
MAS' APPROACH TO MACROPRUDENTIAL POLICY

Monetary Authority of Singapore

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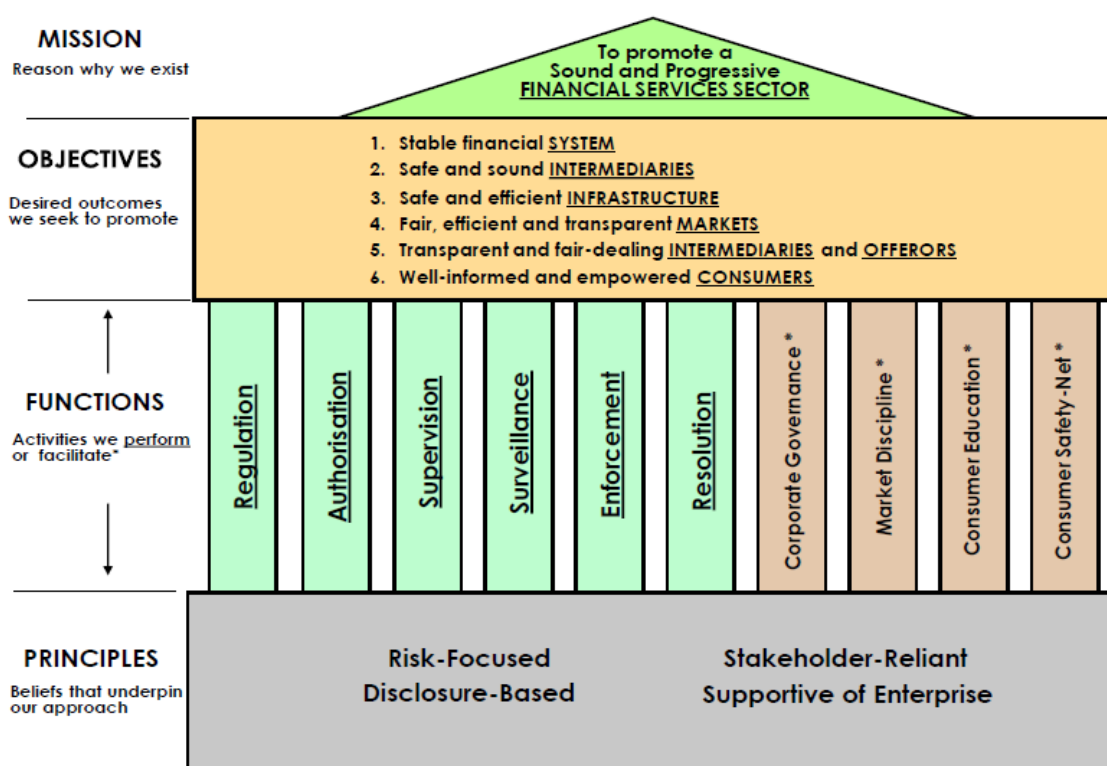
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MONETARY AUTHORITY OF SINGAPORE
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1 Introduction

1.1 The Monetary Authority of Singapore is an integrated financial supervisor that is responsible for “fostering a sound and reputable financial centre and promoting financial stability”¹ in Singapore. MAS achieves this objective through **microprudential supervision** of individual financial institutions and **macroprudential oversight** of the financial system as a whole.

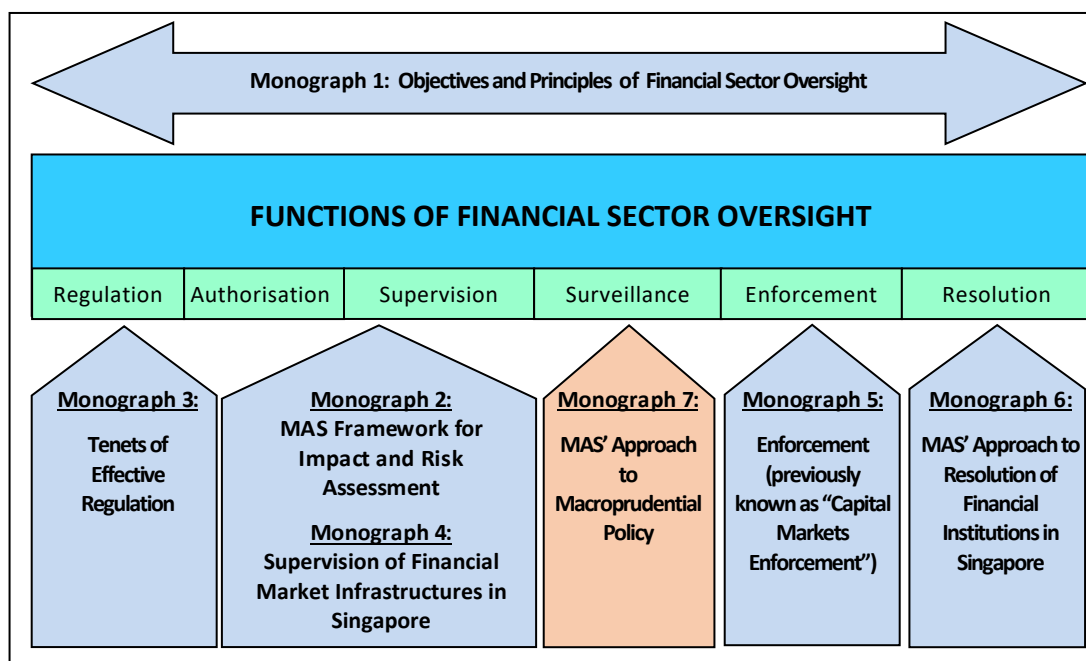
1.2 The objectives of MAS’ supervision and the principles that guide our approach are set out in “Objectives and Principles of Financial Sector Oversight in Singapore”, issued in April 2004. The schematic representation below illustrates how the various supervisory functions of MAS support its mission to promote a sound and progressive financial services sector.



