

THE COLLATERAL FRAMEWORKS OF THE FEDERAL RESERVE SYSTEM, THE BANK OF JAPAN AND THE EUROSISTEM¹

ARTICLES

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The collateral frameworks of the Federal Reserve System, the Bank of Japan and the Eurosystem to support the implementation of monetary policy are based on similar principles. Nevertheless, each central bank has translated these principles into practice in different ways, against the background of its specific economic and institutional constraints. The purpose of this article is to compare the collateral frameworks of these three entities. Section 1 explains why central banks only lend on a collateralised basis and describes the fundamental principles which guide the design of the collateral framework. Section 2 describes what constraints each central bank has faced and how these have impacted on the design of the collateral framework. Section 3 compares the eligibility criteria and risk control measures. Section 4 provides some statistics on the volumes of eligible collateral available to counterparties in the three regions and on the use of the different assets as collateral. Section 5 assesses how each central bank has aimed at avoiding market distortions in implementing its collateral framework. Section 6 concludes.

I WHY DO CENTRAL BANKS ONLY LEND AGAINST COLLATERAL?

Open market operations represent the key instrument used by all three central banks for supplying liquidity to the banking sector. Open market operations can be conducted on either an outright or a temporary basis. Outright purchases result in assets being bought in the open market and remaining on the balance sheet of the central bank, leading to a permanent increase in banks' holdings of central bank money. Temporary open market operations, on the other hand, involve lending central bank money to banks with a fixed and usually short maturity. These operations allow the central bank to manage marginal liquidity conditions in the interbank market for overnight reserves and thus to steer very short-term money market interest rates so as to implement monetary policy decisions.

All three central banks also conduct two other main types of credit operation, i.e. the Lombard facility and intraday credit. The Lombard facility – known as the marginal lending facility in the Eurosystem, the primary credit facility in the Federal Reserve System and the complementary lending facility in the Bank of Japan – aims to provide a safety valve for the interbank market, so that, when the market cannot provide the necessary liquidity, a bank can still obtain it from the central bank, albeit at a higher rate.² Moreover, central banks provide, on an intraday basis, the

working balances which banks need to carry out payments.

For all these different types of credit operation – open market operations, the Lombard facility and intraday credit – the central bank requires counterparties to pledge collateral as security.³ The primary reason why a central bank lends to the banking sector against collateral is to maintain the soundness of its assets effectively and efficiently. This can be elaborated on from various aspects:

- Collateralised lending reduces the operational complexity that would arise with unsecured lending, such as the need to monitor very actively counterparties' creditworthiness, as well as to calculate and

1 The comments, evaluations and judgements regarding the collateral frameworks or methodologies adopted by the other central banks in this article are solely those of the ECB and do not necessarily reflect the views of the other entities. For the purposes of this article, the term central bank is used generically to refer not only to an individual central bank, but also to central banking systems, such as the Eurosystem and the Federal Reserve System.

2 In the United States, until the reform of the Federal Reserve System's discount window in 2003, lending was only made on a discretionary basis at below-market rates. There were, however, certain exceptions, such as a special liquidity facility with an above-market rate that was put in place in late 1999 to ease liquidity pressures during the changeover to the new century. The complementary lending facility was introduced in 2001 in Japan.

3 The Federal Reserve System does not require intraday credit to be collateralised except in certain circumstances (e.g. if the counterparty needs additional daylight capacity beyond its net debit cap, or if there are concerns about the counterparty's financial condition).

monitor credit limits. Furthermore, uncollateralised lending requires a high degree of discretion and may not therefore be compatible with the principles of transparency and accountability.

- Collateralised lending allows the central bank to lend at the same rate to all counterparties, which is important for ensuring the smooth transmission of monetary policy.
- As the market may assume that the central bank has inside information that could be used to assess a bank's financial strength, reducing a counterparty's credit limit or charging a higher rate may send unintended signals to the market and be misinterpreted.
- Financial independence from the government is a key factor in contributing to the central bank's overall independence in the implementation of monetary policy. Collateralisation of lending to counterparties

helps guard the central bank's financial independence by reducing the risk of losses. Furthermore, even if financial independence is not threatened, small losses could, in certain circumstances, have a damaging effect on the central bank's reputation.

Of course, assuming that the collateral can be legally transferred to the central bank and that adequate valuation and risk control measures can be designed, there is, in theory, an almost infinitely wide range of assets that could potentially perform the role of collateral. This may cover liquid marketable fixed-income securities, such as government and corporate bonds, equity-style instruments, loans to the public sector, corporations or consumers, and even assets, such as real estate and commodities. Therefore, in order to guide decision-making on what types of asset to accept as collateral, each central bank has established some guidelines or principles for its collateral framework (see Box 1).

Box 1

PRINCIPLES OF THE COLLATERAL FRAMEWORKS

Federal Reserve System

The Federal Reserve System has decided to adhere to four principles for managing its assets. These principles, which were published in December 2002 in the publicly available document entitled "Alternative Instruments for Open Market and Discount Window Operations", are as follows:

- The Federal Reserve System must have effective control over the stock of high-powered money and the size of its balance sheet.
- The Federal Reserve System should structure its portfolio and undertake its activities so as to minimise their effect on relative asset values and credit allocation within the private sector.
- The Federal Reserve System should manage its portfolio to minimise risks in a manner consistent with the achievement of its goals and to maintain sufficient liquidity to be able to conduct potentially large actions at short notice.

- The Federal Reserve System should place a high priority on transparency and accountability.

