Risk management

In 2017, we continue to implement most of the recommendations from the Enhanced Disclosure Task Force (EDTF) to improve bank risk disclosures(1). We have also implemented the temporary and permanent disclosure recommendations(2) that are applicable to DBS from the EDTF's November 2015 report, "Impact of expected credit loss (ECL) approaches on bank risk disclosures".

For an overview of the recommendations and where we have incorporated the relevant disclosures, refer to Summary of disclosures on page 112.

The table below gives an overview of the locations of our risk disclosures.

	Risk management section	Other locations in Annual Report	Pillar 3 disclosures(3)
Risk overview	**1** Risk overview 72 **2** Risk-taking and our business segments 72	Capital management and planning 92	**1** Introduction **3** Capital adequacy **6** Exposures and risk-weighted assets (RWA)
Risk governance	**3** Risk governance 73	Corporate governance report 48	
Risk appetite	**4.1** Risk thresholds and economic capital usage 74 **4.2** Stress testing 75	Remuneration report 62	
Credit risk	**5.1** Credit risk management at DBS 76 **5.2** Credit risk mitigants 78 **5.3** Internal credit risk models 78 **5.4** Credit risk in 2017 80	**Note 14** Financial assets and liabilities subject to netting agreement 143 **Note 41.1** Maximum exposure to credit risk 170 **Note 41.2** Loans and advances to customers 171 **Note 41.3** Credit quality of government securities and treasury bills and bank and corporate debt securities 175 **Note 41.4** Credit risk by geography and industry 175	**7.1** Credit risk assessed using Internal Ratings-Based Approach (IRBA) **7.2** Credit risk assessed using standardised approach **7.3** Credit risk mitigation **7.4** Counterparty credit risk-related exposures **8** Equity exposures under IRBA **9** Securitisation exposures **10.1** Credit exposures **10.2** Major credit exposures by geography and industry **10.3** Loans and advances to customers (by performing/ non-performing) **10.4** Movements in specific and general allowances
Market risk	**6.1** Market risk management at DBS 83 **6.2** Market risk in 2017 84		**10.6** Interest rate risk in the banking book **10.7** Equity exposures in the banking book
Liquidity risk	**7.1** Liquidity risk management at DBS 85 **7.2** Liquidity risk in 2017 87 **7.3** Liquid assets 88 **7.4** Regulatory requirements 88	**Note 42.1** Contractual maturity profile of assets and liabilities 177	**10.5** Total assets by residual contractual maturity
Operational risk	**8.1** Operational risk management 89 at DBS 90 **8.2** Operational risk in 2017		
Reputational risk	**9.1** Reputational risk management at DBS 91 **9.2** Reputational risk in 2017 91		

(1) See "Enhancing the Risk Disclosure of Banks" published by the Financial Stability Board in October 2012
(2) The additional considerations under the existing EDTF recommendations fall into the following three categories:
- *Permanent: Disclosures made in the pre-transition period, which should continue following the adoption of the ECL framework*
- *Temporary: Disclosures made in the pre-transition period, which should cease following the adoption of the ECL framework*
- *Post ECL Adoption Permanent: Disclosures to be made following the adoption of an ECL framework only*

(3) Refer to http://www.dbs.com/investor/index.html for DBS' Pillar 3 disclosures

The sections marked by a grey line in the left margin form part of the Group's audited financial statements

1 Risk overview

Business and strategic risk
An overarching risk arising from adverse business and economic changes materially affecting DBS' long-term objectives. This risk is managed separately under other governance processes.

Read more about our material matters on page 25.

Credit risk (page 76)
A risk arising from borrowers or counterparties failing to meet their debt or contractual obligations.

Market risk (page 83)
A risk arising from adverse changes in interest rates, foreign exchange rates, equity prices, credit spreads and commodity prices, as well as related factors.

Liquidity risk (page 85)
A risk that arises if DBS is unable to meet our obligations when they are due.

Operational risk (page 89)
A risk arising from inadequate internal processes, people or systems, as well as external events. This includes legal risk, and excludes strategic and reputational risk.

Reputational risk (page 91)
A risk that arises if our shareholder value (including earnings and capital) is adversely affected by any negative stakeholder perception of DBS' image. This influences our ability to establish new relationships or services, continue servicing existing relationships and have continued access to sources of funding. Reputational risk usually occurs when the other risks are poorly managed.

2 Risk-taking and our business segments

Because we focus on Asia's markets, we are exposed to concentration risks within the region. We manage these risks by diversifying our risk across industries and individual exposures. In addition, DBS relies on the specialist knowledge of our regional markets and industry segments to effectively assess our risks. The chart below provides an overview of the risks arising from our business segments. The asset size of each business segment reflects its contribution to the balance sheet, and the risk-weighted assets (RWA) refer to the amount of risk incurred.

Refer to Note 44 to the financial statements on page 180 for more information about DBS' business segments.

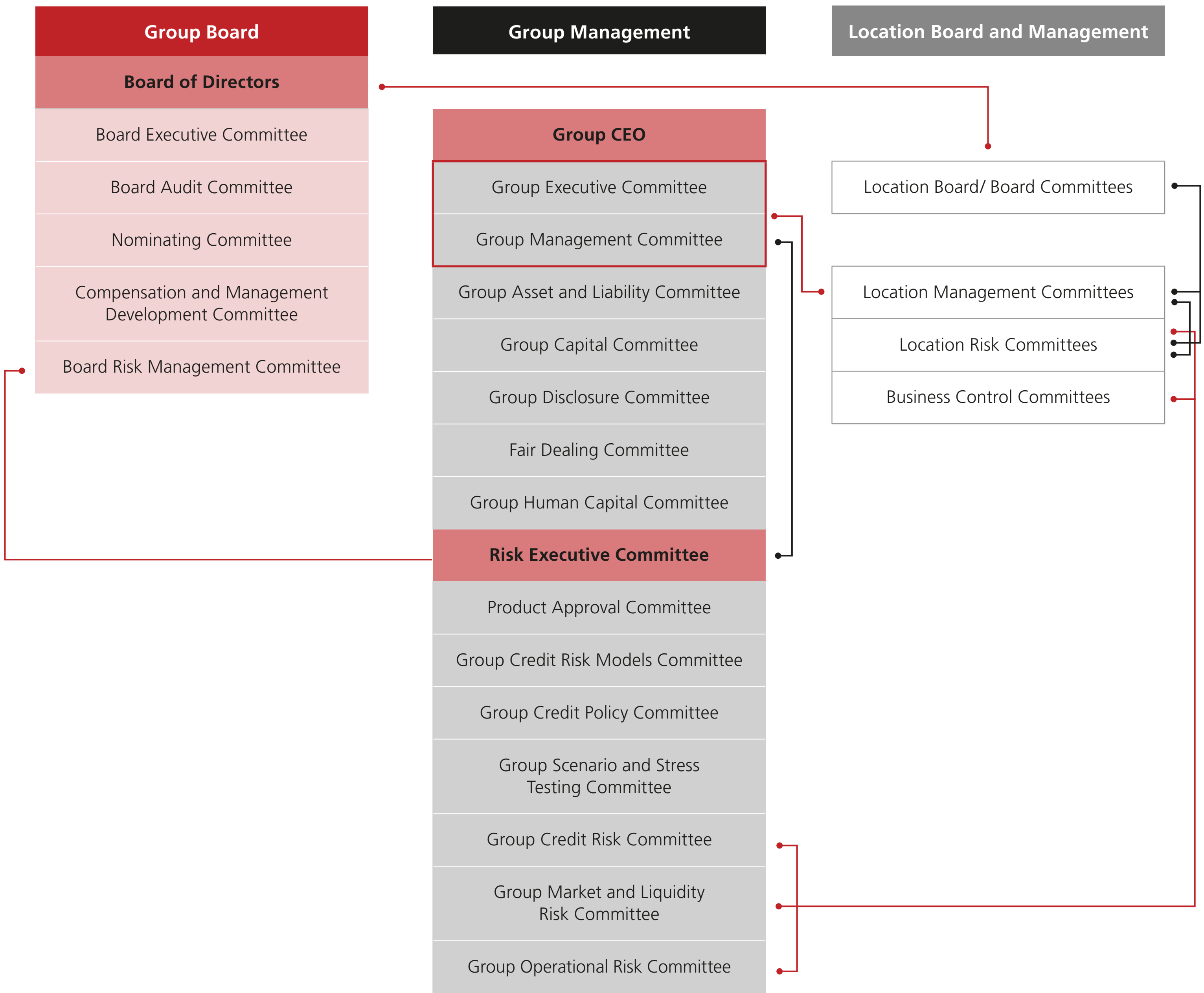
SGD million	Consumer Banking/ Wealth Management	Institutional Banking	Treasury Markets	Others[(a)]	Group
Assets[(b)]	110,718	246,863	103,158	51,807	512,546
Risk-weighted assets	42,355	170,391	53,448	21,395	287,589
% of RWA					
Credit risk	85%	94%	30%	78%	80%
Market risk	0%	0%	66%	15%	13%
Operational risk	15%	6%	4%	7%	7%

(a) *Encompasses assets/ RWA from capital and balance sheet management, funding and liquidity activities, DBS Vickers Group and The Islamic Bank of Asia Limited*
(b) *Before goodwill and intangibles*

3 Risk governance

The Board oversees DBS' affairs and provides sound leadership for the CEO and management. Authorised by the Board, various Board committees oversee specific responsibilities based on clearly defined terms of reference.

Under our risk management approach, the Board, through the Board Risk Management Committee (BRMC), sets our Risk Appetite, oversees the establishment of enterprise-wide risk management policies and processes, and sets risk appetite limits to guide DBS' risk-taking.



Note: The lines reflect possible escalation protocols and are not reporting lines per se

The BRMC oversees the identification, monitoring, management and reporting of credit, market, liquidity, operational and reputational risks. To facilitate the BRMC's risk oversight, the following risk management committees have been established.

Risk management committees	
Risk Executive Committee (Risk EXCO)	As the overall executive body regarding risk matters, the Risk EXCO oversees DBS' risk management as a whole.
Product Approval Committee (PAC)	The PAC oversees new product approvals, which are vital for mitigating risk within DBS. The committee assesses the reputational risk and suitability of products. In addition, the committee assesses whether we have the appropriate systems to monitor and manage the resulting risks.
Group Credit Risk Models Committee (GCRMC) **Group Credit Policy Committee (GCPC)** **Group Scenario and Stress Testing Committee (GSSTC)** **Group Credit Risk Committee (GCRC)** **Group Market and Liquidity Risk Committee (GMLRC)** **Group Operational Risk Committee (GORC)**	Each of the committees reports to the Risk EXCO, and the committees as a whole serve as an executive forum to discuss and implement DBS' risk management. Key responsibilities: • Assess and approve risk-taking activities • Oversee DBS' risk management infrastructure, which includes frameworks, decision criteria, authorities, people, policies, standards, processes, information and systems • Approve risk policies such as model governance standards, stress testing scenarios, and the evaluation and endorsement of risk models • Assess and monitor specific credit concentration • Recommend scenarios and the resulting macroeconomic variable projections used for enterprise-wide stress tests The members in these committees comprise representatives from the Risk Management Group (RMG) as well as key business and support units.