¹ Section 4(1)(b) of the Monetary Authority of Singapore Act.

1.3 MAS has issued monographs setting out its approach to specific functions that come under the broad rubric of financial supervision. Earlier monographs have covered supervisory functions with a microprudential focus, namely regulation, supervision, enforcement, and resolution.² This monograph addresses MAS’ approach to macroprudential policy (see schema below).

1.4 Section 2 of this document explains the objectives of macroprudential policy. Section 3 sets out how macroprudential policy interacts with MAS’ other mandates for microprudential supervision and monetary policy. Section 4 elaborates on MAS’ macroprudential policy framework while Section 5 lays out the principles that guide MAS’ macroprudential policy approach and policy toolkit.



² To date, MAS has issued monographs on regulation (Tenets of Effective Regulation, June 2010), supervision (MAS Framework for Impact and Risk Assessment of Financial Institutions, April 2007 and Supervision of Financial Market Infrastructures in Singapore, January 2013), enforcement (Capital Markets Enforcement, January 2016 and September 2018), and resolution (MAS’ Approach to Resolution of Financial Institutions in Singapore, August 2017).

2 Objectives of Macroprudential Policy

2.1 While microprudential supervision focuses on individual financial institutions and markets, macroprudential policy is concerned with the financial system as a whole. The 2007-2009 Global Financial Crisis (GFC) has underlined the importance of feedback loops that make the financial system more than just the sum of its parts. These feedback loops can impair the proper functioning of the financial system and impact the real economy adversely, even if most financial institutions may appear sound individually.

2.2 The systemic risks caused by these feedback loops can be categorised as either **cross-sectional** or **time-varying**.

Cross-sectional Systemic Risks

2.3 Cross-sectional systemic risks arise from the interconnectedness or linkages among financial institutions as well as between financial institutions and other economic actors. Such linkages can be in the form of direct lending or trading exposures. They can also be indirect, arising from common membership of payment, clearing and settlement systems or holding common exposures to similar assets.

2.4 These interconnections can serve as contagion channels through which shocks propagate across the financial system and the broader economy. For example, when a financial institution defaults on its obligations, other financial institutions with significant exposures to that financial institution would suffer financial losses (real or accounting markdowns) and could also come under stress. Another example is where distressed market participants conduct fire-sales of assets into illiquid markets. This could drive down market prices of these assets and force others to mark down the values of their holdings; thereby leading to spiralling impact on other seemingly less-connected market participants. Failing financial institutions could also impact households and corporates that rely on them for credit and other financial services.

