



Monetary Authority of Singapore

A nighttime aerial photograph of the Singapore city skyline, featuring the Marina Bay area with its iconic buildings and the surrounding urban landscape.

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LIST OF ABBREVIATIONS

ACU	Asian Currency Unit
AFC	Asian Financial Crisis
ASEAN	Association of Southeast Asian Nations
BIS	Bank for International Settlements
COE	Certificate of Entitlement
CPF	Central Provident Fund
CPI	consumer price index
DBU	Domestic Banking Unit
ECB	European Central Bank
EIA	Energy Information Administration
EU	European Union
EPG	Economic Policy Group
FDI	Foreign Direct Investment
F&B	food and beverage
GDP	gross domestic product
GFC	Global Financial Crisis
GFCF	gross fixed capital formation
GST	Goods and Services Tax
HDB	Housing & Development Board
ICT	information and communications technology
IMF	International Monetary Fund
IPI	import price index
IT	information technology
m-o-m	month-on-month
MNC	multinational corporation
NAIRU	non-accelerating inflation rate of unemployment
NEA	Northeast Asian economies
NEER	nominal effective exchange rate
NODX	non-oil domestic exports
OECD	Organisation for Economic Cooperation and Development
OPEC	Organisation of the Petroleum Exporting Countries
PBC	People's Bank of China
PCE	private consumption expenditure
PMI	purchasing managers' index
PPP	purchasing power parity
q-o-q	quarter-on-quarter
REER	real effective exchange rate
SA	seasonally adjusted
SAAR	seasonally adjusted annualised rate
ULC	unit labour cost
VA	value added
y-o-y	year-on-year

Preface

The *Macroeconomic Review* is published twice a year in conjunction with the release of the MAS Monetary Policy Statement. The *Review* documents the **Economic Policy Group's (EPG)** analysis and assessment of macroeconomic developments in the Singapore economy, and shares with market participants, analysts and the wider public, the basis for the policy decisions conveyed in the Monetary Policy Statement. It also features in-depth studies undertaken by EPG, and invited guest contributors, on broader economic issues facing Singapore.

In this issue of the *Review*, we are pleased to present Special Feature A documenting the proceedings of the 6th Asian Monetary Policy Forum (AMPF) held in May this year, which saw central bankers, academics and industry representatives offer their perspectives on the challenges confronting monetary policy today. The 6th AMPF was jointly organised by the Chicago Booth School of Business, the National University of Singapore (NUS) Business School and MAS under the auspices of the Asian Bureau of Finance and Economic Research (ABFER). We are grateful to Professor Douglas Laxton of the NOVA School of Business and Economics and former Division Chief of the Economic Modeling Division in the IMF's Research Department for contributing Special Feature B, which discusses the output gap measures relevant to monetary policy and financial stability assessments, and for the need to make a clear distinction between them for policy purposes. Our thanks also go to Professor Sumit Agarwal and Mr Chua Yeow Hwee at NUS and Professor Changcheng Song of the Singapore Management University (SMU) for Special Feature C, which presents the findings of a study on the role of changing consumption habits in shaping the inflation expectations of households. We also extend our appreciation to Dan Nyberg and Han Teng Chua of the IMF for preparing Box A, which examines the degree of synchronisation of business and financial cycles in Singapore with their global counterparts. Finally, we would like to thank Associate Professor Peter Wilson for his assistance in editing the *Review*.

This *Macroeconomic Review* is produced by EPG, MAS. The team comprises: Alvin Jason s/o John, Andrew Colquhoun, Ang Ziqin, Angeline Qiu, Betty Chong, Brian Lee, Celine Sia, Chia Yan Min, Choy Keen Meng, Cyrene Chew, Edward Robinson, Elizza Mileva, Eng Aik Shan, Geraldine Koh, Grace Lim, Harry Lee, Hema d/o Sevakerdasan, Huang Junjie, Irineu de Carvalho Filho, Jensen Tan, Li Tiansheng, Liew Yin Sze, Linda Ng, Michael Ng, Neha Varma, Ng DingXuan, Ng Yi Ping, Nicholas Koh, Priscilla Ng, Seah Wee Ting, Shem Ng, Soh Wai Mei, Tan Boon Heng, Tan Choon Leng, Tan Yin Ying, Toh Jing Ting, Toh Ling Yan, Tu Suh Ping and Wu Jingyu.

The data used in the *Review* was drawn from the following government agencies, unless otherwise stated: BCA, CPF Board, DOS, EDB, Enterprise Singapore, IMDA, LTA, MOF, MOM, MND, MPA, MTI, STB and URA.

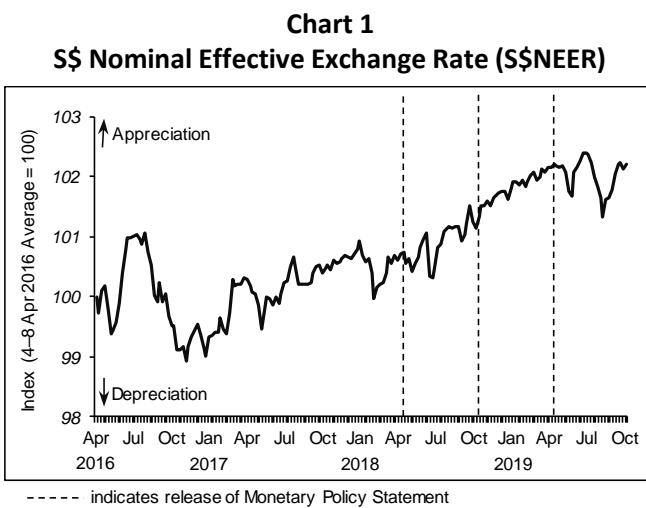


14 October 2019

Monetary Policy Statement

INTRODUCTION

1. In its April 2019 Monetary Policy Statement, MAS maintained the rate of appreciation of the S\$NEER policy band. There was also no change to the width of the policy band or the level at which it was centred. This policy stance was assessed to be appropriate, given contained inflationary pressures and a narrowing of the positive output gap.



2. Over the last six months, the S\$NEER has fluctuated within the upper half of the policy band, reflecting shifts in global risk sentiment and capital inflows into Singapore. The three-month S\$ SIBOR edged up from 1.9% in end-April 2019 to 2.0% in end-June, before falling back to 1.9% in August, where it has remained as at end-September.

OUTLOOK

3. Growth in the Singapore economy has slowed over the first three quarters of the year. It is expected to pick up modestly in 2020, although this projection is subject to considerable uncertainty in the external environment. Core inflation has come in lower than anticipated in recent months, and will remain subdued in the year ahead.

Growth Backdrop

4. According to the *Advance Estimates* released by the Ministry of Trade and Industry today, the Singapore economy grew by 0.1% year-on-year in Q3 2019, similar to the preceding quarter. In the last six months, the drag on GDP growth exerted by the manufacturing sector has intensified, reflecting the ongoing downturn in the global electronics cycle as well as the pullback in investment spending, caused in part by the uncertainty in US-China relations. In comparison, activity in the services sectors continued to expand, supported mainly by finance & insurance and business services. The construction sector also remained on a recovery path, and grew for the third consecutive quarter in Q3.

5. Global economic growth is expected to slow discernibly in 2019 compared to the previous two years, and should stabilise in 2020 barring further shocks. Growth had eased more significantly in Q2 2019 as the cumulative effect of the tariffs and elevated policy uncertainty took a heavier toll on manufacturing and trade. There are nascent signs that the downturn could spill over into domestic demand in some of Singapore's major trading partners in the quarters ahead, even as macroeconomic policy conditions in these economies have turned more accommodative.

6. Against this global backdrop, the weakness in electronics production and its supporting industries in Singapore is likely to persist over the near term. At the same time, the finance & insurance and information & communications services sectors should continue to expand, underpinned by domestic demand in the region and ongoing digitalisation-related investments. Within the domestic-oriented sectors, the outlook for the retail industry has dimmed but growth in education, health & social services is expected to stay resilient. The construction sector should also recover further in the year ahead, given the strong pipeline of public infrastructure projects.

7. On the whole, Singapore's GDP growth is projected to come in at around the mid-point of the 0–1% forecast range in 2019 and improve modestly in 2020. The output gap has turned slightly negative and this is expected to persist into 2020, which will keep inflationary pressures muted.

Inflation Trends and Outlook

8. MAS Core Inflation, which excludes costs of accommodation and private road transport, fell significantly to an average of 0.8% year-on-year in July–August 2019, from 1.4% in H1. Part of this decline was anticipated, reflecting falling costs of electricity & gas, and the dissipation of the effect of previous water price increases. However, retail and services inflation came in lower than expected. CPI-All Items inflation eased by a smaller extent over the same period, from 0.6% to 0.4%, as higher private road transport costs and a slower decline in imputed rentals on owner-occupied accommodation partially offset the moderation in core inflation.

9. In the quarters ahead, external sources of inflation are likely to be benign, amid weak demand conditions, and generally well-supplied food and oil commodity markets. However, oil prices could be volatile in the near term, reflecting geopolitical risks. On the domestic front, labour market conditions are softening as firms become more cautious about hiring. This would lower wage growth in 2019 and 2020 compared to last year. At the same time, non-labour costs such as retail rents should stay subdued. Meanwhile, the extent to which businesses can pass on accumulated costs to consumers would be constrained by poorer consumer sentiment and greater market competition.

10. As for the non-core components of the CPI, the negative contribution of imputed rentals to headline inflation should gradually dissipate in the coming months. However, private road transport costs are unlikely to increase significantly, as weakening sentiment and wider availability of alternative modes of transport weigh on the demand for cars.

11. MAS Core Inflation is expected to come in at the lower end of the 1–2% range in 2019, and average 0.5–1.5% in 2020. Meanwhile, CPI-All Items inflation is projected to be around 0.5% this year and average 0.5–1.5% in 2020.

MONETARY POLICY

12. Singapore's GDP growth should pick up modestly in 2020, but the level of output will remain below potential. Consequently, inflationary pressures should be muted. MAS Core Inflation is likely to remain below its historical average over the next few quarters before rising gradually over the medium term.

13. MAS will therefore reduce slightly the rate of appreciation of the S\$NEER policy band. There will be no change to the width of the policy band and the level at which it is centred. This measured adjustment to the policy stance is consistent with medium-term price stability, given the current economic outlook. MAS will continue to closely monitor economic developments and is prepared to recalibrate monetary policy should prospects for inflation and growth weaken significantly.

Chapter 1

The International Economy

1 The International Economy

The global economy lost further momentum in H1 2019, with a synchronous slowdown taking hold across major advanced countries and many Asian economies. Amid an escalation in trade tensions, heightened policy uncertainty has continued to act as a headwind to global economic activity, contributing to declines in investment and output. However, household consumption and the services sector have provided countervailing support to global growth.

The recent moderation in employment and wage growth in the US and Eurozone highlights the risk that the manufacturing downturn could spill over to consumption via weaker labour markets, triggering a further step-down in growth. To pre-empt this, policy settings in these economies, as well as in a number of Asian countries, have been eased, although stimulus measures in China have been restrained compared with previous slowdowns. On balance, global growth¹ is expected to slow to 3.6% in 2019, from 4.3% in 2018, and then stabilise at the same pace in 2020. However, the global economy's steady loss of momentum raises its vulnerability to downside risks, even while policy space is becoming more constrained.

Table 1.1
Global GDP Growth*

	Q1 2019	Q2 2019	2018	2019F	2020F	(%)
	q-o-q SAAR		y-o-y			
Total	4.2	3.3	4.3	3.6	3.6	
G3	2.4	1.4	2.1	1.5	1.1	
US	3.1	2.0	2.9	2.3	1.8	
Japan	2.2	1.3	0.8	1.0	0.2	
Eurozone	1.7	0.8	1.9	1.1	0.9	
	y-o-y					
Asia ex-Japan	4.3	4.3	5.0	4.3	4.4	
NEA-2	1.8	2.2	2.6	2.0	2.0	
Korea	1.7	2.0	2.7	1.9	2.2	
Taiwan	1.8	2.4	2.6	2.1	1.9	
ASEAN-4	4.5	4.6	4.9	4.5	4.5	
Indonesia	5.1	5.0	5.2	5.0	5.0	
Malaysia	4.5	4.9	4.7	4.5	4.2	
Philippines	5.6	5.5	6.2	5.7	6.1	
Thailand	2.8	2.3	4.1	2.8	3.0	
China	6.4	6.2	6.6	6.2	5.9	
Hong Kong SAR	0.6	0.5	3.0	-0.1	1.0	
India**	5.8	5.0	6.8	6.0	6.8	

Source: CEIC, Consensus Economics, October 2019 and EPG, MAS estimates

* Growth forecasts by Consensus Economics. All aggregates are weighted by shares in Singapore's NODX.

** Figures are reported on a Financial Year (FY) basis, FY2019 refers to the period from April 2019 to March 2020.

¹ Weighted by Singapore's NODX shares.

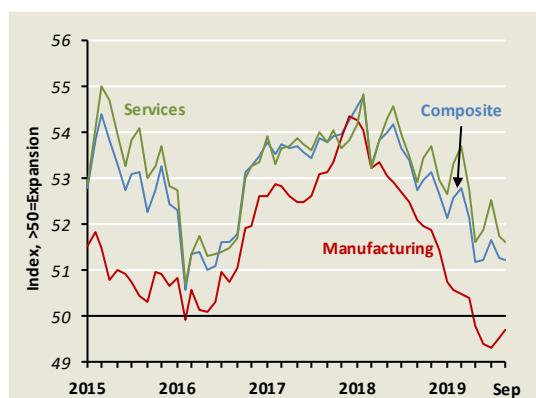
**Global growth has slowed this year
and should stabilise in 2020.**

Global growth has eased since mid-2018, decelerating further to 3.3% q-o-q SAAR in Q2 2019, from 4.2% in the previous quarter. High-frequency indicators suggest that economic activity remained sluggish in Q3. (Chart 1.1) With the manufacturing PMI signalling contraction since May, world exports have declined in tandem, as tariff-related strains accentuated the downswing in the global electronics cycle and in automobile demand. (Chart 1.2) Following the escalation of US-China trade tensions in August, new export orders have contracted further while the global capital goods PMI has also weakened, coming in at 48.4 in September.

These headwinds are likely to persist given elevated uncertainty, as evidenced by the historically high level of the *Global Economic Policy Uncertainty* index. (Chart 1.3) The increase in the index since early 2018 has coincided with the emergence of US-China trade tensions and concerns over Brexit. Higher policy uncertainty has in turn deterred business investment, as firms wait for greater clarity before embarking on planned investment. EPG's empirical analysis has found that higher uncertainty tends to be associated with declines in global investment and output. Specifically, a one standard deviation increase in the index, equivalent to the rise in uncertainty since early 2018, has a negative effect on global capex, causing it to fall by 0.8% after two quarters. Smaller effects are found for global consumption, which is in line with the relative resilience of private consumption observed in major countries and many emerging economies. However, the recent softening in labour markets may weigh on consumption in the coming quarters.

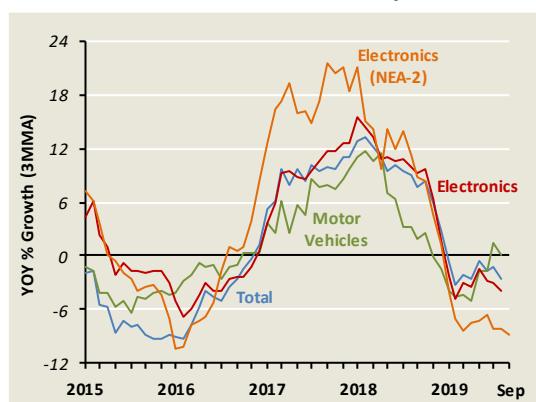
Faced with mounting risks of weakness in trade and manufacturing spilling over into the rest of the economy, some countries in the G3 and Asia have eased monetary policy, contributing to a loosening of financial conditions since mid-2019. Some countries have also introduced fiscal stimulus to support growth, for example through increased infrastructure investment. All in, global growth is projected to decline from 4.3% in 2018 to 3.6% this year, and stabilise at that rate in 2020.

Chart 1.1
Global PMIs



Source: J.P. Morgan, IHS Markit and Haver Analytics

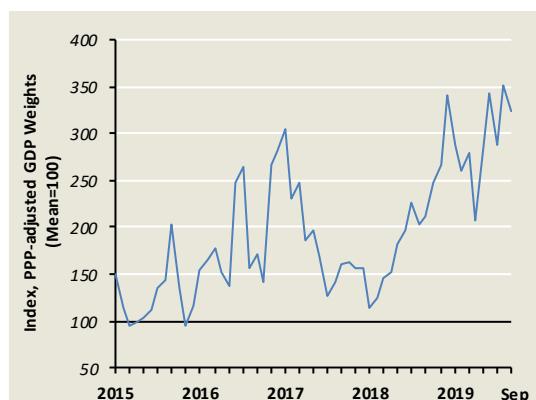
Chart 1.2
Global* Merchandise Exports



Source: Haver Analytics and EPG, MAS estimates

* "Global" comprises Canada, China, EU28, Hong Kong SAR, Indonesia, Japan, Malaysia, Mexico, the Philippines, South Korea, Taiwan, Thailand, the United States and Vietnam.

Chart 1.3
Global Economic Policy Uncertainty Index



Source: PolicyUncertainty.com

1.1 G3 Economies

Outlook Beset By Heightened Uncertainty

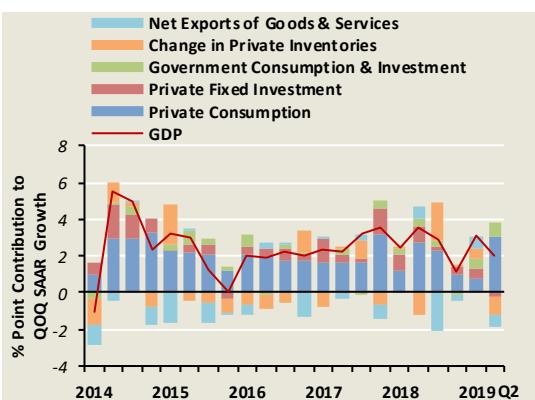
Growth in the G3 economies decelerated to 1.4% q-o-q SAAR in Q2 2019, from 2.4% in the preceding quarter, as the slowdown in investment, manufacturing and trade intensified amid elevated policy uncertainty. In contrast, consumption across the G3 was relatively resilient, underpinned by strong labour markets, with additional temporary support in Japan coming from households bringing forward purchases ahead of a consumption tax increase in October. However, businesses' hiring intentions have weakened and wage growth has started to moderate, suggesting consumer spending may pull back in the coming quarters. Set against this, looser fiscal and monetary policies are expected to support activity, although the fiscal boost in the US will be considerably weaker than in 2018, while increased government spending in Japan will merely soften the impact of the tax hike on consumption. Policy uncertainties, in particular around the US-China trade tensions, will continue to pose significant downside risks to the near-term outlook. All in, G3 growth is expected to moderate to 1.5% this year and 1.1% in 2020, from 2.1% in 2018.

The US economy has shown resilience despite heightened uncertainty and sluggish investment.

The US economy expanded by 2.0% q-o-q SAAR in Q2 2019, led by robust domestic demand. Final sales to domestic purchasers increased by 3.6% q-o-q SAAR in Q2, from 1.8% in Q1. Household spending and government expenditure rebounded strongly in Q2, collectively contributing 3.9% points to growth. This more than offset the weakness in spending on private fixed investment spending and a slower pace of inventory accumulation, which together subtracted 1.2% points from growth. (Chart 1.4)

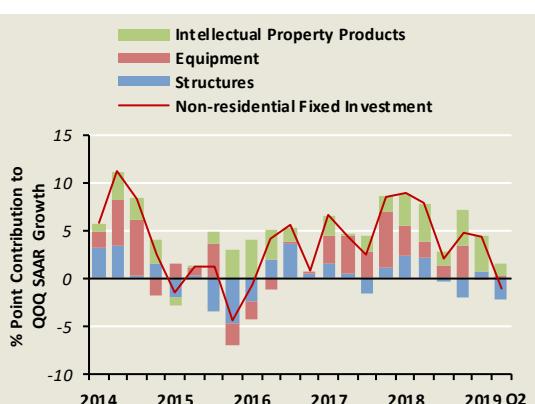
Personal consumption expenditure expanded by 4.6% q-o-q SAAR in Q2, driven by higher spending on durable goods, including automobiles. Government expenditure grew at its strongest pace since Q2 2009, as agencies compensated for lower spending due to the partial government shutdown from December 2018 to January 2019. However, non-residential fixed investment declined by 1.0% in Q2, as reduced spending on structures (reflecting the negative impact of lower energy prices on investment in the shale sector) outweighed an increase in spending on equipment and intellectual property. (Chart 1.5) Meanwhile, residential fixed investment fell for a sixth consecutive quarter in Q2, by 2.9% q-o-q SAAR.

Chart 1.4
Contribution to US Growth by Expenditure



Source: Haver Analytics and EPG, MAS estimates

Chart 1.5
US Non-residential Fixed Investment



Source: Haver Analytics and EPG, MAS estimates

US growth momentum will ease further but a sharp slowdown is not expected.

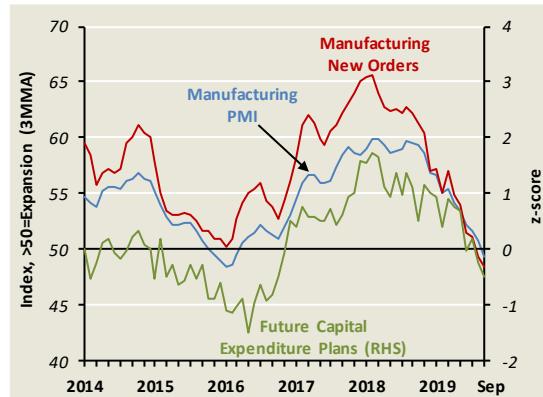
Persistent trade policy uncertainty and softness in global growth will continue to weigh on business confidence, capex and manufacturing production into 2020. The manufacturing PMI, as well as its new orders sub-component, signalled contraction in September, although the degree of softening could have been exaggerated due to a labour strike at General Motors. The outlook for business investment spending is still weak, judging by tepid forward-looking indicators—orders of core capital goods were sluggish in August and September, while Federal Reserve district banks' surveys showed that firms' future capital expenditure plans have been scaled down markedly. (Chart 1.6)

By contrast, the outlook for private consumption is supported by robust labour market conditions and steady wage gains, notwithstanding some recent slackening. Net job creation has slowed to an average of 157,000 over Jul–Sep, but it remains above the rate of about 100,000 needed to absorb labour force growth. (Chart 1.7) In addition, both the job openings rate and the pace of hiring remain elevated. Ongoing tightness in the labour market, as well as a pickup in labour productivity growth—from 1.3% in 2018 to 1.7% in H1 2019—should support stronger wage gains without stoking inflation.

Accommodative financial conditions will lend additional support to economic activity by encouraging household spending and business investment. Lower interest rates have started to feed through to interest rate-sensitive parts of the economy. There are early signs that residential investment is picking up, judging by the increase in mortgage originations and housing starts in Q2 and Q3, respectively. (Chart 1.8)

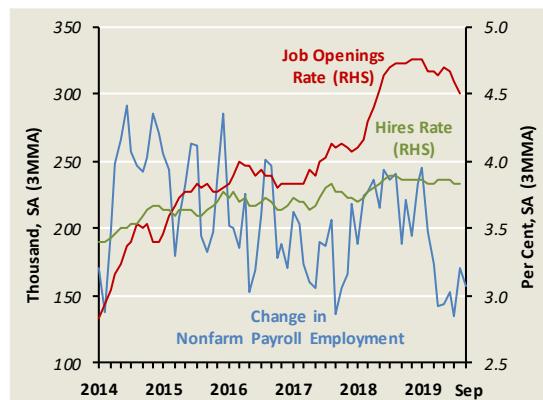
Overall, the US economy is projected to grow by 2.3% in 2019 before slowing to 1.8% in 2020, reflecting a subdued business investment outlook and reduced fiscal stimulus. The increase in federal discretionary spending approved under the Bipartisan Budget Act of 2019 will provide some fiscal support into 2020 even as the boost from earlier tax cuts fades. Still, the risks to the US growth outlook are tilted to the downside, stemming mainly from trade policy uncertainty and protracted weakness in investment.

Chart 1.6
ISM PMI Indices and Federal Reserve Surveys of Firms' Future Capex Plans



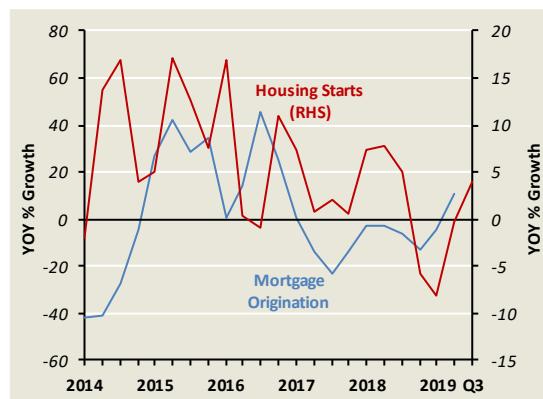
Source: CEIC, Haver Analytics and EPG, MAS estimates

Chart 1.7
US Labour Market Indicators



Source: Haver Analytics and EPG, MAS estimates

Chart 1.8
Housing Starts and Mortgage Originations



Source: Haver Analytics and EPG, MAS estimates

Economic conditions in the Eurozone weakened in Q2 2019.

Eurozone GDP growth decelerated to 0.8% q-o-q SAAR in Q2 2019 from 1.7% in the preceding quarter, due primarily to weakness in foreign trade. (Chart 1.9) The source of the slowdown was reflected in the differential performance within the bloc, as the more heavily trade-driven economies, Germany and Italy, underperformed less trade-reliant France and Spain. However, idiosyncratic country factors also significantly affected growth outcomes. German economic activity was dampened by persistent issues in the automobile industry. Meanwhile, political uncertainty and a widening risk premium undermined Italy's growth in Q2. In contrast, the expansions in France and Spain were supported by firm labour market conditions. The Eurozone growth figures were also distorted by a surge of capital flows from MNCs into Ireland, which significantly lifted investment and import growth.

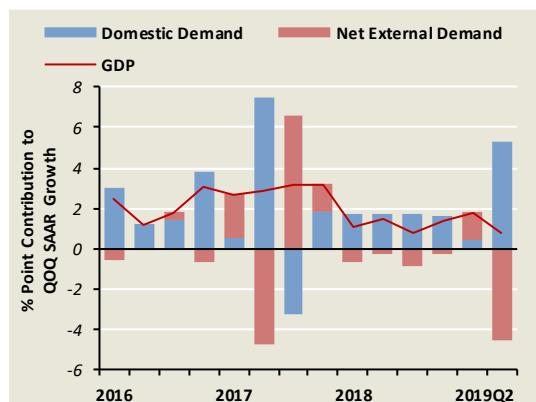
Risks to the Eurozone outlook are skewed to the downside.

Looking ahead, export growth in the Eurozone is expected to remain subdued amid the ongoing global manufacturing and trade downturn. Leading indicators such as the *ifo Export Expectations* index and manufacturing PMIs have remained in contractionary territory. (Chart 1.10) The Eurozone's flash manufacturing PMI fell further in October 2019, while September's report showed shrinking backlogs of work and new export orders, both of which are at their lowest levels since the 2012 sovereign debt crisis.

There are tentative signs that the weakness on the trade front is spilling over onto the domestic-facing sectors. Eurozone wage growth and consumer confidence have eased slightly since the start of the year, although they remain well above their longer-term averages. (Chart 1.11)

Monetary policy is expected to remain accommodative, judging by the steep decline in financial market swap rates since July 2019. The European Central Bank (ECB) announced a comprehensive easing package in September 2019 that included a 10-basis point cut to the Deposit Facility Rate, extended forward guidance, and the resumption of asset purchases from November 2019. Credit standards for corporate loans eased in Q3 2019. At the same time, fiscal policy is set to remain modestly expansionary, with the Eurozone-wide fiscal

Chart 1.9
External and Domestic Demand in the Eurozone



Source: Haver Analytics and EPG, MAS estimates

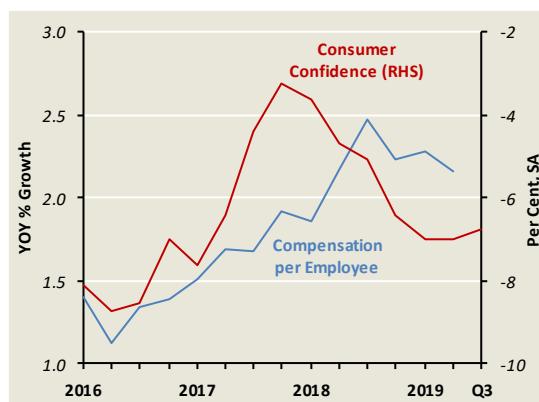
Note: The outsized offsetting moves in mid-2017 can be attributed to the large and unexpected swings in Ireland's gross fixed capital formation and import growth.

Chart 1.10
Leading Indicators of Eurozone Exports



Source: Haver Analytics and EPG, MAS estimates

Chart 1.11
Eurozone Consumer Confidence and Wages



Source: ECB, European Commission and EPG, MAS estimates

stance projected to record a net loosening of 0.1% of GDP in 2020, after an expansionary impulse of 0.5% of GDP in 2019. Specifically, in 2020, Germany and the Netherlands plan to increase climate change-related spending and infrastructure investment, respectively.

For the short-term outlook, a disruptive Brexit or protracted uncertainty over the outcome could adversely affect the Eurozone through a further reduction in trade and investment. In addition, an escalation in global trade tensions, especially if new restrictions are imposed on Eurozone exports, would further depress the region's weak manufacturing sector and exports. Overall, GDP growth in the Eurozone is projected to come in at 1.1% in 2019 and 0.9% in 2020.