Most of the above committees are supported by local risk committees in all major locations, where appropriate. These local risk committees oversee the local risk positions for all businesses and support units, ensuring that they keep within the limits set by the Group risk committees. They also approve location-specific risk policies.

The Chief Risk Officer (CRO), who is a member of the Group Executive Committee and reports to the Chairman of the BRMC and the CEO, oversees the risk management function. The CRO is independent of business lines and is actively involved in key decision-making processes. He often engages with regulators to discuss risk matters, enabling a more holistic risk management perspective.

Working closely with the risk and business committees, the CRO is responsible for the following:
- Management of DBS' risks, including systems and processes to identify, approve, measure, monitor, control and report risks
- Engagement with senior management about material matters regarding all risk types
- Development of risk controls and mitigation processes
- Ensuring DBS' risk management is effective, and the Risk Appetite established by the Board is adhered to

4 Risk Appetite

DBS' Risk Appetite is set by the Board and governed by the Risk Appetite Policy – a key part of our risk culture. A strong organisational risk culture is imperative for DBS to move forward, and this includes an effective incentive framework (refer to "Remuneration Report" on page 62).

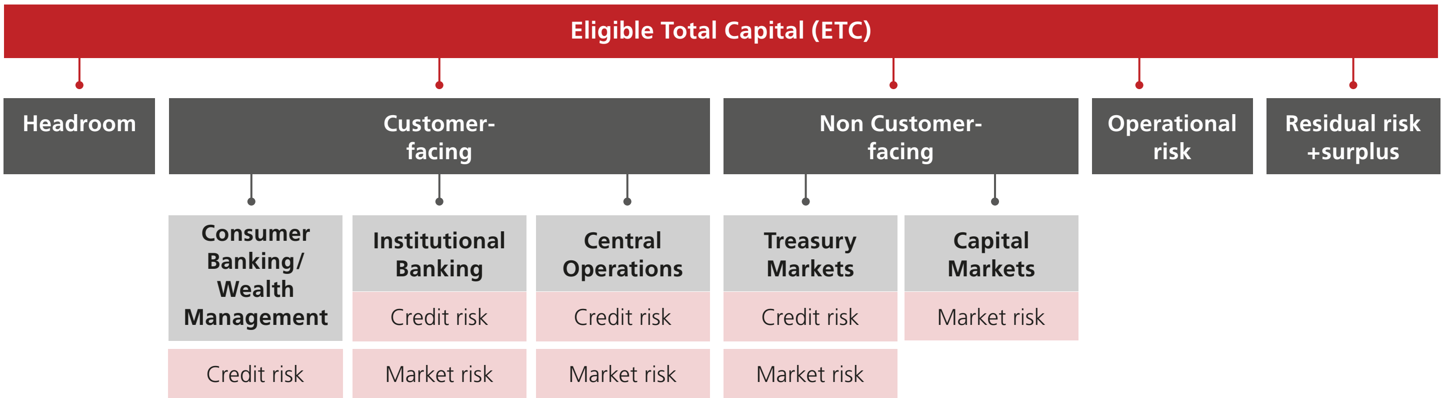
4.1 Risk thresholds and economic capital usage

Our Risk Appetite takes into account a spectrum of risk types and it is implemented using thresholds, policies, processes and controls.

Threshold structures are essential in making DBS' Risk Appetite an intrinsic part of our businesses, because they help to keep all our risks within acceptable levels. Portfolio risk limits for the quantifiable risk types reach all parts of DBS from the top down, and these are implemented using formal frameworks. As for the non-quantifiable risk types, these are controlled using qualitative principles.

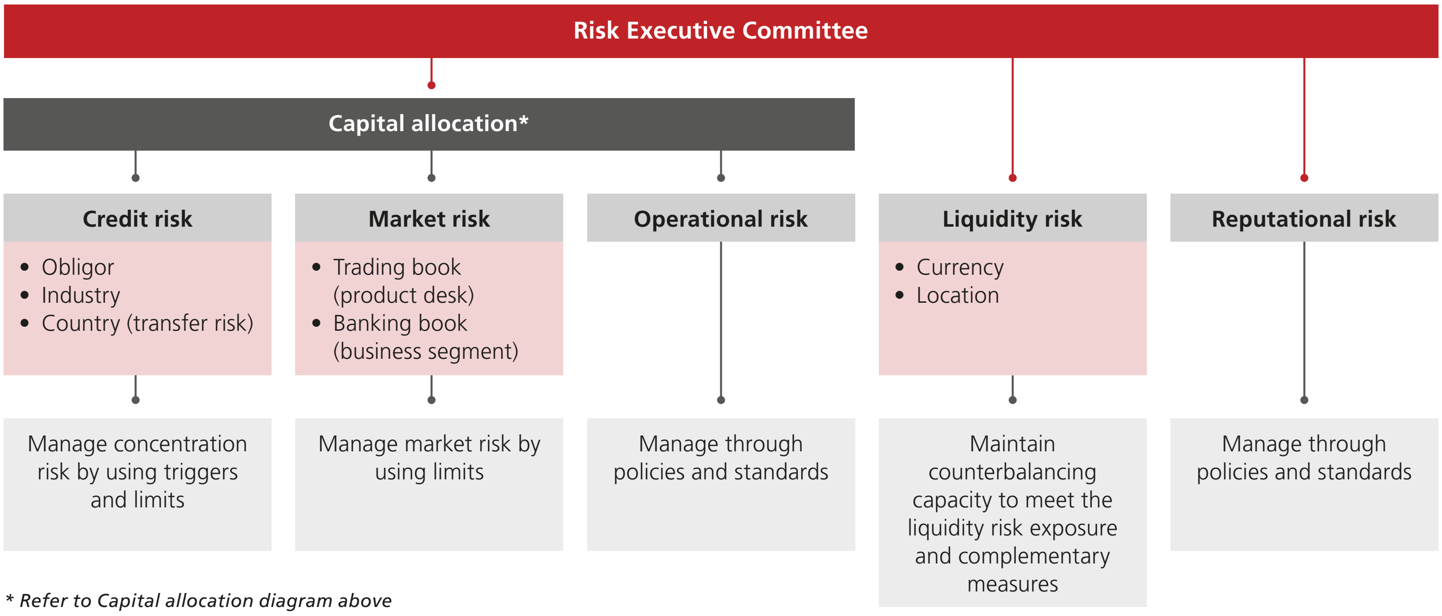
To ensure that the thresholds pertaining to our Risk Appetite are completely risk sensitive, we have adopted economic capital (EC) as our primary risk metric. EC is also a core component in our Internal Capital Adequacy Assessment Process (ICAAP).

Risk Appetite is managed through a capital allocation structure to monitor internal capital demand. The diagram below shows how risk is managed along the dimensions of customer-facing and non customer-facing units.



As a commercial bank, DBS allocates more EC to our Consumer Banking/ Wealth Management and Institutional Banking business segments, as compared to Treasury Markets. A buffer is also maintained for other risks as well, including country, operational, reputational and model risks.

The following chart provides a broad overview of how our Risk Appetite permeates throughout DBS. Refer to Sections 5 through 9 for more information about each risk type.



** Refer to Capital allocation diagram above*

4.2 Stress testing

Stress testing is an integral part of our risk management process, and includes both sensitivity analysis and scenario analysis. Stress testing is conducted at least once annually. This relates to regulatory and internal stress tests over the whole portfolio and gamut of risk types. On top of this, additional stress tests are carried out in response to microeconomic and macroeconomic conditions or portfolio developments. Every stress test is documented and the results are discussed at the BRMC.

This element alerts senior management to our potential vulnerability to exceptional but plausible adverse events. As such, stress testing enables us to assess capital adequacy and identify potentially risky portfolio segments as well as inherent systematic risks. This then allows us to develop the right contingency plans, exit strategies and mitigating actions beforehand.

The ICAAP ensures our business plans are consistent with our risk appetite. This is done by comparing the projected demand for capital to the projected supply of capital in stress scenarios.

5 Credit risk

The most significant measurable risk DBS faces – credit risk – arises from our daily activities in our various businesses. These activities include lending to retail, corporate and institutional customers. It includes both the risk of lending as well as the pre-settlement and settlement risk of foreign exchange, derivatives and debt securities.

Refer to Note 41.1 to the financial statements on page 170 for details on DBS' maximum exposure to credit risk.

5.1 Credit risk management at DBS

DBS' approach to credit risk management comprises the following building blocks:

Policies
Risk methodologies
Processes, systems and reports

Policies

The dimensions of credit risk and the scope of its application are defined in the Group Credit Risk Management Policy. Senior management sets the overall direction and policy for managing credit risk at the enterprise level.

The Group Core Credit Risk Policies (CCRPs) established for Consumer Banking/ Wealth Management and Institutional Banking set forth the principles by which DBS conducts its credit risk management and control activities. These policies, supplemented by a number of operational policies and standards, ensure consistency in identifying, assessing, underwriting, measuring, reporting and controlling credit risk across DBS, and provide guidance in the formulation of business-specific and/ or location-specific credit risk policies and standards.

The operational policies and standards are established to provide greater details on the implementation of the credit principles within the Group CCRPs and are adapted to reflect different credit environments and portfolio risk profiles. The CCRPs are considered and approved by GCPC.

Risk methodologies

Credit risk is managed by thoroughly understanding our customers – the businesses they are in, as well as the economies in which they operate.

The assignment of credit risk ratings and setting of lending limits are integral parts of DBS' credit risk management process, and we use an array of rating models for our corporate and retail portfolios. Most of these models are built internally using DBS' loss data, and the limits are driven by DBS' Risk Appetite Statement and the Target Market and Risk Acceptance Criteria (TMRAC).

Wholesale borrowers are assessed individually using both judgmental credit risk models and statistical credit risk models. They are further reviewed and evaluated by experienced credit risk managers who consider relevant credit risk factors in the final determination of the borrower's risk. For some portfolios within the SME segment, DBS also uses a programme-based approach to achieve a balanced management of risks and rewards. Retail exposures are assessed using credit scoring models, credit bureau records as well as internally and externally available customer behaviour records. These are supplemented by our Risk Acceptance Criteria. Credit extensions are proposed by the business unit, and these are approved by the credit risk function after taking into account independent credit assessments and the business strategies set by senior management.

Refer to Section 5.3 on page 78 to read more about our internal credit risk models.

Pre-settlement credit risk for traded products arising from a counterparty potentially defaulting on its obligations is quantified by an evaluation of the market price plus potential future exposure. This is used to calculate DBS' regulatory capital under the Current Exposure Method (CEM), and is included within DBS' overall credit limits to counterparties for internal risk management.

We actively monitor and manage our exposure to counterparties in over-the-counter (OTC) derivative trades to protect our balance sheet in the event of a counterparty default. Counterparty risk exposures that may be adversely affected by market risk events are identified, reviewed and acted upon by management, and highlighted to the appropriate risk committees. Specific wrong-way risk arises when the exposure to a counterparty directly correlates with the probability of defaulting due to the nature of the transactions. DBS has a policy to guide the handling of specific wrong-way risk transactions, and its risk measurement metric takes into account the higher risks associated with such transactions.

Issuer default risk that may also arise from derivatives, notes and securities are generally measured based on jump-to-default computations.