Time-varying Systemic Risks

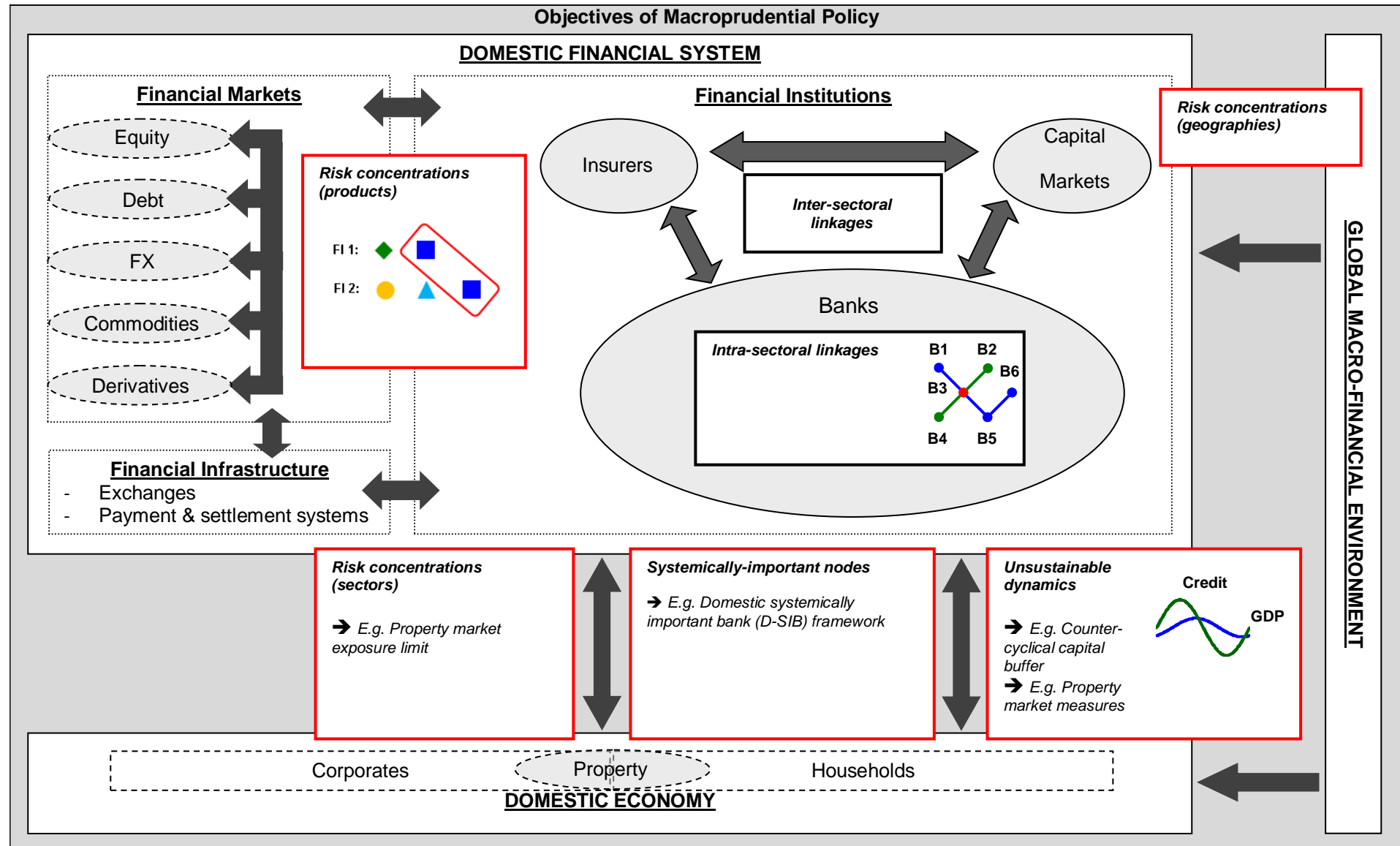
2.5 Time-varying systemic risks arise from excessive fluctuations in financial conditions over time. Such volatility could stem from a variety of sources, including extrapolative expectations, excessive risk-taking due to competition, and procyclical risk management practices. Market participants with extrapolative expectations tend to expect the highest returns at the peak of a cycle (overly optimistic) and the lowest returns at its trough (excessively risk averse). Competition among financial institutions and investors could lead them to misprice and take on excessive risks in the search for yield. Procyclical risk management practices include the use of point-in-time risk measures that tend to underestimate tail risks and overestimate gains under benign conditions. Concerns have also been raised about the use of common modelling approaches and peer benchmarking which could lead to herding among market participants that exacerbate procyclicality.

2.6 Such behaviours can amplify economic and financial cycles, leading to a build-up of vulnerabilities during a boom and severe adjustments in a downturn. A rapid increase in leverage under benign conditions could be followed by widespread losses should the economy slow down unexpectedly and borrowers face difficulty repaying their debts.

2.7 The scale of losses and the broader economic impact may be further amplified through macro-financial linkages. First, lenders that sustain losses could become constrained and reduce the supply of credit to the economy, further impacting economic activity. Second, tighter financial conditions could lead borrowers to reassess their debt levels and deleverage, resulting in further drops in consumption and investment.

2.8 Macroprudential policy seeks to protect the financial system and the real economy from cross-sectional and time-varying systemic risks. This involves identifying, monitoring and mitigating the risks associated with systemically important nodes in the financial system, possible risk concentrations in particular geographies, sectors and products, and potentially unsustainable dynamics in financial and asset markets (see schema on next page). Macroprudential tools can then be employed to address potential vulnerabilities identified, in a way that allows authorities to “lean against the wind”, attenuating financial and asset market cycles even before significant systemic risks manifest. In the property market for

example, unsustainably high and rising property prices could presage a subsequent sharp correction that would significantly impact households and banks, given their high exposure to property. Over the medium-term, property prices and credit trends should be aligned with broader economic fundamentals. Accordingly, the use of macroprudential tools in the sector pre-empts destabilising effects arising from volatility in prices and credit.



3 Interactions between Macroprudential Policy and Other Mandates

Macroprudential Policy and Microprudential Supervision

3.1 MAS is both the microprudential and macroprudential supervisor of the financial sector in Singapore. The two mandates complement each other. Policy measures that serve macroprudential objectives can also yield microprudential benefits. For instance, while loan-to-value (LTV) limits have been used to address systemic risk associated with rapid increases in property prices and housing loans, they also support microprudential supervision by building up buffers against potential credit losses at the level of individual financial institutions.

3.2 Active microprudential supervision can provide useful ground-up insights that inform macroprudential policy-making and help with effective enforcement of macroprudential measures across financial institutions. At the same time, macroprudential surveillance can highlight thematic risks to which individual institutions may be exposed. Supervisors can then engage their respective institutions on how to address these risks.

3.3 Combining both the macroprudential and microprudential mandates in MAS helps to integrate these perspectives and address possible tensions. For example, housing loans are typically regarded as lower risk exposures and may not receive as much supervisory attention as other loan portfolios, such as corporate loans, which are generally larger in size and pose greater default risks. Yet, poor underwriting standards for housing loans could contribute to systemic risk if housing credit growth and property price increases were to become unsustainable. Balancing these perspectives, MAS conducted a thematic inspection on banks' residential property loans business in 2012. The inspection findings supported MAS' subsequent introduction of a Total Debt Servicing Ratio requirement and publication of industry guidance on housing loan underwriting practices.