Bank of Japan

The Bank of Japan has published its principles concerning eligible collateral in a document entitled “Guidelines on Eligible Collateral”. The following three principles are mentioned:

- With a view to maintaining the soundness of the Bank’s assets, the Bank shall only accept collateral with sufficient creditworthiness and marketability. Moreover, there should be no obstacles to the Bank’s exercising of its rights, including the security interest.
- The Bank shall give proper consideration to the smooth operation of its business and efficient use of collateral.
- The Bank shall make effective use of market information, such as ratings by rating agencies in assessing the eligibility of collateral and market prices in calculating collateral prices, and public information in evaluating the creditworthiness of corporate debt obligations, asset-backed securities (ABS) and asset-backed commercial paper (ABCP).

Eurosystem

Unlike those of the Federal Reserve System and the Bank of Japan, the Eurosystem’s principles are not stated explicitly, but can be derived mostly from the EC Treaty and the ESCB Statute. The core principles are:

- Collateral must protect the Eurosystem from incurring losses in its credit operations.
- The volume of collateral available to counterparties must ensure that the Eurosystem can effectively conduct monetary policy operations and promote the use of the TARGET payment system.
- Eurosystem operations should be equally accessible to a broad set of counterparties.
- Eligible collateral should offer cost-efficient transfer and mobilisation conditions, credit risk evaluation and monitoring possibilities.
- The Eurosystem shall act in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources.
- The collateral framework should be simple and transparent.

These principles can be distilled down to a rather similar set of elements:

- First, all three central banks require eligible collateral to be creditworthy in order to maintain the soundness of the bank's assets.
- Second, the type and quantity of eligible collateral must allow the central bank to conduct its open market operations smoothly, even for large amounts at very short notice. In addition, the choice and quantity of collateral available must allow the payment systems to function efficiently.
- Third, all three central banks strive for efficiency. Thus, in its mobilisation, the collateral ideally should not incur costs that exceed the actual benefits to counterparties.
- Fourth, all three central banks aim for a high degree of transparency and accountability in order to ensure that the public trusts that the institution is behaving objectively, responsibly and with integrity, and that it is not favouring any special interests. For the collateral framework, this means selecting assets for eligibility based on objective and publicly available principles and criteria, while avoiding unnecessary discretion.
- Fifth, all three central banks, albeit in rather different ways, strive to avoid distortions to asset prices or to market participants' behaviour which would lead to an overall loss in welfare.

2 COMMON GOAL, DIFFERENT IMPLEMENTATION

One of the asset classes which would normally most readily comply with these principles is marketable securities issued by the central government. Government securities are generally the asset class which is most available on banks' balance sheets and thus they ensure that operations of a sufficient size can be conducted without disrupting financial

markets. Government bonds have a low cost of mobilisation, as they can be easily transferred and handled through securities settlement systems, and the information required for pricing and evaluating their credit risk is publicly available. Furthermore, accepting government bonds would not conflict with the central bank's objectives of being transparent and accountable, as well as of avoiding the creation of market distortions.

Having said this, there are other types of asset that also clearly fulfil these principles. In fact, all three central banks have expanded the eligibility criteria beyond central government debt securities, although to different degrees. The Federal Reserve System, in its temporary open market operations, accepts not only government securities, but also securities issued by the government-sponsored agencies and mortgage-backed securities guaranteed by the agencies; in its primary credit facility operations, the Federal Reserve System accepts a very wide range of assets, such as corporate and consumer loans, as well as cross-border collateral. For temporary lending operations, the Bank of Japan and the Eurosystem accept as collateral a very wide range of private-sector fixed income securities, as well as loans to the public and private sector. For each central bank, the decision to expand the eligibility criteria beyond government securities can be explained by several factors related to the overall design of the operational framework, such as the size of the temporary operations and the decision on how many counterparties can participate, as well as by the financial environment in which the central bank operates, in particular, the depth and integration of non-government securities markets. These factors are explored in detail in the following two sub-sections.

2.1 CHOICES OF THE OVERALL OPERATIONAL FRAMEWORK

One of the key aspects of the operational framework which impacts on the collateral framework is how the central bank supplies liquidity to the banking sector. Table 1 compares

Table 1 Comparison of sizes of credit operations

(averages for 2006, in EUR billions)

	Federal Reserve System		Eurosystem		Bank of Japan	
	Average outstanding amount	% of balance sheet	Average outstanding amount	% of balance sheet	Average outstanding amount	% of balance sheet
Temporary operations	19	3	422.4	38	274	34
Lombard facility	0.2	0	0.1	0	0.6	0.1
Intraday credit	102 ¹⁾	15	260 ²⁾	24	124.3	15.5
Total	121	18	682.5	62	398.9	49.7

Source: Federal Reserve System, ECB and Bank of Japan.
Note: Converted to euro using end-2006 exchange rates.

1) 2005 data.

2) Estimate.

the size of central bank credit operations, both in terms of amounts outstanding and as a proportion of their total balance sheet.

The table raises a number of interesting observations. First, the size of the Federal Reserve System's temporary open market operations is significantly lower than that of the Eurosystem and the Bank of Japan, both in absolute amounts and as a proportion of the balance sheet. This is because the Federal Reserve System primarily supplies funds to the banking sector via outright operations, which accounted for 90% of its balance sheet at the end of 2006. The Federal Reserve System's temporary operations play the role of smoothing short to medium-term fluctuations in liquidity needs at the margin. Second, for all three central banks, the size of the Lombard facility is negligible, in line with its role of providing funds when the market cannot provide them and putting a ceiling on overnight interest rates. Third, the Eurosystem issues by far the largest volume of intraday credit, both in absolute terms and as a proportion of its balance sheet.