Concentration risk management

Our risk management processes, which are aligned with our Risk Appetite, ensure that an acceptable level of risk diversification is maintained across DBS.

For credit risk, we use EC as our measurement tool, since it combines the individual risk factors of probability of default (PD), loss given default (LGD) and exposure at default (EAD), as well as portfolio concentration factors. Granular EC thresholds are set to ensure that the allocated EC stays within our Risk Appetite.

Thresholds regarding major industry groups and single counterparty exposures are monitored regularly, and notional limits for country exposures are set as well. Governance processes are in place to ensure that our exposures are regularly monitored with these thresholds in mind, and appropriate actions are taken when the thresholds are breached.

DBS continually examines how we can enhance the scope of our thresholds to effect better risk management.

Country risk

Country risk refers to the risk of loss due to events in a specific country (or a group of countries). This includes political, exchange rate, economic, sovereign and transfer risks.

DBS manages country risk through the requirements of the Bank's CCRPs and the said risk is part of our concentration risk management. The way we manage transfer risk at DBS is set out in our Country Risk Management Standard. This includes an internal transfer risk and sovereign risk rating system, where assessments are made independently of business decisions. Our transfer risk limits are set in accordance with the Group Risk Appetite Policy.

Country limits are set based on country-specific strategic business considerations as well as the acceptable potential loss according to our Risk Appetite. Senior management and credit management actively evaluate and determine the appropriate transfer risk exposures for DBS taking into account the risks and rewards and whether they are in line with our strategic intent. Limits for all other countries are set using a model-based approach.

All country limits are approved by the BRMC.

Credit stress testing

DBS engages in various types of credit stress testing, and these are driven either by regulators or our internal requirements and management.

Our credit stress tests are performed at total portfolio or sub-portfolio level, and are generally meant to assess the impact of changing economic conditions on asset quality, earnings performance, capital adequacy and liquidity. DBS' stress testing programme is comprehensive and covers all major functions and areas of business.

DBS typically performs the following types of credit stress testing at a minimum and others as necessary:

Pillar 1 credit stress testing	DBS conducts Pillar 1 credit stress testing regularly as required by regulators. Under Pillar 1 credit stress testing, DBS assesses the impact of a mild stress scenario (at least two consecutive quarters of zero GDP growth) on Internal Ratings-Based (IRB) estimates (i.e. PD, LGD and EAD) and the impact on regulatory capital. The purpose of the Pillar 1 credit stress test is to assess the robustness of internal credit risk models and the cushion above minimum regulatory capital.
Pillar 2 credit stress testing	DBS conducts Pillar 2 credit stress testing once a year as part of the ICAAP. Under Pillar 2 credit stress testing, DBS assesses the impact of stress scenarios, with different levels of severity, on asset quality, earnings performance as well as internal and regulatory capital. The results of the credit stress tests form inputs to the capital planning process under ICAAP. The purpose of the Pillar 2 credit stress testing is to examine, in a rigorous and forward-looking manner, the possible events or changes in market conditions that could adversely impact DBS.
Industry-wide stress testing	DBS participates in the annual industry-wide stress test (IWST) conducted by the Monetary Authority of Singapore (MAS) to facilitate its ongoing assessment of financial stability. Under the IWST, DBS is required to assess the impact of adverse scenarios, as defined by the regulator, on asset quality, earnings performance and capital adequacy.
Sensitivity and scenario analyses	DBS also conducts multiple independent sensitivity analyses and credit portfolio reviews based on various scenarios. The intent of these analyses and reviews is to identify vulnerabilities for the purpose of developing and executing mitigating actions.

Processes, systems and reports

DBS constantly invests in systems to support risk monitoring and reporting for our Institutional Banking and Consumer Banking/ Wealth Management businesses.

The end-to-end credit process is continually being reviewed and improved through various front-to-back initiatives involving the business units, the operations unit, the RMG and other key stakeholders. Day-to-day monitoring of credit exposures, portfolio performance and external environmental factors potentially affecting credit risk profiles is key to our philosophy of effective credit risk management.

In addition, risk reporting on credit trends, which may include industry analysis, early warning alerts and significant weak credits, is submitted to the various credit committees, allowing key strategies and action plans to be formulated and evaluated. Credit control functions also ensure that any credit risk taken complies with group-wide credit risk policies and standards. These functions ensure that approved limits are activated, credit excesses and policy exceptions are appropriately endorsed, compliance with credit standards is carried out, and covenants established are monitored.

Independent risk management functions that report to the CRO are jointly responsible for developing and maintaining a robust credit stress testing programme. These units oversee the implementation of credit stress tests as well as the analysis of the results, of which management, various risk committees and regulators are informed.

Non-performing assets

DBS' credit facilities are classified as "Performing assets" or "Non-performing assets" (NPA), in accordance with the MAS Notice to Banks No. 612 "Credit Files, Grading and Provisioning" (MAS Notice 612).

These guidelines require credit portfolios to be categorised into one of the following five categories, according to our assessment of a borrower's ability to repay a credit facility from its normal sources of income.

The link between the MAS categories shown below and DBS' internal ratings is shown in Section 5.3 on page 79.

Classification grade	Description
Performing assets	
Pass	Indicates that the timely repayment of the outstanding credit facilities is not in doubt.
Special mention	Indicates that the borrower exhibits potential weaknesses that, if not corrected in a timely manner, may adversely affect future repayments and warrant close attention by DBS.
Classified or NPA	
Substandard	Indicates that the borrower exhibits definable weaknesses in its business, cash flow or financial position that may jeopardise repayment on existing terms. These credit facilities may be non-defaulting.
Doubtful	Indicates that the borrower exhibits severe weaknesses such that the prospect of full recovery of the outstanding credit facilities is questionable and the prospect of a loss is high, but the exact amount remains undeterminable.
Loss	Indicates that the amount of recovery is assessed to be insignificant.

A default is considered to have occurred with regard to a particular borrower when either or both of the following events have taken place:

- Subjective default: Borrower is considered to be unlikely to pay its credit obligations in full, without DBS taking action such as realising security (if held)
- Technical default: Borrower is more than 90 days past due on any credit obligation to DBS

This is consistent with the guidance provided under the MAS' Notice to Banks No. 637 "Notice on Risk Based Capital Adequacy Requirements for Banks Incorporated in Singapore" (MAS Notice 637).

Credit facilities are classified as restructured assets when we grant non-commercial concessions to a borrower because its financial position has deteriorated or is unable to meet the original repayment schedule. A restructured credit facility is classified into the appropriate non-performing grade based on the assessment of the borrower's financial condition and its ability to repay according to the restructured terms.

Such credit facilities are not returned to the performing status until there are reasonable grounds to conclude that the borrower will be able to service all future principal and interest payments on the credit facility in accordance with the restructured terms. Apart from what has been described, we do not grant concessions to borrowers in the normal course of business.

In addition, it is not within DBS' business model to acquire debts that have been restructured at inception (e.g. distressed debts).

Refer to Note 2.11 to the financial statements on page 136 for our accounting policies regarding specific and general allowances for credit losses.

In general, specific allowances are recognised for defaulting credit exposures rated substandard and below.

The breakdown of our NPA by loan grading and industry and the related amounts of specific allowances can be found in Note 41.2 to the financial statements on page 171. A breakdown of past due loans can also be found in the same note.

When required, we will take possession of all collateral and dispose of them as soon as practicable. Realised proceeds are used to reduce outstanding indebtedness.

A breakdown of collateral held for NPA is shown in Note 41.2 to the financial statements on page 171.

Repossessed collateral is classified in the balance sheet as other assets. The amounts of such other assets for 2017 and 2016 were not material.

5.2 Credit risk mitigants

Collateral received

Where possible, DBS takes collateral as a secondary recourse to the borrower. This includes, but is not limited to, cash, marketable securities, real estate, trade receivables, inventory and equipment, and other physical and/ or financial collateral. We may also take fixed and floating charges on the assets of borrowers.

Policies are in place to determine the eligibility of collateral for credit risk mitigation. These include requiring specific collateral to meet minimum operational requirements in order to be considered as effective risk mitigants. DBS' collateral is generally diversified and periodic valuations of collateral are required. Real estate constitutes the bulk of our collateral, while marketable securities and cash are immaterial.

For derivatives, repurchase agreements (repo) and other repo-style transactions with financial market counterparties, collateral arrangements are typically covered under market-standard documentation, such as International Swaps and Derivatives Association (ISDA) Agreements and Master Repurchase Agreements. The collateral received is mark-to-market on a frequency DBS and the counterparties mutually agreed upon. This is governed by internal guidelines with respect to collateral eligibility. In the event of a default, the credit risk exposure is reduced by master-netting arrangements where DBS is allowed to offset what we owe a counterparty against what is due from that counterparty in a netting-eligible jurisdiction.

Refer to Note 14 to the financial statements on page 143 for further information on financial assets and liabilities subject to netting agreement but not offset on the balance sheet.

Collateral held against derivatives generally consists of cash in major currencies and highly rated government or quasi-government bonds. Exceptions may arise in certain countries, where due to domestic capital markets and business conditions, the bank may be required to accept less highly rated or liquid government bonds and currencies. Reverse repo-transactions are generally limited to large institutions with reasonably good credit standing. The bank takes haircuts against the underlying collateral of these transactions that commensurate with collateral quality to ensure credit risks are adequately mitigated.

In times of difficulty, we will review the customer's specific situation and circumstances to assist them in restructuring their repayment liabilities. However, should the need arise, disposal and recovery processes are in place to dispose of collateral held by DBS. We also maintain a panel of agents and solicitors that helps us to dispose of non-liquid assets and specialised equipment quickly.

Collateral posted

DBS is required to post additional collateral in the event of a rating downgrade. As at 31 December 2017, for a three-notch downgrade of its Standard and Poor's Ratings Services and Moody's Investors Services ratings, DBS Bank will have to post additional collateral amounting to SGD 19 million (2016: SGD 44 million).

Other risk mitigants

DBS accepts guarantees as credit risk mitigants. Internal thresholds for considering the eligibility of guarantors for credit risk mitigation are in place.

5.3 Internal credit risk models

DBS adopts rating systems for the different asset classes under the Internal Ratings-Based Approach (IRBA).

There is a robust governance process for the development, independent validation and approval of any credit risk model. The models go through a rigorous review process before they are endorsed by the GCRMC and the Risk EXCO. They must also be approved by the BRMC before being used. The key risk measures generated by the internal credit risk rating models to quantify regulatory capital include PD, LGD and EAD. For portfolios under the Foundation IRBA, the supervisory LGD and EAD estimates are applied. For retail portfolios under the Advanced IRBA, internal estimates are used. In addition, the ratings from the credit models act as the basis for underwriting credit risk, monitoring portfolio performance and determining business strategies. The performance of the rating systems is monitored regularly by the GCRMC and the BRMC to ensure their ongoing effectiveness.

An independent risk unit conducts formal validations for the respective rating systems annually. The validation processes are also independently reviewed by Group Audit. This serves to highlight material deterioration in the rating systems for management attention.

5.3.1 Retail exposure models

Retail portfolios are categorised into the following asset classes under the Advanced IRBA: residential mortgages, qualifying revolving retail exposures and other retail exposures.