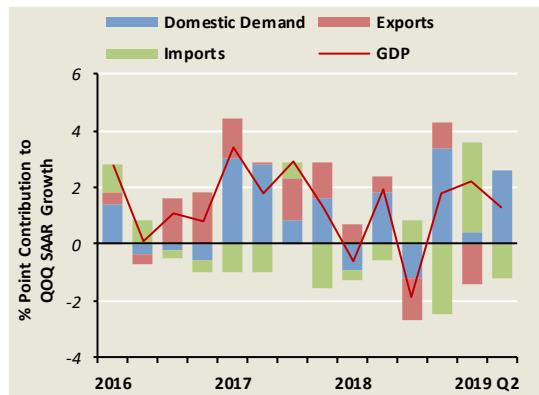
Fiscal measures in Japan will provide key economic support.

As in the rest of the G3, GDP growth in Japan moderated in Q2 2019, to 1.3% q-o-q SAAR from 2.2% in Q1. (Chart 1.12) Domestic demand was bolstered by households bringing forward durable goods purchases ahead of the consumption tax hike in October 2019, while healthy corporate profits facilitated business investment. However, external demand stayed weak, with net exports subtracting 1.2% points from growth.

Japan's economy is expected to lose momentum in the next two quarters, although government spending will offer some support. Weakening consumer confidence suggests households will reduce spending following the tax increase. Households' willingness to purchase durable goods has fallen below the levels seen in 2014 when a previous tax hike induced a short recession. (Chart 1.13) Nonetheless, the government's fiscal offsets of 5.5 trillion yen, which includes a 5% rebate on electronic items and increased childcare support, will help to cushion the anticipated retraction in demand. Further, the extent of damage caused by Typhoon Hagibis is still unclear, even as the government has announced a 500 billion yen aid package.

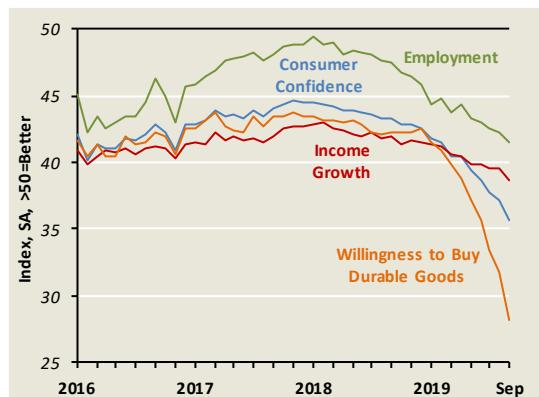
The slowdown in external demand will continue to dampen Japan's trade activity. Exports to China fell in both Q2 and Q3 2019, despite a less severe contraction in semiconductor shipments in September. (Chart 1.14) Meanwhile, Japan's trade dispute with Korea could worsen and cause a more discernible impact its economy, given that Korea is Japan's third largest trading partner. On balance, GDP growth in Japan is projected at around 1.0% in 2019 and 0.2% in 2020.

Chart 1.12
Contribution to Japan's GDP Growth



Source: Haver Analytics and EPG, MAS estimates

Chart 1.13
Japan's Consumer Confidence



Source: Haver Analytics and EPG, MAS estimates

Chart 1.14
Japan's Exports by Destination



Source: Haver Analytics and EPG, MAS estimates

1.2 Asia

Subdued Growth With Downside Risks

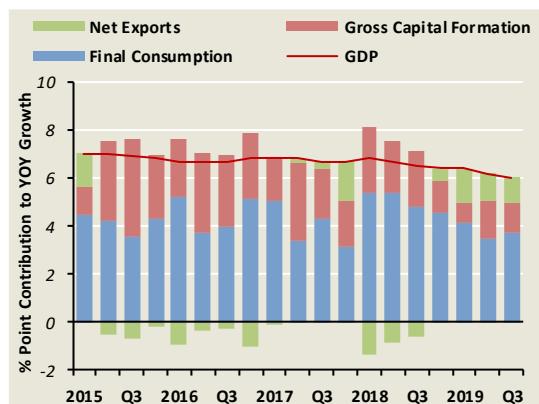
Growth in Asia ex-Japan held steady in Q2 2019 at a relatively weak pace of 4.3% y-o-y, on par with the preceding quarter. Sluggish external demand continued to dampen exports and investment across most of the region, with decelerating household spending also weighing on growth in China, India and Hong Kong. Some economies in the region appear to be benefitting from shifts in trade patterns, although there is as yet only limited evidence of a reorientation of foreign direct investment inflows. Policy easing is expected to provide some support to regional economic activity in the coming quarters, including in China where the government's response has been more targeted and measured than in previous slowdowns. On balance, GDP growth in Asia ex-Japan is projected to come in at 4.3% this year and 4.4% in 2020.

External and domestic headwinds contributed to slower growth in China.

The pace of economic activity in China continued to moderate, as slower global demand growth, higher trade tariffs and measures to mitigate financial risks weighed on exports and domestic spending. China's economy expanded by 6.0% y-o-y in Q3 2019, down from 6.2% in Q2, and just within the official target range of 6.0–6.5% for the whole year. Households have become more cautious in recent quarters, with final consumption contributing 3.7% points to growth in Q3 and 3.4% points in Q2, compared with 5.0% points in 2018. (Chart 1.15) Investment growth has also moderated mainly due to weaker private capital spending. Private sector fixed asset investment grew by 4.7% y-o-y from January to September 2019, down from 8.7% in the same period last year. State sector investment rose by 7.3% y-o-y over the same period, up from 1.2% a year earlier.

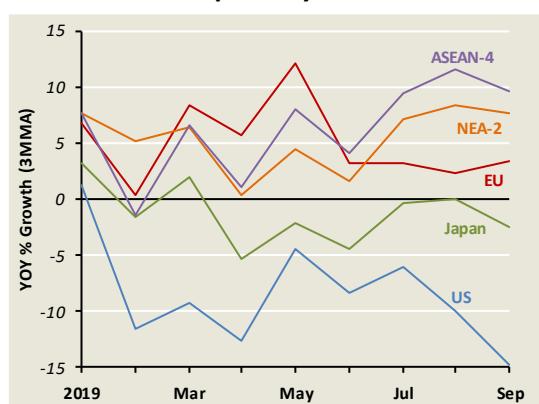
Although the growth contribution of net exports remained positive at 1.1% points in the third quarter, this was mainly due to import contraction. Merchandise imports declined by 5.0% while exports fell by 0.1% in Jan–Sep 2019 relative to the same period in 2018. Shipments to the US have deteriorated significantly as a result of trade restrictions on US\$250 billion of Chinese goods. At the same time, China's exports to the economies integrated into regional supply networks have fared better. (Chart 1.16) This suggests that there have been some shifts in supply chains in response to higher tariffs. Specifically, exports to the ASEAN-4 and Taiwan for the Jan–Sep period rose by 6.9% y-o-y and 12.9% y-o-y, respectively.

Chart 1.15
Contribution to China's GDP Growth
by Expenditure



Source: Haver Analytics and EPG, MAS estimates

Chart 1.16
China's Exports by Destination



Source: Haver Analytics and EPG, MAS estimates

China's growth is projected to fall slightly below 6% in 2020, reflecting the continued negative effect of tariffs levied on Chinese exports and weak business sentiment. The room for additional monetary easing is limited by the high debt-to-GDP ratio, as well as currency depreciation pressures and the risk of capital outflows. Given moderate levels of general government debt, there is fiscal space at the central government level to respond to a more severe than expected growth slowdown and pre-empt a further rise in unemployment. (Chart 1.17)

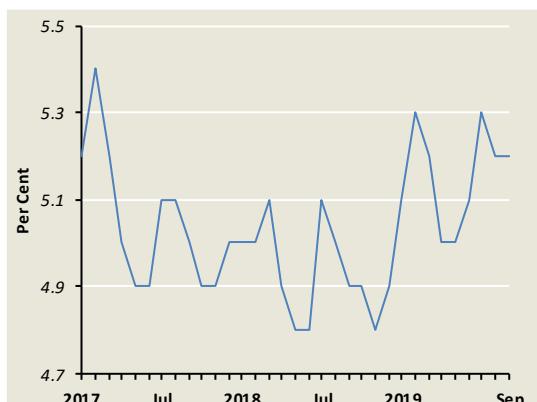
China's policy response has been more targeted and measured than in the past.

Monetary policy has aimed to lower funding costs for the real economy, while regulators remain focused on containing financial risks. The People's Bank of China (PBC) has kept the main policy rate, the 7-day reverse repurchase rate, unchanged since March 2018 but has lowered the required reserve ratio (RRR) by 4.0% points cumulatively, most recently in September 2019. Some of the liquidity released through the RRR cuts has been absorbed by lower lending via the PBC's other instruments. (Chart 1.18) Meanwhile, growth in credit to the non-financial sector has stabilised at about 11% y-o-y so far in 2019, driven by higher growth in bank loans and increased corporate bond issuance, while shadow bank lending contracted.

The ongoing fiscal stimulus seeks to promote economic rebalancing by emphasising tax incentives for corporations, small businesses and households. This is in contrast to past easing cycles, when infrastructure investment featured prominently. In Jan–Sep, consolidated fiscal revenues rose by 4.4% y-o-y, down sharply from 13% in the same period in 2018, owing to reductions in value-added tax, personal income taxes and import duties. In addition, the authorities have raised the bond issuance quota for local governments and shifted more spending on-budget, with the aim of further restricting off-budget borrowing for public investment projects. As a result, overall expenditure grew by 12.8% y-o-y in Jan–Sep, and the consolidated fiscal deficit is expected to reach an estimated 5.9% of GDP in 2019. (Chart 1.19)

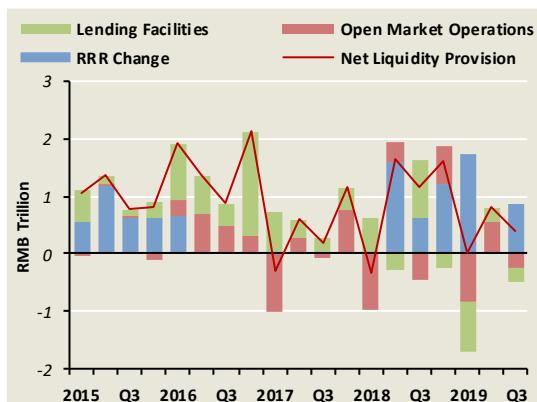
The government's measured response to the current growth slowdown reflects a shift in policy priorities

Chart 1.17
China's Surveyed Unemployment Rate



Source: Haver Analytics and EPG, MAS estimates

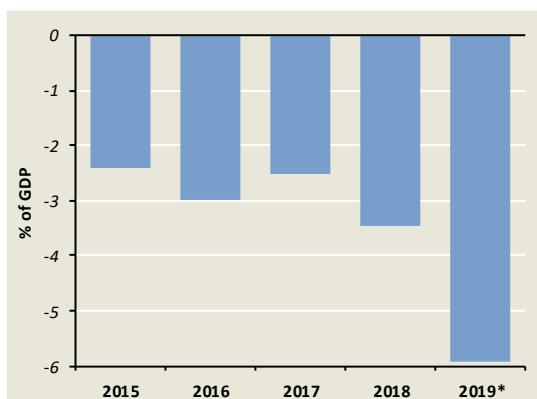
Chart 1.18
PBC Liquidity Provision



Source: CEIC and EPG, MAS estimates

Note: The Q3 2019 estimates are based on July and August data.

Chart 1.19
China's Consolidated Fiscal Deficit²



Source: CEIC, Ministry of Finance of China and EPG, MAS estimates

* Data for 2019 is from budget projections.

² China's budget system consists of a Public Finance Budget, a Government Fund Budget, a Social Security Fund Budget and a State Owned Enterprise Fund Budget. The consolidated budget balance refers to the sum of the four budgets minus net withdrawals from the stabilization fund.

towards financial stability and economic rebalancing. In the past decade, high public infrastructure spending contributed to strong growth in shadow banking and rapidly rising corporate leverage. Credit to the non-financial sector grew from 130% of GDP in 2008 to 240% in 2016, in part due to borrowing by local government financing vehicles for public investment. The infrastructure boom also resulted in resource misallocation and slower productivity growth. Given that public infrastructure is no longer a major constraint on growth in China, government investment now faces diminishing returns. The country's incremental capital-output ratio (ICOR) has risen significantly in recent years, possibly pointing to the declining efficiency of investment. (Chart 1.20)

Financial and fiscal constraints aside, a more restrained and targeted stimulus is broadly in line with China's current growth objectives and longer-term employment trends. In recent years, explicit long-term growth targets have been de-emphasised and shorter-term goals lowered, as policymakers prioritised the quality of growth over its speed. Furthermore, the growth rate required to create jobs to absorb new workers is lower today, because China's working-age population has peaked and the labour force is shrinking.

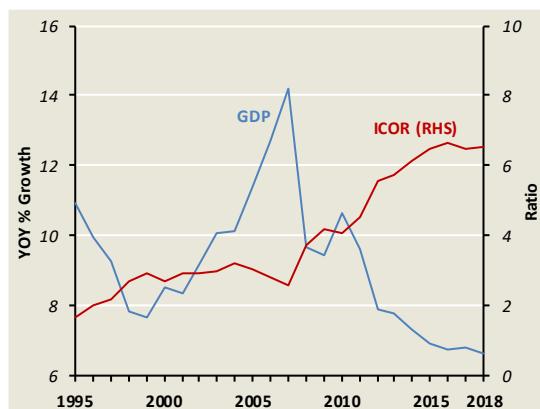
Economic activity in Hong Kong slowed sharply.

Hong Kong's economy contracted by 1.7% q-o-q SAAR in Q2 2019, as ongoing political tensions weighed on domestic demand and visitor arrivals. Compared to the previous year, real GDP growth decelerated to 0.5% in Q2 2019, from 0.6% in Q1. Investment was the biggest drag on growth in Q2, falling markedly by 11.6% y-o-y due largely to a pullback in building and construction activities as business sentiment worsened.

Although the labour market has remained relatively resilient, private consumption weakened sharply in Q2, and likely also in Q3, as the domestic political stand-off dampened confidence. The retail sector and tourist spending have been especially affected, as visitors stayed away. (Chart 1.21) Tourist arrivals plummeted by 39% y-o-y in August, the worst showing since the SARS crisis in 2003, alongside an unprecedented 23% y-o-y contraction in retail sales.

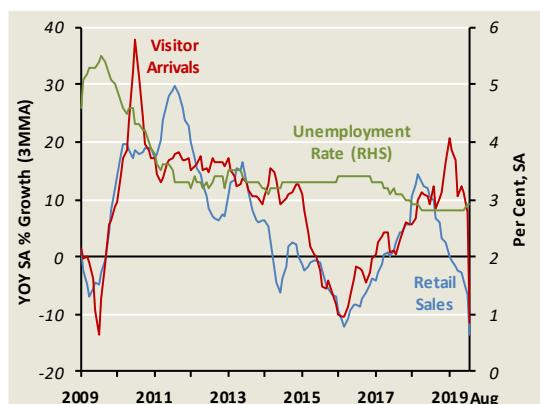
Near-term economic prospects for Hong Kong hinge on the evolution of the political situation, even as external headwinds continue to dampen the trade outlook.

Chart 1.20
China's Incremental Capital-Output Ratio



Source: CEIC and EPG, MAS estimates

Chart 1.21
Hong Kong's Retail Sales, Visitor Arrivals and Unemployment Rate



Source: Haver Analytics and EPG, MAS estimates

However, proactive government policy should provide some support to growth. The government announced a fiscal stimulus package targeted at consumers and businesses in August totalling HK\$19.1 billion or about 0.7% of GDP in 2018, and an additional HK\$1.4 billion package of living and training allowances and subsidies in September. On balance, the Hong Kong economy is expected to shrink by 0.1% in 2019, and grow by 1.0% in 2020.

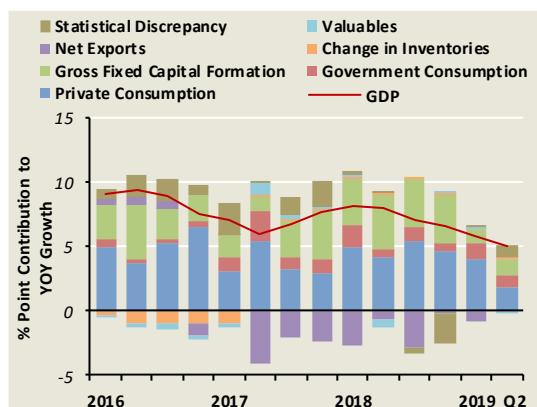
India's growth fell to a recent low on weak domestic demand.

The Indian economy grew by 5.0% y-o-y in Q2 2019, the slowest pace since Q1 2013, as domestic demand retracted. (Chart 1.22) The slowdown was due mainly to a substantial pullback in household spending, amid a credit crunch in the non-bank financial sector, which had been a key source of household financing. Private consumption grew by 3.1% y-o-y in Q2 2019, less than half of Q1's 7.2% pace. High-frequency indicators suggest household spending likely remained weak in Q3, with passenger vehicle sales declining for the fifth straight quarter, against a backdrop of rising unemployment and persistently tepid rural wage growth. (Chart 1.23)

Investment growth was also sluggish, as private sector firms continued to hold back on capex in the face of credit constraints and muted final demand. Gross fixed capital formation grew by 4.0% y-o-y in Q2, slightly faster than in the preceding quarter but far below the average of 9.2% in the previous two years. With anaemic domestic demand, imports expanded at a slower pace than exports, resulting in a positive contribution of net exports to GDP growth.

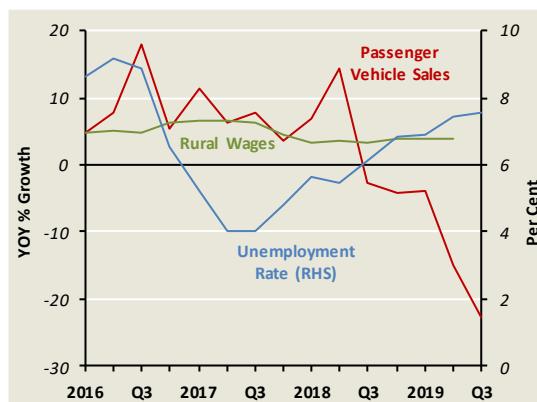
In the coming quarters, government policies should provide some support to economic activity and contribute to a gradual recovery. Monetary policy has become more accommodative, while fiscal measures, including corporate tax cuts, and moves to front-load capital infusions into state banks and expedite GST refunds for small firms, should contribute to an improvement in business sentiment. However, the scope for additional government spending is constrained by India's already-high government budget deficit and debt. In the medium term, reforms of the banking sector and foreign investment rules should provide a boost to the economy. On balance, India's economy is expected to grow by 6.0% in FY2019 (ending March 2020), and 6.8% in FY2020.

Chart 1.22
Contribution to India's GDP Growth by Expenditure



Source: CEIC and EPG, MAS estimates

Chart 1.23
India's Consumption Indicators



Source: CEIC, Haver Analytics, Centre for Monitoring Indian Economy and EPG, MAS estimates

Growth in Korea and Taiwan will be supported by increased government spending.

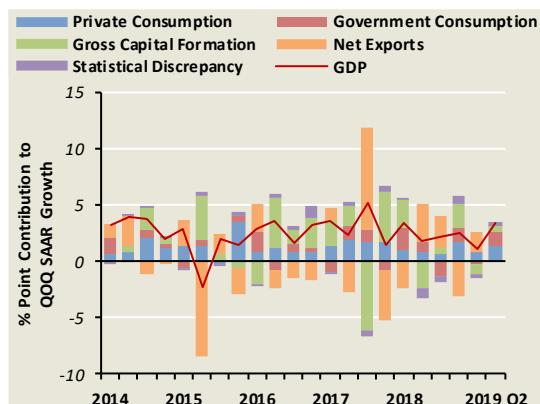
Bucking the trend in most of the region, GDP growth rebounded in Korea and Taiwan in Q2 2019, expanding by 4.2% and 2.7% q-o-q SAAR, respectively. (Chart 1.24) Strong household spending and private investment growth underpinned the expansions in both economies, while a fiscal boost in Korea further lifted activity. On the external front, trade continued to detract from growth in Korea, whereas net exports made a small positive contribution in Taiwan as the economy benefitted from some trade diversion due to the US-China tariffs. Specifically, Taiwan's exports of semiconductors and other ICT products such as servers and notebooks grew strongly in recent months. Korea's *Advance Estimate* for Q3 GDP indicated growth dropped back to 1.6% q-o-q SAAR on a decline in public and private domestic demand, while net exports strengthened, led by automobiles and the highly volatile ships component. The release suggests fiscal support temporarily flagged, although passage of a further supplementary budget in August should see some spending flow through in Q4.

Looking ahead, however, external headwinds are expected to cap the performance of both economies. Export orders have continued to contract for Taiwan, albeit at a slower pace, and are about flat in Korea, with the machinery and semiconductor component weighed down by the electronics cycle downturn. (Chart 1.25) Moreover, Korea-Japan trade tensions could further drag down export growth in Korea in the coming quarters. To support the economy in 2020, both Korea and Taiwan have announced significant fiscal support in the form of increased job creation and R&D funding in Korea, and infrastructure spending in Taiwan. Overall, both economies are expected to record GDP growth of around 2.0% in 2019 and 2020.

Robust consumption and accommodative policies will underpin growth in the ASEAN-4 economies.

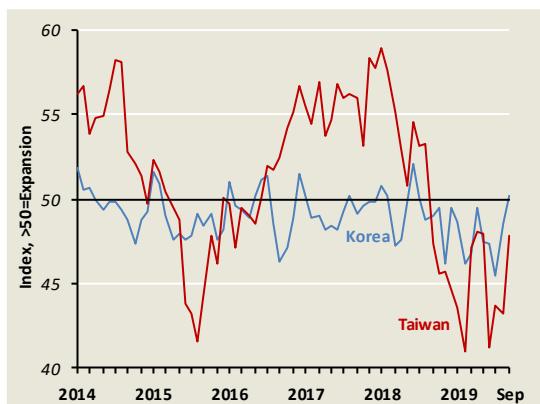
Economic momentum in the ASEAN-4 slowed in H1 2019 to 4.5% y-o-y, compared with 4.7% in H2 2018. Sluggish external demand weighed on trade in the region, especially with key markets such as the US, China and Japan. (Chart 1.26) Concurrently, investment activity weakened alongside subdued business sentiment and fiscal consolidation. Nevertheless, household consumption remained the bedrock of growth in the region as labour market conditions have

Chart 1.24
Contribution to GDP Growth in the NEA-2 by Expenditure



Source: CEIC, Haver Analytics and EPG, MAS estimates
Note: NEA-2 refers to Korea and Taiwan, with output weighted by shares in Singapore's NODX.

Chart 1.25
PMI Export Orders in Korea and Taiwan



Source: Haver Analytics and EPG, MAS estimates

Chart 1.26
Exports by Destination in the ASEAN-4



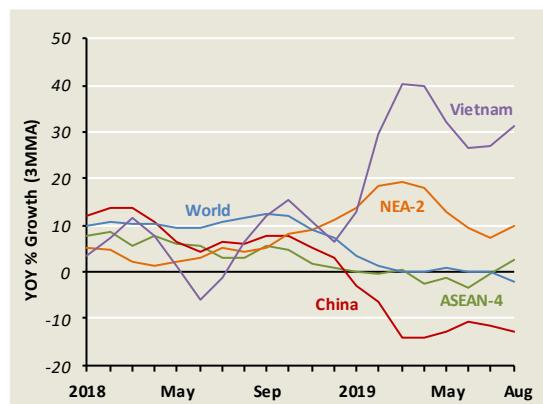
Source: Haver Analytics and EPG, MAS estimates

held up despite the uncertain economic environment.

The US-China trade tensions have led to some diversion in trade away from China to other parts of Asia, particularly to Vietnam, Taiwan and Korea. There are tentative signs that the ASEAN-4 economies are beginning to benefit from the shift as well. Although US imports from China have continued to fall, the growth of imports from the ASEAN-4 has fared better, and has picked up more discernibly since June. (Chart 1.27) At the same time, there has been a surge in FDI inflows into the ASEAN-4 across a range of industries, including electronics and apparel. This may suggest production relocation in line with supply chain switches, which bodes well for the ASEAN-4's exports in the future. (Chart 1.28)

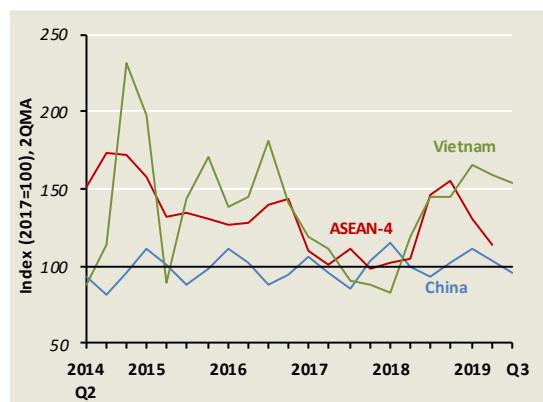
In recent months, the ASEAN-4 authorities have eased monetary and fiscal policies in an effort to mitigate the effects of the external slowdown. Amid benign inflation, policy rates have been reduced across the board since Q1 2019. Some central banks have also cut reserve requirement ratios. Additionally, fiscal policy has turned more supportive, as Indonesia and the Philippines have accelerated public investment in infrastructure projects, while Thailand unveiled a stimulus package amounting to nearly 2% of 2018 GDP, which consists of assistance to low-income households and measures to boost tourism. Overall, the ASEAN-4 economies are projected to expand by 4.5% in both 2019 and 2020, down from 4.9% in 2018.

Chart 1.27
US Imports from
Selected Asian Geographies



Source: US Census Bureau and EPG, MAS estimates

Chart 1.28
FDI Flows* into ASEAN and China



Source: Haver Analytics and EPG, MAS estimates

* Data used are as follows: Malaysia, Philippines and Thailand: Manufacturing or overall FDI approvals; Vietnam: Newly registered manufacturing FDI; Indonesia: Realised FDI for the secondary sector; China: Utilised foreign capital.

1.3 Global Inflation

Inflationary Pressures Remain Contained

Global consumer price inflation has picked up slightly since the beginning of the year, underpinned by diminishing slack in major economies, as well as rising food prices resulting from unfavourable weather conditions, particularly in Asia ex-Japan. However, the deceleration in the global economy and a further step-down in inflation expectations in Q2 and Q3 point to a subdued inflation outlook. Global headline inflation is projected to ease to 1.4% in 2019 from 2.2% in 2018, before rising to 2.0% in 2020.

G3 inflation is expected to remain benign.

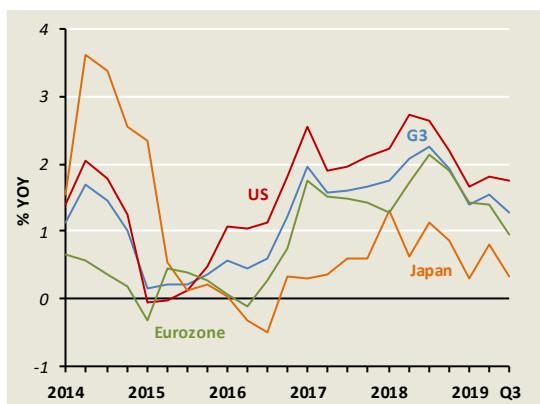
Inflation in the G3 remained subdued in Q3 2019, well below central banks' targets. (Chart 1.29) In the US, the headline and PCE inflation came in at 1.8% and 1.4% y-o-y, respectively, over Jul–Aug. In the Eurozone, CPI and core inflation declined from the previous quarter, to 1.0% and 0.9% y-o-y respectively in Q3. Likewise, in Japan, headline and core inflation in Q3 moderated to 0.3% and 0.5% y-o-y, respectively.

Looking ahead, inflation in the G3 is expected to pick up mildly. The IMF projects that the output gaps in the US and Eurozone will remain positive in 2020. (Chart 1.30) Stable labour market conditions in both economies will support moderate wage increases, such that ULC growth should continue its upward trend, albeit at a slower pace than in previous quarters. (Chart 1.31) Meanwhile in Japan, the consumption tax hike, which came into effect on October 1, is expected to temporarily lift headline inflation by 0.5% points in FY2019 and FY2020, albeit with offsetting pressures from other measures in childcare support. While these developments should exert some upward inflationary pressure, the synchronous global slowdown and recent downshift in inflation expectations should offset it to some extent. (Chart 1.32) All considered, G3 inflation is projected to come in at 1.4% in 2019 and 1.6% in 2020.

Higher food prices have contributed to an uptick in inflation in Asia ex-Japan.

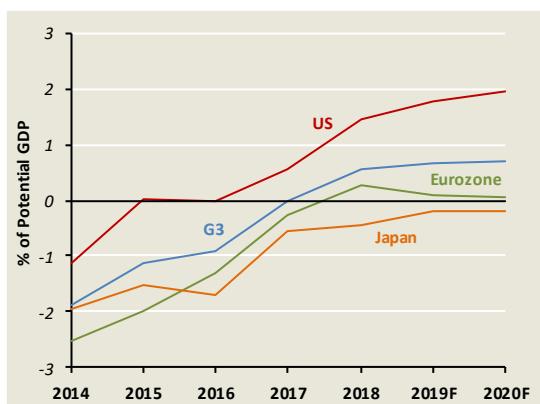
Inflation in most Asia ex-Japan economies stepped up in Q3 2019, bringing the average rate to 2.7% y-o-y from 2.5% in Q2. (Chart 1.33) Nevertheless, headline inflation in the region is projected to remain relatively stable at 2.4% this year, and increase only slightly to 2.8% in 2020.

Chart 1.29
CPI Inflation in the G3



Source: Haver Analytics and EPG, MAS estimates
Note: G3 is weighted by shares in Singapore's NODX.