The size of the temporary operations clearly has an impact on the choice of collateral: all other things being equal, the larger the size of the operations, the greater the need to expand the type of collateral accepted to a wider set of instruments in order to ensure that the central bank has the ability to conduct monetary policy and ensure the smooth operation of the payments system. This has had a significant influence on

the design of the Eurosystem's and the Bank of Japan's collateral frameworks, as both conduct much larger temporary operations than the Federal Reserve System.

A second important aspect of the overall operational set-up, which impacts on the design of the collateral frameworks, is the choice of counterparties that can participate in the various central bank operations. To ensure that its open market operations can be conducted efficiently on a daily basis and also at very short notice, the Federal Reserve System uses only a small group of currently 21 "primary dealers". These primary dealers are relied upon to redistribute liquidity to the rest of the banking sector. For the primary credit facility, the approach is different: all 7,000 credit institutions which have a reserve account with the Federal Reserve Bank and an adequate supervisory rating are allowed access. The Eurosystem's operational framework has been guided, instead, by the principle of ensuring access to its refinancing operations to any counterparty that so desires. All credit institutions subject to minimum reserve requirements can thus participate in the main temporary operations, provided they meet some basic requirements. Currently, about 1,700 are eligible to participate in regular open market operations, although in practice fewer than 500 participate regularly in such operations; whereas 2,150 have access to the Lombard facility and a similar number can use intraday credit. The Bank of Japan takes an intermediate approach in order to ensure that it can operate

in a wide range of different markets and instruments, but at the same time also maintain operational efficiency: around 150 counterparties are eligible to participate in the fund-supplying operations against pooled collateral, but they must also fulfil certain criteria.

The selection of counterparties has certain implications: all other things being equal, the wider their range, the more heterogeneous are the types of collateral asset held on their balance sheets. In the case of the Eurosystem, this heterogeneity of counterparties' balance sheets was even greater – relative to the other two central banks – due to the fragmented nature of national financial markets upon the inception of the euro in 1999. The Eurosystem has therefore considered it especially important to take into account this heterogeneity when designing its collateral framework, in order to ensure that banks in the different countries of the euro area can participate in central bank operations with relatively similar costs of collateral and without needing to significantly restructure their balance sheets. In the case of the Federal Reserve System, however, the relatively few counterparties participating in open market operations are very active in the government and agency securities market. It can therefore be fairly confident that these banks have large holdings of the same type of collateral. By contrast, for its primary credit facility operations, the Federal Reserve System has chosen a very diverse range of counterparties – even broader than that of the Eurosystem for open market operations – and it caters for this by accepting a very broad range of collateral.

Lastly, from an institutional perspective, it should be mentioned that the Eurosystem is also bound by Article 102 of the EC Treaty, which prohibits the public sector from having privileged access to finance from credit institutions. In designing the institutional framework for the single monetary policy, it was decided (in the form of a statement attached to Council Regulation (EC) No. 3604/93) that distinguishing between debt issued by public and private entities in the definition of eligible

collateral for central bank operations would only be permitted where such distinctions “are justified exclusively by differences in the solvency of the issuers or in the liquidity of the market of their debt instruments”. This essentially means that the Eurosystem cannot give preferential treatment to government bonds in its collateral framework and that any eligibility rules must be objectively and uniformly applied to both public and private-sector issuers. This institutional constraint does not apply to the other two central banks.

2.2 EXTERNAL CONSTRAINTS

In addition to the design of the overall operational framework, the central bank needs to take into account its specific financial environment, in particular the size of the government and private bond markets relative to the demand for collateral.

In the United States, there are three fixed-income assets – the US Treasury paper, the agency bond securities and mortgage-backed securities – which have large outstanding amounts, are highly liquid and standardised, have a high credit quality and are widely held on the primary dealers' balance sheets. The large size and liquidity of the markets for these assets ensure that the central bank can intervene at short notice and for large amounts, without disturbing financial markets.

The high credit rating of the issuers ensures that the Federal Reserve System faces little risk; in addition, the fact that all these securities are book-entry format and can be easily priced and settled ensures operational efficiency; lastly, operating in highly standardised markets of a limited number of public or quasi-public entities ensures transparency. Given the relatively small size of the Federal Reserve System's temporary operations (and the fact that the majority of these are already collateralised with US Treasury securities), it would probably be feasible to implement monetary policy only with government bonds. However, given that two other markets exist,

which also obviously fulfil the Federal Reserve System's principles, granting them eligibility provides even more flexibility to counterparties with relatively limited additional costs.

An important challenge for the Federal Reserve System occurred in the late 1990s and early 2000s, when there were expectations about persistent US Treasury budgetary surpluses, leading to a scarcity of US Treasury securities, as well as concerns about the impact on the implementation of monetary policy. The Federal Reserve System considered a range of different solutions, such as expanding the range of assets for its outright operations to include non-Treasury securities, or modifying and expanding its discount window operations to make it the main source of funds for the banking sector. At the same time, it assessed whether these changes to its operational framework would still comply with its core principles, in particular the effective implementation of monetary policy and the need for market neutrality.

