0.7%
2011	83.5%	7.1%	4.4%	0.3%	3.8%	0.8%
2012	89.9%	3.2%	1.2%	0.4%	4.1%	1.2%
2013	91.2%	2.3%	1.0%	0.3%	3.5%	1.7%

1/ Reserves in cash concept (end of period data)

Table 2.3 – Asset Allocation[1/]

US$ millions

Period	Sovereigns	Agencies	Supra-nationals	Bank deposits	Supra. deposits	Others
2005	35,450.33	1,905.86	1,735.15	11,755.39	151.60	704.62
2006	60,260.94	8,009.93	1,498.29	12,933.57	152.07	1,032.24
2007	150,794.73	7,757.58	11,670.38	7,090.81	151.93	1,127.59
2008	154,511.58	13,915.91	25,516.99	785.14	990.22	1,199.83
2009	208,014.34	9,176.61	4,481.27	2,779.93	5,665.67	1,468.41
2010	226,098.54	16,584.11	5,120.38	3,334.38	28,714.64	2,053.62
2011	287,583.91	24,522.50	15,167.37	1,150.16	13,196.73	2,767.35
2012	322,808.50	11,472.40	4,423.14	1,485.20	14,614.54	4,374.62
2013	314,166.09	7,956.67	3,605.44	919.47	11,961.18	5,996.00

1/ Reserves in cash concept (end of period data)

Table 2.4 – Average term of investment[1/]

Period	Years
2005	1.37
2006	2.05
2007	2.77
2008	3.04
2009	1.63
2010	1.85
2011	2.75
2012	2.79
2013	2.02

1/ Reserves in cash concept (end of period data)

Table 2.5 – Average term of investment[1/]

Period	Years
2005	1.16
2006	1.58
2007	2.38
2008	2.88
2009	2.21
2010	1.68
2011	2.65
2012	2.78
2013	2.52

1/ Reserves in cash concept (annual average)

Table 3.1 – International reserves VaR[1/]

Period	Total VaR	Interest component VaR	Currencies component VaR
2005	5.5	1.0	5.3
2006	2.9	1.4	2.0
2007	3.6	3.5	0.9
2008	8.4	8.1	1.7
2009	4.1	3.3	2.5
2010	2.6	1.6	2.4
2011	3.1	2.8	2.5
2012	2.2	2.1	1.7
2013	2.6	2.0	1.5

1/ Yearly average of the annualized daily VaR

Table 3.2 – Currencies stress test[1/]

Variation	Result
	US$ billions
-30.0%	-23.08
-20.0%	-15.39
-10.0%	-7.69
-5.0%	-3.85
5.0%	3.85
10.0%	7.69
20.0%	15.39
30.0%	23.08

1/ Reserves variation due to foreign exchange rates fluctuation compared to US Dollar, position in 12.31.2013

Table 3.3 – Interest rates stress test[1/]

Variation	Result
	US$ billions
0.5%	-3.2
1.0%	-6.3
1.5%	-9.4
2.0%	-12.4
2.5%	-15.3
3.0%	-18.2
4.0%	-23.8
5.0%	-29.1

1/ Reserves variation due to parallel shifts of yield curves. Position in 12.31.2013

Table 3.4 – Liquidity risk[1/]

Year	Sovereigns	Supranationals	Agencies
2011	0.08	0.48	0.39
2012	0.04	0.18	0.16
2013	0.03	0.08	0.05

1/ Values refer to the respective portfolios.

Table 3.5 – Allocation by asset class

Period	Agencies	Supranationals	Sovereigns	Financial Institutions	Central Banks
2004	3.2%	2.0%	52.5%	42.3%	0.0%
2005	3.7%	3.6%	68.6%	24.1%	0.0%
2006	9.5%	2.0%	71.8%	16.6%	0.0%
2007	4.3%	6.6%	84.4%	4.6%	0.0%
2008	7.1%	13.5%	78.5%	1.0%	0.0%
2009	4.0%	4.4%	89.8%	1.8%	0.0%
2010	5.9%	7.2%	80.8%	1.2%	4.8%
2011	7.2%	6.1%	84.2%	0.3%	2.2%
2012	3.2%	2.9%	91.0%	0.4%	2.4%
2013	2.3%	2.5%	92.8%	0.3%	2.1%

Table 3.8 – Total exposure to market through money market instruments[1/ 2/]

Period	Supranationals	Financial institutions	Central banks
2005	152	11,906	-
2006	152	13,283	-
2007	152	7,317	-
2008	990	1,045	-
2009	5,666	3,073	-
2010	15,155	3,350	13,560
2011	5,624	1,152	7,573
2012	5,967	1,485	8,654
2013	4,830	1,833	9,424

1/ Values in US$ millions (end of period data).
2/ Deposits operations, Repurchase commitment and Forex.