Chart 1.30
Output Gaps in the G3



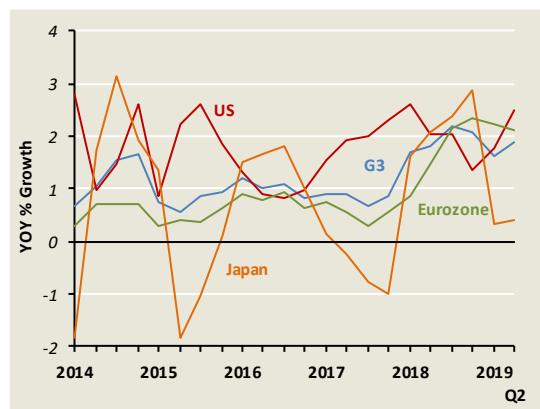
Source: IMF World Economic Outlook (October 2019) and EPG, MAS estimates

In China, CPI inflation rose to 2.9% y-o-y in Q3 2019, from 2.6% in Q2. A supply shortfall caused by bad weather and an outbreak of African swine fever resulted in higher food price inflation. Reflecting continued weakness in domestic demand, core inflation stayed subdued at 1.5% y-o-y in Q3. CPI inflation is expected to stay within the government's 2019 target of 3% and edge down in 2020 due to the weaker growth outlook. Meanwhile, inflation in Hong Kong picked up to 3.3% y-o-y in Q3 2019 from 3.0% in Q2, also partly on account of pork supply disruptions. Government relief measures, as well as weakening domestic demand, will continue to cap inflationary pressures in the coming quarters. CPI inflation is expected to rise modestly to 2.7% in 2019 from 2.4% in the previous year, and ease to 2.2% in 2020.

India's headline CPI inflation increased to 3.5% y-o-y in Q3 2019 from 3.1% in the preceding quarter, mainly due to unfavourable weather conditions pushing up food prices. Despite upside risks to food prices from uneven rainfall distribution, inflation is expected to rise only modestly in the coming months, given weak GDP growth. On balance, headline inflation in India is expected to come in at 3.2% in 2019 and 4.3% in 2020.

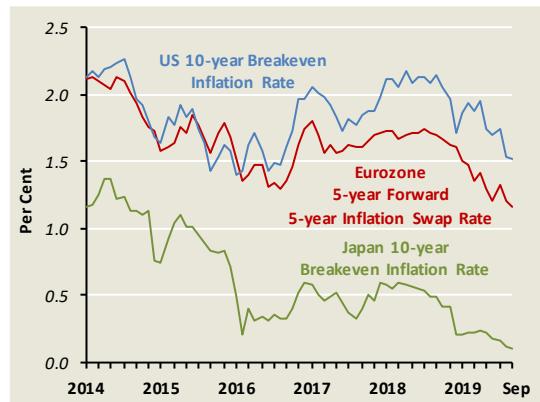
CPI inflation in Q3 2019 was flat in Korea and decelerated to 0.4% y-o-y in Taiwan on account of weak core inflation and subdued food prices. In the ASEAN-4, average inflation was 2.5% and 2.4% y-o-y in Q2 and Q3 2019 respectively, an uptick compared to Q4 2018 – Q1 2019. The increase was mostly driven by low base effects due to the zero-rating of the GST in Malaysia and elevated food prices from poor weather in Indonesia. Inflationary pressures in both NEA-2 and the ASEAN-4 are expected to remain muted into next year, largely due to softening demand. Headline inflation in the NEA-2 is projected at 0.6% in 2019 and 1.2% in 2020, while in the ASEAN-4, it is forecast at 2.4% in 2019 and 2.9% in 2020.

Chart 1.31
Unit Labour Cost in the G3



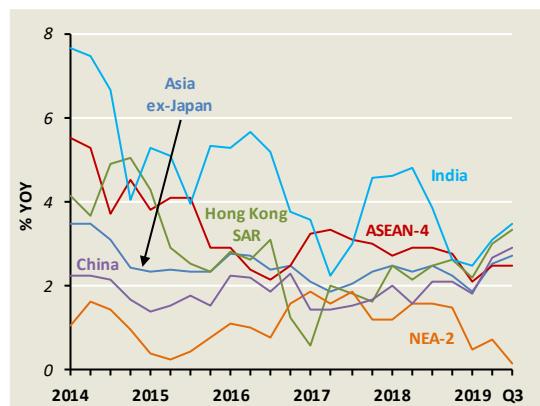
Source: OECD and EPG, MAS estimates

Chart 1.32
Market-based Measures of Inflation Expectations



Source: Bloomberg

Chart 1.33
CPI Inflation in Asia ex-Japan



Source: Haver Analytics and EPG, MAS estimates

Chapter 2

The Singapore Economy

2 The Singapore Economy

Economic growth in Singapore has slowed considerably over the past two quarters, with GDP expanding by 0.1% y-o-y in both Q2 and Q3 2019, a step-down from the 1.2% posted in Q4 2018 – Q1 2019. The downswing in the global electronics cycle continued to pose a large drag on the trade-related cluster, which also felt the brunt of US-China trade tensions. Modern services remained the main anchor of growth, underpinned by robust expansion of digitalisation-related activities in the ICT and finance & insurance sectors. Meanwhile, the domestic-oriented cluster picked up slightly alongside the recovery of the construction sector. Overall, the weakness has been largely contained within the electronics-related segments.

Looking ahead, the global growth outlook is lacklustre and beset by uncertainty arising from trade developments. Against this backdrop, activity in the Singapore economy is expected to stay soft over the next 18 months. Prospects for the trade-related cluster will largely hinge on the recovery of the global electronics cycle, while the reconfiguration of regional trade flows and supply chains adds a further source of uncertainty. Elsewhere, growth in modern services is expected to be driven by digitalisation activities, while the domestic-oriented cluster should see incremental gains, supported by construction and firm demand for essential services.

Over the past two decades, the Singapore economy has weathered several real and financial shocks. A review of these downturns shows that global electronics-sector shocks exert the dominant impact and these percolate through broader income multiplier and confidence effects. Negative economic shocks have been mainly absorbed by a squeeze on firms' profitability, while the labour market and hence the household sector have been relatively insulated.

2.1 Recent Economic Developments

A Step-Down In Growth

The Singapore economy recorded marginal growth in Q2 and Q3 2019. The trade-related cluster continued to be weighed down by the downswing in the global electronics cycle and prevailing US-China trade tensions. Modern services remained the lynchpin of the economy, with digitalisation-related activities in the ICT and finance & insurance sectors uplifting growth. Meanwhile, the domestic-oriented cluster posted incremental gains, supported by the recovery of the construction sector, though weaknesses in the retail segment capped gains. A deeper analysis of sectoral outturns confirms that the downturn in activity has been largely confined to the electronics-related segments.

Domestic growth has slowed over the past two quarters.

The Singapore economy saw a downshift in growth momentum over the previous two quarters. Real GDP expanded by 0.1% y-o-y in both Q2 and Q3 2019, a step-down from an average of 1.2% posted in the two preceding quarters. (Chart 2.1) On a q-o-q SAAR basis, growth averaged –1.1% in Q2–Q3 2019, shrinking from an expansion of 1.3% in the two quarters before.

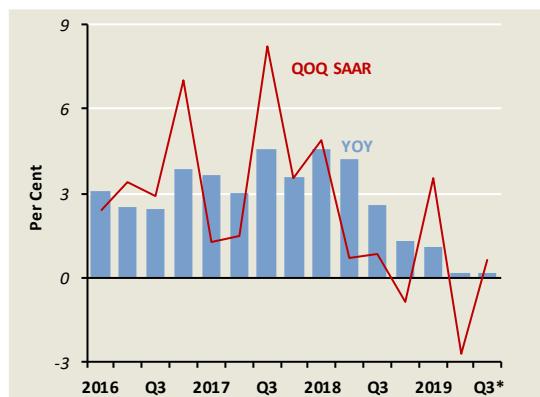
EPG's Economic Activity Index (EAI)¹ indicates that the decline in growth came largely from the weakness in the trade-related cluster, especially from electronics-related activities. (Chart 2.2) In comparison, modern services contributed positively to growth. Meanwhile, outturns in the domestic-oriented cluster also improved incrementally.

The trade-related cluster continued to be weighed down by the downswing in the global electronics cycle.

The trade-related cluster remained mired in the downturn of the global electronics cycle and US-China trade tensions. In particular, the largest drag to the cluster stemmed from the severe pullback in electronics demand. Accordingly, the weakness in the domestic economy was most discernible in the electronics-related industries of the manufacturing and wholesale trade sectors.

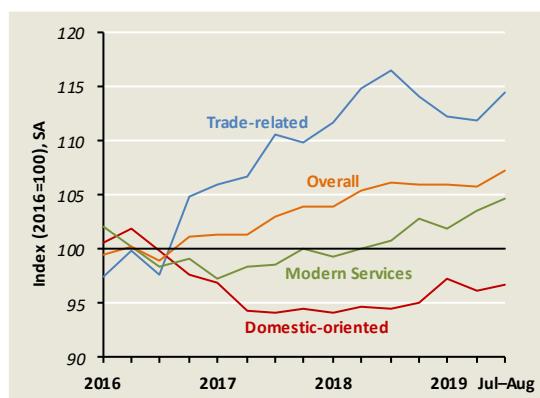
The Index of Industrial Production (IIP) contracted by a further 1.7% y-o-y in Q3 2019, following the –3.3%

Chart 2.1
Singapore's Real GDP Growth



* Advance Estimates.

Chart 2.2
Economic Activity Index



Source: EPG, MAS estimates

¹ The EAI is a composite index that aggregates the performance of a set of coincident high-frequency indicators across the major sectors of the economy.

recorded in Q2. (Chart 2.3) The semiconductor segment declined particularly sharply. In addition, reflecting the supply glut in the global chips market, demand for upstream semiconductor equipment remained weak, with the domestic machinery & systems segment also contracting.

Modern services remained the main growth driver of domestic growth.

Modern services continued to be the key source of growth over the past two quarters, supported by digitalisation-related activities in the ICT and finance & insurance sectors.

The ICT sector registered more creditable gains, albeit at a slower pace. Structural weakening in the demand for printing services and the production and broadcasting of television and radio programmes, had contributed to a slight moderation. The IT & information services segment, which had hitherto enjoyed robust growth, also eased slightly.

Credit card network services was a source of strong growth in financial services. Demand for payment-network services remained healthy, alongside a steady expansion in e-commerce activities, and the ongoing shift towards cashless payments.

Meanwhile, the rest of the industry turned in a mixed performance. Sentiment-sensitive segments generally benefited from the improvement in risk sentiment, supported by the accommodative policies of global central banks. The recovery in the ACU segment also gained momentum, on the back of improving loan growth (including trade bills financing) to East Asia, reflecting still-resilient domestic activity among the regional economies and some stabilisation in trade finance. (Chart 2.4) In the DBU segment, loans to the building & construction and transport, storage & communication segments increased at a steady clip. (Chart 2.5) Meanwhile, growth in the insurance industry lost steam. This reflected a combination of softer domestic and regional demand for insurance services and high-base effects in the reinsurance segment.

Elsewhere, the business services sector recorded tepid growth due to a pullback in rental & leasing. Nonetheless, the strong performance in professional services helped support overall growth in the sector. The contraction in real estate also eased, amid higher

Chart 2.3
Index of Industrial Production

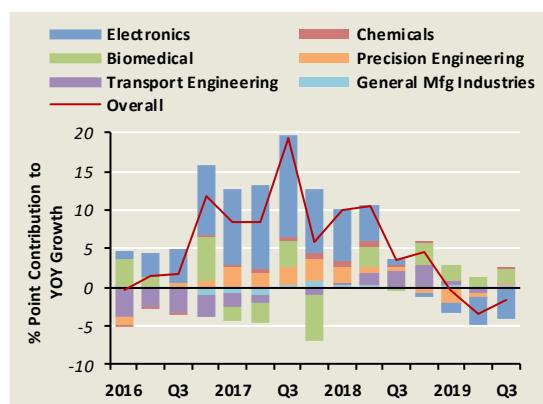


Chart 2.4
ACU Non-bank Loans

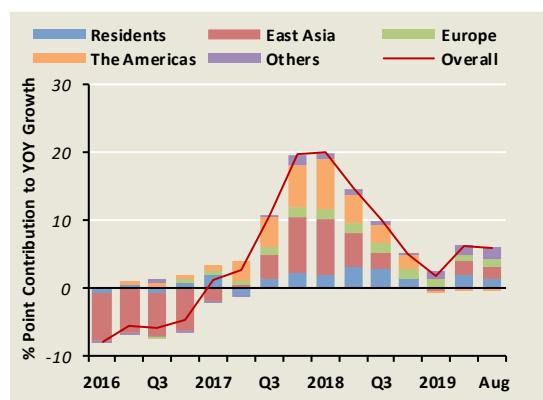
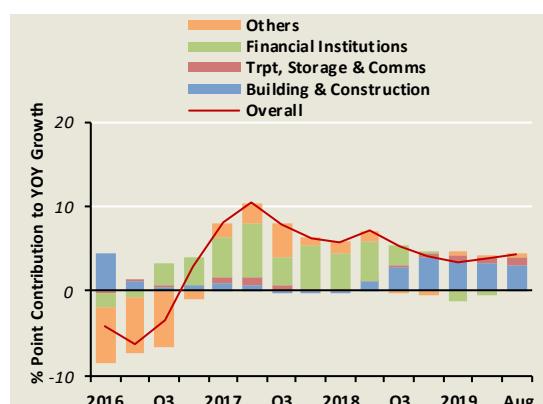


Chart 2.5
DBU Non-bank Loans to Businesses



transaction volumes in the private residential property market in Q2–Q3 2019.

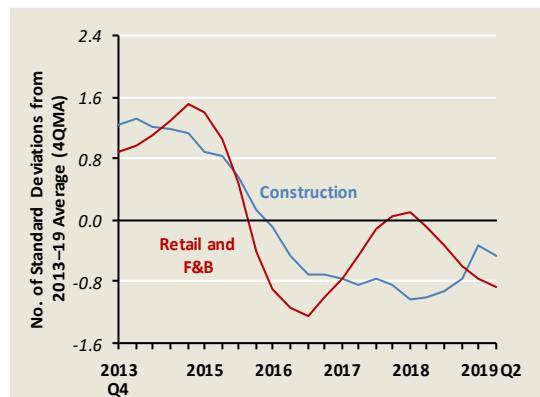
Growth in the domestic-oriented cluster was supported by the recovery in the construction sector.

The domestic-oriented cluster made a small positive contribution to overall GDP growth in both Q2 and Q3, led by the construction sector. Construction activity expanded by an average of 2.8% y-o-y in Q2–Q3 2019, a step-up from 0.8% in the preceding two quarters. Supported by a steady pipeline of infrastructure projects, nominal public certified payments increased by 9.7% y-o-y in Apr–Aug 2019, reversing the 1.7% contraction in Q4 2018 – Q1 2019. In comparison, private construction certified payments were largely flattish after a 10.5% expansion, in the respective periods, held back by the commercial and industrial segments. Results from EPG's factor utilisation analysis² for the construction sector show a general improvement since Q1 2018, although there was a mild dip in the most recent quarter due mainly to a decline in net firm formation. (Chart 2.6)

Meanwhile, the performance of the consumer-facing industries remained sluggish. Retail sales volumes (excluding motor vehicles) continued to decline in Q2 2019 and Jul–Aug, by 1.8% y-o-y and 1.6%, respectively. The weakness was due to lower spending on discretionary items such as watches & jewellery, furniture & household equipment as well as computers & telecommunications equipment. (Chart 2.7) The rebound in motor vehicle sales in Q1 2019 failed to gain traction and sales volumes contracted by double-digits in Q2 2019 and Jul–Aug. Weakening sentiment and wider availability of alternative modes of transport posed a drag on the demand for cars. Elsewhere, spending on F&B services expanded at a steady pace, averaging 1.7% in Apr–Aug 2019. Outturns varied across sub-segments, with expanding sales volumes at fast food outlets and restaurants offsetting mild declines in catering sales.

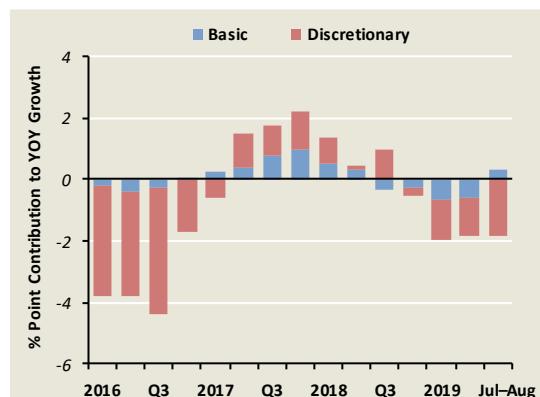
Nevertheless, factor utilisation analysis indicates continued deterioration in utilisation in the retail and

Chart 2.6
Factor Utilisation in the Construction, Retail and F&B Sectors



Source: EPG, MAS estimates

Chart 2.7
Growth in Retail Sales Volumes (Excluding Motor Vehicles)



Source: EPG, MAS estimates

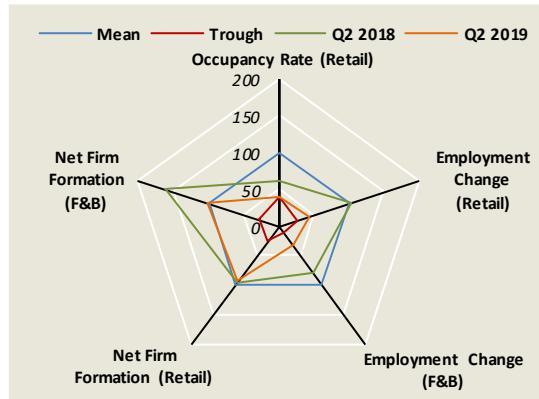
² The factor utilisation indicator is a proxy for the extent of slack in specific sectors. For the construction sector, net firm formation, employment change and imports of construction machinery were used. For the retail and F&B services segments, information was aggregated from net employment changes and net firm formation in each segment, and the retail occupancy rate. Principal components analysis was then used to summarise the information set. The number of standard deviations of the first principal component from its historical average was used as a gauge of industry activity or resource utilisation.

F&B segments, driven by declines in employment, net firm formation and occupancies over the past year. (Charts 2.6 and 2.8)

Tourism-related industries saw an uptick.

Total visitor arrivals grew by 2.5% y-o-y in Apr–Aug 2019, an improvement from the 1.7% seen in Q4 2018 – Q1 2019. The step-up in visitors can be attributed to strong arrivals from the Americas, as well as a rebound in visitors from Greater China, though the gains were capped by a moderation in arrivals from Europe and South Asia. Revenue per available room³ rose in Apr–Aug 2019 compared to Q4 2018 – Q1 2019, due to a broad-based increase in occupancies across different hotel tiers.

Chart 2.8
Factor Utilisation Indicators for Retail and F&B



Source: EPG, MAS estimates

Note: The data have been normalised to a mean of 100, and are plotted on a four-quarter moving average basis.

³ Revenue per available room is the product of the standard average occupancy rate and the standard average room rate.

2.2 Economic Outlook

An Extended Trough

Global growth remains sensitive to developments on the trade front. Against this backdrop, GDP outturns could experience bouts of weakness in H2 2019 and early 2020. Prospects for the trade-related cluster will hinge on the recovery of the global electronics cycle, and the ongoing reconfigurations of regional trade flows and supply chains. While manufacturing and trade-related services face strong external headwinds, there are still several areas of strength in the economy. The modern services cluster will continue to provide key support, while the domestic-oriented cluster should see further incremental gains. All in, Singapore's GDP growth for 2019 is expected to come in at around the mid-point of the forecast range of 0.0 to 1.0 per cent, and then improve modestly in 2020.

**Domestic economic activity is expected
to remain tepid into 2020.**

Downside risks have intensified since the last Review, emanating from elevated policy uncertainty and a steeper than expected slowdown of the Chinese economy. A synchronous slowdown is taking hold across Singapore's major trading partners, and high-frequency indicators suggest that the downswing has carried over into Q3, with the weakness in manufacturing, trade and investment likely to persist in the near term.

The Singapore economy should continue to face headwinds into 2020. Prolonged heightened uncertainty will keep the global economy entrenched in a period of weakness, with firms cutting back production and delaying investment plans. The domestic economy could experience fits and starts for the rest of the year, and into 2020.

Growth will be uneven across industries.

The impact of the external headwinds will not be evenly distributed across the domestic economy. The heatmap in Table 2.1 classifies the various segments of the domestic economy into three tiers. The electronics-related industries, which are classified as Tier 1, are at the epicentre of the current shock. With the exception of small niche segments, most of these industries started registering negative growth from Q1 this year.

The next tier encompasses industries with strong production linkages to Tier 1 industries, as identified by Input-Output tables.⁴ These Tier 2 industries,

Table 2.1
Economic Performance by Industry Tiers

	Q4 2018	Q1 2019	Q2 2019	Q3 2019
Tier 1				
Tier 2				
Tier 3				

Source: EPG, MAS estimates

Note: Cells which are highlighted in green indicate strong activity, while those highlighted in red reflect weak activity. The shade of the colours is graduated to reflect relative magnitudes.

⁴ Based on computations using DOS 2015 Input-Output Tables.

including transportation and storage, as well as financial services, have thus far been less affected by the electronics downturn. More than half of the segments in this group are still experiencing positive growth.

The rest of the economy is in Tier 3. Key industries include construction, professional services, as well as food and essential services. Although Tier 3 segments lack strong, direct linkages to the electronics-related segments, they could be at risk of a wider pullback in business and consumer confidence. The majority of these segments have thus far continued to expand, while some which contracted in Q2 saw either a moderation in the rate of decline or a pickup in activity in Q3.

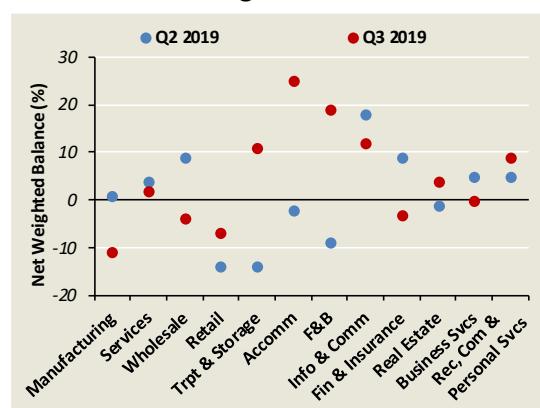
This variation in growth performance is likely to persist in the quarters ahead. The latest Q3 2019 *Business Expectations* surveys by EDB and DOS show that firms in the external-facing sectors such as manufacturing, wholesale trade and financial & insurance services anticipate business conditions to deteriorate in H2 2019 compared to H1. (Chart 2.9) Within manufacturing, firms in the electronics, chemicals and precision engineering sectors were more downbeat about their business prospects, while those in the biomedical segment were relatively more positive. Firms in the consumer-facing segments such as retail, accommodation and F&B were also more optimistic compared to the previous quarter.

Significant uncertainties surround the outlook for the trade-related cluster.

The outlook for the trade-related cluster, particularly for electronics-related industries, remains uncertain. These industries have seen higher volatility in recent months. (Chart 2.10) The increase in volatility could be associated with the production-inventory dynamics in the upstream semiconductor industry. Given the uncertainty in demand, semiconductor producers might hesitate to increase production, and instead rely on drawing down inventories to meet new orders. Indeed, the inventory-to-shipment ratio of chips started falling in early 2019, following a period of inventory build-up. (Chart 2.11) At the same time, global chip sales dipped sharply by 14.6% y-o-y during the first eight months of the year. (Chart 2.12)

In the downstream end-demand segment, sales of both consumer and corporate electronic products remain

Chart 2.9
Business Expectations for Manufacturing and Services Firms



Note: Observations represent the net weighted balance of firms expecting a more favourable six-month ahead outlook, compared to the preceding six months.

Chart 2.10
Rolling 36-month Standard Deviation in IIP Month-on-month Growth Rate

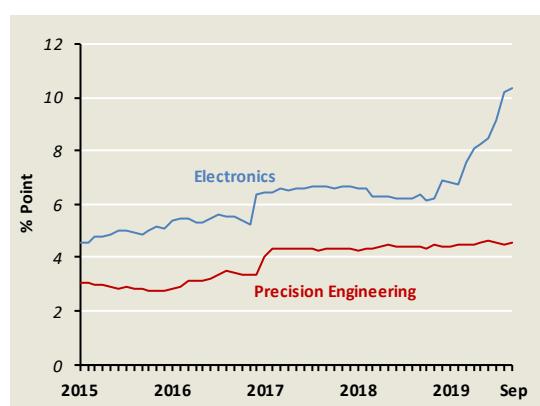
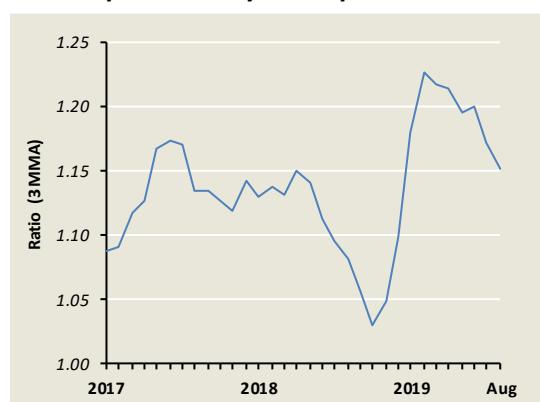


Chart 2.11
Chips Inventory-to-Shipment Ratio



Source: Haver Analytics and EPG, MAS estimates

Note: Weighted by Korea, Taiwan and US shares of electronics exports.

weak. (Chart 2.13) While structural factors, such as the proliferation of internet-based services and impetus towards automation, are supportive of growth in tech-related investments, firms could be deterred from committing to large investments amid the uncertain economic climate.

From Singapore's perspective, reconfigurations of regional trade flows and supply chains could be another source of uncertainty. There have been some shifts in trade patterns and regional supply chains since the announcement of the first tranche of US trade restrictions in June 2018. Amid escalating import tariffs, some trade diversion has taken place as US firms source from alternative suppliers in other economies. For instance, Mexico and Vietnam have gained market share in US imports of tariff-hit products.

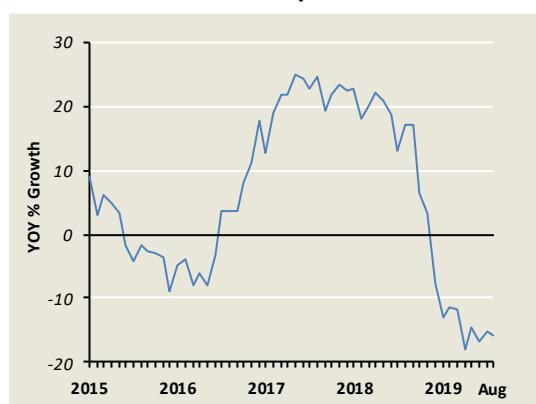
Being one of the key nodes that intermediate flows between the regional economies, Singapore's re-export flows have reflected some of these shifts following the implementation of US tariffs. In the one-year period following the implementation of first-round US tariffs on Chinese imports in Q3 2018, Singapore's re-exports to Taiwan, the US and Vietnam have gained momentum. In contrast, re-exports of electronics to China and Korea have seen continuous contraction. (Chart 2.14) Nonetheless, the supply chains continue to evolve and the impact of these changes on the future growth of the trade-related industries remains unclear and warrants monitoring.

Some moderation is expected in the modern services cluster, though it will remain the key source of growth in 2020.

Digitalisation-related activities will continue to support the modern services cluster, underpinned by ongoing digital transformation efforts both nationwide and in the region. Within the financial & insurance sector, providers of credit card networks will continue to benefit from strong expansion in electronic transactions. Their positive contribution to growth is expected to extend into 2020, reflecting several structural support factors.

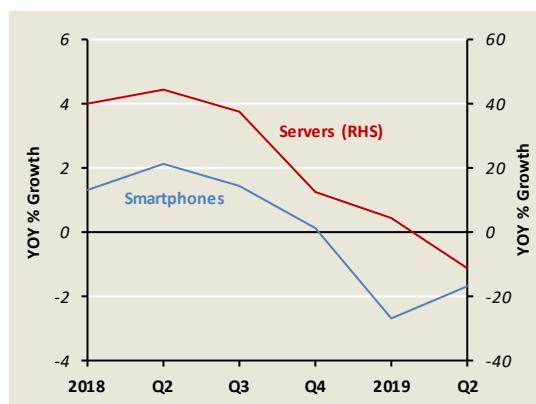
The increasing ubiquity of digital stored value facilities, also known as e-wallets, and payment gateways will boost credit card transactions. Growing consumer preference towards going cashless and the shift in spending from brick and mortar retail establishments

Chart 2.12
Global Chip Sales



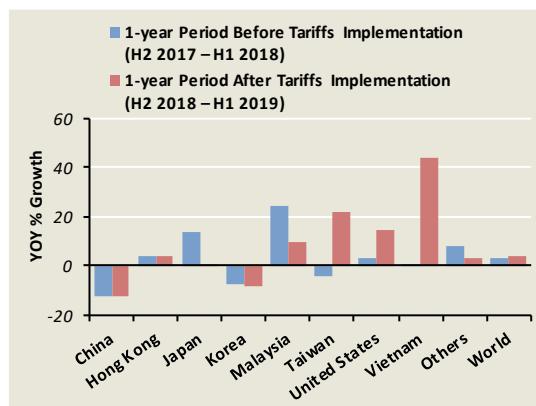
Source: World Semiconductor Trade Statistics

Chart 2.13
Global Sales of Electronic Products



Source: Gartner and IDC

Chart 2.14
Singapore's Re-exports of Electronics



Source: EPG, MAS estimates

towards e-commerce platforms will further buttress demand for electronic transactions. With still only around 50% of household expenditure on food services at restaurants, cafes and pubs paid via e-payment modes⁵, there remains scope for further increase—in China, for example, 93.2% of such payments are electronic.⁶ Even as overall transactions are expected to come under pressure from softening cyclical macroeconomic conditions, efforts by merchants to boost sales via digital presences will support increased digitalisation of payments. In the short term, e-payments should continue to capture a larger share of the overall transactions pie.

Over the longer-term, as the shift towards e-payments reaches a steady state and e-commerce becomes more mainstream, the degree of consumer penetration could plateau. However, the absolute size of credit card network services should continue to grow, underpinned by a wider range of products and services that are available online. The expansion of e-commerce into more “intelligent” e-shopping experiences, where merchants better tailor the marketing of goods and services to customers, is one potential source of growth. On the corporate front, the increasing complexity of global production networks will fuel demand for cross-border business-to-business transactions in the region, generating concomitant support for activities of payment network operators.