Macroprudential Policy and Monetary Policy

3.4 MAS role as the central bank as well as the integrated financial supervisor in Singapore puts it in a unique position to ensure that monetary policy works in concert with

macroprudential policy and microprudential supervision to secure overall macroeconomic and financial stability objectives.

3.5 Both monetary and macroprudential policies can promote price and financial stability conditions in a consistent manner. For example, monetary conditions can affect risk perceptions and risk-taking behaviour among market participants. Conversely, macroprudential policies, such as those aimed at moderating the property market, can impact overall economic activity and price expectations. Placing both functions under the same authority helps to integrate multiple vantage points, information sets and facilitates optimal policy formulation for macroeconomic and financial stability.

3.6 MAS determines its monetary policy based on price stability considerations, including taking into account the impact of the macroprudential policies that may be in place. MAS' exchange rate-centred monetary policy has served Singapore well in achieving price stability. However, in the context of free capital movements, an exchange rate-centred monetary policy implies that domestic interest rates are largely determined by foreign interest rates and investor expectations of the future movements in the Singapore dollar exchange rate. This limits MAS' ability to use monetary policy to independently manage domestic financial conditions, especially when the fluctuations are externally-driven and only for particular sectors. For example, the extended low global interest rate environment and search for yield following the Global Financial Crisis threatened a build-up of financial vulnerabilities in Singapore's property market. To attempt to moderate the specific cyclical conditions in the property sector using a wide-ranging instrument like monetary policy would have required very significant adjustments to the exchange rate, with ensuing unintended negative impact on other sectors of the economy.³

3.7 Accordingly, MAS formulates macroprudential policy to mitigate systemic risks in a manner that complements monetary policy, taking into account the latter's implications for overall financial conditions. It has been shown empirically that macroprudential policy

³ Kenneth Kuttner and Ilhyock Shim estimate that a 100 basis-point increase in the short-term interest rate would lower real annualised credit growth by less than 1 percentage point in the following quarter, reducing real housing demand growth by only 1 percentage point. Kuttner, K and Shim, I (2013), "Can Non-Interest Rate Policies Stabilise Housing Markets? Evidence from a Panel of 57 Economies", BIS Working Papers No. 433.

measures can have a significant impact on credit conditions, particularly for specific sectors such as the property market, but only a modest and indirect impact on overall aggregate demand. Macroprudential policy can thus help curb excessive volatility in financial conditions that could lead to unsustainable dynamics in financial and asset markets.

Box Item 1: MAS' Governance Arrangements for Macroprudential Policy

MAS adopts a tiered governance structure for macroprudential policy.

The Board-level Chairman's Meeting (CM) approves major policy decisions on the financial supervision framework, including those relating to macroprudential policy (e.g. the domestic systemically-important bank framework, the counter-cyclical capital buffer framework). A broader, encompassing perspective to macroprudential and monetary policy objectives are achieved through overlapping memberships at the CM and the Board-level Monetary and Investment Policy Meeting (MIPM) which sets monetary policy.

MAS management is responsible for the day-to-day implementation of macroprudential policies (e.g. the calibration of specific policy measures) approved by CM. Management escalates to the CM major policy decisions (e.g. framework for property market measures) to ensure Board support for the policies. Two management-level committees are involved in macroprudential policy – the Management Financial Stability Committee (FSC) and the Management Financial Supervision Committee (MFSC).

FSC is chaired by the MAS Managing Director and supported by the Macroprudential Surveillance Department as secretariat. Its membership includes senior management overseeing various functions, including financial supervision, monetary policy, and reserve management. FSC meets quarterly and more often if needed to deliberate on macroprudential and financial stability issues. It is responsible for formulating macroprudential policy and any associated communication plan.

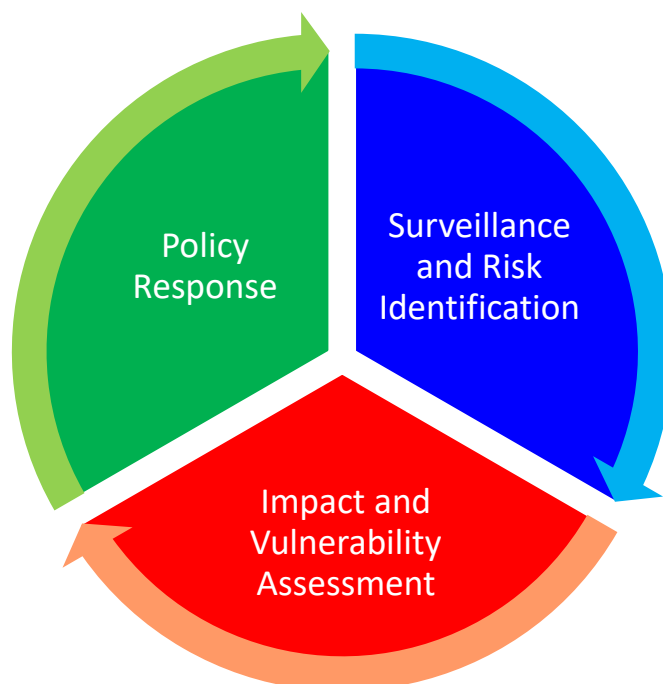
MFSC is chaired by the Deputy Managing Director responsible for financial supervision. Its membership comprises senior management from the financial supervision function and the

General Counsel. It meets weekly (or more regularly if needed) to deliberate on regulatory and supervisory issues and may refer financial stability matters to FSC for further deliberation.