In the euro area, private sector bond markets have not yet reached the same scale as in the United States, where the vast majority of residential mortgages are funded through the capital markets, in which the government-sponsored agencies have played a critical role. In the EU, however, the funding of residential mortgages is still predominantly done through retail deposits. It is estimated that retail deposits accounted for approximately 70% of €5.1 trillion of outstanding residential mortgage balances in the EU in 2005, with only 27.5% funded through securities, such as covered bonds and mortgage-backed securities, and the remainder through unsecured borrowing. In addition, in the EU, the corporate bond market is less developed than in the United States, as firms have traditionally tended to obtain financing directly from banks rather than the capital markets. The fact that loans still form a major part of the assets of Eurosystem counterparties, and will likely continue to do so for the foreseeable future, was one of the reasons why the Eurosystem developed a euro

area-wide eligibility framework for bank loans, which was launched at the start of 2007.

As well as having a more bank-based financial system, the other major influence on the set-up of the Eurosystem's collateral framework is the ongoing process of integration of the euro area financial markets. Whereas the other two central banks have had well-integrated markets for a long time, the Eurosystem needed to take into account the highly diverse nature of national financial markets at the start of 1999 when designing its collateral framework. One of the clearest consequences of this situation was the establishment of two tiers of collateral, with the first tier based on euro area-wide harmonised eligibility criteria and the second tier targeted towards the specific needs of the local banking sector. Although the level of segmentation in financial markets has subsided significantly over the last eight years and the two-tier list was finally phased out in 2007, the fact that some segments of the market are still not fully integrated continues to impact on the Eurosystem's collateral policy. At the same time, the Eurosystem's collateral framework has also had some positive effects in terms of fostering the integration of financial markets. For example, through the establishment of the Correspondent Central Banking Model (CCBM), the Eurosystem has facilitated the use of collateral on a cross-border basis in credit operations with the Eurosystem, thereby providing an additional incentive for counterparties to diversify their portfolios across assets in different countries. The use of collateral on a cross-border basis in credit operations with the Eurosystem increased from 12% in 1999 to more than 50% in 2006 as a result of the CCBM.

In Japan, private sector bond markets are also less developed than in the United States, with only a very small proportion of mortgages being financed through mortgage-related securities, and corporations mainly obtaining financing from banks rather than the capital markets. However, given that the government bond market is extremely deep, with higher

outstanding issuance volume than both the US and euro area government bond markets, the lack of alternative private sector bond markets has posed fewer difficulties for the Bank of Japan than for the Eurosystem. Nevertheless, the Bank of Japan has modified its collateral framework as the economic and financial environment has changed. It has also broadened the range of eligible collateral to include relatively new instruments, such as asset-backed securities (ABS), as the marketability of these instruments has increased. Furthermore, it made loans to the Deposit Insurance Corporation, as well as to the Government's "Special Account for the Allotment of Local Allocation Tax and Local Transfer Tax", eligible in early 2002. These actions noticeably increased the amount of eligible collateral and hence contributed to the smooth provision of liquidity under the quantitative easing policy.

3 ELIGIBILITY CRITERIA AND RISK CONTROL MEASURES

This section describes how the three central banks have translated their principles into eligibility criteria, while also taking into account the various external constraints that they face. The precise eligibility criteria are summarised very broadly in Table 2.

There are a number of interesting similarities and differences. First, the eligibility criteria for the Federal Reserve System's open market operations are fundamentally issuer-based: all debt securities issued by the US Treasury are eligible, plus all senior debt issued by the government-sponsored agencies (the largest of which are Fannie Mae, Freddie Mac and the Federal Home Loan Bank), plus all the mortgage-backed securities which are fully guaranteed by the same agencies. For the Eurosystem and the Bank of Japan's refinancing operations against pooled collateral, the eligibility criteria are more general and not issuer-based, so as to encompass a broader range of assets.

Second, the Federal Reserve System accepts a substantially wider range of collateral for its primary credit facility than in its open market operations; furthermore, the range of collateral accepted for its primary credit facility is also broader than that accepted in the Lombard facility at the Eurosystem and the Bank of Japan. For example, foreign currency-denominated securities, securities issued abroad, and mortgage loans to households are eligible for the Federal Reserve System's primary credit facility, but would not be eligible in Japan or the euro area.

Third, the Eurosystem is the only central bank that accepts unsecured bonds issued by credit institutions as collateral in its main open market operations, although these are eligible in the Federal Reserve System's primary credit facility. The Bank of Japan does not accept unsecured bonds issued by counterparties of the Bank to avoid disclosing the Bank's judgement on any particular counterparty's creditworthiness and collateralising credit to the counterparties with liabilities of the counterparties which may be redeemed by proceeds from the central bank's credit itself.

Fourth, ABS are generally eligible for use in the main open market operations of all three central banks, although, in the case of the United States, they must be guaranteed by a government agency. In 2006 the Eurosystem established some additional specific criteria that must be fulfilled by ABS and asset-backed commercial paper (ABCP)⁴: as well as fulfilling the other general eligibility criteria, such as being denominated in euro and settled in the euro area etc., there must be a true sale of the underlying assets to the special purpose vehicle (SPV)⁵ which issues the debt security, and the SPV must be bankruptcy remote so that the

4 Only a very small number of ABCP are currently eligible, mainly because they do not fulfil one of the general eligibility criteria, in particular the requirement to be traded on a regulated market or non-regulated market that is accepted by the ECB.

5 A true sale is the legal sale of an underlying portfolio of securities from the originator to the SPV, implying that investors in the issued notes are not vulnerable to claims against the originator of the assets.