Within each asset class, exposures are managed on a portfolio basis. Each account is assigned to a risk pool, considering factors such as borrower characteristics and collateral type. Loss estimates are based on historical default and realised losses within a defined period. Default is identified at facility level.

Business-specific credit risk elements such as underwriting criteria, scoring models, approving authorities and asset quality and business strategy reviews, as well as systems, processes and techniques to monitor portfolio performance, are in place. Credit risk models for secured and unsecured portfolios are also used to update the risk level of each loan on a monthly basis, reflecting the broad usage of risk models in portfolio quality reviews.

5.3.2 Wholesale exposure models

Wholesale exposures are under the Foundation IRBA for capital computation. They include sovereign, bank and corporate. Specialised lending exposures are under the IRB supervisory slotting criteria approach.

The risk ratings for the wholesale exposures (other than securitisation exposures) are mapped to corresponding external rating equivalents.

Sovereign exposures are risk-rated using internal risk-rating models. Factors related to country-specific macroeconomic risk, political risk, social risk and liquidity risk are included in the sovereign rating models to assess the sovereign credit risk in an objective and systematic manner.

Bank exposures are assessed using the bank-rating model. The model considers both quantitative and qualitative factors such as capital levels and liquidity, asset quality, earnings, management and market sensitivity. The credit risk ratings derived are benchmarked against external credit risk ratings to ensure that the internal ratings are well-aligned and appropriately calibrated.

Large corporate credits are assessed using internal rating models. Factors considered in the risk assessment process include the counterparty's financial standing and qualitative factors such as industry risk, access to funding, market standing and management strength.

SME credit rating models consider risk factors on the counterparty's financial position and strength, as well as its account performance.

Credit risk ratings under the IRBA portfolios are, at a minimum, reviewed by designated approvers on an annual basis unless credit conditions require more frequent assessment.

A description of the internal ratings used, the corresponding external ratings and MAS classification for the various portfolios is as follows:

Grade (ACRR)	Description of rating grade	Equivalent external rating	MAS classification	
PD Grade 1	Taking into account the impact of relevant economic, social or geopolitical conditions, the borrower's capacity to meet its financial commitment is exceptional.	AAA	Pass	Performing assets
PD Grade 2	Taking into account the impact of the relevant economic, social or geopolitical conditions, the borrower's capacity to meet its financial commitment is excellent.	AA+, AA, AA-	Pass	Performing assets
PD Grade 3	More susceptible to adverse economic, social, geopolitical conditions and other circumstances. The borrower's capacity to meet its financial commitment is strong.	A+, A, A-	Pass	Performing assets
PD Grade 4A/ 4B	Adequate protection against adverse economic, social or geopolitical conditions or changing circumstances. More likely to lead to a weakened capacity for the borrower to meet its financial commitment.	BBB+/ BBB	Pass	Performing assets
PD Grade 5	Relatively worse off than a borrower rated "4B" but exhibits adequate protection parameters.	BBB-	Pass	Performing assets
PD Grade 6A/ 6B	Satisfactory capacity for the borrower to meet its financial commitment but this may become inadequate due to adverse business, financial, economic, social or geopolitical conditions and changing circumstances.	BB+/ BB	Pass	Performing assets
PD Grade 7A/ 7B	Marginal capacity for the borrower to meet its financial commitment but this may become inadequate or uncertain due to adverse business, financial, economic, social or geopolitical conditions and changing circumstances.	BB-	Pass	Performing assets

Grade (ACRR)	Description of rating grade	Equivalent external rating	MAS classification	
PD Grade 8A	Sub-marginal capacity for the borrower to meet its financial commitment. Adverse business, financial or economic conditions will likely impair its capacity or wiliness to meet its financial commitment.	B+	Pass	Performing assets
PD Grade 8B/ 8C[(a)]	Low capacity for the borrower to meet its financial commitment. Adverse business, financial or economic conditions will likely impair its capacity or wiliness to meet its financial commitment.	B/ B-	Special mention	Performing assets
PD Grade 9	Borrower is vulnerable to non-payment and is dependent upon favourable business, financial and economic conditions to meet its financial commitment. Likely to have little capacity to meet its financial commitment under adverse conditions.	CCC-C	Sub standard (non-defaulting)	Non-performing assets
PD Grade 10 and above	A borrower rated "10" and above is in default (as defined under MAS Notice 637).	D	Sub standard and below (defaulting	Non-performing assets

(a) For companies scored by the HK SME Scoring Model, in addition to the ACRR, there is a further test to evaluate whether the borrower meets the criteria of Special mention. If it does not, the ACRR can remain as 8B/ 8C but is not classified as Special mention

5.3.3 Specialised lending exposures

Specialised lending IRBA portfolios include income-producing real estate, project finance, object finance, hotel finance and commodities finance. These adopt the supervisory slotting criteria specified under Annex 7v of MAS Notice 637, which are used to determine the risk weights to calculate credit risk-weighted exposures.

5.3.4 Securitisation exposures

DBS is not active in securitisation activities that are motivated by credit risk transfer or other strategic considerations. As a result, we do not securitise our own assets, nor do we acquire assets with the view of securitising them.

We arrange securitisation transactions for our clients for fees. These transactions do not involve special-purpose entities we control. For transactions that are not underwritten, no securitisation exposures are assumed as a direct consequence of arranging the transactions. Any decision to invest in any of such arranged transactions is subject to independent risk assessment.

Where DBS provides an underwriting commitment, any securitisation exposure that arises will be held in the trading book to be traded or sold down in accordance with our internal policy and risk limits. In addition, DBS does not provide implicit support for any transactions we structure or have invested in.

We invest in our clients' securitisation transactions from time to time. These may include securitisation transactions arranged by us or other parties. We may also act as a liquidity facility provider, working capital facility provider or swap counterparty. Such exposures require the approval of the independent risk function, and are subject to regular risk reviews after they take place. We also have processes in place to monitor the credit risk of our securitisation exposures.

5.3.5 Credit exposures falling outside internal credit risk models

DBS applies the Standardised Approach (SA) for portfolios that are expected to transit to IRBA or for portfolios that are immaterial in terms of size and risk profile.
These portfolios include:

- IRBA-transitioning retail and wholesale exposures
- IRBA-exempt retail exposures
- IRBA-exempt wholesale exposures

Any identified transitioning retail and/ or wholesale exposures are expected to adopt Advanced or Foundation IRBA, subject to certification by MAS. Prior to regulatory approval, these portfolios are under SA.

The portfolios under the SA are subject to our overall governance framework and credit risk management practices. DBS continues to monitor the size and risk profile of these portfolios, and will enhance the relevant risk measurement processes if these risk exposures become material.

DBS uses external ratings for credit exposures under the SA where relevant, and we only accept ratings from Standard and Poor's, Moody's and Fitch in such cases. DBS follows the process prescribed in MAS Notice 637 to map the ratings to the relevant risk weights.

5.4 Credit risk in 2017

Concentration risk

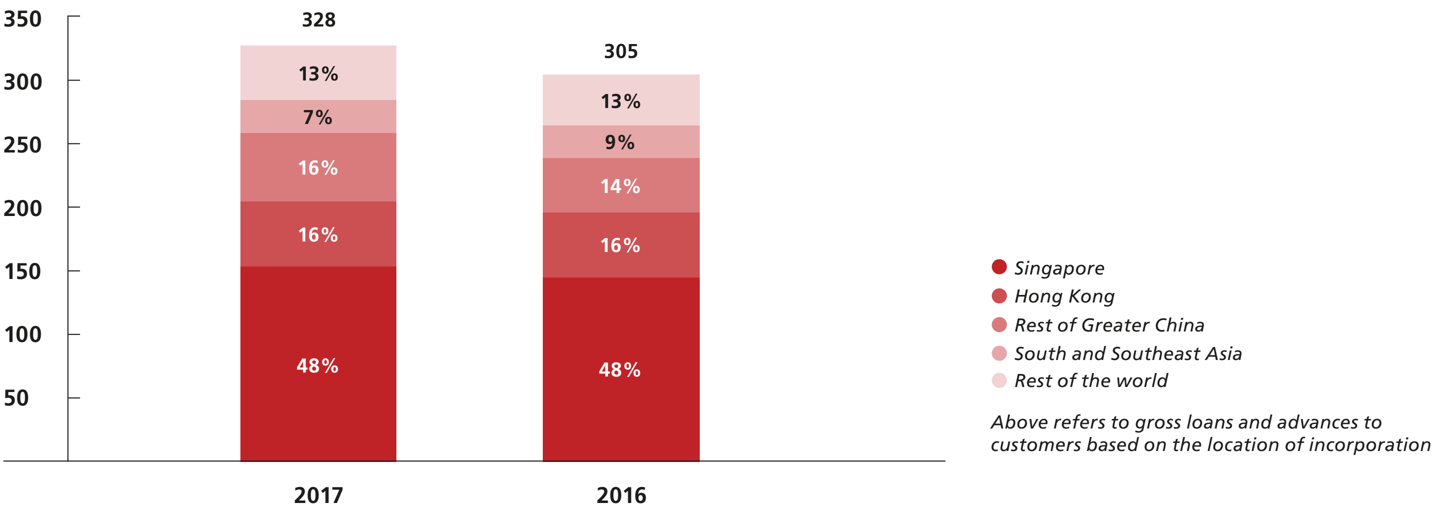
DBS' geographic distribution of customer loans has remained stable for the past year.

Our gross loans and advances to customers continue to be predominantly in our home market of Singapore, accounting for 48% of the portfolio. The portfolios for Greater China (including Hong Kong) grew while the portfolios in South and Southeast Asia declined in 2017.

Greater China saw positive loan asset growth, mainly driven by opportunities from cross-border business flows leveraging the Belt and Road Initiative (BRI) and domestic consumption-related sectors in China, while Taiwan benefited from the ANZ portfolio integration.

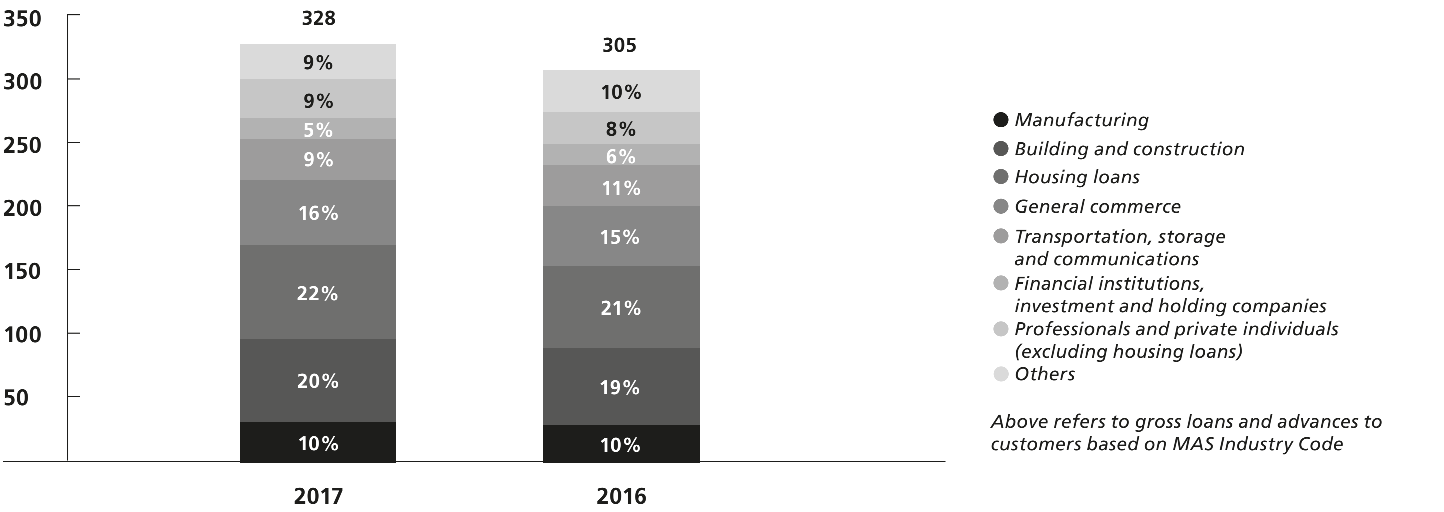
Our portfolio is well-distributed and fairly stable across various industries, with building and construction and general commerce being the largest contributors in the wholesale portfolio.