While MAS is the only public authority in Singapore with a macroprudential policy mandate, there are other public agencies with data, surveillance insights and policy tools that may be relevant for promoting financial stability. MAS works with these other authorities to obtain relevant data. For the property market, an interagency taskforce comprising representatives from MAS, the Ministry of Finance and the Ministry of National Development monitors developments and coordinates policy measures.

4 Macroprudential Policy Framework

4.1 The schema below sets out MAS' framework for macroprudential policy, which involves the iterative processes of **surveillance and risk identification**, **impact and vulnerability assessment**, and **policy response**.



Surveillance and Risk Identification

4.2 MAS takes a system-wide perspective in its macroprudential surveillance efforts. As a small and open economy that is highly integrated with the rest of the world, the contagion risk to Singapore from external sources is not immaterial. MAS identifies potential risks arising from global and domestic developments, as well as their interactions, and then traces their transmission channels through Singapore's financial system and economy.

4.3 MAS constantly monitors a broad suite of indicators to identify potential risks and how they may manifest. These indicators cover five broad sectors: banks, non-bank financial institutions, corporates, households, and the external sector. Linkages within and between these sectors are identified through network analyses of balance sheet variables and transaction flow data.

4.4 MAS conducts surveillance using a comprehensive information set, including regulatory returns, survey data, and commercial sources. The regulatory returns cover a wide range of regulated entities, including banks and non-bank financial institutions, and financial markets. Data collected through supervisory returns are supplemented by information obtained from commercial sources and surveys. For example, the quarterly Housing Loans Survey, the monthly Housing Loan Profile Survey and the annual Small and Medium-Sized Enterprise (SME) Financing Survey provide granular information on the risk profile of loans. Since MAS regulates almost all financial institutions in Singapore, there are few entities of relevance that fall outside its regulatory perimeter. Although MAS also has legal authority to collect data from unregulated entities to support its financial stability mandate, in practice it has worked with other authorities to obtain such data.⁴ Quantitative information is complemented by intelligence collected through dialogue with industry, other domestic and foreign authorities, and international organisations.

Impact and Vulnerability Assessment

4.5 MAS uses a combination of stress tests and sensitivity analyses to assess potential vulnerabilities in the financial system. The focus of these assessments are on tail risks – unlikely events that may pose systemic effects. The emphasis is on analysing how the financial system and the real economy could be affected if particular tail risks were to materialise.

4.6 MAS conducts an annual industry-wide stress test⁵ of key financial institutions to evaluate the resilience of the financial system to plausible scenarios of stressed macroeconomic and financial conditions. The stress test also serves as a pre-emptive supervisory tool to encourage financial institutions to identify vulnerabilities and develop risk mitigation plans. The types of risk being assessed include solvency, credit, market, and liquidity risks, as well as thematic dives into emerging risks, e.g. particular sectors or risk types.

⁴ For example, MAS works with the Council for Estate Agencies to collect aggregate information on households' purchases of overseas properties; with the Urban Redevelopment Authority to obtain property market indicators; and with the Ministry of Law to understand trends in consumer lending by moneylenders and pawnbrokers.

⁵ In addition, financial institutions perform regular stress tests which capture risks that are unique to them individually. Reverse stress tests, where financial institutions describe scenarios in which their solvency would come under threat, provide further insights on the risks that could impair Singapore's financial system. MAS supervisors also engage financial institutions on the results of these stress tests.

MAS will conduct more stress tests as and when necessary, e.g. during the Global Financial Crisis.

4.7 Participants in the industry-wide stress tests are selected based on their importance to the Singapore financial system and economy. They include the major banks, finance companies, insurers, and capital market intermediaries (clearing houses and clearing members). For instance, banks and insurance companies are selected primarily for their size or interconnectedness with other financial institutions operating in Singapore. Financial institutions that provide essential services to exchanges and clearing houses or have significant market-making roles are also included in the exercise. Supervisors may also exercise judgement to include other institutions whose risk profiles are assessed to be material.

4.8 MAS prescribes severe but plausible stress scenarios for each year's industry-wide stress test. MAS develops the stress scenarios by drawing on its own surveillance of external and domestic risks as well as risk assessments by other authorities, industry players, and private sector analysts. The scenarios selected are translated into macroeconomic and financial variables, using a combination of quantitative tools and expert judgement. MAS' macro-econometric model of the economy is used to ensure that the projections of Singapore's macroeconomic variables are model-consistent with forecasts of external macroeconomic variables. Financial market variables (such as credit spreads and yield curves) are produced through a variety of methods, including using satellite models which link financial market variables with economic outcomes, benchmarking against historical stress periods/crises, and drawing on the views of industry analysts.