Turning to the rest of financial services, while the accommodative policies of the Federal Reserve, ECB and other central banks in the region should benefit fund management and foreign exchange trading, these industries continue to be vulnerable to swings in sentiment. Downshifts in the growth of insurance and financial intermediation services could persist, especially if the more downbeat global outlook weighs on regional and domestic economic growth. Furthermore, while there are green shoots seen in the ACU segment, loan growth is not expected to pick up significantly amid still elevated uncertainty.

Growth in business services should ease further over the rest of 2019. Notably, the less favourable global and domestic macroeconomic environment could dampen demand for office space. Indeed, lacklustre

⁵ According to *Statistics Singapore Newsletter Issue 2 2019*, “Prevalence of E-Payment Transactions—Findings from the Household Expenditure Survey 2017/18”.

⁶ Statista (2019), “Leading payment methods when dining out in China as of June 2018”, available at statista.com/statistics/999586/china-preferred-payment-method-when-eating-out/.

growth in private commercial certified payments in recent months is set to continue, tempering expectations of a strong recovery in the real estate segment. Even if the robust expansion of professional services persists, it would not fully offset the weakness in the larger real estate segment.

Growth of the domestic-oriented cluster will be underpinned by the construction sector and essential services.

The domestic-oriented cluster will be supported by the recovery in construction, although the performance of consumer-facing industries is expected to remain sluggish.

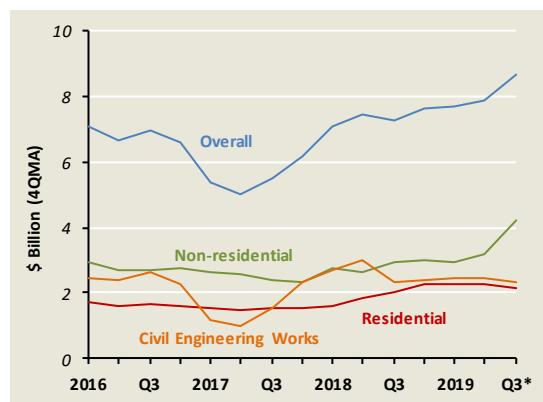
The construction sector is set to grow at a steady rate. Contracts awarded, a leading indicator of construction activity, has picked up in Q3, following some flattening in growth in H1 2019. (Chart 2.15) There is a healthy pipeline of both public and private sector projects, which will provide support over the rest of H2 2019 and into 2020. Within the public sector, examples include the Punggol Digital District, PUB's Tuas Water Reclamation Plant for the Deep Tunnel Sewerage System Phase 2, the North-South Corridor and the Thomson-East Coast Line. In the private sector, the redevelopment of en-bloc residential sites and industrial building activities should spur growth.

Meanwhile, the outlook for the retail sector remains muted. Consumer sentiment continues to be susceptible to the weakness in the overall economy. Further cutbacks in discretionary spending would not be unexpected, especially as the labour market shows signs of softening.

In comparison, the accommodation and food services sector could pick up for the rest of 2019. A net weighted balance of 25% of firms in the accommodation sector expect the business outlook to improve in H2 2019, which encompasses the year-end festive season. Room revenue should receive a boost from the Formula One race in September, which saw the second highest attendance since the start of the races in Singapore. Some support to growth is also expected from the meetings, incentives, conferences and exhibitions space.

Elsewhere, growth in essential services such as education and health & social services should stay resilient, alongside the ramping-up of activities in

Chart 2.15
Construction Contracts Awarded



* Estimated based on Jul–Aug 2019 data.

healthcare. This cluster of “other services” has historically held up even during recessionary periods, reflecting its inherent insulation from cyclical developments. For instance, during the GFC, the sector expanded by an average of 4.4% y-o-y over Q1 2008 – Q4 2009, compared to 1.1% for the overall economy.

2.3 Singapore's Economic Downturns: A Macro-Financial Perspective

Over the past two decades, the Singapore economy has weathered a number of real and financial shocks. Analyses of past downturns show that global electronics sector shocks have had the most significant impact on the domestic economy, while shocks from external financial turbulence have had a more limited impact and diffusion. Generally, during these economic downturns, investment and exports retracted sharply, mirroring the significant pullback of the more externally-oriented industries. The impact of the shocks was mainly absorbed by declines in firms' profitability, before labour costs were reduced through wage adjustments and a scaling back of employment. Disruptions from tighter financial conditions have been more muted, with domestic credit growth remaining relatively supported during such stress periods. At the current juncture, the weakness in the electronics-related segments has not spilled over into an economy-wide downturn. Shifts in business confidence, firms' hiring intentions and ease of access to credit warrant continued monitoring, as early indicators of a broadening or weakening dynamic.

Macro-financial linkages are used to identify responses of sectors within the Singapore economy to shocks.

Over the past two decades, the Singapore economy has experienced a number of real shocks and several bouts of financial stress. Economic downturns were at times accompanied by a tightening of financial conditions, while moderate constrictions in financial conditions took place without spillovers to the broader economy. (Table 2.2)

This section reviews how the Singapore economy has responded to these economic shocks and financial stresses by tracing through the macro-financial linkages of the economy during stress episodes.

A circular flow of income framework is used to identify the interactions between domestic households, corporates, the government, as well as the external sector. (Figure 2.1) Real flows emanate from the main expenditure and income transactions domestically, as well as from export/import activities. Financial flows are intermediated domestically through domestic financial institutions, and externally either directly with external parties or indirectly through domestic financial institutions. (An examination of the degree of synchronisation of Singapore's business and financial cycles with its global counterparts can be found in Box A.)

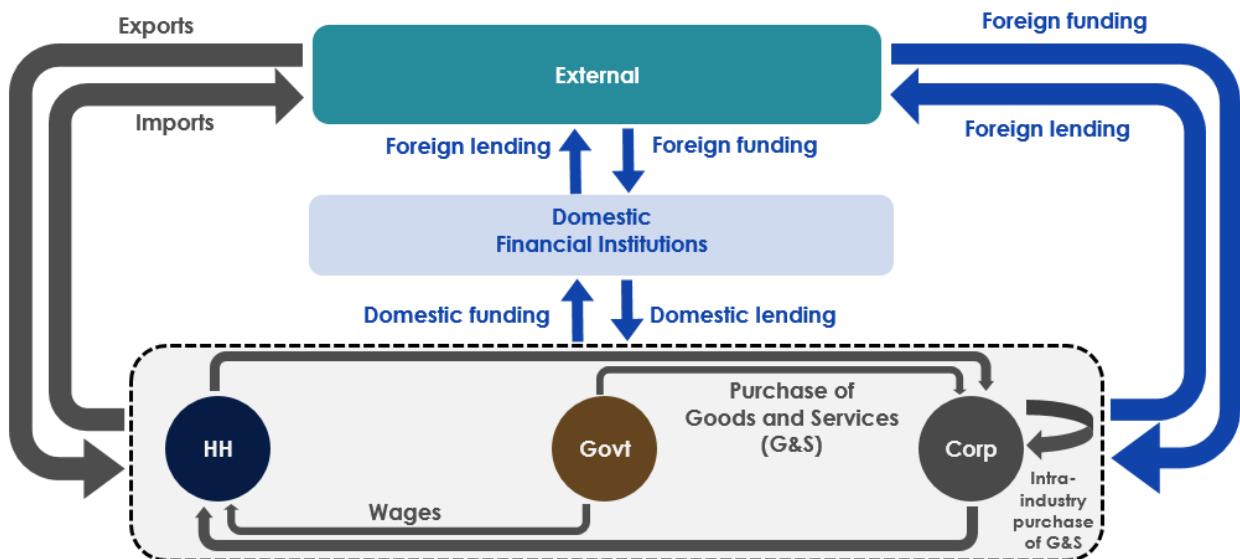
Table 2.2
Real Economic & Financial Shocks

Episodes (Period)	Real Shock	Financial Shock
Asian Financial Crisis (Q3 1997 – Q4 1998)		
Dot-com Boom-Bust (Q3 2000 – Q4 2001)		
Global Financial Crisis (Q1 2008 – Q4 2009)		
Eurozone Debt Crisis (Q2 2010 – Q4 2012)		
Oil Price Collapse (Q4 2014 – Q3 2016)		

Source: EPG, MAS estimates

Note: Cells in white indicate absence of stress, while those in red reflect presence of stress. The shade of the colours is graduated to reflect relative magnitudes.

Figure 2.1
Circular Flow of Income Framework



Note: Grey arrows refer to real flows, while blue arrows refer to financial flows.

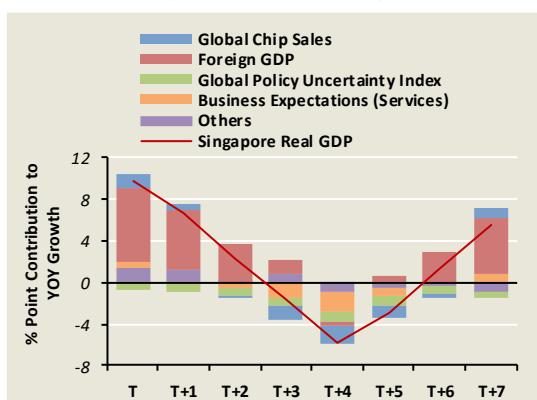
Real shocks to the domestic economy were typically due to external factors.

Given the openness of the Singapore economy, it is unsurprising that past downturns were mostly attributable to external shocks. Indeed, a decomposition of Singapore's GDP growth during the previous three recessions—the Asian Financial Crisis (AFC), the Dot-com Boom-Bust and the GFC—shows that external demand, the global electronics cycle, and global economic uncertainty, are associated with significant changes in Singapore's GDP growth outturns. (Chart 2.16) In contrast, domestic demand, as proxied by business expectations of the services sector, plays a lesser role.⁷

Exports and investment contracted during past crises, alongside externally-oriented industries.

From an expenditure perspective, the brunt of the shocks was felt in private investment and exports of goods and services, which contracted by an average of 5–10% during the downturns. The impact on private consumption was generally more muted, which suggests that corporates could have absorbed much of the shocks. (Chart 2.17) At the same time, government expenditure increased, and the policy stance turned countercyclical. For instance, government investments

Chart 2.16
Decomposition of Singapore's GDP Growth During Previous Downturns (T = Peak Quarter)



Source: EPG, MAS estimates

⁷ This decomposition is effected via a regression equation in which domestic real GDP growth in y-o-y terms is regressed on the growth rates of foreign GDP and global chip sales, the global economic uncertainty index and business expectations of the services sector.

in healthcare infrastructure boosted gross fixed capital formation (GFCF).

By industry, the declines in investment and exports during past recessions were mirrored by significant contractions in the more externally-oriented industries, such as wholesale and retail trade and manufacturing. (Chart 2.18)

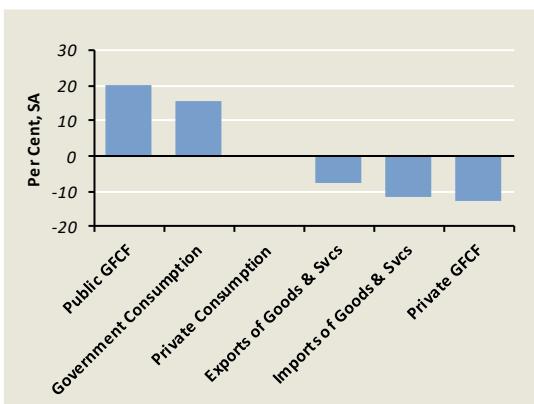
Shocks were propagated via inter-sectoral linkages and declines in business and consumer confidence.

The impact of external shocks was transmitted and amplified via linkages between the domestic industries. The worst-hit sectors are defined as those which experienced the sharpest VA contractions. These Tier 1 sectors were the financial & insurance sector during the AFC, and the manufacturing sector during the burst of the Dot-com bubble and the GFC.

Industries with strong production linkages⁸ to the worst-hit sectors, or Tier 2 sectors, saw less severe declines than Tier 1 firms. This is due to the fact that the income multiplier effects are mainly propagated within the same sector (i.e., direct impact), with smaller indirect spillovers to other sectors. (Chart 2.19) Further, import leakages are relatively high in the manufacturing sector, attenuating the transmission of shocks from the Tier 1 sectors.

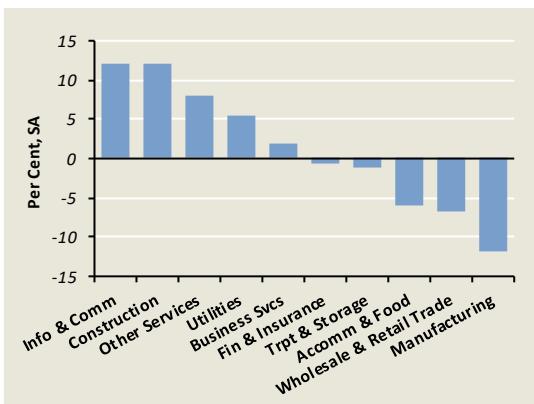
Sectors with weaker linkages (i.e., Tier 3) were affected in a similar way to those in Tier 2. Industries in Tier 3 saw an average decline of 2.1% in their output during the first four quarters following the shock, marginally higher than the 2.0% contraction for the Tier 2 industries. (Chart 2.20) This suggests that rather than transmission via inter-sectoral linkages, Tier 3 sectors were more vulnerable to the broader pullback in business and consumer confidence.

Chart 2.17
Average Change in Expenditure From Peak to Trough During Previous Downturns



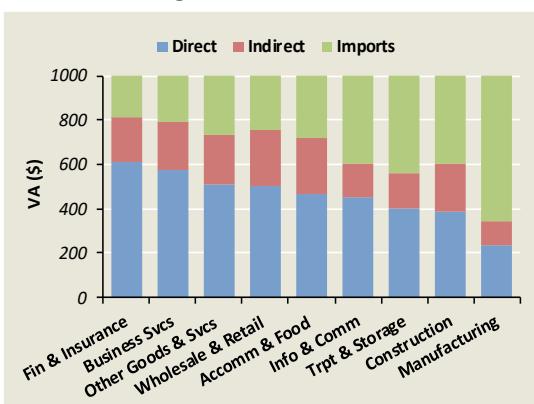
Source: EPG, MAS estimates

Chart 2.18
Average Change in Sectoral Real VA From Peak to Trough During Previous Downturns



Source: EPG, MAS estimates

Chart 2.19
Average VA per \$1,000 of Final Demand During Previous Downturns



Source: EPG, MAS estimates

⁸ Based on DOS' Input-Output tables. As an example, the downturn in the manufacturing sector also led to a pullback in wholesale trade and business services, which provide ancillary services to manufacturing.

Firms' profitability absorb most of the shocks with the labour market largely insulated.

On average across the three crises, negative shocks were primarily absorbed by changes in firms' profitability. Gross operating surplus, a proxy for profitability, was first to decline in a downturn. (Chart 2.21) Firms then reduced production levels and minimised non-wage operating costs.

The pace of salary increments declined before wage cuts were eventually implemented in the downturn. Such adjustments were much smaller compared to the impact on firms' gross operating surpluses. Firms appeared to lay off workers only as a final step, which suggests that there were layers of buffer before the shock exerted an impact on the household sector. In the earlier recessions, firms were also helped by cuts in employer CPF contributions and the Jobs Credit Scheme, which significantly reduced manpower costs.

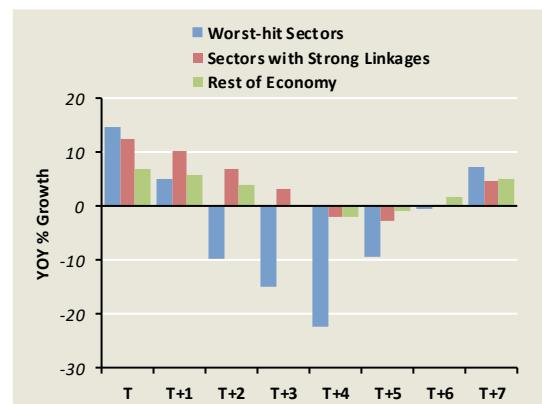
External shocks triggered episodes of financial tightening via the financial channel.

As Singapore is a regional financial centre, the domestic banking system undertakes financial intermediation both for the domestic economy and for the region. The latter occurs via foreign banks as well as directly with foreign corporates. Substantial cross-border financial flows also take place through domestic non-financial corporates, which lend to and borrow directly from foreign banks and firms. The domestic economy (including the financial system) is thus exposed to international economic and financial developments through both the banking and corporate sectors. Indeed, the episodes of tightening in Singapore's financial conditions seen most recently, namely the GFC, the Eurozone sovereign debt crisis and the oil price collapse, were all triggered by external shocks, with domestic factors playing a far smaller role.

Portfolio investment and banking inflows tended to be less stable and reverse during stress periods.

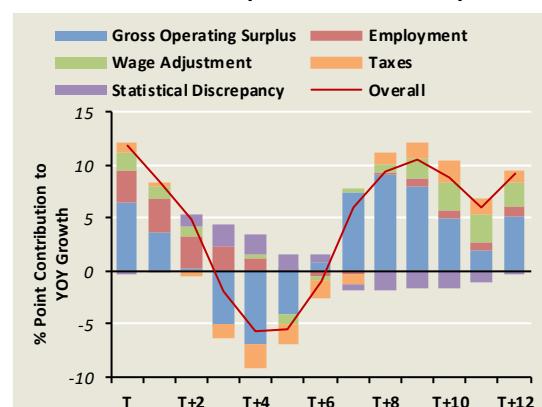
During financial stress episodes, foreign portfolio investment and banking inflows were most prone to pullbacks. For the domestic banking sector, non-resident funding was particularly volatile during previous such episodes. Local corporate and household deposits, in comparison, were relatively stable sources

Chart 2.20
Average Change in Sectoral Real VA During Previous Downturns (T = Peak Quarter)



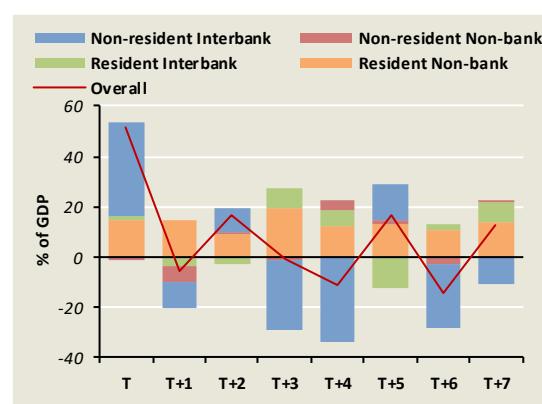
Source: EPG, MAS estimates

Chart 2.21
Average Change in GDP During Previous Downturns (T = Peak Quarter)



Source: EPG, MAS estimates

Chart 2.22
Change in Non-bank Deposits by Institutional Sector (T = Peak Quarter)



Source: EPG, MAS estimates

of financing. (Chart 2.22) Meanwhile, external financing of corporates was also well-supported in stress episodes, due to steady direct investment inflows from related entities abroad to their Singapore operations.

The slowing of credit growth during financial stress periods mainly reflected the unwinding of loans extended to external counterparties who likely also reduced their demand for credit. Meanwhile, loans to the local economy held up, albeit at a more restrained pace, with the slowdown affecting most domestic sectors. (Chart 2.23)

These transmission channels are being closely monitored as the economy navigates the current slowdown.

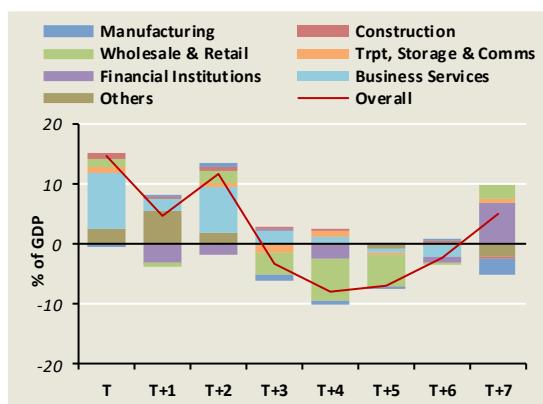
This review of macro-financial linkages identifies a number of signposts relevant to the current economic downturn. Specifically, these signposts across both the real and financial sectors can help to identify any broadening and deepening of the downturn.

The analysis suggests that economic shocks can percolate through the wider economy via broader income and confidence effects, on top of direct inter-sectoral production linkages. While the current downturn has largely been isolated to the electronics-related sectors, sentiment or confidence indices of other sectors in the economy are being closely watched for broader spillover effects.

Firm profitability is typically the first to come under pressure, before job retrenchment begins as part of a wider cost-cutting response. At the current juncture, firm profitability has borne the bulk of the current adjustment. Hiring intentions will be closely watched as the next important indicator of the response by firms if the economic environment deteriorates.

The Singapore economy is highly exposed to external financial conditions, reflecting its role as a regional financing centre and the reliance of its large corporates on external related-party financing. Viable firms could find themselves having difficulty accessing credit or facing rising costs of credit, if banks tighten lending standards in a more uncertain environment. Thus, developments in domestic credit conditions also warrant close monitoring.

Chart 2.23
Change in Non-bank Loans by Sector
(T = Peak Quarter)



Source: EPG, MAS estimates

Box A
Business and Financial Cycles in Singapore^{1/}

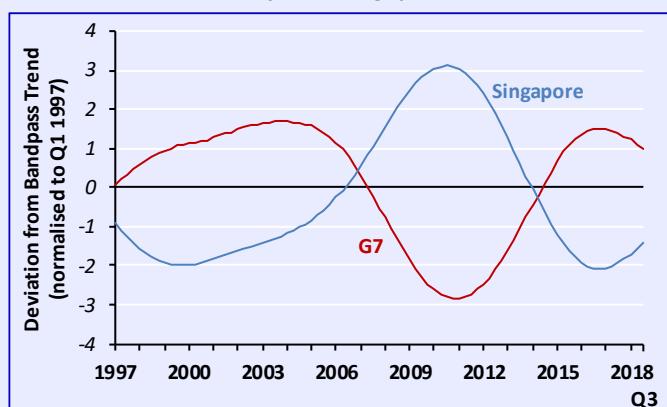
Introduction

Singapore is a small and highly open economy as well as a major financial centre. As a result, the economy and financial system are exposed to global and regional macro-financial shocks through significant trade and financial channels. This Box examines the degree of synchronisation of Singapore's business and financial cycles with its global counterparts and draws policy implications.

Low synchronisation between domestic and global financial cycles ...

Singapore's financial cycle exhibits relatively low synchronisation with its global counterpart. To construct an estimate of the financial cycle from 1997–2018 (following the approach in Franks *et al.*, 2018), we use an average of: (1) the credit-to-GDP ratio; (2) total credit to private non-financial sector; and (3) residential property prices, filtered by the Christiano-Fitzgerald (2003) bandpass filter. The concordance statistic^{2/} which measures the degree of co-movement over the cycle with the estimated G7^{3/} financial cycle is around 0.2.^{4/} The financial cycle synchronisation is relatively low despite Singapore's highly integrated financial system with international financial markets. (Chart A1) This could reflect regional-specific shocks such as the impact of the Asian Financial Crisis, and policy responses including macroprudential policies, especially during the post-Global Financial Crisis (GFC) period.

Chart A1
Financial Cycles: Singapore and G7



Source: Haver Analytics, OECD and IMF staff estimates

... may be explained by increased use of macroprudential policies

Increased reliance on macroprudential policy may have led to the observed asynchronous movement of the domestic and global financial cycles. In recent years, MAS has actively used macroprudential policies to target financial stability risks, particularly in the real estate sector.^{5/} MAS is both the microprudential and macroprudential supervisor of the financial sector in Singapore. In this context, macroprudential policy is formulated as a complement to monetary policy with the objective of mitigating systemic financial sector risks. In particular, MAS, together with other government agencies, has been highly alert to financial stability risks stemming from the property market, and has addressed them through prudential measures

^{1/} This Box was contributed by Dan Nyberg and Han Teng Chua from the IMF, based on Appendix VII in the 2019 Article IV Consultation Staff Report for Singapore. The views expressed in this Box are those of the authors and do not necessarily represent the views of the IMF, its Executive Board, IMF management or MAS.

^{2/} Concordance measures the fraction of time that two series are in the same phase of their respective cycles.

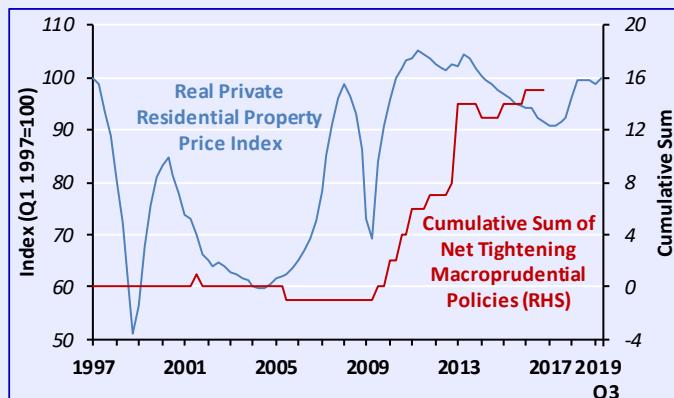
^{3/} The G7 countries are Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.

^{4/} See IMF (2019a) for the methodology and data transformations.

^{5/} See MAS (2019).

such as limits on the total debt servicing ratios and loan-to-value ratios, as well as stamp duties and supply-side measures.^{6/} A recent IMF database on macroprudential policy (see Alam *et al.*, 2019) illustrates how Singapore has gradually tightened its macroprudential stance in the wake of the GFC when global interest rates have been low.^{7/} (Chart A2) Other macroprudential policy measures to address financial stability risks include designating domestic systemically important banks, limits to property exposures and a counter-cyclical capital buffer framework.

Chart A2
Singapore's Property Prices and Macroprudential Policies

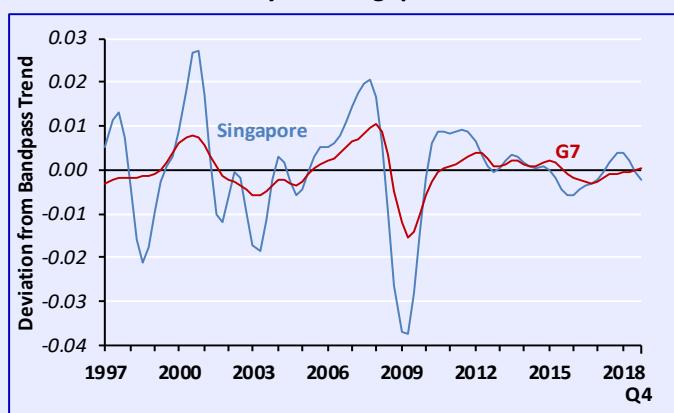


Source: CEIC, IMF integrated Macroprudential Database and IMF staff estimates

Domestic and global business cycles have been more synchronised than financial cycles

Singapore's business cycle shows high concordance with the global cycle, but also more volatility. Using a bandpass filter, the business cycle in Singapore appears to have a higher amplitude than the global cycle (proxied by that of the G7). (Chart A3) Indeed, the standard deviation is roughly twice as high as for the G7. The higher volatility of Singapore's business cycle reflects its small and open economy as well as high trade dependence. Merchandise trade amounted to an average of 245% of Singapore's GDP in the 10 years post-GFC, whereas in the G7 it was much lower at 22%. The cyclical concordance with the G7 is around 0.7 over the entire sample period.

Chart A3
Business Cycles: Singapore and G7



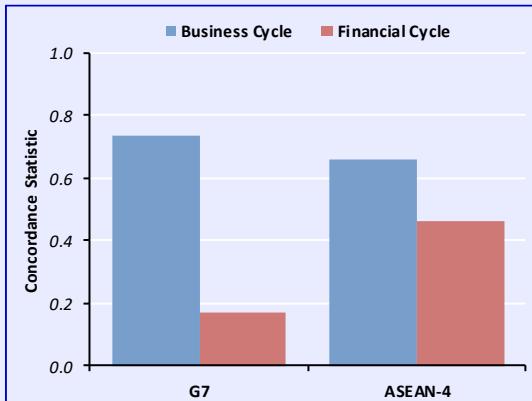
Source: Haver Analytics and IMF staff estimates

^{6/} See IMF (2019b) for a complete discussion of recent macroprudential measures.

^{7/} The integrated Macroprudential Database (iMaPP) tracks macroprudential measures up to 2016. In the chart text, the "cumulative sum of net tightening macroprudential policies" indicator adds up the policy actions for measures since 1997. Values of 1, -1 and 0 were assigned to each measure for tightening, loosening actions and no change, respectively. An increase of the indicator therefore reflects a tighter macroprudential stance and vice versa.

Singapore's business cycle is also more highly synchronised with its regional trade partners in ASEAN compared to the financial cycle. The cyclical concordance of the business cycle with ASEAN-4 is around 0.7 over the entire sample period, while that of the financial cycle is lower at approximately 0.5. (Charts A4 and A5) The high business cycle synchronisation and the relatively higher concordance of the financial cycle compared to the global cycle (G7) likely reflects Singapore's strong trade integration and economic cooperation with the region, in part through initiatives under the ASEAN Economic Community.

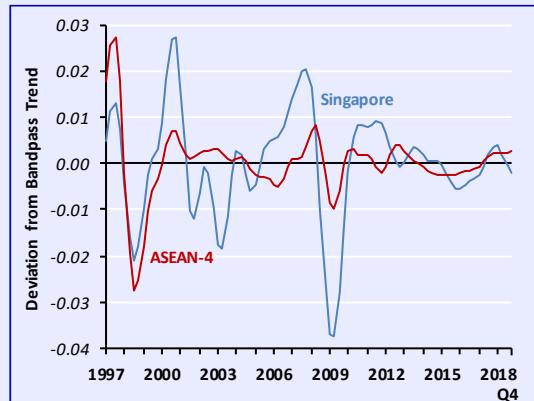
Chart A4
Singapore: Concordance of Cycles



Source: Haver Analytics, CEIC, Bloomberg and IMF staff estimates

Note: The period covered is from Q1 1997 to Q4 2018, except for the ASEAN-4 financial cycle which starts at Q1 2003.