Geographical concentration (SGD billion)



Above refers to gross loans and advances to customers based on the location of incorporation

Industry concentration (SGD billion)



Above refers to gross loans and advances to customers based on MAS Industry Code

Refer to Note 41.4 to the financial statements on page 175 for DBS' breakdown of credit risk concentration.

Non-performing assets

In absolute terms, our total NPA increased by 25% from the previous year to SGD 6,070 million in 2017, due largely to our accelerated recognition of weak oil and gas support services as NPA. This has contributed to an increase in our non-performing loans (NPL) ratio from 1.4% in the previous year to 1.7% in 2017.

Refer to "CFO Statement" on page 30.

Collateral received

The tables below provide breakdowns by loan-to-value (LTV) bands for the borrowings secured by properties from the various market segments.

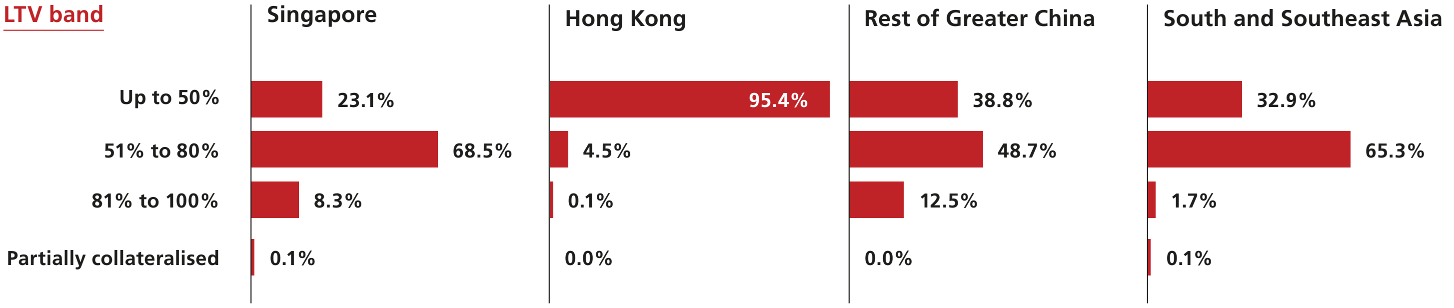
Residential mortgage loans

The LTV ratio is calculated using mortgage loans including undrawn commitments divided by the collateral value. Property valuations are determined by using a combination of professional appraisals and housing price indices.

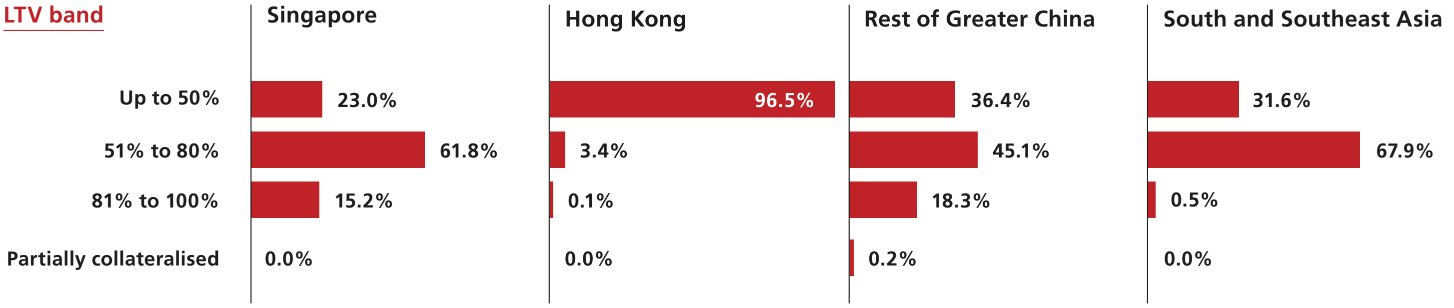
In Singapore, with new mortgage loans capped at LTV of 80% since 2010 and the Property Price Index (PPI) for private properties having increased by 1% over the year, there was an approximate 7% shift in the proportion of mortgage exposure with LTV > 80% to the LTV < 80% bands.

Percentage of residential mortgage loans (breakdown by LTV band and geography)

As at 31 December 2017



As at 31 December 2016



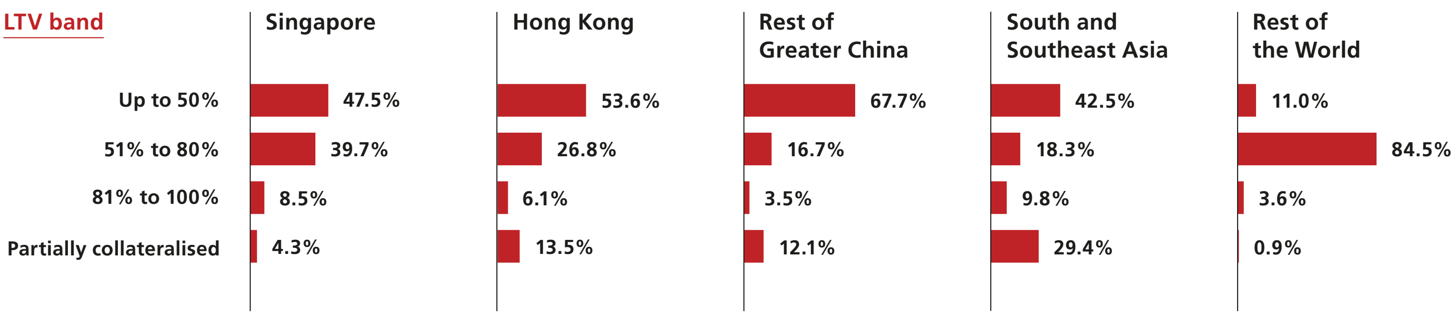
Loans and advances to corporates secured by property

These loans are extended for the purpose of acquisition and/ or development of real estate, as well as for general working capital. 92% of our loans were fully collateralised, as compared to 90% in 2016. Majority of these loans have LTV < 80%. Our property loans are mainly concentrated in Singapore and Hong Kong, which together accounted for 83% of the total property loans.

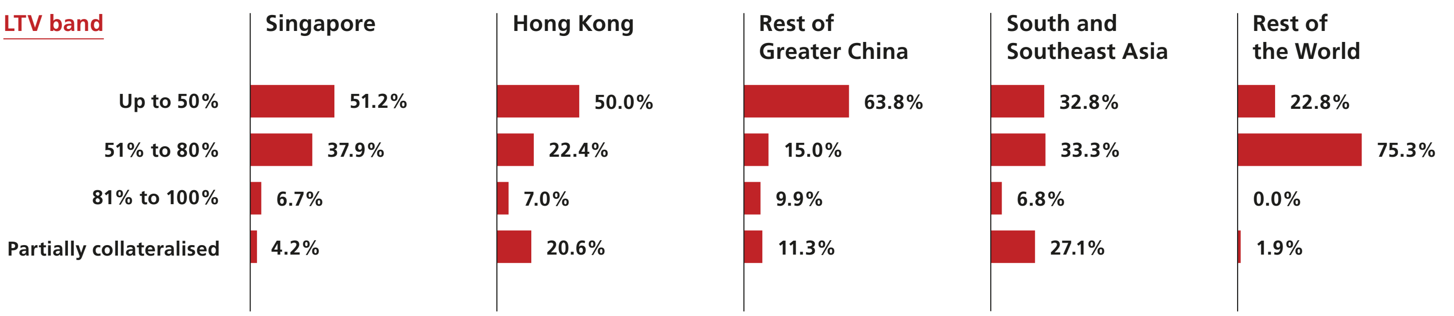
The LTV ratio is calculated as loans and advances divided by the value of property, including other tangible collaterals that secure the same facility. The latter includes cash, marketable securities, bank guarantees, vessels, and aircrafts. Where collateral assets are shared by multiple loans and advances, the collateral value is pro-rated across the loans and advances secured by the collateral.

Percentage of loans and advances to corporates secured by property (breakdown by LTV band and geography)

As at 31 December 2017



As at 31 December 2016



Loans and advances to banks

In line with market convention, loans and advances to banks are typically unsecured. DBS manages the risk of such exposures by keeping tight control of the exposure tenor, selection of bank counterparties and monitoring of their credit quality.

Derivatives counterparty credit risk by markets and settlement methods

DBS continues to manage our derivatives counterparty risk exposures with netting and collateral arrangements, thereby protecting our balance sheet in the event of counterparty defaulting.

A breakdown of our derivatives counterparty credit risk by markets (OTC versus exchange-traded) and settlement methods (cleared through a central counterparty versus settled bilaterally) can be found below.

Notional OTC and exchange-traded products

In notional terms, SGD million	As at 31 Dec 2017
OTC derivatives cleared through a central counterparty	823,742
OTC derivatives settled bilaterally	1,131,247
Total OTC derivatives	**1,954,989**
Exchange-traded derivatives	20,978
Total derivatives	**1,975,967**

Refer to Note 37 to the financial statements on page 162 for a breakdown of the derivatives positions held by DBS.

6 Market risk

Our exposure to market risk is categorised into:

Trading portfolios:

Arising from positions taken for (i) market-making, (ii) client-facilitation and (iii) benefiting from market opportunities.

Non-trading portfolios:

Arising from (i) positions taken to manage the interest rate risk of our Institutional Banking and Consumer Banking assets and liabilities, (ii) equity investments comprising investments held for yield and/ or long-term capital gains, (iii) strategic stakes in entities and (iv) structural foreign exchange risk arising mainly from our strategic investments, which are denominated in currencies other than the Singapore Dollar.

We use a variety of financial derivatives such as swaps, forwards and futures, and options for trading and hedging against movements in interest rates, foreign exchange rates, equity prices and other market risks of our (i) investments, (ii) maturity mismatches between loans and deposits, (iii) structured product issuances, and (iv) other assets and liabilities.

6.1 Market risk management at DBS

DBS' approach to market risk management comprises the following building blocks:

Policies
Risk methodologies
Processes, systems and reports

Policies

The Market Risk Management Policy sets our overall approach towards market risk management, while the Market Risk Management Standard establishes the basic requirements for the said management within DBS.