4.9 The common stress scenarios and associated stress parameters are then communicated to the participating institutions for their bottom-up stress tests. As the participating institutions vary greatly in terms of the size and nature of their operations, MAS encourages them to develop stress test methodologies which are commensurate with their risk profiles. Participating institutions can leverage their own granular data, understanding of their customers, and knowledge of their own strategies and risk appetites to customise their stress test methodologies to their specific contexts.

4.10 Upon receiving the financial institutions' stress test results, MAS validates them for accuracy, reasonableness, and robustness. MAS assesses rigorously the stress test methodologies that financial institutions use, with a view to verifying that risk exposures are adequately covered, the methodologies employed are sensitive to such risks, and the underlying assumptions are reasonable. The common prescribed scenarios also allow MAS to conduct peer analyses of the results to identify weaknesses in stress testing methodologies, risk exposures, or risk mitigation plans.

4.11 MAS complements the industry's bottom-up stress tests with its own top-down stress test. Unlike the bottom-up stress tests, a common methodology is applied for the top-down stress test, so as to produce results that can be compared across institutions. This provides an additional perspective and serves as a robustness check of the institutions' stress test results. Top-down stress tests are also used to study possible feedback loops (e.g. potential second-round effects from interbank and macro-financial linkages), which bottom-up stress tests are not suited to analyse.

4.12 In addition, MAS conducts sensitivity analyses to examine the potential impact of targeted shocks on the corporate and household sectors. For example, MAS has used granular corporate and mortgage debt information to assess the debt servicing implications of interest rate increases on businesses and households.

4.13 For the external sector, MAS seeks to identify and evaluate the impact of external shocks and how they could propagate to Singapore. This involves studying direct exposures to and funding reliance on external parties. It also includes assessing indirect exposures, such as to borrowers or economies with significant exposures to the affected geographies or sectors.

Policy Response

4.14 If MAS' surveillance and impact assessments identify a material systemic risk that could impact the financial system or the real economy adversely, MAS will take policy action to remove or mitigate the risk or build resilience against it. The next section sets out the

principles that guide MAS' macroprudential policy approach and provides details on MAS' policy toolkit.

4.15 After taking the appropriate policy action, MAS will continue to conduct surveillance and impact assessments so as to review the effectiveness of the policy measures and monitor if there are any unintended consequences. Where necessary, policy adjustments will be made to improve policy outcomes. Continuous monitoring and impact assessments are also needed to identify new or emerging risks and vulnerabilities.

5 Macroprudential Policy Approach and Policy Tools

Policy Approach

5.1 MAS' macroprudential policy approach can be characterised as pre-emptive, targeted, calibrated, and multi-pronged.

5.2 **Pre-emptive:** MAS aims to pre-empt tail risks and their associated systemic effects. Given the high costs of financial crises and the protracted nature of post-crisis recoveries⁶, it is preferable to take preventive measures to reduce the probability and potential impact of a crisis than to take corrective actions only after a crisis has occurred. For example, rather than to act only when non-performing loans are rising, MAS has pre-emptively put in place a range of loan-to-value (LTV) ratio and debt-servicing requirements to promote responsible borrowing and lending behaviour. They help borrowers avoid taking on excessive leverage, which could lead to a build-up of financial vulnerabilities.

5.3 **Targeted:** MAS' macroprudential policies are targeted at specific systemic risks. Financial vulnerabilities are not spread evenly across the economy. They tend to be concentrated in certain sectors. Targeted policy measures aim to address the sources of vulnerabilities while minimising unintended spill-over effects to other areas that are not at risk. The policy calibration can also be varied according to the degree of risk posed by different sectors or market segments. For example, to stabilise the property market, MAS has applied credit measures such as LTV and total debt servicing ratio (TDSR) requirements only on property loans, so as not to disrupt credit to other sectors of the economy. Within the property sector, policy measures have been targeted at customer segments that are contributing to excessive investment demand or speculation while minimising the impact on owner-occupiers. For example, the additional buyer's stamp duty has been set at 0% for Singaporeans buying their first homes. For those buying their second or subsequent properties, the stamp duty rates are tiered according to the number of properties already owned by the buyer (e.g. a Singaporean purchasing a third property pays higher stamp duties

⁶ Carmen Reinhart and Kenneth Rogoff found that on average economies that suffer a systemic banking crisis will experience a peak to trough decline in per capita GDP of around 11.5% and will take 8 years to return to the pre-crisis level of income. Reinhart, C and Rogoff, K (2014), "Recovery from Financial Crises: Evidence from 100 Episodes", American Economic Review: Papers and Proceedings.

than one buying a second property). Non-residents pay higher stamp duties than residents. The differentiated application of ABSD rates on non-residents – for whom credit measures are not as effective – is necessary – in view of Singapore’s relative scarcity of land, juxtaposed against the large pool of external liquidity searching for yield in global and regional asset markets, including the property market.⁷

5.4 **Calibrated:** MAS has adopted a calibrated approach in implementing macroprudential policy. This approach allows MAS to review the policy impact, monitor for any unintended consequences and make policy adjustments as appropriate, while minimising the risk of overshooting macroprudential objectives and destabilising the market. For example, MAS tightened LTV limits on borrowers with multiple housing loans progressively over time to moderate investment demand for properties. The holding period and rates for the seller’s stamp duty were also increased gradually to discourage short term holding of properties. Conversely, MAS fine-tuned the TDSR framework by exempting owner-occupiers who were refinancing their housing loans to help ease the debt servicing burdens of these borrowers.