Table 2 Comparison of eligibility criteria

	Federal Reserve System (temporary open market operations)	Federal Reserve System (primary credit facility)	Eurosystem	Bank of Japan	
Type of asset	Marketable debt securities	√	√	√ Debtor must not be a counterparty	
	Equities	-	√ Government agency stocks only	-	
	Bank loans	-	√	√ Debtor must be a non-financial corporation or public-sector entity √ Debtor must not be a counterparty	
Type of issuer/debtor	Central government	√	√	√	
	Government agency	√	√	√	
	Regional, local government	-	√	√	
	Corporate	-	√	√ Debtor must not be a counterparty	
	Bank	-	√	√ Debtor must not be a counterparty	
	Supranational	-	√	√ International financial institutions	
	Asset-backed securities	√ Only if guaranteed by an agency	√	√ Only if there is a true sale of assets and the SPV is bankruptcy remote from the originator	√ Only if there is a true sale of assets and the SPV is bankruptcy remote from the originator
	Household	-	√ Residential property and consumer loans	-	-
Issuer residence	Domestic	√	√	√	
	Foreign	-	√ Includes foreign governments, supranationals and European Pfandbriefe issuers	√ For marketable securities, it includes all 30 countries of the European Economic Area (EEA), the four non-EEA G10 countries and supranationals. √ Valid only for commercial paper that is guaranteed by a domestic resident, certain foreign governments and supranationals	
Seniority	Senior	√	√	√	
	Subordinated	-	-	-	
Credit standards	Minimum credit threshold for issuer or asset	Not applicable	Minimum rating of BBB or equivalent, but AAA for some complex or foreign currency assets	Minimum single A or equivalent Minimum rating varies from single A to AAA depending on issuer group and asset class ¹⁾ ; JGBs, government guaranteed bonds and municipal bonds are eligible regardless of the ratings	
Settlement	Domestic	√	√	√	
	Foreign	-	√ Euroclear, Clearstream and third party custodians	-	
Currency	Domestic	√	√	√	
	Foreign	-	√ Usually only the major currencies	-	

1) For bills, commercial paper, loans on deeds to companies and other corporate debt, the Bank of Japan evaluates collateral eligibility based on its own criteria for assessing a firm's creditworthiness. Additionally, for some assets, the Bank of Japan requires debtors to have at least a certain credit rating level from credit rating agencies.

underlying assets are beyond the reach of the originator and its creditors, including in the event of the originator's insolvency; the underlying assets must also not consist of credit-linked notes or similar claims resulting from the transfer of credit risk by means of credit derivatives. One of the clearest consequences of these criteria is that synthetic securitisations⁶, as well as collateralised bond obligations which include tranches of synthetic ABS as underlying assets, are not eligible. However, despite the introduction of these additional criteria, the volume of potentially eligible ABS is still very large, amounting to €746 billion at the end of August 2007 which is estimated at 58% of the entire European ABS market. The Bank of Japan has also established specific eligibility criteria for ABS and ABCP which are similar to those of the Eurosystem; there must be a true sale (i.e. no synthetic securitisation) and the SPV must be bankruptcy remote; alternative measures must also be set up for the collection of receivables and the securities must be rated AAA by a rating agency. In its open market operations, the Federal Reserve System only accepts mortgage-backed securities which are guaranteed by one of the government agencies (which incidentally also only constitute true sale securitisation), but in its discount window operations it will accept a wide range of ABS, ABCP and collateral debt obligations, including synthetic securitisation. Furthermore, in August 2007, there was a minor change in the discount window collateral policy which implied that a bank could pledge ABCP of issuers to whom that bank also provides liquidity enhancements, such as a line of credit.

Fifth, the Eurosystem and the Bank of Japan (as well as the Federal Reserve System in its primary credit facility) accept bank loans to corporations and the public sector as collateral.

Sixth, in terms of foreign collateral, there are both similarities and differences. In their open market operations, all three central banks only accept collateral in local currency, which is also issued and settled domestically. However,

unlike the other two central banks, the Eurosystem also accepts assets issued by entities from some countries outside the European Economic Area for its operations.

Lastly, all three central banks have somewhat different approaches regarding the assessment of compliance with the eligibility criteria and the disclosure to the banks as to which assets are eligible. The Federal Reserve System, in its open market operations, publishes its eligibility criteria in several documents and on its website. Owing to the simplicity of the assets it accepts, there is no need to publish a list of eligible assets on its website. For its primary credit facility, the Federal Reserve System publishes a general guide regarding the eligibility criteria and suggests that the counterparty contact its local Federal Reserve Bank regarding specific questions on the details of eligibility. The Bank of Japan publishes a general guideline on eligibility on its website, which for most assets sufficiently clarifies whether a specific asset is eligible or not. For some assets, whose obligors are private companies in most cases, the Bank of Japan only assesses eligibility upon the counterparty's request. For the Eurosystem, the ECB publishes a definitive list of all eligible marketable securities on a daily basis. Owing to the Eurosystem's very large and diverse collateral framework (about 26,000 securities are listed in the eligible asset database), as well as the decentralised settlement of transactions at the level of the Eurosystem NCBs, this is important both for transparency to counterparties and for operational efficiency. For obvious reasons, the eligibility of bilateral credit claims can only be assessed on request and a list cannot be published.