Chart A5
Business Cycles: Singapore and ASEAN-4



Source: Haver Analytics and IMF staff estimates

Note: ASEAN-4 includes Indonesia, Malaysia, Philippines and Thailand.

Conclusion

Business and financial cycle analysis suggests an important role for buffers and macroprudential policies in helping with stabilisation. Analysis of business cycle synchronisation indicates high cyclical concordance between Singapore's cycle and the global business cycle. However, as a small and very open economy, Singapore's cycle exhibits higher volatility, suggesting the importance of maintaining strong precautionary buffers in both the corporate and household sectors to manage short-term swings in the global economic cycle, while maintaining the medium-term focus on price stability. The financial cycle in Singapore shows less synchronisation with its global counterpart, especially in the post-GFC period when global interest rates have been low, which could have resulted from Singapore's proactive use of macroprudential measures as part of the macroeconomic policy framework to limit excessive credit and house price growth.

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Chapter 3

Labour Market and Inflation

3 Labour Market and Inflation

Overall employment continued to expand in H1 2019, underpinned by hiring in the modern services and domestic-oriented clusters, even as the trade-related cluster shed jobs. However, hiring sentiment turned cautious. The resident unemployment rate edged up and there were fewer job vacancies than unemployed persons. As the labour market continues to soften, wage growth is expected to ease in 2019 and 2020 compared to last year.

MAS Core Inflation fell to 0.8% y-o-y in Q3 from an average of 1.4% in H1, with price increases moderating across most broad categories of the core CPI basket. While part of this decline was anticipated, reflecting a fall in the costs of electricity & gas and the dissipation of the effect of previous water price increases, retail and services inflation was also lower than expected.

External sources of inflation are likely to remain benign amid weak global economic growth, although volatility in oil prices, due to geopolitical tensions in major oil-producing regions, presents some risks to this outlook. At the same time, softening labour market conditions imply an easing in domestic cost pressures, while sluggish demand could limit the pass-through of cost increases to consumers. MAS Core Inflation is thus expected to come in at the lower end of 1–2% in 2019, and average within 0.5–1.5% in 2020.

Meanwhile, CPI-All Items inflation is forecast to come in at around 0.5% in 2019, before rising to 0.5–1.5% next year. The gap between headline and core inflation should narrow in 2020 as imputed rentals on owner-occupied accommodation cease to weigh on the former.

3.1 Labour Market

Cautious Hiring Sentiment

Overall employment continued to expand in H1 2019, by almost 19,000, with hiring in the modern services and domestic-oriented clusters more than offsetting job losses in the trade-related cluster. However, hiring sentiment was more restrained amid the continued economic slowdown. The resident unemployment rate edged up to 3.1% in June, and there were fewer job vacancies than unemployed persons for the first time since December 2017. Although retrenchments remained low in Q2, the re-entry rate among retrenched residents declined. Softening labour market conditions should dampen wage growth in 2019 and next year.

The trade-related cluster cut headcount in H1, while employment in modern services and the domestic-oriented cluster continued to expand.

Net employment growth remained firm at 18,900 in H1 2019, higher than the 10,100 recorded in the same period a year ago, even as it moderated from the robust 35,200 recorded in H2 2018, which was partly boosted by seasonal hiring in Q4. (Chart 3.1) Job gains in modern services¹ continued apace, particularly in ICT and financial services, amid ongoing digitalisation efforts in Singapore and the region. Employment in the domestic-oriented cluster also remained resilient, supported by community, social & personal (CSP) services on the back of rising structural demand for health & social services. Further, the construction sector recorded employment gains in H1 2019, following three years of decline. However, the retail trade industry shed more jobs, given faltering consumer sentiment and competition from e-commerce players. After improving briefly in 2018, employment in the trade-related cluster shrunk again in H1 this year, amid the weak external environment and trade frictions. The decline in headcount was concentrated in electronics manufacturing and wholesale trade.

Foreigners, particularly lower-skilled work permit holders, accounted for a significant portion of the job gains in the first half of 2019, due largely to the rebound in construction and sustained growth in services. (Chart 3.2) Meanwhile, local employment continued to be supported by hiring in CSP, professional, financial and ICT services.

Chart 3.1
Employment Change by Cluster

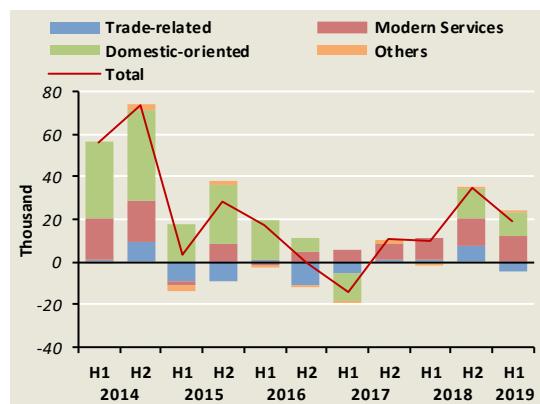
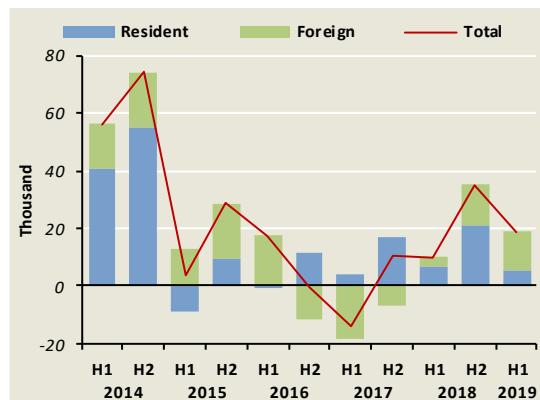


Chart 3.2
Resident and Foreign Employment Change



¹ The “modern services” cluster comprises ICT, financial & insurance, real estate and professional services. The “trade-related” cluster consists of manufacturing, wholesale trade and transportation & storage industries. The “domestic-oriented” cluster contains retail trade, F&B, administrative & support services, CSP (excluding arts, entertainment & recreation), construction and utilities & others. The “others” cluster is made up of accommodation as well as arts, entertainment & recreation industries.

Hiring sentiment has turned cautious but employers retained their existing workers.

Rates of recruitment and re-entry of retrenched residents into employment have declined. The significant fall in the vacancy rate also signals hesitant hiring intentions. (Chart 3.3) Nonetheless, the number of retrenchments remained low in Q2. (Chart 3.4) Even as it edged up in Q3, it remained comparable to a year ago based on preliminary data from MOM. In response to elevated uncertainty in the business outlook, firms tend to place employees on a short work-week or temporarily lay them off to reduce labour costs, and only opt to retrench when the deterioration in outlook becomes more apparent. Thus, the number of employees on short work-week or temporary layoff is more responsive than retrenchments to economic downturns. Indeed, the former went up to 1,900 in H1 2019 from 900 in H2 2018, suggesting some reaction to the slowdown in activity among firms, although still much milder than that during the Global Financial Crisis.

With more residents entering the labour force to look for work than those securing employment, the number of unemployed residents on a seasonally adjusted basis increased to 72,600 in June 2019 from 69,600 in December 2018. (Chart 3.5) As a result, the resident unemployment rate rose by 0.1% point to 3.1%, even as the overall unemployment rate held steady at 2.2%. According to preliminary data for Q3, the resident and overall unemployment rates inched up by 0.1% point each, despite firm overall employment growth of 26,700.

The combination of more unemployed persons and reduced job postings in Q2 caused the ratio of job vacancies to unemployed persons to dip below unity to 0.94. Based on the full set of available Q2 data, EPG's Labour Market Pressure Indicator showed a decline for the second consecutive quarter, indicating some softening of the labour market. (Chart 3.6)

The weakness in economic activity has thus far been absorbed by firms rather than passed on to the labour market.

The slowdown in GDP growth has mainly been absorbed by weaker productivity growth rather than cuts to employment. Productivity fell by 0.9% y-o-y in H1 2019, reversing the gains in the previous year.

Chart 3.3
Recruitment, Vacancy and Re-entry Rates

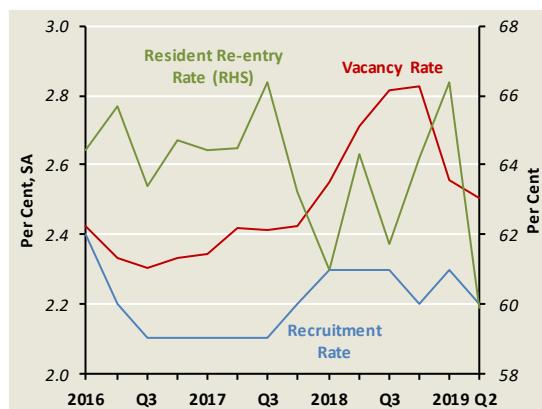


Chart 3.4
Retrenchment and Short Work-Week or Temporary Layoff

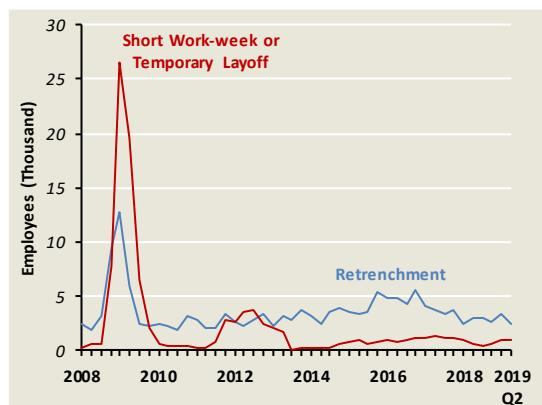
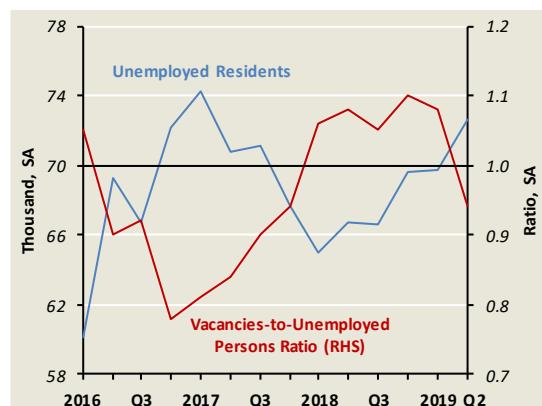


Chart 3.5
Unemployed Residents and Vacancies-to-Unemployed Persons Ratio



Note: Data refers to that in the last month of each quarter.

Decomposing the “within effect”² of overall productivity growth showed that almost the entire decline was due to the trade-related cluster, i.e., wholesale trade and manufacturing, where employment was resilient even though output declined. (Chart 3.7) Meanwhile, productivity growth in the modern services cluster turned marginally negative, while that of domestic-oriented services was slightly positive due to a cyclical uplift in construction.

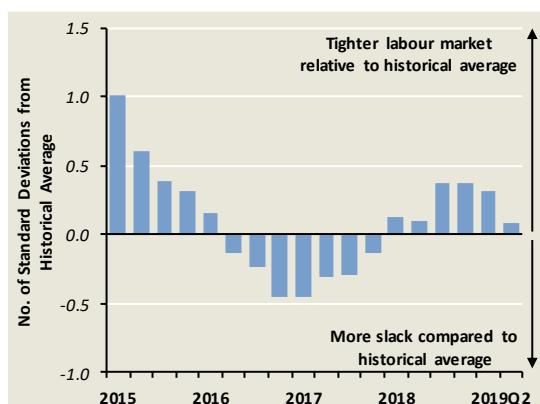
From the income perspective³, growth of gross operating surplus dropped to around zero in H1 2019, while that of compensation of employees remained relatively stable at 3.5%. (Chart 3.8) This is consistent with inferences in Chapter 2.3 that the brunt of the slowdown in GDP growth was borne by firms through lower profits rather than employee compensation.

Wage flexibility also provides some buffer for companies to adjust costs rather than reduce headcount. Resident wage growth (based on average monthly earnings) has edged down somewhat, reducing firms’ marginal wage costs. In H1 2019, resident wage growth decelerated to 2.8% y-o-y from 3.5% in 2018. (Chart 3.9)

Labour demand could moderate.

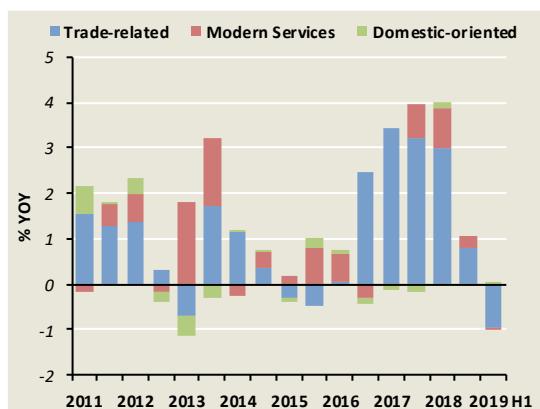
Looking ahead, the economic slowdown is expected to dampen hiring, although unevenly across industries. Seasonal patterns will provide some uplift to modern services in Q3 and domestic-oriented services in Q4. Since employment responds to economic activity with a lag, labour demand could moderate in the near term. Alongside a modest pickup in GDP growth in 2020, labour productivity growth should turn slightly positive.

Chart 3.6
Labour Market Pressure Indicator



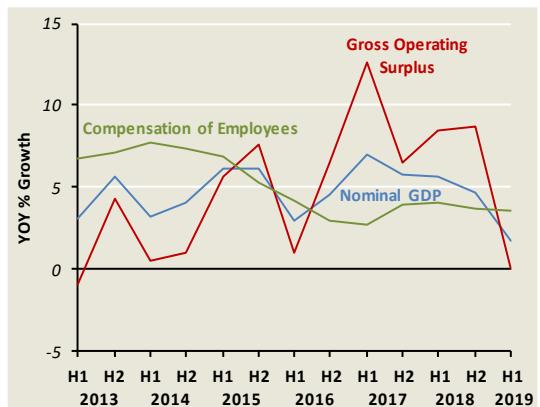
Source: EPG, MAS estimates

Chart 3.7
“Within Effect” of Productivity Growth



Source: EPG, MAS estimates

Chart 3.8
GDP by Income Approach



² Labour productivity growth can be decomposed into the “within effect” (i.e., contribution of each sector’s productivity growth), the “static-shift effect” (contribution of changes in the share of workers employed in sectors with different productivity levels), and the “dynamic-shift effect” (contribution of changes in the share of workers employed in sectors with different productivity growth rates).

³ Under the income approach, GDP is calculated as the sum of compensation of employees, gross operating surplus and taxes less subsidies on production and imports.

At the sectoral level, the trade-related cluster is likely to continue trimming headcount—particularly in the electronics and precision engineering industries within manufacturing, as well as in wholesale trade—alongside weakness in the global electronics cycle, persistent trade frictions, and lacklustre demand. Vacancy rates in these sectors have declined both sequentially and compared to the previous year. (Chart 3.10) Nevertheless, there are segments within the manufacturing sector where output has expanded, including chemicals, biomedical and general manufacturing. Preliminary Q3 data showed that employment in manufacturing increased by 1,200.

Job creation in the modern services cluster should remain relatively firm, provided business sentiment does not deteriorate significantly. Hiring in professional and financial services is expected to be supported by a seasonal pickup in Q3. Meanwhile, the ICT industry, particularly in corporate IT solutions, will continue to be a source of job creation as companies press on to digitalise and streamline processes for cost efficiency.

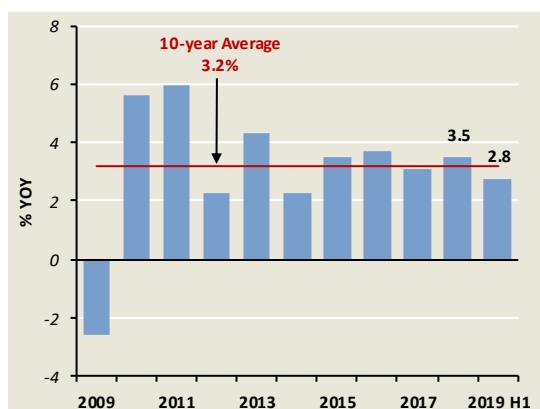
The hiring outlook in the domestic-oriented cluster will be supported by construction activities, amid a healthy pipeline of both public and private sector projects. Indeed, preliminary Q3 data showed that employment in construction grew by 5,300. Meanwhile, employment in F&B services and retail industries should benefit from year-end festivities, although the latter would continue to face competition from e-commerce players. Hiring in CSP services will stay resilient due to the ramp-up of operations in healthcare facilities.

Wage growth is likely to ease in 2019 and 2020.

Declining profitability as well as the softening labour market should reduce the pace of wage growth, especially in firms with more flexible compensation arrangements. Resident wage growth is therefore likely to ease in 2019 and into 2020, compared to last year.

To quantify the elasticity of wage response to labour market conditions, EPG has econometrically estimated the New Keynesian Wage Phillips Curve relationship in Singapore. The analysis shows that resident wage growth responds strongly to labour market slack. (See Box B for the details.)

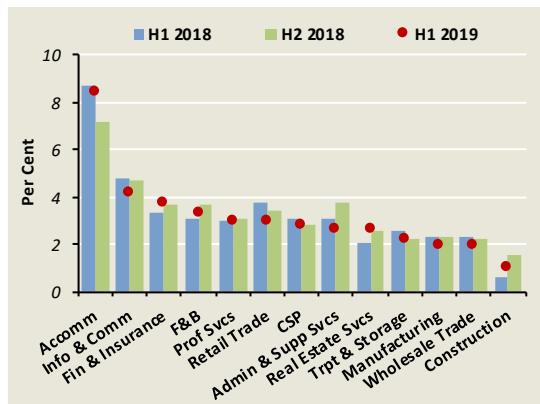
Chart 3.9
Resident Wage Growth



Source: EPG, MAS estimates

Note: Based on average monthly earnings.

Chart 3.10
Vacancy Rates by Industry



Note: Data refers to that in the last month of each period.

3.2 Consumer Price Developments

Core Inflation Is Subdued

MAS Core Inflation stepped down in Q3 2019 to 0.8% y-o-y, compared to the 1.4% outturn in the first half of the year, as price pressures eased across most broad CPI categories except for food. CPI-All Items inflation edged down to 0.4% in Q3, from 0.6% in H1, as lower core inflation was partially offset by the rise in private road transport costs and a smaller decline in the cost of accommodation. Amid a subdued economic environment, external and domestic cost pressures are not likely to rise further, and the pass-through to consumer prices should be limited. Inflationary pressures are expected to remain muted in the coming quarters, with MAS Core Inflation anticipated to come in at the lower end of the 1–2% range for the whole of 2019, and CPI-All Items inflation at about 0.5%. In 2020, both measures of inflation are projected to average within 0.5–1.5%.

Core inflation has eased in recent months.

MAS Core Inflation moderated to 0.8% y-o-y in Q3 2019, compared to an average of 1.4% in the first half of the year. (Chart 3.11) The fall in core inflation was partly attributable to a decline in electricity & gas prices and the dissipation of the impact of previous water price hikes⁴, both within expectation. However, retail and services inflation came in lower than anticipated. Meanwhile, CPI-All Items inflation edged down to 0.4% in Q3, from an average of 0.6% in H1, with a rise in private road transport costs and a smaller decline in the cost of accommodation partially offsetting lower core inflation. (Chart 3.12)

External sources of inflation have been generally benign.

The overall import price index (IPI) fell by an average of 3.8% y-o-y in Q3, reversing the 1.3% increase in Q2 2019. (Chart 3.13) This largely reflected the fall in oil prices over recent months. Import price inflation for non-oil goods has also generally eased since Q2, mainly due to smaller increases in the prices of machinery and transport equipment. Meanwhile, imported inflation for miscellaneous manufactured articles⁵, which is a proxy measure of the cost of finished consumer goods imports, has largely been mild and stable since the beginning of the year.

Chart 3.11

CPI-All Items and MAS Core Inflation

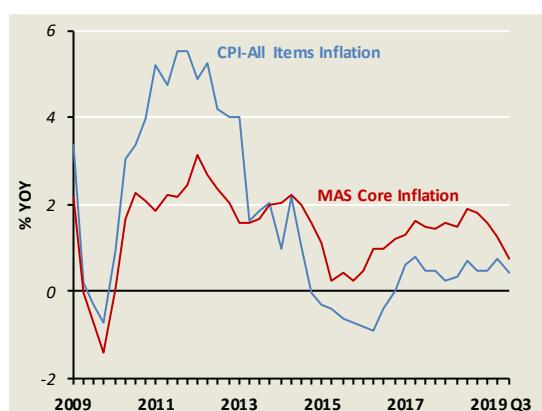
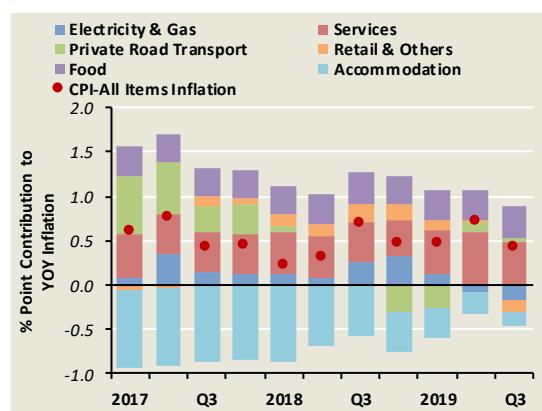


Chart 3.12

Contribution to CPI-All Items Inflation



Source: EPG, MAS estimates

Note: Water prices are included in the “Retail & Others” component of the CPI.

⁴ The water price increases in July 2017 and July 2018 contributed to a rise in the cost of water supply on a y-o-y basis between July 2017 and June 2019, but no longer had an effect from July 2019.

⁵ Jewellery, Goldsmiths' & Silversmiths' Wares & Articles of Precious or Semiprecious Materials are excluded, as these are influenced by fluctuations in the global prices of precious metals such as gold, and are not included in the CPI basket.

The rise in imported food prices has passed through only partially to domestic non-cooked food prices.

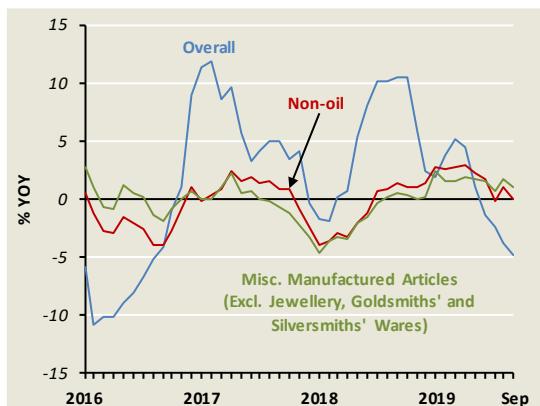
Prices of imported food rose by 1.7% y-o-y in Q3, moderating from the 2.3% increase in Q2 this year. While there was a stronger pickup in the import prices of meat and vegetables & fruits, inflationary pressures in most other components have receded. The rise in imported meat prices likely reflected the impact of the African swine fever on pork prices. At the same time, import prices of vegetables & fruits have spiked in recent months due to weather-related disruptions in Malaysia and China. However, the pass-through of higher import prices to consumer non-cooked food inflation appears to be muted, with the latter averaging 1.1% y-o-y in the first nine months of this year, lower than the 1.7% rise in imported food prices over the same period. (Chart 3.14)

Key global food commodity markets remain well supplied on the whole, which, coupled with tepid demand, should keep inflationary pressures at bay. Non-cooked food inflation is expected to rise towards the end of the year, mainly reflecting the moving seasonality of the Chinese New Year holiday, which will be in January next year (it fell in February this year). Overall, non-cooked food inflation is expected to come in at a similar level in 2019 and 2020.

Oil prices have fallen since the last Review.

The Brent crude benchmark slipped from around US\$74 per barrel in end-April to US\$58 in early September. This decline mainly reflected concerns about slowing global growth, and lowered projections for oil consumption in 2019 and 2020 in view of weaker-than-expected realised demand in H1 2019. (Chart 3.15) Developments in US-China trade negotiations also caused significant oil price volatility over this period. More recently, the attack on Saudi Arabia's oil facilities on 14 September brought supply risks to the fore. The expected production losses caused Brent crude oil prices to spike above US\$70 per barrel on the day after the attack, but oil prices have since eased to around US\$62 by end-October as supply was quickly restored.

Chart 3.13
Selected Components of the IPI



Source: EPG, MAS estimates

Chart 3.14
Food & Live Animals IPI and CPI for Non-cooked Food Items

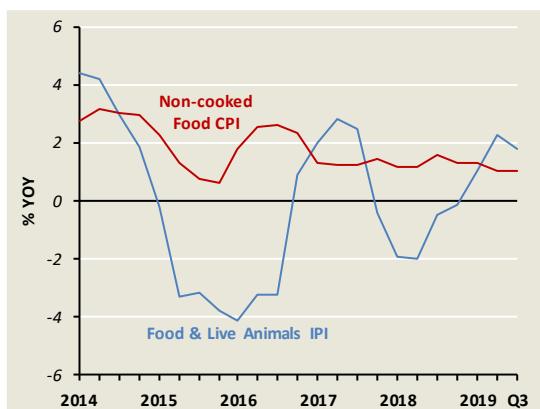
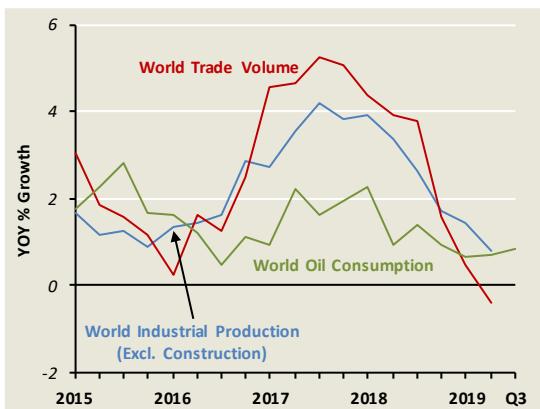


Chart 3.15
World Oil Consumption, Industrial Production and Trade Volume



Source: EIA, Netherlands Bureau for Economic Policy Analysis and Haver Analytics

Barring major geopolitical risk events, oil prices are anticipated to decline further in 2020.

While there are upside risks to oil prices from geopolitical tensions in major oil-producing regions, these are less likely to result in sustained increases in oil prices unless significant and prolonged outages occur. Moreover, oil production growth in non-OPEC countries is projected to stay firm, led by expanding supply from the US. Together with the weaker outlook for oil demand, global oil markets are anticipated to return to surplus in 2020, placing downward pressure on prices. (Chart 3.16) Oil prices are expected to average around US\$63 per barrel in 2019, lower than the US\$67 forecast in the previous *Review*, before sliding further to around US\$59 in 2020.

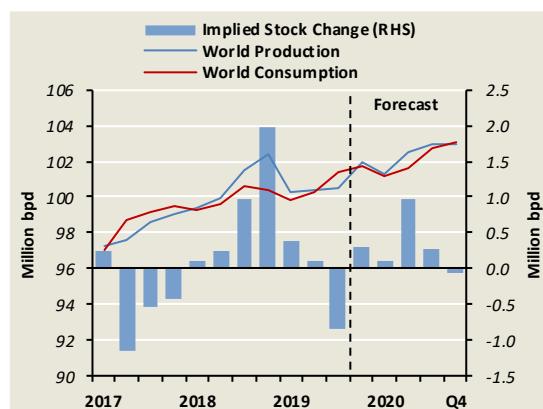
Rising participation in the Open Electricity Market should continue to dampen domestic inflation in 2020.

Based on the projected path of oil prices, domestic electricity tariffs are expected to fall slightly in 2020. Meanwhile, increasing adoption of cheaper price plans under the Open Electricity Market (OEM) should continue to depress the cost of electricity into next year, albeit to a smaller extent than in 2019 as the switch rate of households gradually stabilises. (Chart 3.17) Taking the effects of the OEM into account, electricity & gas prices are projected to lower core inflation by 0.2% point in 2019 and 2020. Energy-related components, comprising electricity & gas and petrol, are forecast to subtract 0.1% point from headline inflation in both 2019 and 2020.

Domestic cost pressures should ease alongside a softening labour market.

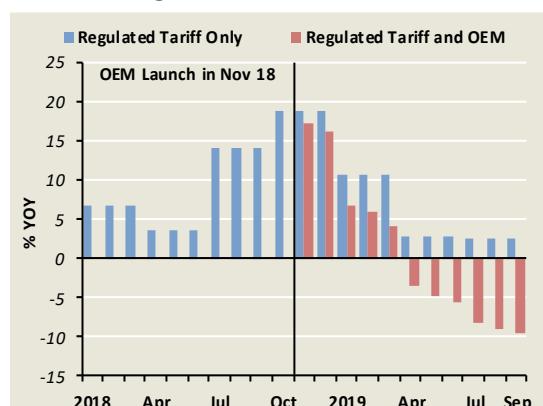
Unit labour cost (ULC) for the overall economy rose at a faster pace of 3.0% y-o-y in Q2 2019, compared to 2.4% in the preceding quarter. (Chart 3.18) This was driven by the decline in productivity in the goods-producing industries, even as the rate of increase in ULC for the services-producing industries moderated. Meanwhile, non-labour costs have been relatively contained. Office rental growth decelerated further in Q3 2019 compared to the same period a year ago, while retail rents showed only a slight pickup after sustained declines. (Chart 3.19)

Chart 3.16
World Oil Production and Consumption



Source: EIA

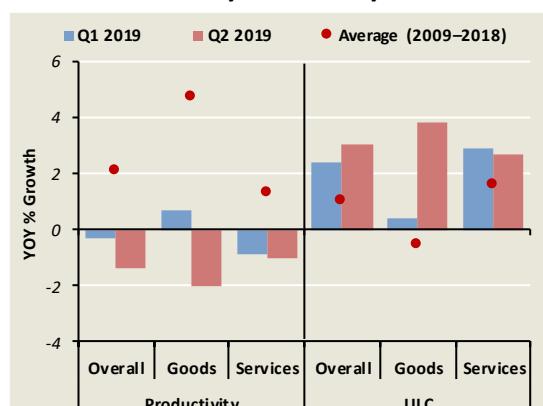
Chart 3.17
Electricity CPI Inflation under the Regulated Tariff and OEM



Source: EPG, MAS estimates

Note: For periods after October 2018, the blue bars indicate electricity CPI inflation in a counterfactual scenario based on changes in the regulated tariff only. Red bars denote actual y-o-y electricity CPI inflation.