5.5 **Multi-pronged:** MAS adopts a multi-pronged strategy by using a variety of macroprudential policy tools in complementary fashion. As financial vulnerabilities may arise from different sources of risk, a diverse toolkit enables targeted policy measures to be taken against specific risks. For example, in the case of property market measures in Singapore, it has been found that the lending measures (e.g. LTV, TDSR) work by mitigating the pro-cyclical feedback loop between housing credit on one hand, and property transactions and property prices on the other. In contrast, tax measures (e.g. additional buyer’s stamp duty, seller’s stamp duty) and land supply were found to impact property prices more directly.

5.6 Having a portfolio of policy actions also reduces the risk of over-reliance on a single policy instrument. Such reliance could lead to an excessively stringent setting of the policy tool and increase the risk of unintended consequences. In contrast, using a range of more targeted policy instruments would allow greater degrees of freedom and a less stringent calibration of each tool. For instance, to dampen investment demand for residential properties, investors buying their second or subsequent properties have to pay higher stamp

⁷ At its peak, foreign purchases account for close to a fifth of all private residential property purchases in 2011.

duties. Similarly, borrowers taking on their second or subsequent housing loans are subject to tighter LTV limits. In addition, a diversified policy strategy is more comprehensive as it can guard against regulatory arbitrage. For example, MAS' loan tenure limit prevents borrowers from circumventing the TDSR requirement by lengthening their loan tenures to reduce monthly loan repayments.

5.7 A multi-pronged policy strategy requires proper coordination of the components to avoid policy conflicts. This is especially important where the policy instruments are under the purview of different authorities. For instance, the macroprudential policies targeted at the property market in Singapore include lending policies (e.g. LTV, TDSR, loan tenure limits) managed by MAS, tax measures like stamp duties under the Ministry of Finance, and other administrative measures (e.g. land supply) controlled by the Ministry of National Development. The agencies share information and analyses of the property market and coordinate policy actions through an interagency taskforce. The collective aim of the taskforce is to align the objectives of each authority under the overarching goal of promoting a stable and sustainable property market. Further, coordinated announcements by the authorities of their policy measures would send a strong signal to the market that the authorities are committed to addressing systemic risks in the property market.

Policy Tools

5.8 The table on the next page categorises Singapore's macroprudential policy tools based on the type of systemic risk that is being addressed and the authority with oversight of the instrument. The policy toolkit extends beyond microprudential tools under MAS' purview, and include policy measures under the purview of the Ministry of Finance and the Ministry of National Development. They are included insofar as they mitigate systemic risks that could impair the proper functioning of the financial system and impact the real economy adversely.

Type of Systemic Risk	Policy Tool	Authority	Objectives
Systemically important nodes in the financial system	Domestic systemically important bank framework ⁸	MAS	Minimise spill-overs to the financial system from the failure of systemically important banks by providing for additional financial buffers against risk and orderly resolution of these banks.
Risk concentrations	Property Sector Exposure Limit	MAS	Minimise spill-overs from a property downturn by preventing banks from amassing concentrated exposures to the sector.
Unsustainable dynamics in financial and asset markets	Counter-cyclical capital buffer ⁹	MAS	Reduce procyclicality by restraining credit growth during a boom while building buffers that can be released during periods of stress to support continued flow of credit to the economy.
	Limits on unsecured lending ¹⁰	MAS	Discourage borrowers from taking on excessive leverage.
	Loan-to-value (LTV) and loan tenure limit on motor vehicle loans	MAS	Discourage borrowers from taking on excessive leverage.

⁸ For details, see MAS Financial Stability Review 2015 Box G (November 2015), “Singapore’s Framework for Domestic Systemically Important Banks”.

⁹ For details, see MAS Financial Stability Review 2015 Box H (November 2015), “The Counter-cyclical Capital Buffer: Expanding the Macroprudential Toolkit”.