Table 5.1 – International Reserve Returns[1/2/]

Period	Result (%)
2005	-3.63
2006	5.99
2007	9.35
2008	9.37
2009	0.80
2010	1.82
2011	3.60
2012	1.84
2013	-1.46

Source: Central Bank of Brazil
1/ Calculated from the managerial system.
2/ Only the internally managed reserves are considered here.

Table 5.2 – Risk (%) vs. return (%) profile [1/ 2/]

Index	Risk (%)	Return (%)
USA 1-3	1.60	3.20
Reserves	3.13	4.44
USA 3-5	3.72	4.78
USA	5.04	5.01
Sweden	11.97	9.49
Australia	12.82	10.77
Canada	9.44	8.76
Japan	10.19	3.14
United Kingdom	9.52	6.73
Germany	10.61	8.77
Denmark	10.78	9.04
S&P 500	15.57	5.68
Euro Stoxx50	24.15	5.58
DJ-UBS CI	17.15	4.19
Gold	17.95	14.18

1/ Annualized return (using the US dollar as the base currency).
2/ Standard deviation of monthly returns (Annual %).

Glossary

The definitions present the unique objective of helping the general understanding of the concepts described in the report.

Active management
Particular way of financial management in which it is tried to anticipate movements of market, variations of liquidity and other dynamic facts, with the objective of obtaining a better risk adjusted return in relation to the benchmark.

Bank risk
Credit risk with origin in operations in which the counterparty is a bank.

Basis point (b.p.)
A basis point represents 0.01%

Benchmark
It is a reference portfolio that is typically used as representation of the choice of risk and return of the investor.

CDS
Credit Default Swap. Financial instrument through which it is possible to buy or sell insurance against default of assets issued by companies or countries.

CRB
Commodity Research Bureau. Commodities index price daily evaluated by Thomson Reuters/Jefferies.

Default
Technical situation in which the debtor does not fulfill a contractual obligation.

Duration
It is approximately the weighted average maturity of investment of an asset or portfolio.

ECB
European Central Bank.

Fed
Federal Reserve, the Central Bank of the United States.

Government agencies
They are agencies sponsored by governments with the objective of supporting strategic areas of the economy as construction, education etc.

Hedge
Strategy of investment performed with the objective of neutralizing or at least reducing certain type of risk.

Ibovespa
Benchmark of BM&FBovespa S.A. – Stock Market, Goods and Futures calculated from a hypothetical basket containing the most negotiated Brazilian stocks.

Money market
Segment of the financial market compounded by short-term assets (until one year) and usually of major liquidity, such as commercial papers, certificates of negotiable deposits (CDs), treasury bills, buybacks agreements (repos), etc.

Rating
Grade given by a risk agency that expresses the credit risk of institutions, countries and assets.

Rating Agencies
They are agencies, usually private, which rate the credit risk of institutions, countries and assets.

Spread
Price difference between the quotations for buying and selling an assetor between quotations of two different assets.

Supranationals
Papers issued by multilateral organisms, such as the International Monetary Fund (IMF), the Interamerican Bank for Development (BID), the Bank for International Settlements (BIS), the World Bank (Bird) etc.

Swift
Society for Worldwide Interbank Financial Telecommunications. It is a global system of telecommunications whose main objective is to provide message service, which enables the Central Bank of Brazil to liquidate operations with international reserves.

Tapering
In the context of central banks, it consists on the decrease of its economic stimulus via market intervention.

Treasuries/T-bills
Debt instruments issued by the North American Treasury. Treasury bills (T-bills) are issued with up to one year term and do not pay coupons before maturity. The other treasuries (bonds and notes) are issued with a higher term and pay coupons periodically.

Value at Risk
Estimated value for the investment loss, in a certain time horizon, with a given confidence level.

VIX
Implicit volatility index, based upon S&P500 calls.

Volatility
Degree of prices variability or assets returns.

Yield
Profitability. Dividend or interests paid as percentage of the current value.

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