Chart 3.18
Productivity and ULC by Sector



Broadly, domestic cost pressures appear relatively contained at this juncture. In 2020, labour productivity should pick up, while wage growth could ease further, such that ULC growth comes in lower than this year. Further, the easing in cost pressures against a backdrop of softer consumer sentiment and greater market competition should limit the extent of increases in consumer prices.

Food services inflation has picked up, and is expected to average around current levels this year and next.

Domestic food services inflation was 1.8% y-o-y in Q3 2019, slightly higher than the 1.6% outturn in Q2, as hawker and restaurant meals saw larger price increases. (Chart 3.20) Spending on prepared meals remained resilient, with growth in the F&B sales index firming over Q2 and the first two months of Q3. At the same time, ULC growth in the accommodation & food services sector had strengthened in recent quarters. Food services inflation is therefore forecast to average higher in 2019 and 2020 compared to 1.5% over the last two years.

Inflation in other services has moderated recently ...

Services inflation, apart from food services, eased to 1.6% y-o-y in Q3 2019 from 1.9% in Q2, largely due to a smaller increase in holiday expenses, although this was partly offset by a stronger pickup in airfares. After excluding these two volatile components, the fall in services inflation was still apparent across both discretionary and essential items⁶, suggesting that general price pressures may have receded in tandem with weaker economic conditions recently. (Charts 3.21 and 3.22)

Chart 3.19
Office and Retail Rental Indices



Chart 3.20
Output and Cost Indicators for F&B

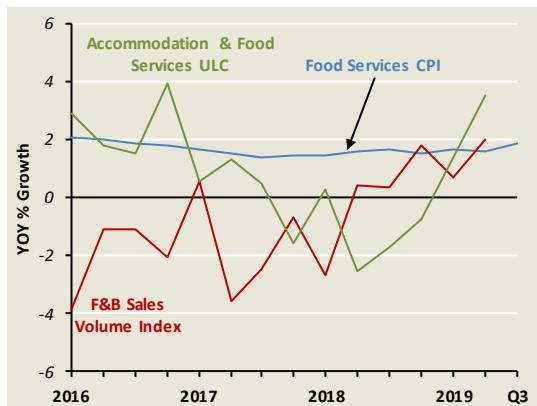
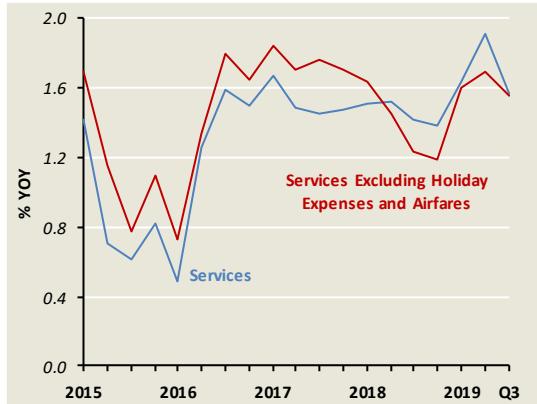


Chart 3.21
Services Inflation Excluding Holiday Expenses and Airfares



Source: EPG, MAS estimates

⁶ Essential services tend to be more income-inelastic and are influenced by broader demographic trends. They include healthcare, education and domestic services, and account for roughly half the weight of the services components in the CPI basket.

... and should be contained next year.

For 2019, services inflation is expected to average slightly higher than the 1.5% outturn last year, mainly due to the increase in public transport fares in December 2018. It is likely to be stable next year, with the projected contribution of higher bus and train fares⁷ offsetting lower inflation across the other services components.

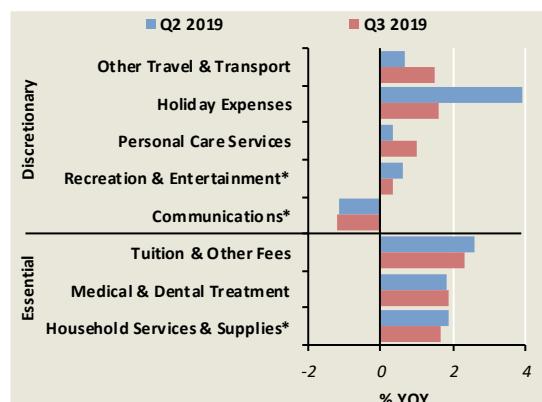
For instance, healthcare services inflation is anticipated to ease slightly in 2020 due to the disinflationary effect of several healthcare subsidies implemented in the latter half of this year.⁸ The pace of increase in education services fees could also moderate. Increases in the coverage and quantum of pre-school subsidies from next year as well as efforts to ramp up the number of pre-school places could cap increases in early childhood education costs, while the lowering of tuition fees in two local universities should also dampen education services inflation.

More broadly, the anticipated easing in domestic cost pressures and more cautious consumer sentiment could limit further increases in the cost of services, particularly for the discretionary components.

Prices of retail items could continue to decline amid cyclical and structural headwinds.

Despite some increase in the IPI for miscellaneous manufactured articles, retail goods prices have continued to trend down, falling by 1.2% y-o-y in Q3 and extending the 0.6% decline in Q2. This mainly reflected the steeper drop in clothing & footwear and consumer electronics prices, although prices across most other retail goods categories also declined, albeit more modestly, over this period. (Chart 3.23)

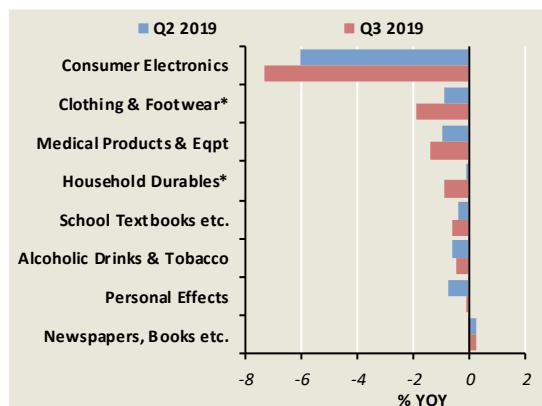
Chart 3.22
CPI Inflation of Selected Services Components



Source: EPG, MAS estimates

* These categories comprise mainly services components, but also include some items that are classified as retail goods.

Chart 3.23
CPI Inflation of Selected Retail Goods Components



Source: EPG, MAS estimates

* These categories comprise mainly retail goods components, but also include some services components.

Note: "Consumer Electronics" includes audio-visual, photographic & information processing and telecommunications equipment.

⁷ The Public Transport Council announced on 8 October 2019 that bus and train fares will increase by 7% from 28 December 2019.

⁸ These include the enhancements to the Community Health Assist Scheme (CHAS) and the outpatient care subsidies in November 2019 under the Merdeka Generation Package announced during the 2019 Budget, as well as the upward revisions to income criteria for healthcare subsidy schemes such as MediShield Life premium subsidies and CHAS in September and October 2019, respectively.

Estimates of retail mark-ups point to some margin compression in recent quarters.⁹ (Chart 3.24) Other than subdued economic conditions, the retail sector continues to face structural challenges, which are expected to drive further declines in retail goods prices for the rest of this year and in 2020.

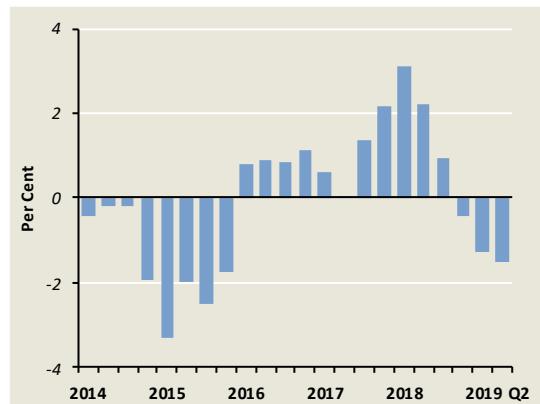
The changing nature of competition in the retail sector could also be shaping pricing behaviour, with implications for inflation. For example, as more retailers focus on online sales, the timing and duration of sales events and the size of discounts offered could shift, potentially contributing to more volatility in retail inflation.

The negative contribution of accommodation costs to headline inflation should dissipate in 2020.

Driven by the recovery in housing rentals in both the HDB and private residential segments, accommodation costs in the CPI declined by a smaller 0.7% y-o-y in Q3, compared to the 1.2% drop in Q2. Notably, various market measures of rentals have picked up in recent quarters. (Chart 3.25) Housing rentals had firmed in tandem with the fall in vacancy rates over 2016–18, as the growth of private housing stock plummeted and vacant units were steadily absorbed. However, the rate of decline in housing stock has levelled off, with vacancy rates stabilising at around 6%. (Chart 3.26)

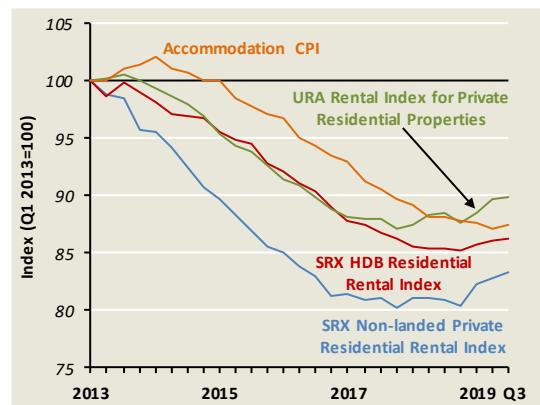
With vacancy rates relatively low, the renewal of the stock of existing leases at higher rates should continue to lift imputed housing rentals¹⁰, such that the decline in accommodation costs slows further over the remainder of 2019. In 2020, accommodation costs are projected to rise slightly and make a marginally positive contribution to headline inflation, after five years in negative territory.

Chart 3.24
Estimated Change in Retail Mark-ups



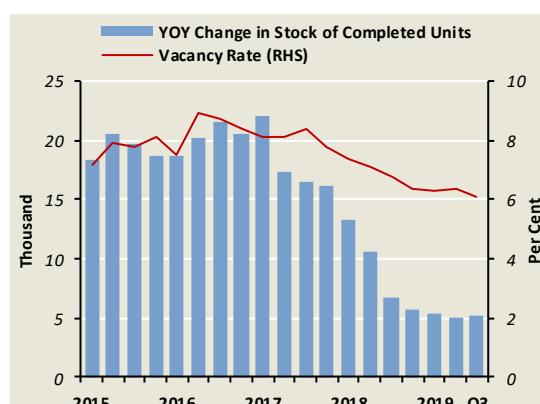
Source: EPG, MAS estimates

Chart 3.25
Measures of Housing Rentals



Source: Singapore Real Estate Exchange (SRX)

Chart 3.26
Vacancy Rate and Available Private Residential Units



Note: Figures exclude executive condominiums.

⁹ Change in mark-ups is estimated by subtracting y-o-y changes in rental, labour and product costs weighted by their shares in retail operating expenditure from the implied Retail Sales Index deflator.

¹⁰ Imputed rentals on owner-occupied housing in the CPI basket are computed based on all valid lease values (i.e., new, renewed and existing leases) each month.

Private road transport inflation is unlikely to see any significant increase.

Private road transport costs rose by 0.5% y-o-y in Q3 2019, easing from the 0.9% increase in Q2. This reflected a fall in the cost of petrol and a smaller increase in car prices. Average COE premiums for cars edged down to \$34,000 in Q3, from \$36,700 in the previous quarter, before recovering to \$37,400 in October. (Chart 3.27)

COE prices could rise only moderately on average over the rest of 2019 and 2020. Despite an anticipated tightening in COE quotas as the number of cars between 9–10 years of age declines, softer economic conditions could weigh on consumers' decisions to purchase big ticket items. In addition, a progressively expanding public transport network and greater availability of alternative modes of transportation, such as private-hire car services, may have led to a more sustained shift in demand away from car ownership.¹¹ Together with the projection of relatively stable petrol prices, private road transport costs are expected to make negligible contributions to headline inflation in both 2019 and 2020.

Nearly three-quarters of the components in core CPI exhibit cyclical ...

To better understand the relationship between MAS Core Inflation and the broader economic cycle, the core CPI basket was disaggregated to identify components that are more sensitive to overall economic conditions and those driven by industry-specific factors. This was done using regressions to relate inflation for 22 broad expenditure categories in the core CPI to the lagged output gap, using quarterly data from Q1 1998 to Q1 2019.¹²

Chart 3.27
Population of Cars Aged 9–10 Years and Average Car COE Premiums

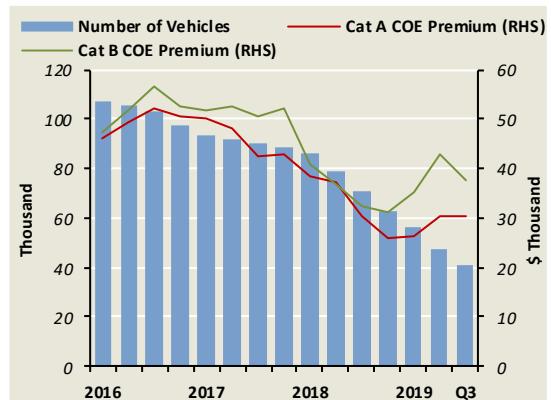
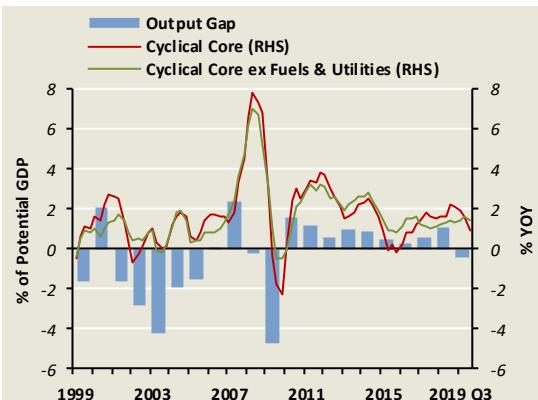


Chart 3.28
Cyclical Core Inflation and Output Gap



Source: EPG, MAS estimates

Note: The cyclical core inflation measures are plotted at a quarterly frequency, while the output gap is shown at an annual frequency. The 2019 output gap figure is a projection.

¹¹ According to the *Report on the Household Expenditure Survey 2017/18*, car ownership was at its lowest in a decade over 2017 and 2018. The 2016 *Household Interview Travel Survey* similarly indicated that more Singaporeans were switching from private to public transport in their daily commute given the wider availability of transportation alternatives to car ownership, such as car sharing services.

¹² The regression specification is adapted from Mahedy and Shapiro (2017). The authors used the deviation of the unemployment rate from NAIRU as the slack variable, and included the expected trend level of inflation and a lag of inflation to capture the influence of forward- and backward-looking inflation expectations. See Mahedy, T and Shapiro, A (2017), "What's Down with Inflation?", *FRBSF Economic Letter*, Federal Reserve Bank of San Francisco.

The CPI for each expenditure category is then classified as cyclical or acyclical based on the following criterion: if inflation for a category shows a positive and statistically significant relationship with the lagged output gap variable at the 10% level of significance, the category is considered cyclical. Otherwise, it is classified as an acyclical component. The results show that close to 70% of the core CPI basket exhibited cyclical over the specified period. The cyclical components spanned a broad range of goods and services, including non-cooked food items, food services, footwear, fuels & utilities, healthcare, holiday expenses, household durables, household services & supplies, other recreational goods, public transport¹³, as well as other travel & transport. A cyclical core inflation measure is obtained by taking a weighted sum of the price indices of these categories.

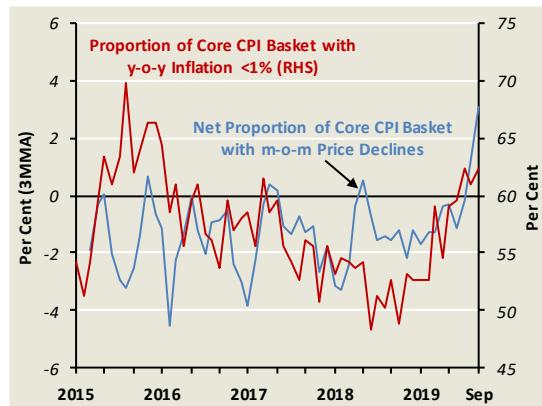
... and inflation appears to have eased in these cyclical components more recently.

Cyclical core inflation averaged lower at 1% y-o-y in Q3, compared to 1.6% in Q2, reflecting declines across most cyclical components of the CPI basket. (Chart 3.28) Excluding the fuels & utilities component, which was impacted by the recent liberalisation of the retail electricity market, cyclical core inflation averaged 1.4% in Q3, slightly lower than the 1.6% in Q2.

There are signs of a broad-based retreat in domestic price pressures.

Meanwhile, the proportion of core CPI basket components with inflation rates of less than 1% y-o-y has trended up substantially, reaching 62% in September from 53% at the beginning of the year. (Chart 3.29) A more granular examination of prices of individual products and services in the core CPI basket shows that the net proportion of items experiencing m-o-m price declines has also risen. All in, there are signs of a broad easing in price pressures.

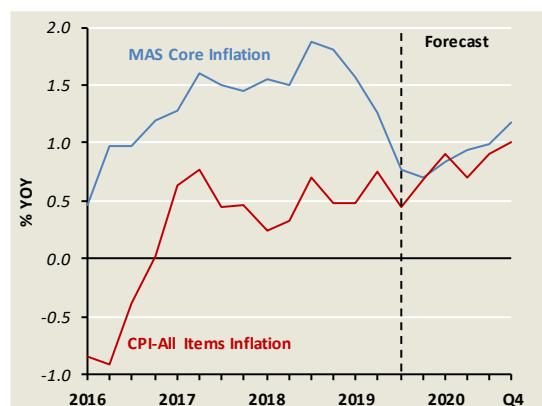
Chart 3.29
Indicators of Price Pressure in the Core Inflation Basket



Source: EPG, MAS estimates

Note: The blue line is the three-month moving average of the number of sampled items in the core CPI basket with m-o-m price declines less those with price increases as a proportion of all items sampled. A negative figure indicates that more items are experiencing price increases than declines.

Chart 3.30
CPI-All Items and MAS Core Inflation

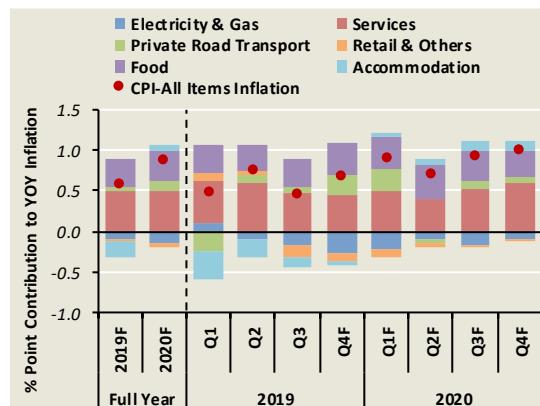


Source: EPG, MAS estimates

¹³ Public road transport includes train fares, bus fares as well as taxi fees and other commuting fees (e.g., school buses and mini-buses, etc.). Although a substantial part of the public road transport component consists of train and bus fares, which are administrative prices, the Public Transport Commission reviews these fares based on macroeconomic variables that generally exhibit cyclicity, such as core inflation, wages and fuel costs.

In sum, inflationary pressures are muted amid the slowdown in the economy. External and domestic cost pressures are not likely to rise further, and the pass-through to prices should also be limited given more cautious consumer sentiment. MAS Core Inflation is expected to hover around the current rate over the remaining months of 2019, and come in at the lower end of the 1–2% forecast range for the year as a whole. In 2020, the forecast range is 0.5–1.5%. Meanwhile, CPI-All Items inflation is projected to be around 0.5% this year. It is expected to come in within 0.5–1.5% in 2020, as the negative contribution of accommodation costs to headline inflation over the last five years dissipates fully. (Charts 3.30 and 3.31)

Chart 3.31
Contribution to CPI-All Items Inflation



Source: EPG, MAS estimates

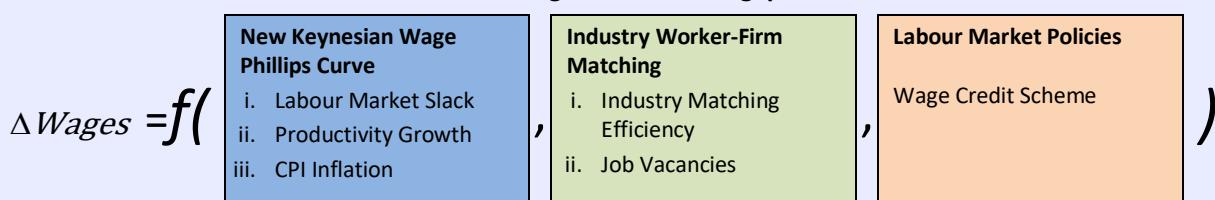
Box B
A New Keynesian Wage Phillips Curve for Singapore

Introduction

The relationship between inflation and measures of economic activity has been at the core of monetary analysis and policy since Phillips (1958) found a negative relationship between wage inflation and unemployment in the UK over the period 1861–1957. In the past few decades, the Phillips Curve has formed the cornerstone of the Keynesian analytical framework for understanding the behaviour of inflation. After the Global Financial Crisis (GFC), however, researchers have pointed to the phenomenon of “missing disinflation”, calling into question the validity of the Phillips Curve framework (see Blanchard, 2016; Ball and Mazumder, 2019). This puzzle has spurred renewed interest in the estimation of the Phillips curve, including its variants based on a New Keynesian paradigm.

In this Box, an augmented New Keynesian Wage Phillips Curve (NWKPC) framework is used to examine the relative importance of several potential determinants of earnings growth in Singapore.^{1/} As the NWKPC describes the relationship between measures of labour market slack and wage inflation, the objective is to assess the responsiveness of wages to cyclical fluctuations in Singapore. Beyond the business cycle, the long-term relationship between wages and productivity growth is also of policy interest. Therefore, the current study augments the standard framework with two other potential drivers of wage growth. (Figure B1) These are sector-specific matching frictions in the labour market and an important labour market policy measure—the Wage Credit Scheme (WCS) instituted in 2013, under which the government co-funds a portion of wage increases that firms give to resident employees.

Figure B1
Drivers of Wage Growth in Singapore



The New Keynesian Wage Phillips Curve

The NWKPC estimated is based on Galí (2011), which revived interest in the response of wage growth to deviations in actual output from full employment output. Workers will be more inclined to bargain for higher wages during boom times in an economy where workers know they may only have the opportunity to negotiate their wages occasionally, compared to the situation in an economy where wage-setting is fully flexible. Therefore, wage growth tends to increase in good times and decline or turn negative during recessions. Further, since workers are likely to demand higher pay in anticipation of price increases, wages should correlate positively with inflation expectations. In the long run, as the economy tends towards full employment output, wage growth will be driven by trend productivity.

Industry Matching Efficiency

Although many theoretical models of job search imply a relationship between matching efficiency and wages, there is no consensus on the direction of this relationship. High efficiency in matching vacancies to unemployed job searchers may give workers more options during their job search, allowing them to accept jobs with higher wages. Nevertheless, high matching efficiency may allow firms to replace workers more easily and prevent existing ones from bargaining for higher wages. The approach here is to rely on the data to reveal the empirical relationship between matching efficiency, vacancies and wage growth in Singapore.

^{1/} This Box builds on previous MAS studies of the price Phillips Curve in Singapore, as featured in MAS (2008) and MAS (2013).

Industry-level variation in matching efficiency and vacancies is exploited to generate more robust estimates. Specifically, a matching function of industry j in time period t of the following form is estimated:

$$m_{jt} = \theta_j + \psi_1 v_{jt-1} + \psi_2 u_{t-1} + e_{jt} \quad (1)$$

This is a log-linear matching function that takes firm vacancies and resident unemployed workers as explanatory variables.^{2/} Quarterly industry-level vacancies are used for v_{jt-1} , the resident unemployment rate for u_{t-1} , and m_{jt} is constructed as the industry recruitment rate multiplied by industry employment. In the matching function estimation, θ_j may be interpreted as a measure of industry-specific matching efficiency between vacancies in industry j and the pool of resident unemployed workers. Intuitively, industries with high matching efficiency (high θ_j) produce more matches between workers and firms, given the same number of vacancies and unemployed workers. This leads to reduced search frictions and a higher recruitment rate (m_{jt}). The estimates of θ_j are then used in the estimation of the basic NKWPC equation (Equation 2 below).

Wage Credit Scheme

Under the WCS introduced in 2013 and set to expire in 2020, the government co-funds a portion of wage increases given to Singaporean employees earning a gross monthly wage of up to \$4,000. Such transfers may have spillover effects on the wages of other workers and cause an acceleration in wage growth. To test the impact of the WCS on aggregate wages, a measure of the average contribution of WCS payments to wages is constructed by dividing the quarterly WCS payouts by the total wage bill for employed residents. This variable takes on positive values after the introduction of the WCS, and is zero prior to that. On average, WCS payouts have comprised only a small 0.0015% of the overall wage bill since its commencement.

NKWPC Estimation

Industry-level panel data is used to estimate the NKWPC over the period from Q1 1991 to Q4 2017, as it has the advantage of allowing for heterogeneity in wage dynamics across industries. Further, Blanchflower and Oswald (1994) found that using panel data in wage equation estimation alleviates potential problems with serial correlation in the error term. Finally, using industry-level panel data can yield more precise coefficient estimates by exploiting industry variation in the variables.

The NKWPC equation estimated is given by^{3/}:

$$\Delta w_{jt} = \alpha_j + \beta \Delta y_t^{trend} + \sum_{s=1}^4 \gamma_s \Delta w_{t-s} + \delta \Delta p_{t-1} + \sum_{s=0}^1 \lambda_s \tilde{U}_{t-s} + \phi \theta_j \cdot v_{jt} + \kappa WCS_{jt} + \varepsilon_{jt} \quad (2)$$

Wage growth in industry j in time period t (Δw_{jt}) is a linear function of its lags, industry fixed effects (α_j), trend productivity growth (Δy_t^{trend}), lagged MAS Core Inflation (Δp_{t-1}), the contemporaneous and one-quarter lagged resident unemployment gap (\tilde{U}_{t-s}), the interaction between industry matching efficiency based on Equation 1 and industry vacancies ($\theta_j \cdot v_{jt}$), and WCS payments (WCS_{jt}).

^{2/} This functional form nests a log-linear Cobb-Douglas function, the most commonly assumed form in the search-and-matching literature (see Petrongolo and Pissarides, 2001), generalised to allow for increasing or decreasing returns to scale in vacancies and unemployed.

^{3/} Given the autoregressive distributed lag structure adopted, a general-to-specific approach (specifically, the Akaike Information Criterion) was used to select the number of lags to include for wage growth, core inflation and the resident unemployment gap.

The y-o-y percentage growth of quarterly resident wages (inclusive of employers' CPF contributions) was used as the dependent variable in the wage equation.^{4/} The main measure of labour market slack is the unemployment gap, constructed as the deviation of the seasonally adjusted resident unemployment rate from its Hodrick-Prescott (HP) filtered trend (smoothing parameter $\lambda = 1,600$). Trend productivity growth is the y-o-y percentage growth in HP filtered labour productivity ($\lambda = 1,600$), while inflation expectations are proxied by the one-quarter lagged MAS Core Inflation.

Three specifications of the NKWPC are estimated. First, an aggregate wage equation is estimated, using as the dependent variable the earnings growth for the entire economy rather than for individual industries. The second regression is a panel specification with industry-specific wage growth as the dependent variable. For both regressions, only the NKWPC variables listed in the first box in Figure B1 are included as explanatory variables. The third specification adds the matching efficiency and WCS variables to the panel regression. The coefficient estimates for each of the specifications are listed in Table B1.

Table B1
Panel Regression Results for Wage Equation (Q1 1991 – Q4 2017)

Dependent Variable: Δw	Specification		
	Aggregate	Panel	
		(1)	(2)
Dependent variable ($t - 1$)	0.50*** (0.10)	0.24*** (0.04)	0.22*** (0.04)
Dependent variable ($t - 2$)	0.10 (0.10)	0.13*** (0.02)	0.12*** (0.02)
Dependent variable ($t - 3$)	0.18* (0.08)	0.14*** (0.02)	0.13** (0.02)
Dependent variable ($t - 4$)	0.46*** (0.05)	-0.42*** (0.03)	-0.43*** (0.21)
Unemployment Gap (t)	-1.43** (0.52)	-1.89*** (0.38)	-2.47*** (0.35)
Unemployment Gap ($t - 1$)	-1.14 (0.62)	-1.13*** (0.23)	-1.17*** (0.20)
Δ Trend Productivity (t)	0.77*** (0.18)	0.67* (0.26)	0.85** (0.37)
Core CPI Inflation ($t - 1$)	1.03*** (0.27)	0.56* (0.25)	0.36* (0.22)
WCS (t)	-	-	0.00 (8.56)
Matching Efficiency * Vacancies (t)	-	-	-0.0024*** (0.00)
Summary Statistics			
Adjusted R^2	0.65	0.69	0.66
Observations	109	634	634

Notes: Robust standard errors in parentheses.

The standard errors reported in column 1 are Newey-West errors, while those in columns 2–3 are Arellano panel standard errors that correct for autocorrelation and heteroskedasticity in the residuals in fixed effects models. Panel regressions have between 43 and 107 time observations (using data from Q1 1991 to Q4 2017 with some missing values in specific industries) and 9 industry categories, providing a total of 634 observations.

* Statistically significant at the 5% level.

** Statistically significant at the 1% level.

*** Statistically significant at the 0.1% level.

^{4/} This facilitates comparisons with studies conducted for other economies, many of which use compensation of employees as a dependent variable. Using resident wage series that excludes employers' CPF contributions does not significantly alter the results.

Results

The estimates for the aggregate NKWPC equation in column 1 have two notable implications. First, the short-run relationship between cyclical labour market slack and wage growth is strong in Singapore, as reflected in the large, negative and significant coefficients on the unemployment gap.^{5/} Similar studies for developed economies, especially the US and Europe, have generally showed much weaker wage responsiveness to cyclical movements.^{6/} Second, the coefficient on trend productivity is positive and significant, implying that wage growth is responsive to trend productivity growth.