The Market Risk Management Guide complements the Market Risk Management Standard by providing more details regarding specific subject matters. Both the Market Risk Management Standard and Market Risk Management Guide facilitate the identification, measurement, control, monitoring and reporting of market risk in a consistent manner. They also set out the overall approach, standards and controls governing market risk stress testing across DBS.

The criteria for determining the positions to be included in the trading book are stipulated in the Trading Book Policy Statement.

Risk methodologies

Value-at-Risk (VaR) is a method that computes the potential losses of risk positions as a result of market movement over a specified time horizon and according to a given level of confidence.

Our VaR model is based on historical simulation with a one-day holding period. We use Expected Shortfall (ES), which is the average of potential loss beyond a given level of confidence, to monitor and limit market risk exposures, as well as monitor net open positions net of hedges. The market risk economic capital that is allocated by the BRMC is linked to ES by a multiplier. ES is supplemented by risk control metrics such as sensitivities to risk factors and loss triggers for management action.

DBS conducts backtesting to verify the predictiveness of the VaR model. Backtesting compares VaR calculated for positions at the close of each business day with the profit and loss (P&L) that actually arises from those positions on the following business day. The backtesting P&L excludes fees and commissions, and revenues from intra-day trading.

For backtesting, VaR at the 99% level of confidence and over a one-day holding period is used. We adopt the standardised approach to compute market risk regulatory capital under MAS Notice 637 for the trading book positions. As such, VaR backtesting does not impact our regulatory capital for market risk.

VaR models allow us to estimate the aggregate portfolio market risk potential loss due to a range of market risk factors and instruments. However, there are limitations to VaR models; for example, past changes in market risk factors may not provide accurate predictions of future market movements, and the risk arising from adverse market events may be understated.

To monitor DBS' vulnerability to unexpected but plausible extreme market risk-related events, we conduct multiple market risk stress tests regularly. These cover trading and non-trading portfolios and follow a combination of historical and hypothetical scenarios depicting risk-factor movement.

ES and Net Interest Income (NII) variability are the key risk metrics used to manage our assets and liabilities. As an exception, credit risk arising from loans and receivables is managed under the credit risk management framework. We also manage banking book interest rate risk arising from mismatches in the interest rate profiles of assets, liabilities and capital instruments (and associated hedges), which includes basis risk arising from different interest rate benchmarks, interest rate re-pricing risk, yield curve risk and embedded optionality. Behavioural assumptions are applied when managing the interest rate risk of banking book deposits with indeterminate maturities. DBS measures interest rate risk in the banking book on a weekly basis.

Processes, systems and reports

Robust internal control processes and systems have been designed and implemented to support our market risk management approach. DBS reviews these control processes and systems regularly, and these reviews allow senior management to assess their effectiveness.

The RMG Market and Liquidity Risk unit – an independent market risk management function reporting to the CRO – monitors, controls and analyses DBS' market risk daily. The unit comprises risk control, risk analytics, production and reporting teams.

6.2 Market risk in 2017

DBS' ES considers the market risks of both the trading and banking books. Our ES (based on a 97.5% level of confidence) is tabulated below. The period-end, average, high and low ES are shown.

1 Jan 2017 to 31 Dec 2017				
SGD million	As at 31 Dec 2017	Average	High	Low
Total	104	112	146	80

1 Jan 2016 to 31 Dec 2016				
SGD million	As at 31 Dec 2016	Average	High	Low
Total	89	98	112	84

DBS' major market risk driver is interest rate risk in the trading and banking books. The average ES for 2017 was higher than 2016 mainly due to updates to models used to measure interest rate risks in the banking book. The following table shows the period-end, average, high and low diversified ES and ES by risk class for Treasury's trading portfolios. The ES reported below are based on a 97.5% level of confidence.

1 Jan 2017 to 31 Dec 2017				
SGD million	As at 31 Dec 2017	Average	High	Low
Diversified	16	21	29	13
Interest rates	15	16	20	14
Foreign exchange	5	5	16	3
Equity	1	1	1	#
Credit spread	4	14	24	4
Commodity	#	#	1	#

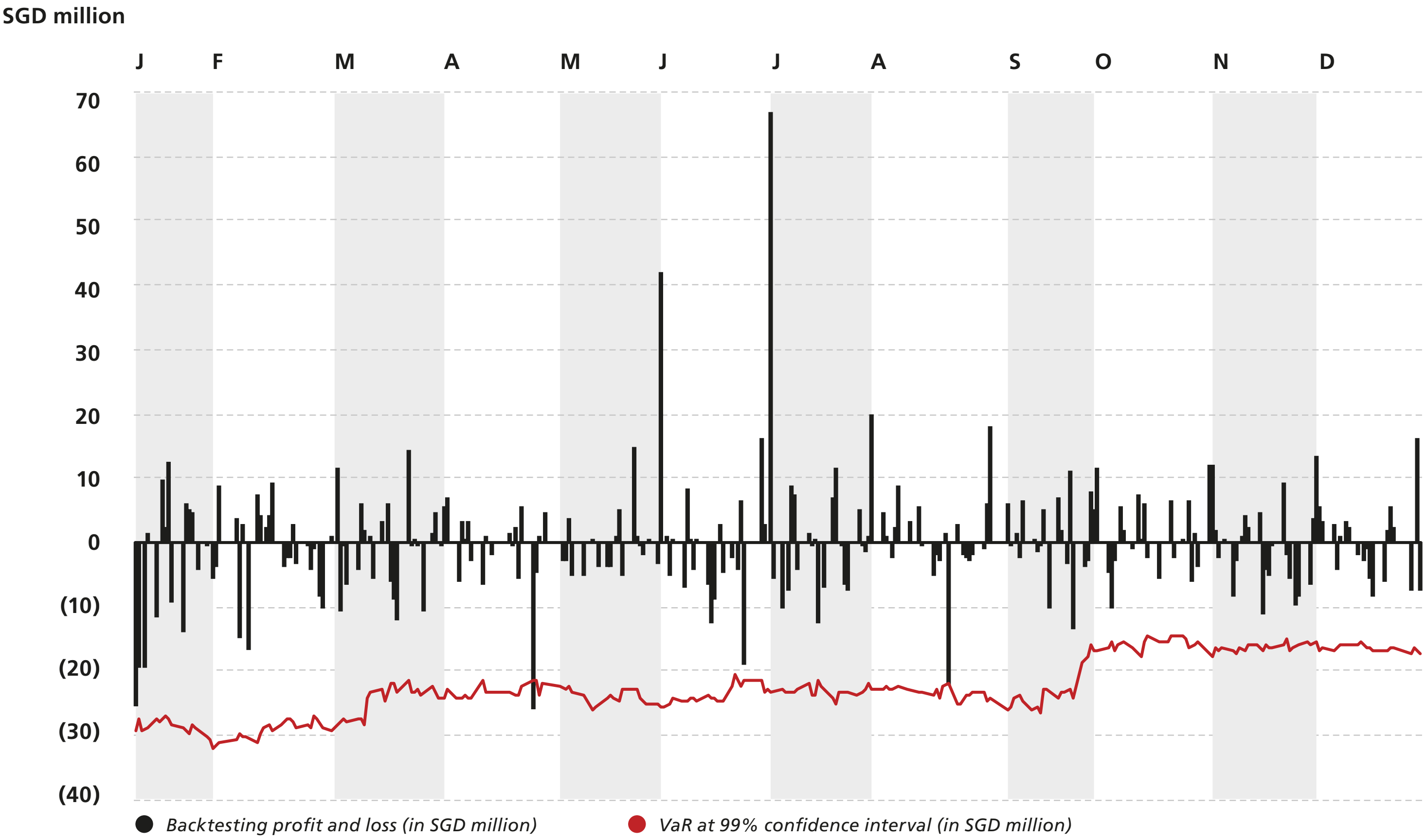
 # Amount under SGD 500,000

1 Jan 2016 to 31 Dec 2016				
SGD million	As at 31 Dec 2016	Average	High	Low
Diversified	26	21	31	14
Interest Rates	16	18	27	14
Foreign Exchange	10	12	18	7
Equity	1	2	3	1
Credit Spread	18	11	19	6
Commodity	#	#	1	#

 # Amount under SGD 500,000

At DBS, the main risk factors driving Treasury's trading portfolios in 2017 were interest rates, foreign exchange and credit spreads. Treasury's trading portfolios' average diversified ES remained relatively flat compared to 2016.

Treasury's trading portfolios experienced two backtesting exceptions occurred in April and August 2017. These were largely due to volatile credit and bond spreads in April 2017 and valuation adjustments carried out at the end of August 2017.



The key market risk drivers of our non-trading portfolios are Singapore Dollar and US Dollar interest rate positions. The economic value impact of changes in interest rates was assessed with plausible rates movements and characteristics of the non-trading portfolio assets and liabilities. The economic value changes based on the worse of an upward or downward parallel shift in the yield curve of 100 basis points and 200 basis points were negative SGD 1,221 million and negative SGD 2,311 million (2016: negative SGD 156 million and SGD 239 million) respectively. The decline in embedded value in 2017, assuming a rise in interest rates, was mainly due to refinement of behavioural assumptions of key assets and liabilities such as current and saving accounts and residential mortgages.

7 Liquidity risk

DBS' liquidity risk arises from our obligations to honour withdrawals of deposits, repayments of borrowed funds at maturity and our commitments to extend loans to our customers. We seek to manage our liquidity to ensure that our liquidity obligations will continue to be honoured under normal as well as adverse circumstances.

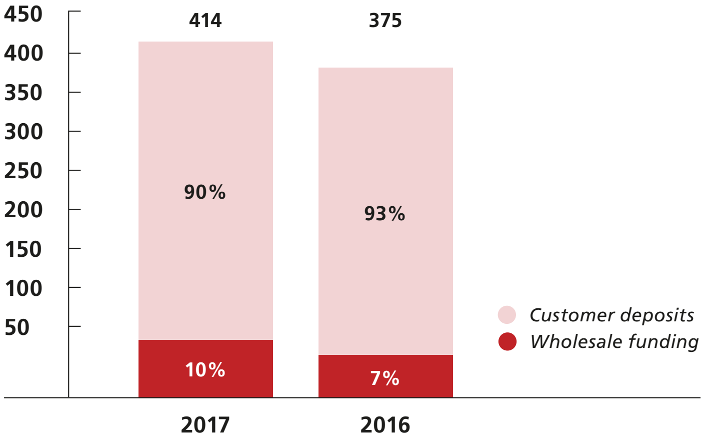
7.1 Liquidity risk management at DBS

Liquidity management and funding strategy

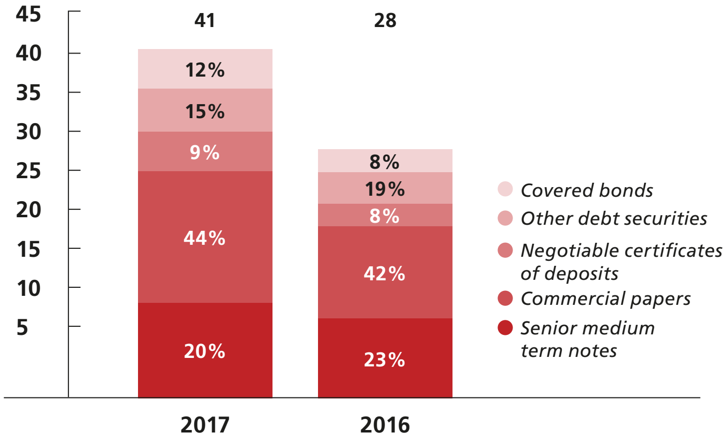
DBS strives to develop a diversified funding base with access to funding sources across retail and wholesale channels. Our funding strategy is anchored on strengthening our core deposit franchise as the foundation of our long-term funding advantage.