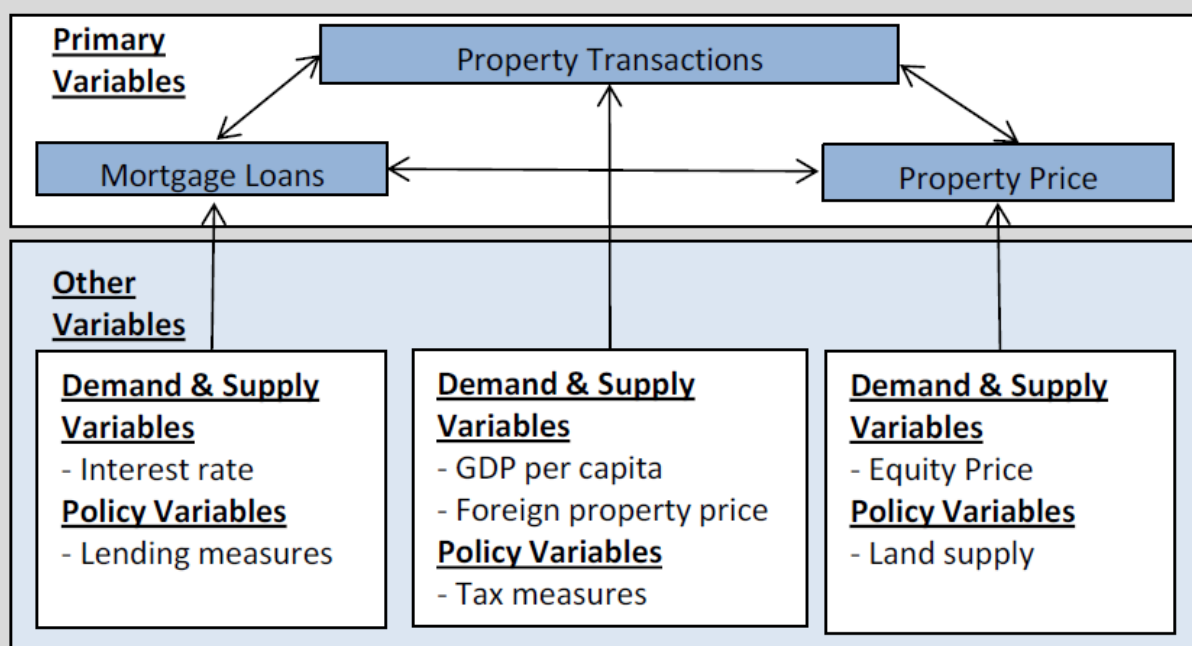
¹⁰ For details, please see MAS Financial Stability Review 2017 Box O (November 2017), “Credit Cards and Other Unsecured Credit Facilities: Building Household Resilience for the Future”.

Type of Systemic Risk	Policy Tool	Authority	Objectives
	<p><u>Property market measures</u></p> <ul style="list-style-type: none"> • Elimination of interest-only housing loans • LTV limit and minimum cash down-payment for first housing loan • Lower LTV limit for second and subsequent housing loans • Loan tenure limit • Total debt servicing ratio requirement • Seller’s stamp duty • Additional buyer’s stamp duty • Land supply 	<p>MAS</p> <p>MAS</p> <p>MAS</p> <p>MAS</p> <p>MAS</p> <p>MOF</p> <p>MOF</p> <p>MND</p>	<p>Discourage borrowers from taking on excessive leverage.</p> <p>Discourage borrowers from taking on excessive leverage. Provide buffer for lenders against losses.</p> <p>Temper investment demand for residential properties.</p> <p>Discourage borrowers from taking on excessive leverage.</p> <p>Discourage borrowers from taking on excessive leverage. Strengthen credit underwriting standards among lenders.</p> <p>Discourage sale of properties within prescribed holding period.</p> <p>Moderate demand for residential properties.</p> <p>Planned for underlying medium-term demand.</p>

MOF – Ministry of Finance; MND – Ministry of National Development

Box Item 2: Effectiveness of Macroprudential Policies for the Property Market

To assess the effectiveness of macroprudential policies, MAS developed a model of the drivers and transmission channels in Singapore’s residential property market. The schema below highlights the dynamic linkages among the key primary variables in the model, i.e. property transactions, property prices, and mortgage loans. These primary variables are in turn driven by policy variables (e.g. lending and tax measures) as well as other demand and supply drivers in the market.



MAS’ empirical work shows that the tax measures (i.e. seller’s stamp duty and additional buyer’s stamp duty) had a larger impact on property transactions and prices than the lending (i.e. LTV and TDSR requirements) and land supply measures.¹¹

The government land sales programme had an empirically significant impact on property prices, even though these measures took the form of announcements of land supply for

¹¹ See Box R “Macroprudential Policies to Address Systemic Risks in the Housing Market” of the MAS’ Financial Stability Review (November 2015), and Wong et al., South East Asian Central Banks (SEACEN) Financial Stability Journal (May 2015), “Using Macroprudential Tools to Address Systemic Risks in the Property Sector in Singapore”.

housing that would be completed only much later. This suggests that the signalling effects of land supply announcements were important.

MAS' lending measures operated mainly by tempering the growth of housing loans. The lending measures also improved the risk profile of borrowers, with meaningful reductions in LTVs, TDSRs, loan tenures, and the share of borrowers with multiple housing loans.

These results are largely consistent with results from other studies.¹²

¹² For example, Lim et al (2011) found that measures such as LTV and debt-to-income caps, ceilings on credit growth, reserve requirements, and dynamic provisioning rules can mitigate the procyclicality of credit. Lim, C; F Columba; A Costa; P Kongsamut; A Otani; M Saiyid; T Wezel and X Wu (2011), "Macroprudential Policy: What Instruments and How to Use Them? Lessons from Country Experiences", IMF Working Paper No. WP/11/238. Kenneth Kuttner and Ilhyock Shim found that debt service-to-income ratios affect housing credit growth while housing-related taxes can slow the growth of house prices. Kuttner, K and Shim, I (2013), "Can Non-Interest Rate Policies Stabilise Housing Markets? Evidence from a Panel of 57 Economies", BIS Working Paper No. 433.

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