Once the eligibility criteria for counterparties and the collateral assets have been decided, the risk control framework then plays a crucial complementary role in ensuring that residual risks are kept at acceptably low levels. There

⁶ A synthetic securitisation uses credit derivatives to achieve the same credit-risk transfer as a true sale structure, but without physically transferring the assets.

are various tools that can be used for this purpose: counterparty borrowing limits; limits on collateral issuers or sectors; collateral valuation procedures; initial haircuts; margin calls; and close links prohibitions. All three central banks use a combination of these tools and, unlike in the choice of eligible collateral, the underlying methodologies and practices of the risk control frameworks are relatively similar:

- First, none of the central banks currently use counterparty borrowing limits for their temporary operations, and no predetermined limits are placed on exposure to certain individual collateral issuers or guarantors.
- Second, regarding the valuation of collateral, there are only some minor differences in the practices of the three central banks. For the Federal Reserve System's repo operations, valuation is carried out daily using prices from a variety of private vendors. For its primary credit facility operations, revaluation takes place at least weekly and is based on market prices, if available. In the case of the Eurosystem, valuation is carried out daily using the most representative price source, and, if no up-to-date price exists, theoretical valuation is used. At the Bank of Japan, daily valuation is used for the Japanese government bond repos, but weekly revaluation is used for the standing pool of collateral. For the valuation of bank loans, all three central banks generally use face value with the application of higher haircuts, generally depending on the maturity of the loan.
- Third, all three central banks use haircuts to take account of liquidity and market risk. The haircuts depend on the liquidity characteristics of the asset, issuer group, asset type, the residual maturity of the asset, and the coupon type. For the primary credit facility, if a market price does not exist, the Federal Reserve System uses the face value and applies higher haircuts.
- Fourth, all three central banks use global margin calls in case the aggregate value of the collateral pool falls below the total borrowing by the counterparty in a particular operation, i.e. margin calls are not calculated on an asset-by-asset basis.
- Fifth, all three central banks prohibit counterparties from using assets where they

Table 3 Comparison of volumes of potentially eligible collateral

(amounts outstanding, yearly average, 2005)

	Federal Reserve System (open market operations only)	Eurosystem (all credit operations)	Bank of Japan (all credit operations)
Total eligible collateral	€8.7 trillion	€10.8 trillion	€7.2 trillion
<i>of which %</i>			
Central government	40	39	73
Government agencies	25	0	1
Financial institutions	0	22	0
Mortgage-backed securities guaranteed by government agencies	35	0	0
Other asset-backed securities	0	4	0
Other securities	0	13	13
Loans	0	23	12

Sources: Federal Reserve System, ECB and Bank of Japan.

Notes: The figures for the Federal Reserve System only refer to the temporary open market operations, while for the Eurosystem and the Bank of Japan the figures refer to collateral eligible for all types of credit operation. In the case of loans eligible for credit operations of the Bank of Japan and the Eurosystem, it is the total amounts outstanding of loans to corporations (but not including small enterprises in Japan) and the public sector by domestically licensed banks. The obligors of these loans do not necessarily fulfil the eligibility criteria of the Bank of Japan and the Eurosystem and thus represent an indicative maximum volume. The quantity of Japanese commercial paper and corporate bonds, included under the category "Other securities", is only a rough estimation and only a proportion of these securities would fulfil the Bank of Japan's criteria.

may have a close financial link with the issuer, which would negate the protection from the collateral. This minimises the risk of a double default scenario.

4 STATISTICS ON VOLUMES OF ELIGIBLE COLLATERAL AND ITS USE BY COUNTERPARTIES IN CENTRAL BANK CREDIT OPERATIONS

Table 3 provides some figures for the volumes of securities and loans which were eligible for open market operations in the Federal Reserve System and for all credit operations for the other two central banks in 2005.

When converted to euro using end-2005 exchange rates, the Eurosystem has the largest amount of eligible collateral, at €10.8 trillion, compared with the Federal Reserve System at €8.7 trillion and the Bank of Japan at €7.2 trillion.⁷ The ratios of eligible collateral to the size of the operations that need to be collateralised show some interesting differences: for the Eurosystem and the Bank of Japan, eligible collateral is 16 and 18 times larger than the operations respectively, but for the Federal Reserve System eligible collateral is 453 times larger than the operations, essentially because of their relatively small size. Even based on the assumption that the Federal Reserve System collateralises intraday credit, this ratio only falls to 72.

There are also a number of differences regarding the actual composition of collateral. Although, for all three central banks, central government securities provide the bulk of potentially eligible collateral, the proportion of government securities is substantially higher for Japan (73%) than for the United States (40%) and the euro area (39%). Another interesting difference is the high volume of mortgage-backed securities eligible in the United States (35%) compared with Japan and the euro area, reflecting the significant role of the US government-sponsored agencies in fostering a large and liquid mortgage

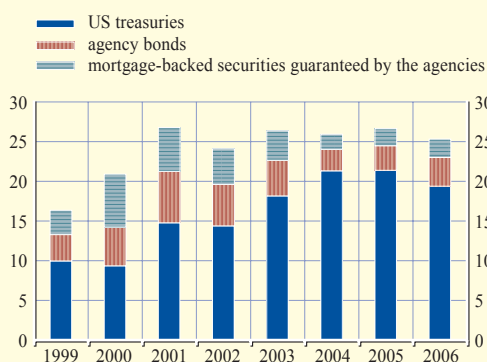
securities market. In the euro area, although ABS account for only 4% of eligible collateral, as already mentioned, this represents 58% of the whole ABS market. Loans to the public and corporate sectors also constitute a significant amount of eligible collateral in the Eurosystem (23%) and the Bank of Japan (13%), but are not accepted by the Federal Reserve System in its open market operations. Finally, it can be noted that the Eurosystem is the only central bank for which bonds issued by financial institutions play an important role, comprising 22% of all eligible collateral. In the case of the Bank of Japan and the Federal Reserve System, these types of bonds are not eligible for open market operations.