Customer deposits grew by SGD 26 billion in 2017, of which current and savings deposits, which are favourable for the liquidity coverage ratio and net stable funding ratio, were the main drivers of growth.

Funding sources (SGD billion)



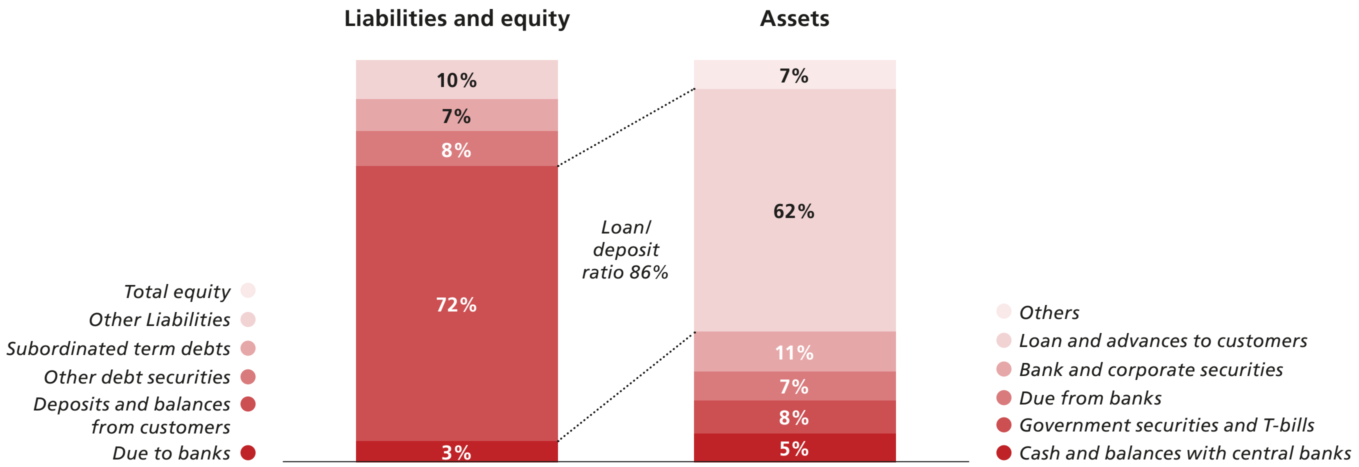
Wholesale funding breakdown (SGD billion)



DBS aims to ensure continuous access to the investor base for capital and senior wholesale funding to support our commercial banking activities. We look for cost efficiencies over the long term and market extensively, focusing on Singapore Dollar, the US Dollar, the Euro, the Australian Dollar and the Hong Kong Dollar as our key issuance currencies. Capital instruments are primarily issued from DBS Group Holdings Ltd (DBSH) while covered bonds originate from DBS Bank Ltd. Senior notes are issued from both DBSH and the Bank as required, although DBSH is currently the only active issuer of public senior benchmarks.

The Asset, an industry journal, recognized us as Best Financial Issuer in Asia for the second year in a row. This was welcome recognition of ongoing efforts to widen our investor base and engage in new products. A notable transaction in 2017 was our second foray that year into the EUR covered bond space at a yield 1 basis point below the benchmark interest swap curve for a 7-year issuance.

The diagrams below show our asset funding structure as at 31 December 2017.



Refer to Note 30 to the financial statements on page 154 for more details of our wholesale funding sources and Note 42.1 on page 177 for the contractual maturity profile of our assets and liabilities.

With increasing diversification of funding sources, optimising the mismatch in fund deployment against sources with respect to pricing, size, currency and tenor remains challenging. To this end, where practicable and transferable without loss in value, we make appropriate use of the swap markets for different currencies, commensurate with the liquidity of each, in the conversion and deployment of surplus funds across locations.

As these swaps typically mature earlier than loans, we are exposed to potential cash flow mismatches arising from the risk that counterparties may not roll over maturing swaps with us to support the continual funding of loans. We mitigate this risk by setting triggers on the number of swaps transacted with the market and making conservative assumptions on the cash flow behaviour of swaps under our cash flow maturity gap analysis (refer to Section 7.2 on page 87).

Overseas locations are encouraged but not required to centralise the majority of their borrowing and deployment of funds with our head office, taking into account the relevant regulatory restrictions while maintaining a commensurate level of presence and participation in the local funding markets.

During our annual budget and planning process, each overseas location conducts an in-depth review of its projected loan and deposit growth as well as its net funding and liquidity profile for the next year. The consolidated Group funding and liquidity profiles are reviewed and revised as necessary by senior management. Each overseas location is required to provide justification if head office funding support is required.

The Group Assets and Liabilities Committee and respective Location Assets and Liabilities Committee regularly review our balance sheet composition, the growth in loans and deposits, our utilisation of wholesale funding, the momentum of our business activities, market competition, the economic outlook, market conditions and other factors that may affect liquidity in the continual refinement of DBS' funding strategy.

Approach to liquidity risk management

DBS' approach to liquidity risk management comprises the following building blocks:

Policies
Risk methodologies
Processes, systems and reports

Policies

The Group Liquidity Risk Management Policy sets our overall approach towards liquidity risk management and describes the range of strategies DBS employs to manage our liquidity.

These strategies include maintaining an adequate counterbalancing capacity to address potential cash flow shortfalls and having diversified sources of liquidity.

DBS' counterbalancing capacity includes liquid assets, the capacity to borrow from the money markets (including the issuance of commercial papers and covered bonds), and forms of managerial interventions that improve liquidity. In the event of a potential or actual crisis, we have in place a set of liquidity contingency and recovery plans to ensure that we maintain adequate liquidity.

The Group Liquidity Risk Management Policy is supported by Standards that establish the detailed requirements for liquidity risk identification, measurement, reporting and control within DBS. The set of Policies, Standards and supporting Guides communicate these baseline requirements to ensure consistent application throughout DBS.

Risk methodologies

The primary measure used to manage liquidity within the tolerance defined by the Board is cash flow maturity mismatch analysis.

This form of analysis is performed on a regular basis under normal and adverse scenarios. It assesses the adequacy of our counterbalancing capacity to fund or mitigate any cash flow shortfalls that may occur as forecasted in the cash flow movements across successive time bands. To ensure that liquidity is managed in line with our Risk Appetite, core parameters such as the types of scenarios, the survival period and the minimum level of liquid assets, are pre-specified for monitoring and control on a group-wide basis. Any occurrences of forecasted shortfalls that cannot be covered by our counterbalancing capacity will be escalated to the relevant committees for evaluation and action.

Liquidity risk stress testing is performed regularly using cash flow maturity mismatch analysis, and covers adverse scenarios including general market and idiosyncratic stress scenarios. Stress tests assess our vulnerability when liability run-offs increase, asset rollovers increase and/ or liquid asset buffers decrease. In addition, ad hoc stress tests are performed as part of our recovery planning and ICAAP exercises.

Liquidity risk control measures such as liquidity-related ratios and balance sheet analysis are complementary tools for cash flow maturity mismatch analysis, and they are performed regularly to obtain deeper insights and finer control over our liquidity profile across different locations. The liquidity risk control measures also include concentration measures regarding top depositors, wholesale borrowing and swapped funds ratios.

Processes, systems and reports

Robust internal control processes and systems support our overall approach in identifying, measuring, aggregating, controlling and monitoring liquidity risk across DBS.

Continuous improvement in data and reporting platforms has allowed most elements of internal liquidity risk reporting to be centralised.

The RMG Market and Liquidity Risk unit manages the day-to-day liquidity risk monitoring, control reporting and analysis.

7.2 Liquidity risk in 2017

DBS actively monitors and manages our liquidity profile through cash flow maturity mismatch analysis.

In forecasting cash flow under the analysis, behavioural profiling is necessary in cases where a product has indeterminate maturity or the contractual maturity does not realistically reflect the expected cash flow.

Two examples are maturity-indeterminate savings and current account deposits, which are generally viewed as sources of stable funding for commercial banks. In fact, they consistently exhibit stability even under historical periods of stress. A conservative view is adopted in the behavioural profiling of assets, liabilities and off-balance sheet commitments that have exhibited cash flow patterns that differ significantly from the contractual maturity profile shown under Note 42.1 of our financial statements on page 177.

The table below shows our behavioural net and cumulative maturity mismatch between assets and liabilities over a one-year period, in a normal scenario without incorporating growth projections. DBS' liquidity was observed to remain adequate in the maturity mismatch analysis. In 2017, the counterbalancing capacity comprising holdings in liquid assets grew significantly, resulting in an improvement in the overall cumulative mismatch.

SGD million[(a)]	Less than 7 days	1 week to 1 month	1 to 3 months	3 to 6 months	6 months to 1 year
As at 31 Dec 2017 **Net liquidity mismatch**	10,218	7,789	(5,203)	15,252	10,963
Cumulative mismatch	10,218	18,007	12,804	28,056	39,019
As at 31 Dec 2016[(b)] **Net liquidity mismatch**	14,298	(1,763)	(7,108)	3,576	9,901
Cumulative mismatch	14,298	12,535	5,427	9,003	18,904

(a) *Positive indicates a position of liquidity surplus. Negative indicates a liquidity shortfall that has to be funded*
(b) *As the behavioural assumptions used to determine the maturity mismatch between assets and liabilities are updated from time to time, the liquidity mismatches may not be directly comparable across past balance sheet dates*

7.3 Liquid assets

Liquid assets are assets that are readily available and can be easily monetised to meet obligations and expenses under times of stress.

Such assets are internally defined under the governance of the relevant oversight committees, taking into account asset class, issuer type and credit rating, among other criteria, before they are reflected as available funds through cash flow maturity mismatch analysis. DBS' Treasury function expects to be able to operationally monetise our pool of liquid assets to meet liquidity shortfalls when the need arises. These liquid assets must be unencumbered and free of any legal, regulatory, contractual or other restrictions.

In practice, liquid assets are maintained in key locations and currencies to ensure that operating entities in such locations possess a degree of self-sufficiency to support business needs and guard against contingencies. The main portion of our liquid assets is centrally maintained in Singapore to support liquidity needs in smaller overseas subsidiaries and branches. Internally, DBS sets a requirement to maintain its pool of liquid assets above a minimum level as a source of contingent funds, taking into account regulatory recommended liquid asset levels as well as internally projected stress shortfalls under the cash flow maturity mismatch analysis.

The table below shows DBS' encumbered and unencumbered liquid assets by instrument and counterparty against other assets in the same category under the balance sheet. The figures are based on the carrying amount at the balance sheet date.