These results are corroborated by the estimates from the industry-level wage equations, as columns 2–3 show. Wages continue to respond strongly and negatively to changes in the unemployment gap in the short run, and have a positive and substantial component driven by long-run productivity growth.

In comparison, the relationship between inflation expectations and wage growth in Singapore is relatively weak and unstable. The coefficient on lagged core CPI inflation varies substantially over the sample period and becomes insignificant when the equation specification is altered, or when alternative measures of inflation expectations are used.

Allowing for time-varying coefficients by estimating the NKWPC using 10-year rolling windows, the coefficient on the unemployment gap becomes smaller (with larger estimated standard errors) after the GFC from 2009–10. This can be attributed to the decline in the variance of the unemployment gap in the 2010s, leading to a weaker identification of the relationship between wage growth and slack in the labour market. The relationship is relatively stronger when the period of heightened cyclical volatility after the crisis is included.

Industry Matching Efficiency

The estimated coefficient on the industry matching efficiency variable is statistically significant, but relatively small in magnitude. The results imply that in a tight labour market, industries with high matching efficiency experience slower wage growth than industries with low matching efficiency. Intuitively, in industries with low matching efficiency, firms may need to offer higher wages to attract workers quickly in order to avoid high search costs. Nevertheless, the industry matching efficiency effect on wages appears to be small in Singapore—a 1% increase in matching efficiency lowers annual wage growth by only 0.002% point.

The estimates for matching efficiency by industry shed some light on how mismatch affects wage growth. Administrative and support services and construction rank highest in matching efficiency, which may reflect the prevalence of recruitment agencies as well as the less specialised skill requirements of these industries. In comparison, ICT and financial services have the lowest matching efficiency, which likely reflects skills mismatch between workers and firms in highly-skilled services, or institutional licensing requirements, such as CFA requirements for accountants, that lengthen the recruitment process.

Wage Credit Scheme

Across a range of equation specifications and robustness checks, the coefficient estimate on the WCS variable is small and statistically insignificant. There are two possible explanations for this result. First, rather than generating wage increases in excess of those that would have been granted by employers, WCS was likely to have funded employers' planned raises. Therefore, the WCS should not be expected to have a significant effect on aggregate wage growth, as the policy's primary intent is to lessen the impact of wage increases on business costs. Second, considering that the WCS only directly affects a small portion of employed residents, the overall percentage of WCS transfers in average wages is very small, which makes it difficult to detect any significant effect.

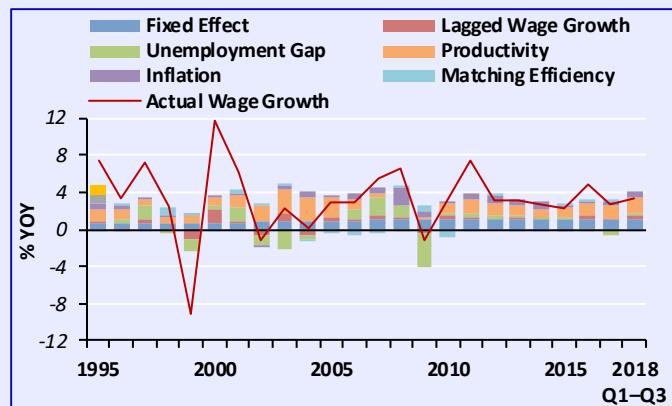
^{5/} Using alternative measures of labour market slack, such as the unemployment rate or the industry level vacancy rate, does not substantively alter the results.

^{6/} For the US, Galí (2011) found a statistically insignificant coefficient for the unemployment rate, while Abdih and Danninger (2018) reported a coefficient of about –0.3. Bonam *et al.* (2018) estimated coefficients ranging between 0 and –1 for the Eurozone, while Muto and Shintani (2014) found coefficients from –0.3 to –1.5 for Japan.

Wage Growth Decomposition

Using the estimated coefficients from the panel regression in column 3 of Table B1, the contribution of each factor to expected wage growth is computed for 1991–2017. (Chart B1)

Chart B1
Decomposition of Resident Wage Growth



As suggested by the regression coefficients, wage growth in Singapore is relatively responsive to cyclical changes in the unemployment gap. In the years preceding the Asian Financial Crisis and the GFC, the economy operating above full employment drove high wage growth. Wage growth turned negative in the recession years, pulled down by rising unemployment. During such periods, besides the unemployment gap, growth in trend productivity was also a primary driver of aggregate wage growth, with inflationary expectations playing a negligible role.

Industry-level fixed effects also play a prominent role in explaining wage changes. The positive aggregate contribution from fixed effects reflects the industry composition of the Singaporean economy, with high employment shares for industries with healthy average wage growth. Accordingly, changes in the contribution of industry fixed effects are the result of shifts in the industry composition of employment. After rising gradually from the late 1990s to around 2013, the industry fixed effects contribution declined in 2013–17. This reflected higher shares of employment in the latter period in industries with weaker wage growth, such as administrative and support services.

The regression estimates suggest that matching frictions have some influence on wage growth in Singapore. When vacancies rise, high matching efficiency reduces wage growth within industries. In 2005–11, matching efficiency had small dampening effects on wage growth, suggesting that a rise in vacancies in high matching efficiency industries, such as construction and administrative and support services, could have held back aggregate wage growth. On the whole, matching frictions appear to have only a small countercyclical effect on wage growth, buttressing it in recessionary periods and moderating it in times of strong GDP growth.

Conclusion

The estimation of a New Keynesian Wage Phillips Curve for Singapore shows that wage growth is more responsive to cyclical labour market slack than in other advanced countries. This is indicative of high wage flexibility, which contributes to firms' resilience to business cycle fluctuations, even as they bear the brunt of a slowdown through lower profits. The correlation between wage growth and trend productivity growth is high, suggesting that the wage-productivity relationship is strong on average. Low matching efficiency industries tend to see faster wage growth, indicating that matching frictions may constitute a source of bargaining power for workers. However, the overall effect of the matching variables to wage outcomes in Singapore is relatively small.

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Chapter 4

Macroeconomic Policy

4 Macroeconomic Policy

In October 2019, MAS reduced the slope of the S\$NEER policy band slightly. This measured shift to a more accommodative policy stance was predicated on the weaker, but stabilising, macroeconomic outlook. Alongside the global pullback in production and trade, Singapore's GDP growth has slowed and is likely to be sub-par for an extended period. Correspondingly, the level of output will remain below potential into 2020. The gradual easing in labour market tightness, benign imported inflation and weak cost pass-through should also keep consumer price increases muted in the coming quarters. Nevertheless, disinflationary forces are unlikely to intensify and core inflation is expected to rise gradually in the medium term.

Fiscal policy continued to prioritise the strengthening of Singapore's longer-term sustainable growth prospects. To this end, the measures in Budget 2019 were largely aimed at raising aggregate productivity and addressing social inequality. Overall, the fiscal stance in CY2019 is estimated to be slightly more expansionary compared to the preceding year.

This macroeconomic policy mix is assessed to be appropriate given current economic conditions. Should the outlook for inflation and growth weaken significantly, MAS is prepared to recalibrate monetary policy.

4.1 Monetary Policy

A Measured Easing

Both global and domestic growth prospects have deteriorated since the previous policy review. Singapore's output gap has turned negative, and this is expected to persist into 2020. The domestic labour market is also softening as hiring sentiment turns cautious. Against this backdrop, domestic and imported cost pressures are likely to be muted in the quarters ahead, and the pass-through to consumer prices will be constrained. Core inflation is thus expected to remain below its historical average in the coming quarters before rising gradually over the medium term. Accordingly, MAS reduced the rate of appreciation of the S\$NEER policy band slightly in October 2019, with no change to the width of the band or the level at which it is centred.

MAS kept the rate of appreciation of the S\$NEER policy band unchanged in April 2019.

At the time of the April 2019 policy review, global growth had come in weaker than anticipated, as the confluence of a sharper downturn in the global IT cycle, a step-down in Chinese domestic demand, and persistent trade tensions weighed more heavily on global trade and production. Nevertheless, the slowdown was largely confined to the manufacturing sector and was not expected to worsen into a broad-based recession. Labour markets remained tight in most of Singapore's major trading partners, including those in the region, and this was expected to underpin domestic demand and the services industries. Macroeconomic policy support in the larger economies was also forthcoming.

Reflecting global growth dynamics, the IT- and trade-related industries in Singapore were forecast to underperform for the rest of 2019. In comparison, the modern services cluster was considered likely to continue its expansion, given steady demand from the region and digitalisation initiatives domestically. The construction sector was seen to remain on a recovery path over the course of the year. Taken together, Singapore's GDP growth was projected to come in slightly below the mid-point of the 1.5–3.5% range in 2019. As the pace of expansion was slightly below potential, the positive output gap, which had widened over 2017–18, was set to narrow.

As the slowdown was limited largely to Singapore's more capital-intensive IT-related industries, productivity growth was likely to bear the brunt of

the adjustment, with the domestic labour market remaining firm. This implied that the pace of wage growth would only ease slightly in 2019 compared to the previous year. As a result, unit labour cost was projected to rise further. In comparison, imported inflation was expected to be benign amid softening demand growth in global commodity markets. At the same time, the dimmer growth backdrop and elevated global uncertainties were expected to constrain the extent to which firms could pass on rising costs to consumers.

MAS revised its forecast range for MAS Core Inflation in 2019 to 1–2%, from 1.5–2.5% previously. This downward adjustment reflected weaker global oil prices and a larger-than-anticipated impact from the liberalisation of the retail electricity market. For the year as a whole, core inflation was forecast to come in near the mid-point of the revised range.

With overall inflationary pressures projected to remain contained amid the positive but narrowing output gap, MAS kept the rate of appreciation of the S\$NEER policy band unchanged in April 2019, following two upward adjustments in the slope last year. There was also no change to the width of the band and the level at which it was centred.

In October 2019, MAS reduced the rate of appreciation of the S\$NEER policy band slightly.

In the six months since the April 2019 policy review, growth momentum in Singapore's major trading partners has slowed further. Global manufacturing and trade activity have continued to weaken,

weighed down by the ongoing slump in the global IT industry and pullback in investment spending as trade tensions intensified and broadened to new fronts.

Global economic growth is expected to stay sluggish into 2020, as elevated policy uncertainty continues to take a toll on business confidence, investment, production and trade. Notwithstanding recent signs of progress, a meaningful resolution of the trade tensions between the US and China remains distant. Even as the manufacturing downturn drags on, the risk of weakness spilling over to other economic activities is also mounting. The global services PMI has trended down, pointing to slower expansion ahead. While labour markets are largely resilient, indications of softening have appeared in the US and several economies in the Eurozone. Macroeconomic policy across both the G3 and regional economies has turned more expansionary, which should in turn support domestic demand. However, constraints such as policy space, debt sustainability and financial stability concerns could cap the stimulus to these economies. Given the dimmer outlook, GDP growth in Singapore's major trading partners is projected to see a step-down from 4.3% in 2018 to 3.6% in 2019, and stabilise at around this rate in 2020 unless significant downside risks materialise.

While a slowdown in Singapore's trade-related sectors was anticipated, the extent of the downshift in activity in the last six months turned out to be more severe than previously envisaged. In turn, GDP growth fell to a disappointing 0.1% y-o-y in Q2–Q3 2019, from an average of 1.2% in the preceding two quarters. However, the modern services and domestic-oriented clusters continued to expand, indicating that most of the weakness has been concentrated in the electronics-related industries.

Singapore's growth prospects in the near term will be highly sensitive to external developments, particularly the evolution of US-China relations, as well as the global electronics cycle. The domestic economy could grow in fits and starts for the rest of 2019 and into 2020, alongside fluctuations in trade, production and inventories, and accompanied by bouts of financial market volatility as investor sentiment shifts. From a sectoral

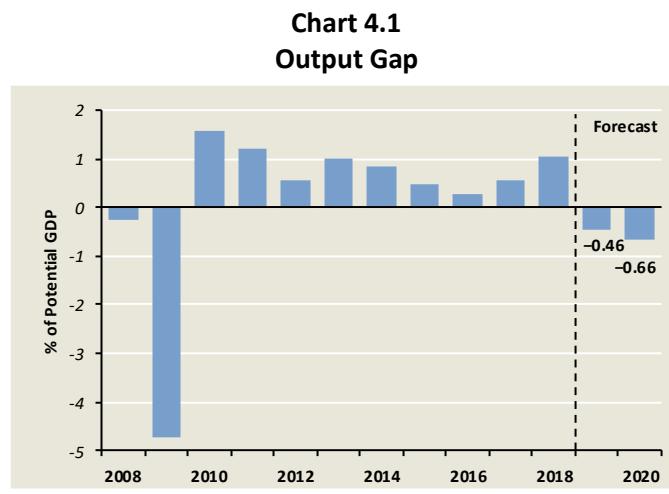
perspective, modern services will continue to be the key driver of growth. Meanwhile, activity in the domestic-oriented cluster should be supported by a healthy pipeline of public infrastructure projects and capacity expansion in the healthcare segment, even as subdued consumer sentiment is likely to weigh on discretionary spending and hence the retail sector. The trade-related sectors are expected to stay sluggish, in the absence of a decisive recovery in the global IT industry.

In sum, Singapore's GDP growth is expected to come in around the mid-point of the 0–1% forecast range this year, and improve modestly in 2020. Nevertheless, this forecast is subject to considerable uncertainty emanating from the external environment. The level of output has already fallen below potential, and is likely to remain so into 2020. (Chart 4.1)

Thus far, the brunt of the cyclical adjustment has been borne by firms through lower profits, with the labour market largely insulated. Indeed, retrenchments in the economy have stayed low. However, there are signs that the extended downturn and prolonged uncertainty are beginning to affect labour demand. The ratio of job vacancies to unemployed persons has fallen below unity, indicating that firms have become more cautious in hiring. Accordingly, the earlier tightness in the domestic labour market is gradually easing and some degree of slack could emerge. This suggests that wage gains are likely to moderate over 2019 and 2020, from the 3.5% recorded in 2018.

Non-labour costs, such as retail rents, are also expected to stay subdued. As a result, domestic cost pressures should ease. Amid weaker consumer sentiment and greater market competition (e.g., in the retail sector and electricity market), the pass-through of higher costs to consumer prices would remain constrained.

Meanwhile, imported inflation is likely to be benign in the quarters ahead. Lacklustre global demand and well-supplied commodity markets should dampen the extent of increases in global food and oil prices. Although there are upside risks to oil prices from geopolitical tensions in major oil-producing regions, the pass-through to core inflation should be weaker than has been the case



Source: EPG, MAS estimates

Note: The output gap is derived from a weighted average of estimates from a structural vector autoregression (SVAR) approach using the Blanchard-Quah decomposition, the Friedman variable span smoother and a univariate Hodrick-Prescott filter. The forecasts for 2019 and 2020 take into account the policy stance in October 2019.

historically, as a large number of domestic households have switched to fixed-rate contracts under the Open Electricity Market.

Against this backdrop, and incorporating the downside surprises in recent months, MAS Core Inflation is expected to come in at the lower end of the 1–2% range in 2019 rather than near the mid-point as envisaged in the April policy review. For 2020, core inflation is projected to average 0.5–1.5%. While there are some indications of a broad easing in price pressures such that core inflation is likely to remain below its historical average in the near term, disinflationary forces are not likely to be entrenched and core inflation should rise gradually over the medium term.

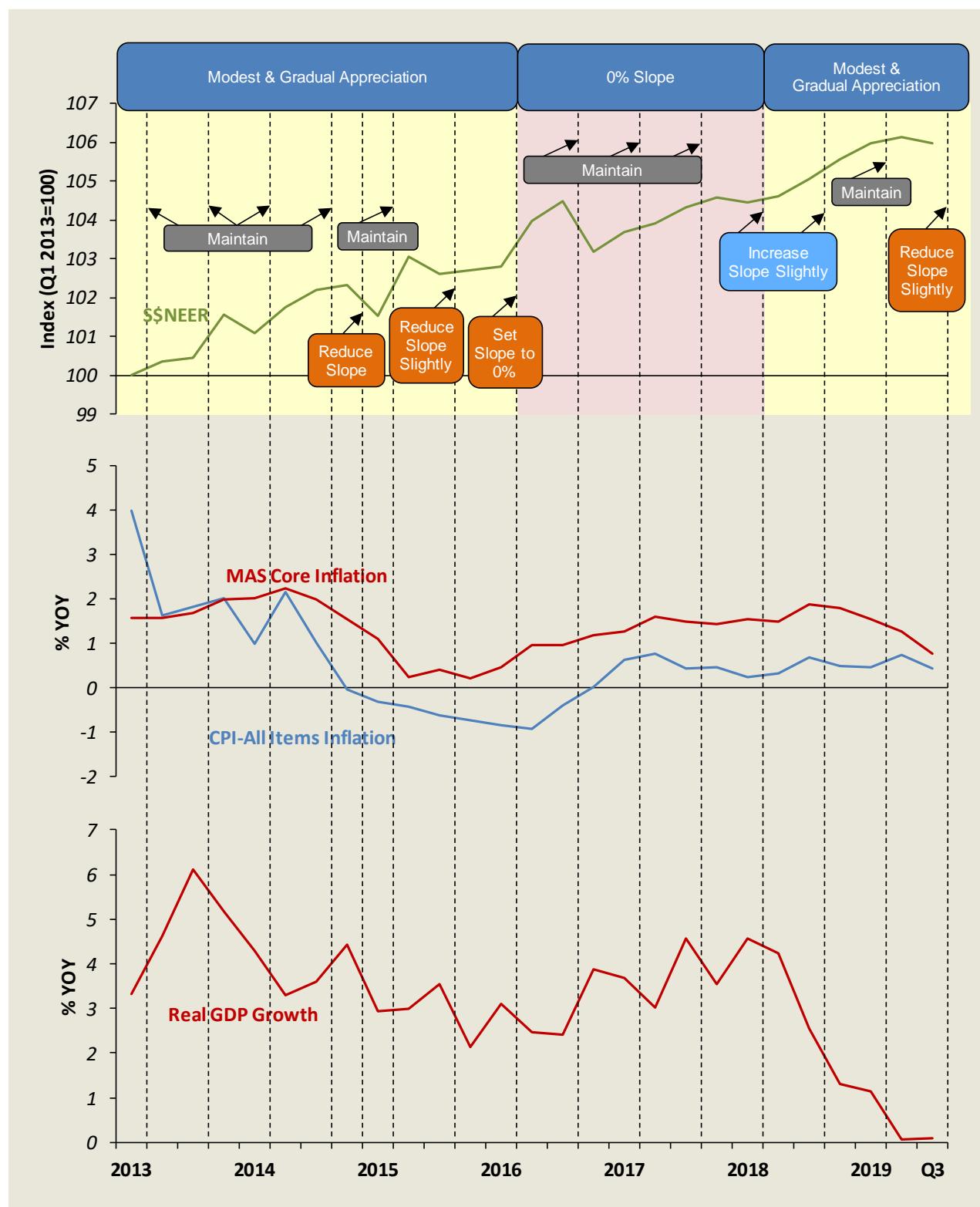
Turning to headline inflation, the drag from imputed rentals should gradually dissipate in the coming months. However, private road transport costs are unlikely to increase significantly, as weakening sentiment and wider availability of alternative modes of transport, such as private-hire car services, weigh on the demand for cars and COEs. On the whole, CPI-All Items inflation is projected to be around 0.5% in 2019 and in the range of 0.5–1.5% in 2020.

In sum, the negative output gap and softening labour market conditions should keep inflationary pressures in the domestic economy muted in the coming quarters. Accordingly, MAS reduced the rate of appreciation of the S\$NEER policy band slightly in the October 2019 policy review. There was no change to the width of the band and the level at which it is centred. This measured adjustment to the policy stance is assessed to be consistent with medium-term price stability, given the current economic outlook.

In the absence of additional shocks, growth of GDP, business costs and consumer prices is expected to stabilise rather than decelerate further, and a more aggressive easing of policy is unwarranted at this juncture. Nevertheless, MAS recognises that the risks to growth, and hence inflation, are tilted towards the downside. Thus, MAS will continue to closely monitor economic developments and is prepared to recalibrate monetary policy should prospects for inflation and growth weaken significantly.

Chart 4.2 traces the longer-term evolution of monetary policy in relation to growth and inflation developments in the Singapore economy.

Chart 4.2
Key Macroeconomic Variables and Changes in the Monetary Policy Stance



--- indicates release of Monetary Policy Statements

The S\$NEER fluctuated in the upper half of the policy band.

In the six months following the April 2019 Monetary Policy Statement (MPS), the S\$NEER remained firmly in the upper half of the policy band, even as there were bouts of volatility precipitated in part by shifts in global risk sentiment and capital flows into Singapore. (Chart 4.3)

Some of this volatility occurred between mid- and end-May, as a deterioration in global investor sentiment associated with the escalation in trade tensions caused the S\$NEER to come under depreciation pressure. The S\$NEER subsequently reverted to an appreciating path, in part due to a weakening in the US dollar after the US Federal Reserve signalled that it would likely shift to a more accommodative monetary policy stance. A second depreciation episode took place over late June to mid-August, amid faltering US-China trade negotiations and signs that growth and inflation in the Singapore economy were softening. However, the S\$NEER appreciated anew thereafter. Despite the sharp swings, the S\$NEER was largely unchanged on a point-to-point basis between the April 2019 MPS and mid-October.

There were sizable movements in S\$ bilateral exchange rates between the week ending 12 April and the week ending 11 October 2019. (Chart 4.4) Notably, the S\$ strengthened by 4.4% against the Chinese renminbi and 3.9% versus the Australian dollar, as incoming data suggested that growth in these economies was faltering. Meanwhile, uncertainty around Brexit continued to weigh on the pound sterling. In comparison, the S\$ weakened against global safe haven currencies such as the Japanese yen (4.6%) and the US dollar (1.3%).

The appreciation of the CPI-deflated S\$REER in Q1 reversed in Q2.

The S\$ real effective exchange rate (S\$REER)¹, with the CPI as the measure of price level, was unchanged between Q4 2018 and Q2 2019. (Chart 4.5) Continued appreciation of the S\$NEER and a pause in the decline in relative prices led to a 0.5% rise in the S\$REER in Q1 2019. However, the gain was ceded in Q2, as relative prices fell again.

Chart 4.3
S\$NEER

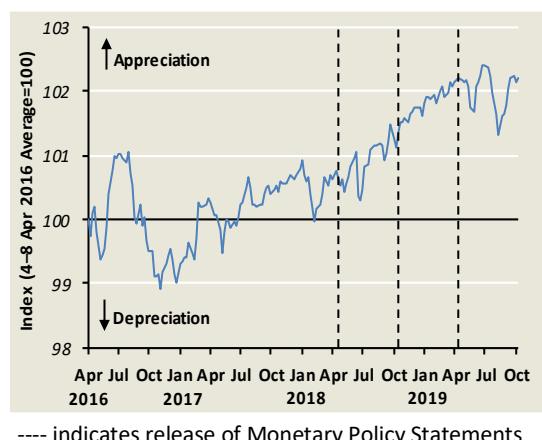


Chart 4.4
Singapore's Bilateral Exchange Rates

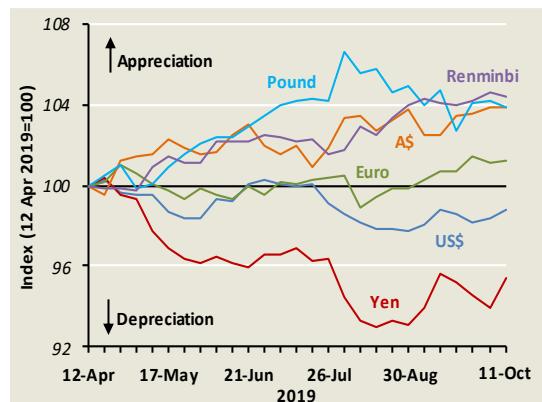
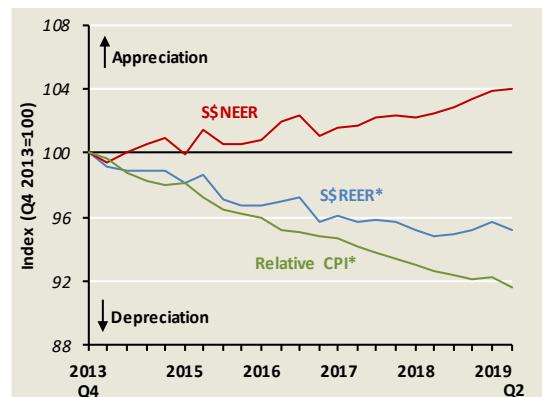


Chart 4.5
Components of the S\$REER (CPI-deflated)



* EPG, MAS estimates.

¹ The S\$REER is a measure of the prices of goods and services in Singapore relative to its trading partners, expressed in terms of a common currency index, the S\$NEER.

When viewed over a longer timeframe, the S\$REER is 4.8% below its peak in Q4 2013. Although the nominal exchange rate strengthened by 4.0% during this period, it was outweighed by the steady fall in relative prices, as foreign consumer price inflation outpaced that in Singapore.

Deposit rates have held up even as the S\$ interbank and swap offer rates fell.

The three-month US\$ LIBOR has seen a general decline since the start of this year, from 2.7% in January 2019 to 2.1% in September, as the monetary policy stance in the US became more accommodative. (Chart 4.6) Domestic interest rates adjusted with a lag and only began to ease from around the middle of the year. Specifically, the three-month S\$ Swap Offer Rate reached a high of 2.1% in May, before falling by 37 bps to 1.7% in September. Meanwhile, the three-month S\$ SIBOR hovered around 2.0% for most of the year, and only slipped marginally to 1.9% by end-September. Accordingly, the discount between the US\$ LIBOR and S\$ SIBOR narrowed to around 20 bps over this period.

Despite the downward adjustments in the S\$ interbank rate and swap offer rate, the savings deposit rate remained unchanged at 0.16%, where it has been since March 2017. (Chart 4.7) Meanwhile, the 12-month fixed deposit rate rose slightly to 0.57% in June 2019, from 0.55% previously, before levelling off.

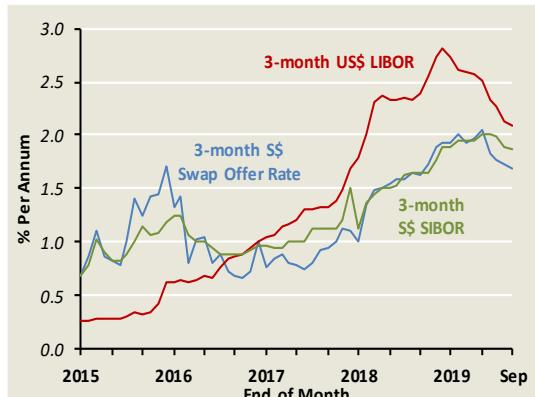
Domestic liquidity conditions have eased in the last two months.

As measured by the Domestic Liquidity Indicator (DLI)², liquidity conditions in Singapore tightened over Apr–Jul 2019. The average extent of the tightening was relatively modest compared to the preceding half year as the S\$NEER and S\$ SIBOR rose at a slower pace. (Chart 4.8) Since August, however, overall liquidity conditions have eased, as both the interest rate and the exchange rate declined.

DBU loans to non-bank customers grew steadily.

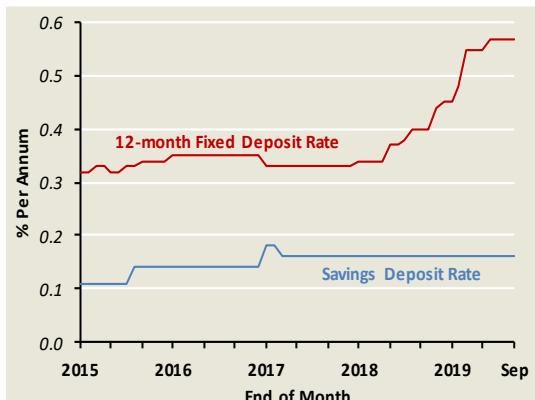
The total stock of outstanding DBU loans to non-bank customers expanded at a relatively even pace, averaging 1.9% y-o-y over Apr–Aug 2019, after being on a trend decline since H2 2017. (Chart 4.9) This stabilisation came on the back of a pickup in the pace of lending to

Chart 4.6
Interbank Rates and the Swap Offer Rate



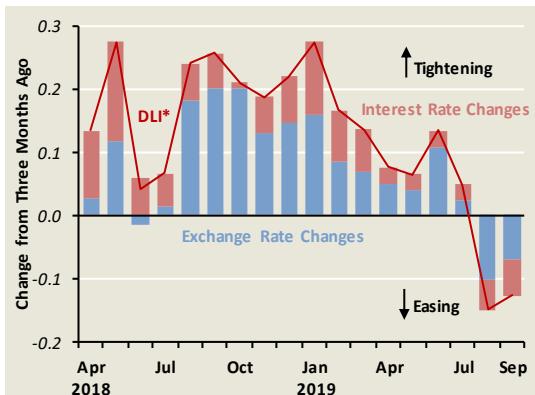
Source: ABS Benchmarks Administration Co Pte Ltd and ICE Benchmark Administration Ltd

Chart 4.7
Deposit Rates



Note: Each line represents the simple average of the top 10 banks' deposit rates.

Chart 4.8
Domestic Liquidity Indicator



* EPG, MAS estimates.

² The DLI captures movements in the S\$NEER and the three-month S\$ SIBOR.

businesses, which offset a decline in loans to households.

Business loan growth accelerated to 4.4% y-o-y in August 2019, from 3.4% in Q1, as the weakness in lending to non-bank financial institutions and firms in the general commerce sector dissipated. In comparison, loans extended to consumers contracted by 1.1% y-o-y in August, due in part to a fall in the volume of outstanding mortgages. Demand for housing loans has been slowing since July 2018, when the government announced additional property cooling measures.

The growth in broader monetary aggregates dipped in recent months, driven by movements in fixed deposits.