Of course, only a fraction of the potentially eligible assets are actually held on the balance sheets of the counterparties. Furthermore, the composition of the assets on the individual balance sheets will not match the overall composition of total eligible assets, as counterparties are likely to have very different investment strategies. According to informal surveys of the Federal Reserve System's primary dealers, its counterparties hold approximately 9% of all eligible collateral; in the case of the Eurosystem and the Bank of Japan, the percentage is roughly estimated to be significantly higher, at 33% and 40% respectively. The volume and composition of eligible assets held on counterparties' balance sheets is clearly an important factor in determining their actual use as collateral with the central banks.

⁷ For the Federal Reserve System, however, the figures only refer to the temporary open market operations; the volume of collateral that is potentially eligible for the primary credit facility is not available, but it is estimated to amount to tens of trillions of US dollars.

Chart 1 Composition of collateral used for repo operations with the Federal Reserve System

(yearly averages, in USD billions)



Source: Federal Reserve System.

As can be seen in Chart 1, in the Federal Reserve System's repo operations, US Treasury securities have been the dominant type of collateral used, and the share has been increasing substantially from a low of 45% in 2000 to around 80% in the last three years. On the other hand, mortgage-backed securities and agency bonds, which are in fact held in similar volumes to Treasuries on primary dealers' balance sheets, together account for only a fifth of collateral used. For the primary credit facility, bank loans are the dominant type of collateral, accounting for 73%

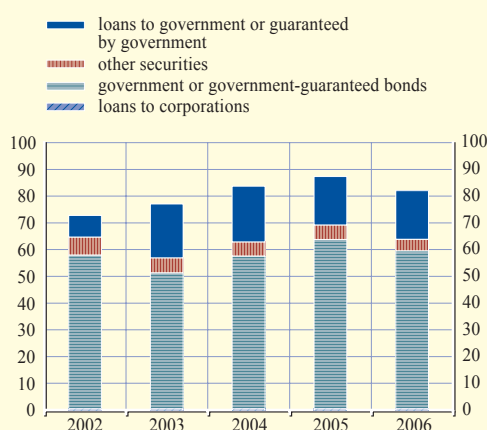
of total collateral pledged in March 2007, ABS are the next largest asset class, accounting for 15%, followed by corporate bonds with 7%.

In the case of the Bank of Japan, Japanese government or government-guaranteed bonds constitute a large share of collateral used, averaging around 70% for the last three years, while loans to corporations and loans to government or guaranteed by government accounted for 23% on average (see Chart 2). The remainder is composed of a broad range of local government or private sector marketable assets. The overwhelming majority of the loans on deeds are direct obligations of the Japanese government or guaranteed by the government; only a very small fraction consists of obligations of corporations. Thus, the total amount of collateral which consists of obligations of the government has averaged at more than 90% over the last four years.

As regards the Eurosystem, Chart 3 shows, first, that the amount of collateral mobilised has increased from €668 billion in 1999 to €959 billion in 2006, due primarily to larger temporary operations which were required to match the increase in banknotes in circulation. The composition of collateral has also changed

Chart 2 Composition of collateral used for temporary operations with the Bank of Japan

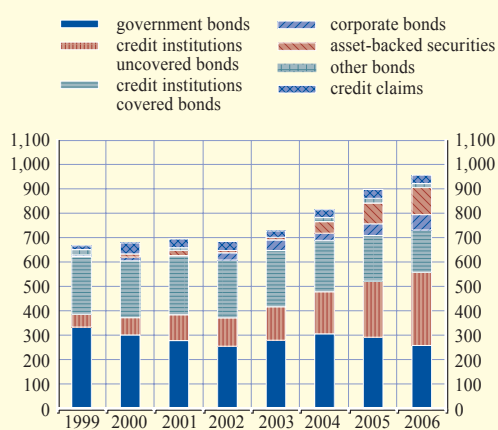
(yearly averages, in JPY trillions)



Source: Bank of Japan.

Chart 3 Composition of collateral used for temporary operations with the Eurosystem

(yearly averages, in EUR billions)



Source: ECB.

significantly over this period, reflecting changes in financial markets and the type of marketable securities held on banks' balance sheets. In 1999 government bonds accounted for just over half of all collateral mobilised; by 2006 their share had fallen to only 27%. The significant increase in collateral mobilised over this period was satisfied by unsecured bonds issued by credit institutions and ABS (the underlying assets of which have also been predominantly originated by credit institutions). This trend towards the use of unsecured bank bonds and ABS is driven partly by the strong increase in demand for collateral by the Eurosystem (which has risen significantly faster than holdings of eligible government bonds on counterparties' balance sheets⁸) but also by the more efficient use of collateral by counterparties, with government bonds being reserved for more profitable trades in the interbank repo market and for the securities lending business. Compared with the Federal Reserve System and the Bank of Japan, the Eurosystem now receives by far the lowest percentage of government collateral. This trend of substitution of government bonds is likely to be reinforced by the introduction of credit claims as eligible collateral from the start of 2007. Although the collateral used within the Eurosystem is becoming less liquid, creditworthiness is maintained thanks to the single A minimum credit rating threshold.

5 IMPACT OF COLLATERAL FRAMEWORKS ON THE MARKET

Although the impact of temporary operations on the relative prices of securities is likely to be substantially lower than that of outright operations, it cannot be ruled out that decisions on the types of collateral eligible for temporary operations could also have an impact on the market in a number of ways. As already mentioned briefly when discussing the principles underlying the collateral framework, all three central banks take into account the impact that their collateral framework might have on financial markets. The Federal Reserve System

explicitly aims to structure its portfolio and undertakes its activities so as to minimise their effect on relative asset prices and credit allocation in the private sector. The Eurosystem and Bank of Japan do not have the explicit objective of avoiding any influence on relative prices in financial markets, but instead endeavour to ensure that, if there is an impact, it does not lead to a negative effect on financial markets or social welfare in general.⁹

In theory, there are a number of ways in which the collateral framework can have an impact on the market.