	Liquid assets				Others[(d)]	Total
SGD million	**Encumbered**	**Unencumbered**	**Total [1]**	**Average[(c)]**	**[2]**	**[1] + [2]**
As at 31 Dec 2017 Cash and balances with central banks[(a)]	7,770	8,944	16,714	15,910	9,749	26,463
Due from banks[(b)]	–	15,478	15,478	11,798	20,497	35,975
Government securities and treasury bills	2,576	37,039	39,615	40,515	138	39,753
Banks and corporate securities	386	46,406	46,792	43,796	8,797	55,589
Total	10,732	107,867	118,599	112,019	39,181	157,780

(a) *Unencumbered balances with central banks comprise holdings that are unrestricted and available overnight. The encumbered portion represents the mandatory balances held with central banks, which includes a minimum cash balance (MCB) amount that may be available for use under a liquidity stress situation. The "Others" portion include term placements with central banks*
(b) *Liquid assets comprise nostro accounts and eligible certificates of deposits*
(c) *Total liquid assets reflected on an average basis over the four quarters in 2017*
(d) *"Others" refer to assets that are not recognised as part of the available pool of liquid assets for liquidity management under stress due to (but not limited to) inadequate or non-rated credit quality, operational challenges in monetisation (e.g. holdings in physical scrips), and other considerations*

In addition to the above table, collateral received in reverse repo-transactions amounting to SGD 4,631 million were recognised for liquidity management under stress. It can be observed from the table that our funding strategy in the normal course of business does not rely on collateralised wholesale funding. Instead, liquid assets are usually maintained only as a source of contingent funding.

7.4 Regulatory requirements

Under MAS' Notice to Banks No. 649 "Minimum Liquid Assets (MLA) and Liquidity Coverage Ratio (LCR)" (MAS Notice 649), DBS, as a domestic bank incorporated and headquartered in Singapore, is required to comply with the LCR standards. In 2017, Group LCR was maintained well above the minimum LCR requirements under MAS Notice 649. Based on our internal assessment and participation in the Quantitative Impact Studies by the Basel Committee on Banking Supervision, DBS has met the minimum standards of the Basel III Net Stable Funding Ratio (NSFR), which had been implemented on 1 January 2018.

8 Operational risk

Operational risk is inherent in our business activities and it may arise from inadequate or failed internal processes, people, systems, or external events. DBS' objective is to keep operational risk at appropriate levels, taking into account the markets we operate in, the characteristics of the businesses as well as our economic and regulatory environment.

8.1 Operational risk management at DBS

DBS' approach to operational risk management comprises the following building blocks:

Policies
Risk methodologies
Processes, systems and reports

Policies

The Group Operational Risk Management (ORM) Policy sets our overall approach for managing operational risk in a structured, systematic and consistent manner.

There are policies, standards, tools and programmes in place to govern ORM practices across DBS. These include corporate operational risk policies and standards that are owned by the respective corporate oversight and control functions. The key policies address risk areas relating to technology, compliance, fraud, money laundering, financing of terrorism and sanctions, new product and outsourcing.

Risk methodologies

DBS adopts the standardised approach to compute operational risk regulatory capital.

To manage and control operational risk, we use various tools, including risk and control self-assessment, operational risk event management and key risk indicator monitoring.

In 2017, our three lines of defence completed an alignment of the operational risk management and assessment approaches, and adopted one common risk universe to manage operational risks. Risk and control self-assessment is conducted by each business or support unit to identify key operational risk and assess the effectiveness of internal controls. When control issues are identified, the units develop action plans and track the resolution of the issues.

Operational risk events are classified in accordance with Basel standards. Such events, including any significant incidents that may impact DBS' reputation, must be reported based on certain established thresholds. Key risk indicators with pre-defined escalation triggers are employed to facilitate risk monitoring in a forward-looking manner.

Additional methodologies are in place to address subject-specific risks, including, but not limited to, the following:

Technology risk

Information Technology (IT) risk is managed through an enterprise technology risk approach. This covers risk governance, communication, monitoring, assessment, mitigation and acceptance, and is supported by a set of IT policies and standards, control processes and risk mitigation programmes.

We have also established policies and standards to manage and address cyber security risk. To enhance the management of this risk, we have appointed a Chief Information Security Officer who is responsible for our cyber security risk management strategy and programme.

Compliance risk

Compliance risk refers to the risk of DBS not being able to successfully conduct our business because of any failure to comply with laws, regulatory requirements, industry codes or standards of business and professional conduct applicable to the financial sector.

This includes, in particular, laws and regulations applicable to the licensing and conducting of banking or other financial businesses, financial crime such as anti-money laundering and countering the financing of terrorism, fraud and bribery/ corruption. We maintain a compliance programme designed to identify, assess, measure, mitigate and report on such risks through a combination of policy and relevant systems and controls.

DBS also provides relevant training and implements assurance processes. We strongly believe in the need to promote a strong compliance culture as well, and this is developed through the leadership of our Board and senior management.

Fraud risk

DBS has established minimum standards for our business and support units to prevent, detect, investigate and remediate fraud and related events. This is based on the Fraud Management Programme, through which standards are implemented at the unit and geographical levels. These standards aim to provide end-to-end management for fraud and related issues within DBS.

Money laundering, financing of terrorism and sanctions risks

There are minimum standards for our business and support units to mitigate and manage our actual and/ or potential exposure to money laundering, terrorist financing, sanctions, corruption, or other illicit financial activities. Accountabilities have also been established for the protection of DBS' assets and reputation, as well as the interests of our customers and shareholders.

New product and outsourcing risks

Each new product, service or outsourcing initiative is subject to a risk review and sign-off process, where relevant risks are identified and assessed by departments independent of the risk-taking unit proposing the product or service. Variations of existing products or services and outsourcing initiatives are also subject to a similar process.

Other mitigation programmes

To manage business disruptions effectively, business continuity management is vital as part of DBS' risk mitigation programme.

A robust crisis management and business continuity management programme is in place within essential business services for unforeseen events. Planning for business resilience includes the identification of key business processes via Business Impact Analysis as well as the documentation and maintenance of our Business Continuity Plan (BCP).

DBS' BCP aims to minimise the impact of business interruption stemming from severe loss scenarios, and provide a reasonable level of service until normal business operations are resumed. Within the crisis management structure, we have in place an incident management process, which provides guidance on incident severity assessment, roles and responsibilities of process owners and escalation protocols for the effective management of a crisis.

Exercises are conducted annually, simulating different scenarios to test our BCPs and crisis management protocol. These scenarios include technology issues affecting essential banking services across DBS, natural disasters with wide geographical impact, safety-at-risk incidents (e.g. terrorism) and other events leading to significant business disruption. The effectiveness of these exercises, as well as DBS' business continuity readiness, our alignment to regulatory guidelines and our disclosure of residual risks, are communicated and attested by senior management to the BRMC on an annual basis.

To mitigate losses from specific unexpected and significant event risks, DBS purchases group-wide insurance policies – under the Group Insurance Programme – from third-party insurers. DBS has acquired insurance policies relating to crime and professional indemnity; Director and officer liability; property damage and business interruption; general liability; and terrorism.

Processes, systems and reports

Robust internal control processes and systems are integral to identifying, monitoring, managing and reporting operational risk.

All units are responsible for the day-to-day management of operational risk in their products, processes, systems and activities, in accordance with the various frameworks and policies. The RMG Operational Risk unit and other corporate oversight and control functions:

- oversee and monitor the effectiveness of operational risk management,
- assess key operational risk issues with the units, and
- report and/ or escalate key operational risks to risk committees with recommendations on appropriate risk mitigation strategies.

DBS has developed an integrated governance, risk and compliance system with aligned risk assessment methodology, common taxonomy and unified processes for the three lines of defence. We will complete the full implementation in 2018.

8.2 Operational risk in 2017

The total operational risk losses in 2017 decreased to SGD 15 million (0.12% of DBS' total operating income), from SGD 23 million (0.20%) in 2016. The losses may be categorised into the following seven Basel risk event categories:

	2017		2016	
Basel risk event types	**SGD million**	**%**	**SGD million**	**%**
Execution, delivery and process management (EDPM)	**7.72**	**51%**	**2.90**	**13%**
External fraud	**6.43**	**43%**	**13.42**	**60%**
Business disruption and system failures	**0.47**	**3%**	**0.06**	**0%**
Clients, products and business practices	**0.38**	**3%**	**5.33**	**23%**
Damage to physical assets	**0**	**0%**	**0.91**	**4%**
Internal fraud	**0**	**0%**	**0.09**	**0%**
Employment practices and workplace safety	**0**	**0%**	**0**	**0%**
Total(1)	**15.00**	**100%**	**22.71(2)**	**100%**

Notes
(1) Reportable operational risk events are those with net loss greater than SGD 10,000 and are reported based on the date of detection
(2) Adjusted to account for updates such as subsequent recoveries and additional costs (e.g. legal expenses) incurred after 2016

EDPM and external fraud accounted for 94% of our total losses in 2017. EDPM, which comprised mainly processing errors, accounted for the highest share and was largely attributable to one risk incident.

9 Reputational risk

DBS views reputational risk as an outcome of any failure to manage risks in our day-to-day activities/ decisions, and from changes in the operating environment. These risks include:

- Financial risk (credit, market and liquidity risks)
- Inherent risk (operational and business/ strategic risks)

9.1 Reputational risk management at DBS

DBS' approach to reputational risk management comprises the following building blocks:

Policies
Risk methodologies
Processes, systems and reports

Policies

DBS adopts a four-step approach for reputational risk management, which is to prevent, detect, escalate and respond to reputational risk events.

As reputational risk is a consequence of the failure to manage other risk types, the definitions and principles for managing such risks are articulated in the respective risk policies. These are reinforced by sound corporate values that reflect ethical behaviours and practices throughout DBS.

At DBS, we have policies in place to protect the consistency of our brand and to safeguard our corporate identity and reputation.

Risk methodologies

Under the various risk policies, we have established a number of mechanisms for ongoing risk monitoring.

These mechanisms take the form of risk limits, key risk indicators and other operating metrics, and includes the periodic risk and control self-assessment process. Apart from observations from internal sources, alerts from external parties/ stakeholders also serve as an important source to detect potential reputational risk events. In addition, there are policies relating to media communications, social media and corporate social responsibility to protect DBS' reputation. There are also escalation and response mechanisms in place for managing reputational risk.

While the respective risk policies address the individual risk types, the Reputational Risk Policy focuses specifically on our stakeholders' perception of how well DBS manages its reputational risks. Stakeholders include customers, government agencies and regulators, investors, rating agencies, business alliances, vendors, trade unions, the media, the general public, the Board and senior management, and DBS' employees.

We recognise that creating a sense of shared value through engagement with key stakeholder groups is imperative for our brand and reputation.

Read more about our stakeholder engagement on page 28.

Processes, systems and reports

Our units are responsible for the day-to-day management of reputational risk, and ensure that processes and procedures are in place to identify, assess and respond to this risk. Events affecting DBS' reputational risk are also included in our reporting of risk profiles to senior management and Board-level committees.

9.2 Reputational risk in 2017

DBS' priority is to prevent the occurrence of a reputational risk event, instead of taking mitigating action when it occurs. There were no significant reputational risk incidents endangering the DBS franchise in 2017.