First, if a central bank grants eligibility to an asset, it increases its liquidity, which would then raise its value in the secondary market relative to assets that are not eligible. This could also enhance the ability of the issuer to obtain credit from the private sector relative to issuers whose assets are not eligible. It is, however, a difficult exercise to quantify this "eligibility premium", since the effect may be muted due to several institutional factors. The most straightforward approach is to monitor price changes of previously ineligible securities when they become eligible. When this analysis was carried out for the euro area in 2005, when eligibility was granted to securities issued in euro in the euro area by residents outside of the European Economic Area, no clear evidence of a liquidity premium appeared.¹⁰ In the case of illiquid assets, such as bank loans, the eligibility premium is likely to be more significant, but any calculations would be fraught with difficulties due to the lack of market prices.

8 Using balance sheet data from euro area monetary and financial institutions, holdings of euro area government securities have increased only marginally from €1.1 trillion in 1999 to €1.3 trillion in 2006, at an average annual growth rate of 2%. Aggregate demand for collateral, on the other hand, increased at a rate of 5% over the same period.

9 This is related to the Eurosystem's statutory obligation, set out in Article 105(1) of the EC Treaty, which states that "the ESCB shall act in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources".

10 See "Credit risk mitigation in central bank operations and its effects on financial markets: the case of the Eurosystem", ECB Occasional Paper Series, No. 49, August 2006.

Second, the risk control framework could also in theory have an impact on the market. For example, if the haircuts applied to the securities accepted as collateral do not accurately reflect the fundamental market and liquidity risks of an asset, there could be incentives for arbitrage between the different assets, which could affect the price of the securities and the corresponding allocation of credit to the issuers. However, this secondary effect of the haircuts on an asset's market price should be even lower than the eligibility premium discussed above.

Third, the market can also be affected by the design of the open market operations. For example, at one extreme, the central bank could have separate auctions for each different type of collateral conducted in separate operations, i.e. an operation for government bonds, an operation for corporate bonds, and so on. The experience of the Federal Reserve System is somewhat closer to this approach as it conducts three operations, one for each type of underlying collateral, and acts as a price-taker in the auctions. Furthermore, operation sizes are selected across collateral types, relative to benchmarks for each type. At the other extreme, as in the Eurosystem's and the Bank of Japan's fund-supplying operations against pooled collateral, the central bank only conducts a single operation, which can be collateralised by a pool comprising a whole spectrum of liquid and illiquid instruments, the composition of which can be freely chosen by counterparties.

Furthermore, the tools chosen by the three central banks to avoid distortion to market prices are different. In order to minimise any effects on relative asset prices, the Federal Reserve System accepts only highly liquid assets in its temporary open market operations. If the market is very deep and liquid, the additional value granted by the eligibility as collateral with the central bank is likely to be insignificant. The Eurosystem, on the other hand, accepts a very broad range of collateral, ranging from highly liquid to illiquid, but avoids creating distortions by using objective and publicly available criteria in its asset

selection and ensuring that assets with similar properties are treated in a similar manner. For example, the eligibility criterion for creditworthiness is assessed through publicly available credit ratings, ensuring no discretion on the part of the Eurosystem and thus no perception of an official approval. The risk of creating distortions through granting eligibility and applying haircuts has been further reduced by a strategy of substantial diversification across issuers and asset types and by ensuring that the aggregate volume of eligible collateral is abundant. The eligibility criteria have also been designed to be very general so that the Eurosystem's collateral framework can adapt rather easily to developments in financial markets. For example, ABS automatically became eligible as their growth took off at the start of the decade, and it was only in 2006 that the Eurosystem adopted specific eligibility criteria for these securities. In its collateral framework, the Bank of Japan has strived to make effective use of market information, such as ratings by rating agencies in assessing the eligibility of collateral and market prices in calculating collateral prices. The Bank has also tried to expand the list of eligible collateral so that instruments in newly developed markets are not treated unfavourably.

6 CONCLUSION

This article illustrates that the fundamental principles of the collateral frameworks of the Federal Reserve System, the Bank of Japan and the Eurosystem are similar. They strive to have a collateral framework which ensures that monetary policy is implemented effectively and that payment systems operate smoothly; they aim to ensure that the central bank takes on a very limited counterparty risk; furthermore, they aim at a high degree of operational efficiency, transparency and accountability, and, in different ways, not to negatively affect market equilibria. Nevertheless, these normative principles have been translated into practice in different ways to take account of economic and institutional constraints which are specific to

each central bank, illustrating that there is no single optimal design for a collateral framework. Despite these practical differences, there are still important lessons – both on a policy and technical level – which can be learned from comparing the specific eligibility criteria and risk control frameworks of the three central banks. Lastly, a central bank – through the design of its collateral framework and open market operations – has an impact on the functioning of financial markets. For example, the Eurosystem has had some positive repercussions on financial market integration through its collateral policy; more recently, by extending eligibility to credit claims at the start of 2007, it has confirmed a framework which existed before the setting-up of the euro in some euro area countries and generalised the liquidity profile of this asset class so that it can now be instantly converted into central bank money in all euro area countries. The impact of a central bank’s collateral policy on financial markets is a subject of high interest, which can be explored further from both a normative and empirical perspective.