In y-o-y terms, growth in the supply of M1 turned positive from May, after slipping into negative territory at the start of 2019. (Chart 4.10) The recovery was due to a rebound in the stock of demand deposits, as well as faster expansion in the amount of currency in active circulation. (Chart 4.11)

Meanwhile, growth in the broader monetary aggregates, i.e., M2 and M3, accelerated over the first five months of the year to a peak of 5.5%, before easing over Jun–Aug. This largely reflects the expansion of fixed deposits, which had surged alongside a rise in interest rates offered by banks in early 2019, before moderating as rates plateaued.

Chart 4.9
DBU Loans to Non-bank Customers

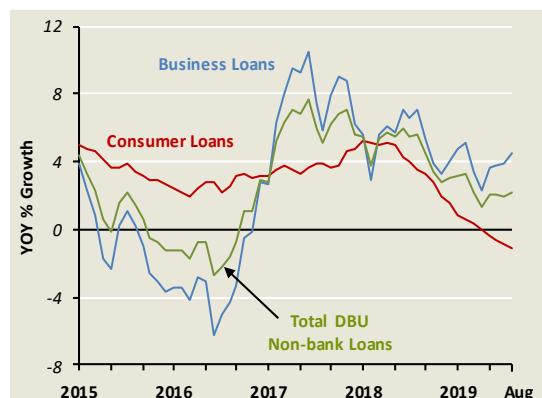
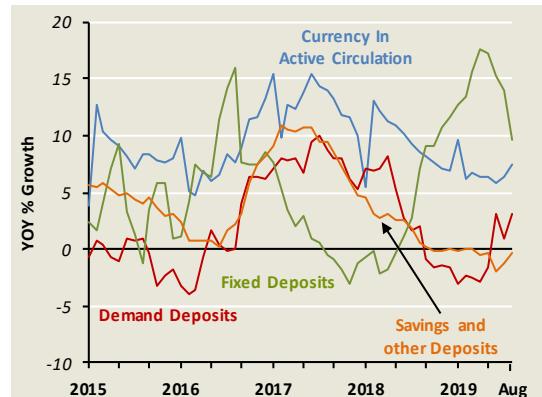


Chart 4.10
Money Supply



Chart 4.11
Components of Money Supply



4.2 Fiscal Policy

Fostering Sustainable Long-term Growth

Budget 2019 prioritised measures to strengthen Singapore's longer-term growth prospects. Accordingly, the key thrusts of the Budget were to lift aggregate productivity, move further towards equality of opportunity and ensure longer-term fiscal sustainability. The fiscal stance is assessed to be mildly expansionary for CY2019.

Budget 2019 aimed to raise productivity and strengthen social inclusion in a prudent manner.

Budget 2019 sought to strengthen Singapore's long-term growth prospects in a sustainable manner. To this end, it devoted funds to encourage a more efficient allocation of resources across firms, greater capital deepening, better utilisation of technology and innovation. At the same time, the Budget put in place measures to broaden social safety nets and strengthen access to educational and economic opportunities. Finally, the Budget elaborated on the Government's strategies to ensure fiscal sustainability into the longer term. For more details on Budget 2019, please refer to the April 2019 Review.

The fiscal stance is projected to be mildly expansionary in 2019.

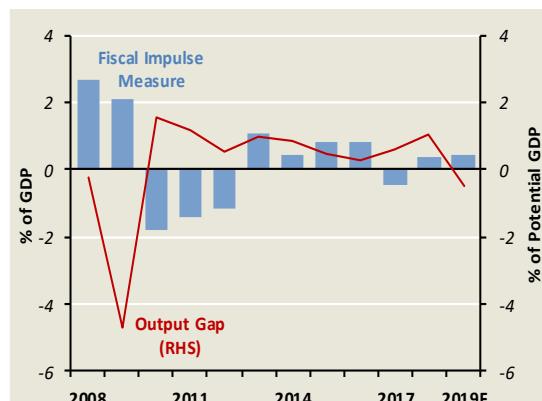
The fiscal impulse, an indicator of the short-term stimulus to aggregate demand from fiscal policy changes, is estimated to be positive at around 0.4% of GDP in CY2019. (Chart 4.12) This implies a slightly more expansionary fiscal policy stance relative to CY2018.

Government operating revenues declined in H1 2019 compared to the previous year.

The following provides an overview of the government's budgetary position in the first half of CY2019 compared to the same period last year.

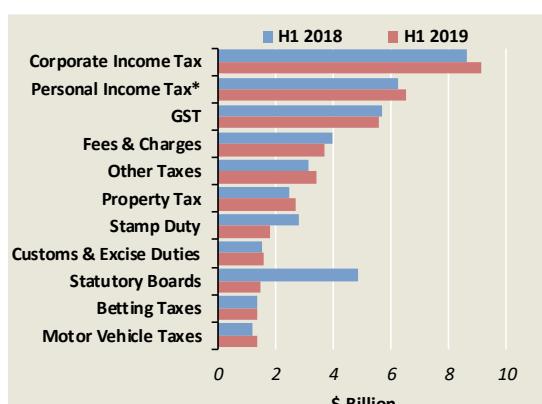
Operating revenues fell to \$39.0 billion (15.9% of GDP) in H1 2019, from \$42.3 billion (17.5% of GDP) in H1 2018. This was mainly due to a decrease in the Statutory Boards' contributions, following an exceptional contribution from MAS in 2018.³ (Chart 4.13) Revenues

**Chart 4.12
Fiscal Impulse Measure**



Source: EPG, MAS estimates

**Chart 4.13
Selected Components of Operating Revenue**



* Includes withholding tax.

³ The FY2017 contribution from MAS that was paid to the Government in Q1 2018 was based on MAS' actual net profit for FY2016. The return on MAS' investment of the official reserves turned out to be higher than projected, as global equity and bond markets rallied in the second half of FY2016.

from stamp duty and fees & charges also declined in the first half of this year due to the moderation in property transaction volumes and COE premiums, respectively.

In comparison, corporate and personal income tax collections increased by a total of \$0.8 billion to \$15.7 billion in H1 2019 on the back of sustained economic expansion and firm wage growth in 2018.

Both operating and development expenditures saw a step-up.

Total government expenditure rose to \$40.4 billion (16.4% of GDP) in H1 2019, from \$38.8 billion (16.1% of GDP) in H1 2018, on account of increases in both operating and development expenditure.

Operating expenditure increased by \$0.9 billion to \$29.6 billion (12.1% of GDP) in H1 2019. The higher outlay was partly due to increased spending on higher education. (Chart 4.14)

Development expenditure amounted to \$10.7 billion (4.4% of GDP) in H1 2019, up from \$10.1 billion a year ago. To strengthen Singapore's public transport connectivity and reliability, the Ministry of Transport (MOT) increased its spending, especially on domestic rail projects. Development expenses by MOT rose by \$1.1 billion to \$5.4 billion in the first half of 2019. (Chart 4.15) In comparison, there was a decline in development outlays by the Ministry of National Development (MND), the Ministry of Trade & Industry (MTI), and the Ministry of Health (MOH). MND spent less, in line with the progress made on public housing upgrading programmes, while MTI's disbursements to the Economic Development Assistance Scheme were smaller. Meanwhile, the decrease in MOH's development expenditure reflected the lumpy nature of expenses related to infrastructure projects such as the Woodlands Health Campus.

The government's primary and basic budget balances slipped into deficit.

Alongside a fall in operating revenue and an increase in total expenditure, the government recorded a primary budget deficit of \$1.4 billion in H1 2019, compared to a surplus of \$3.5 billion in H1 2018.

Special transfers, excluding top-ups to endowment and trust funds, fell from \$1.3 billion to \$0.8 billion over the same period. The decline was due in part to the

Chart 4.14
Selected Components of Operating Expenditure

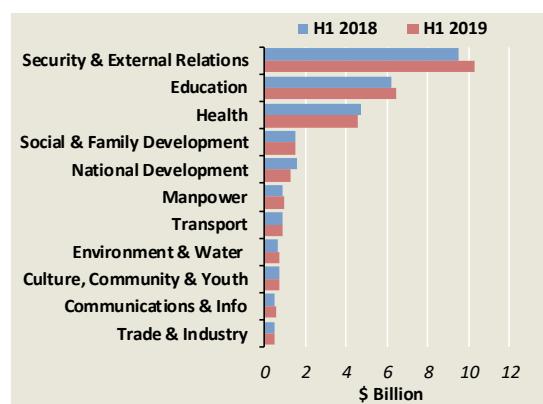
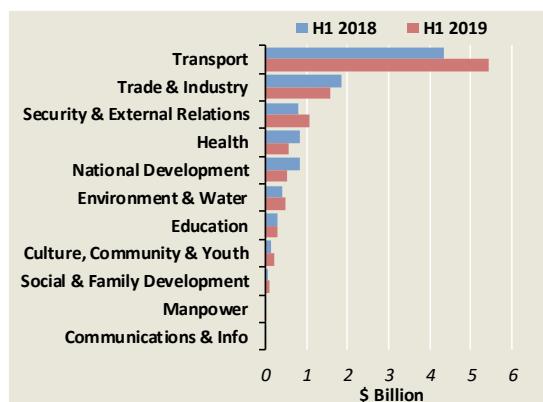


Chart 4.15
Selected Components of Development Expenditure



expiration of the Temporary Employment Credit and Productivity Innovation Credit schemes, as well as lower payments to workers under the Wage Credit Scheme.

On the whole, the government's basic balance, which is the primary balance less special transfers (excluding top-ups to endowment and trust funds) shifted from a surplus of \$2.2 billion in H1 2018, to a deficit of \$2.2 billion in H1 2019.

Box C
Review of MAS Money Market Operations in FY2018/19^{1/}

Money market operations in Singapore are undertaken to manage liquidity within the banking system, and are distinct from the implementation of exchange rate policy. This Box reviews MAS' money market operations in FY2018/19.

The conduct of money market operations is briefly explained in the context of Singapore's exchange rate policy framework. This is followed by a review of banks' demand for cash balances, the behaviour of autonomous money market factors, and the composition of money market operations carried out during this period.

Money Market Operations in Singapore

The open-economy trilemma posits that a country that maintains an open capital account cannot simultaneously manage its exchange rate and domestic interest rates. Given Singapore's open capital account and exchange rate-centred monetary policy, domestic interest rates and money supply are necessarily endogenous. MAS' money market operations are thus not targeted at any level of interest rate or money supply. Instead, they are aimed at ensuring that there is sufficient liquidity in the banking system to meet banks' demand for reserve and settlement balances, and to mitigate sharp interest rate volatility.

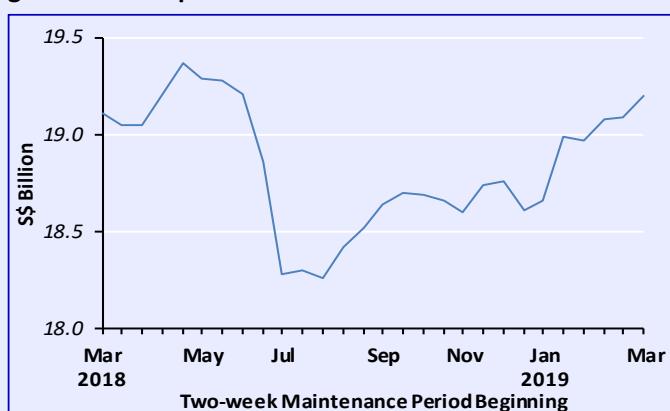
Money market operations are conducted daily by the Monetary & Domestic Markets Management Department (MDD) at MAS. The amount of liquidity required in the banking system is estimated from the banking sector's demand for funds and the net liquidity impact of autonomous money market factors. After carrying out money market transactions, MDD monitors market and liquidity conditions throughout the day.

Banks' Demand for Cash Balances

Banks in Singapore hold cash balances with MAS to meet reserve requirements and settlement needs. They are required to maintain with MAS a Minimum Cash Balance (MCB) equivalent to 3% of their liabilities base on a two-week average basis. This forms a base demand for cash balances. The total demand for reserve balances could vary across periods as banks hold excess cash balances to make large payments (settlement purposes), or as high-quality liquid assets (regulatory purposes).

In FY2018/19, banks' demand for balances to meet reserve requirements was relatively stable in line with a broadly unchanged liabilities base. (Chart C1)

Chart C1
Average Reserve Requirements over Two-week Maintenance Periods

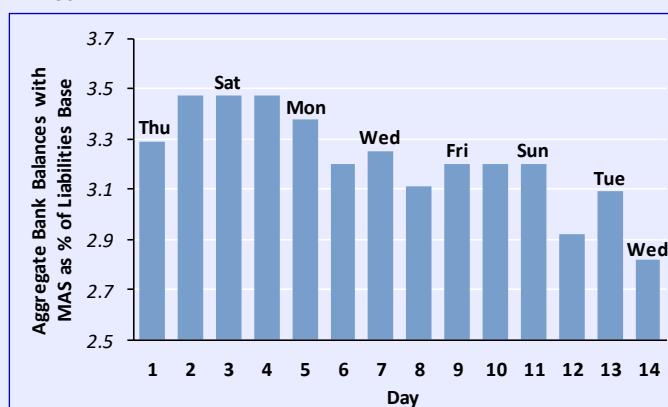


^{1/} This Box was contributed by the Monetary & Domestic Markets Management Department of MAS. More information on MAS' money market operations is available in the monograph "Monetary Policy Operations in Singapore" published on the MAS website.

Although banks are required to keep an average MCB ratio of 3% over the two-week maintenance period, their daily effective MCB ratios may fluctuate between 2% and 4% of their liabilities base. This provides them with more flexibility in their liquidity management, which may lead to day-to-day variations in banks' demand for cash balances within each maintenance period.

Chart C2 shows the daily effective cash balances within an average maintenance period in FY2018/19. Banks tend to hold higher cash balances during the start of a maintenance period to avoid being caught short of cash towards the end of the period. Upon meeting the average MCB ratio of 3%, banks will deposit their excess cash with the MAS Standing Facility towards the end of the maintenance period to earn interest as MAS does not pay any interest on the cash balances. Hence, the daily cash balances required by the banking system during the last few days of a maintenance period are usually lower.

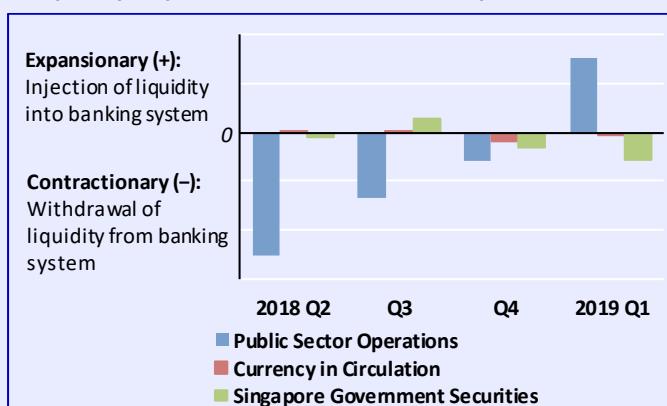
Chart C2
Daily Effective Cash Balances as % of Liabilities Base over a Typical Two-week Maintenance Period in FY2018/19



Money Market Factors

Chart C3 shows the liquidity impact of autonomous money market factors, which comprise: (i) public sector operations; (ii) currency in circulation; and (iii) Singapore Government Securities (SGS) and Treasury Bills (T-bills) issuance, redemption and coupon payments, over FY2018/19. Public sector operations comprise the Government's and CPF Board's net transfers of funds between their accounts with MAS and their deposits with commercial banks. In FY2018/19, the liquidity impact of the autonomous money market factors was net contractionary, largely due to the withdrawal of funds through public sector operations.

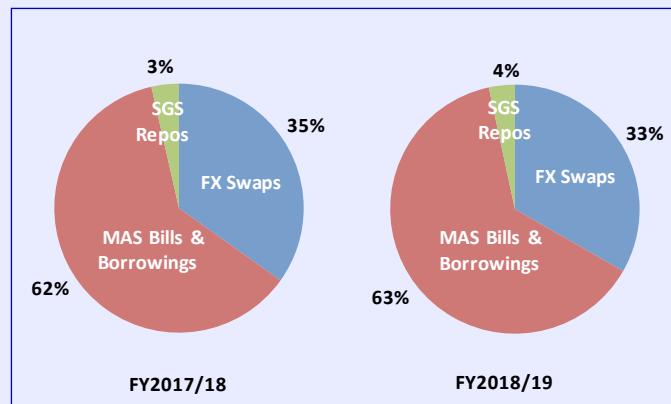
Chart C3
Liquidity Impact of Autonomous Money Market Factors



Composition of Money Market Operations

MAS relies on four money market instruments to manage liquidity in the banking system, namely: (i) FX swaps; (ii) SGS repos; (iii) clean borrowings; and (iv) MAS Bills. The composition of money market operations was largely stable between FY2017/18 and FY2018/19, with MAS Bills and clean borrowings contributing the largest share. (Chart C4)

Chart C4
Composition of Money Market Operations by Instrument



Special Features

Special Feature A

Asian Monetary Policy Forum 2019¹

Introduction

The 6th Asian Monetary Policy Forum (AMPF) was held on 31 May 2019 in Singapore. As in past years, it was convened under the auspices of the Asian Bureau of Finance and Economic Research (ABFER), and co-organised by the University of Chicago Booth School of Business, the National University of Singapore (NUS) Business School and the Monetary Authority of Singapore (MAS). The Forum brought together central bankers, academics and private sector analysts to share

perspectives on the current monetary policy challenges facing central banks, especially in Asia.

This year's deliberations revolved around several themes: (i) the challenges posed by a low interest rate environment for central banks and governments; (ii) the dominant role of the US dollar in the global economy and its implications for policymakers in Asia; and (iii) the policy issues arising from the advent of digital currencies.

Opening Remarks and Keynote Address

The MAS Deputy Managing Director and Chief Economist opened the AMPF 2019 with a review of the global economic conjuncture. He noted that the synchronised expansion of 2017–18 had waned and a significant step-down in activity had become apparent by late 2018, with the weakness persisting into Q1 2019. In a global environment characterised by a “tyranny of suspended risks”—including but not limited to unresolved trade tensions—business cycles appear to have shortened and the path of monetary policy normalisation has become more unpredictable.

Over the past five years, the Forum had engaged in international monetary and financial issues that came to the fore after the GFC, revolving around concerns with capital flows and domestic monetary policy autonomy. For instance, the commissioned paper at the inaugural AMPF in 2014, by Maurice Obstfeld, was on policy trilemmas and trade-offs, with the key takeaway being that globalisation places some limits on monetary policy autonomy, even with flexible

exchange rates (Obstfeld, 2014). Following this, Olivier Blanchard at AMPF 2016 concluded that, if constraints on fiscal policy are binding, and room for international policy coordination limited, then a judicious use of capital flow management measures can improve welfare (Blanchard, 2016). In 2017, Jeffrey Frankel argued that central banks can intervene effectively in foreign exchange markets to dampen fluctuations in the real exchange rate caused by external shocks by way of “systematic managed floating” (Frankel, 2017).

The authors of past AMPF commissioned papers have also devoted attention to financial market development in Asia: Barry Eichengreen at AMPF 2015 noted that governments can help develop the securities markets, especially bond markets, which would allow their economies to reap efficiency gains from cross-border market integration (Eichengreen, 2015). In 2018, Hyun Song Shin examined the changing circuitry of cross-border capital flows, including the build-up of vulnerabilities associated with the

¹ This article provides an overview of the AMPF 2019 discussions, based on the full documentation of proceedings by Chia Wai Mun, Associate Professor, Division of Economics, Nanyang Technological University (NTU). It has benefitted from comments and inputs by Professor Bernard Yeung, President of the Asian Bureau of Finance and Economic Research and Stephen Riady Distinguished Professor at the NUS Business School. The views in this article should not be attributed to MAS, NTU or NUS.

procyclicality of banks' balance sheets (Avdjiev *et al.*, 2018).

In his keynote address at this year's Forum, Philipp Hildebrand, Vice Chairman of BlackRock, shared his views on the challenges facing monetary policymakers in a low interest rate environment. First, central banks and governments currently may not have a robust framework to deal with the next recession. Doing "more of the same"—including unconventional monetary policies undertaken in the aftermath of the GFC—may not be sufficient, given that long-term interest rates are already very low or negative. Current policy proposals centred around price-level or inflation targeting would not be effective, as they continue to work via forward guidance, which has not lifted inflation rates.

Second, future countercyclical policy measures are likely to blur the distinction between monetary and fiscal policy. In a low interest rate and low inflation environment, a more

aggressive form of quantitative easing that works through directly channelling resources to real spending and investment may be required. "Helicopter money" is a possibility, but it would blur the line between monetary and fiscal policy and raise challenging questions about governance and central bank independence. Another option would be to address the current deficiency of aggregate demand through expansionary fiscal policy. This will not undermine debt sustainability as long as the interest rate is lower than the economy's growth rate. However, central banks might then be pressured to ensure that the interest rate stays low, resulting in financial repression.

Third, central banks cannot remain insulated from political influence. They have to pay more attention to the distributional impact of policy choices and explain their policies more clearly to the public. Such enhanced communications would be even more imperative if any form of helicopter money were to be contemplated.

AMPF Commissioned Paper

This year's commissioned paper by Pierre-Olivier Gourinchas (2019) from the University of California, Berkeley on "The Dollar Hegemon? Evidence and Implications for Policy Makers" explored the policy issues relating to the widespread use of the US dollar and its role as a global reserve currency. Gourinchas began by laying out a number of stylised facts concerning the international role of the US dollar.

First, from the real economy perspective, global trade is substantially invoiced in US dollars. The dollar's share as an invoicing currency is about 4.7 times the global share of US goods imports, and about 3.1 times its share of exports (Gopinath, 2015). Second, on the financial side, a significant portion of cross-border financial flows is denominated in dollars. For example, US dollar-denominated bank loans and debt securities issued by non-residents doubled as a share of global GDP from around 7% in 2000 to about 14% last year. Third, on the policy side, monetary authorities anchor their currencies to the dollar more than any other currency, and their holdings of international reserves are also largely in dollars.

The dominance of the dollar in invoicing and payments, in financing, and as an anchor currency is a mutually reinforcing phenomenon. This can be attributed to important complementarities between the different roles of the dollar as a unit of account, means of payment and store of value. From the real economy perspective, in a world of dollar pricing, a change in the exchange rate *vis-à-vis* the US dollar does not affect the relative prices of imports and exports. However, the price of the consumption basket of residents in local currency is affected. Central banks therefore focus on stabilising the consumption basket's price and aim to reduce volatility in the bilateral exchange rate. This in turn incentivises them to anchor local currencies to the dollar. Conversely, the more central banks anchor to the dollar, the more desirable it is for trade to be invoiced in the dollar. Further, if the private sector's cashflows are denominated in US dollars, borrowing will also be predominantly in dollars to limit the impact of currency fluctuations on firms' balance sheets.

According to standard producer currency pricing (PCP), exports are priced in exporters' currencies and, consequently, changes in bilateral exchange rates affect the relative prices of imports and exports. However, in practice, today's trade is often invoiced in a small number of dominant currencies such as the US dollar. This prevalence of US dollar invoicing has given rise to a new paradigm called dominant currency pricing (DCP), which leads to a number of policy implications.

First, local monetary authorities face a more adverse inflation-output trade-off under DCP than PCP. Under DCP, a nominal depreciation of the bilateral exchange rate between trading partners has no effect on the terms of trade, as it does not affect the home currency prices of either imports or exports, both of which are priced in dollars. Hence, changes in bilateral exchange rates lead to little expenditure switching, which can only take place through a change in the dollar exchange rate. However, a depreciation of the domestic currency against all currencies (including the US dollar) leads to an increase in the price of imports and consumer price inflation.

Second, US monetary policy has a larger impact on global growth and trade under DCP. Intuitively, US monetary policy matters more the larger the portion of trade invoiced in dollars. A contractionary US monetary policy appreciates the dollar, reduces US output and lowers US inflation. Under DCP, when the US dollar appreciates, the home currency prices of imports rise.

To counter the higher inflation, these countries' central banks will tighten monetary policy. If that happens, a contractionary monetary policy in the US triggers a larger reduction in global output and trade than that under PCP.

The third implication concerns the desirability of exchange rate flexibility within the context of the trilemma versus dilemma debate. According to the open economy trilemma, it is impossible for a central bank to have a fixed exchange rate, free capital mobility and an independent monetary policy simultaneously; the central bank has to forgo one of the three. However, an important contribution by Hélène Rey (2013) suggests that the existence of a global financial cycle in capital flows, asset prices and credit growth turns the

classical trilemma into a dilemma. When capital is freely mobile, the global financial cycle restricts monetary policy autonomy regardless of the exchange rate regime, reducing the desirability of flexible exchange rates.

However, Gourinchas argued that in an environment with financial spillovers, flexible exchange rates may become more, not less, desirable. His argument runs as follows. A US monetary tightening and the related dollar appreciation raises the financial burden of a dollar borrower outside of the US, and thus can have potentially contractionary effects in other countries. The impact on any economy will depend on the degree of financial spillovers and the response of local monetary authorities.

When spillovers are limited, a US monetary policy tightening is expansionary for a small open economy due to the latter's currency depreciation against the dollar and expenditure switching effects. However, when the degree of financial spillovers is higher, a US monetary tightening raises the financial burden on a small open economy. In this case, a parallel monetary tightening by the local monetary authority resulting in an appreciation of the domestic currency can relax the financial constraints on the dollar borrowers, thus moderating the contractionary effect. Thus, with greater financial spillovers, exchange rate flexibility is more desirable.

Finally, the dollar standard has implications for the stability of the international monetary and financial system. The present scarcity of safe assets is consistent with one of the main macroeconomic phenomena of the past few decades—the secular decline in global real interest rates since the early 1980s. The real safe return fell by about 6% points between 1980 and 2016, and is now close to zero, or negative. Importantly, the scarcity of safe assets mutates once the economy reaches the zero lower bound (ZLB) for interest rates. An acute scarcity of safe assets creates a situation similar to a liquidity trap, which is dubbed a "safety trap". At the ZLB, the scarcity can have adverse effects: since the equilibrium real interest rate cannot fall any further to equilibrate the market for safe assets, global output becomes the only adjustment variable. Aggregate demand falls below potential

output, and the global economy enters a recession.

In short, when markets cannot clear via prices, they will clear via changes in quantities. In this environment, countries will be tempted to depreciate their currency, and devaluations become “beggar-thy-neighbour” policies as countries gain output and employment only at the expense of others. As a result, currency wars and trade wars are more likely to break out. Any domestically-oriented policy such as fiscal austerity, reserve accumulation or stricter liquidity requirements in the banking sector, which are deemed appropriate at the country level, may be counter-productive globally as they would further increase the demand for safe assets.

In the short to medium term, the factors supporting the global dominance of the dollar are strong and there is little risk of it being displaced. However, in the long run, Gourinchas believes there is a greater chance that the dollar’s pre-eminent position will be eroded. This is because the US share of world output is declining and expected to fall further. According to projections by the IMF, the share of the US economy will fall from 15.5% of world GDP in 2016 to 13.7% in 2024. This decline implies that even though the

dollar hegemony is locally stable, it is not sustainable. The global economy will transit either to another anchor or to a multipolar environment. The most likely outcome is one where the dollar co-exists with one or two other international currencies.

During the discussion of Gourinchas’ paper, a distinction was made between the role of US Treasuries as safe assets and the fact that they are denominated in US dollars. Recent research has shown that it was US Treasuries’ liquidity that led to the violation of uncovered interest rate parity, i.e., it was the greater-than-anticipated demand for US Treasuries that drove the US dollar appreciation (Jiang *et al.*, 2018).

Moreover, foreign demand for a country’s government-issued securities depends on a number of factors, including capital market size, level of economic development and financial openness, and not just on reserve currency status. As governance and institutional standards in emerging economies have improved, monetary policy frameworks strengthened and inflation brought under control, many emerging economy borrowers are now able to issue debt to foreigners in their own domestic currencies, in contrast to the situation a decade or two ago.

Policy Note

The final section of the Forum, the Policy Note, was devoted to the challenges posed by digital currencies to central banks and the existing banking system.² The two presenters were Darrell Duffie from Stanford University and Beatrice Weder di Mauro, President of the Centre for Economic Policy Research (CEPR), and Distinguished Fellow at INSEAD Emerging Market Institute, Singapore. The presenters drew attention to the implications for monetary policy transmission and financial stability resulting from technological advances that have led to a decline in the use of cash, the rise of digital payments, and the creation of private digital currencies.

The advent of digital currencies has opened up opportunities for considerable efficiency gains in global payment systems, particularly in cross-border transactions. Traditionally, banks formed the backbone of payment systems. However, the declining use of cash and rise in electronic payments pose a threat to the traditional payment model. Concurrently, technology has allowed the issuance of multiple private digital currencies. Such currencies not only threaten central banks’ monopoly on currency issuance, but could also be a means for money laundering, illegal transactions and tax evasion. In a decentralised system, monetary authorities will not have the information to regulate these

² Please see also Special Feature A in the April 2019 issue of the *Macroeconomic Review* on the Digital Currency Economics and Policy Workshop jointly organised by ABFER, NUS Business School and MAS in November 2018.

activities which society collectively deems undesirable.

In response to these developments, central banks could consider introducing central bank digital currencies (CBDCs), which would enjoy greater public trust and have a distinct advantage over private digital currencies. In the case of a general CBDC, central banks can provide an account to all residents and transactions would be recorded as changes to individual accounts. Alternatively, residents could receive tokens of cryptocurrencies with a stable value tied to major fiat currencies (such as the US dollar). Payments with tokens would be backed by bank deposits and banks would maintain their key role in handling transactions.

“Wholesale” CBDCs offer a more limited approach whereby tokens are issued only for wholesale purposes, for example in interbank money markets. In a 2018 survey of 80 central banks, 69% said they were, or will soon be, conducting work related to CBDCs.³

The establishment of a CBDC will lead to major changes in the effectiveness of monetary policy. First, moving from fiat money to a CBDC will expand central banks’ policy room, in the sense that monetary policy can easily go beyond the ZLB; that is, negative interest rate policy may become more effective when cash is eliminated. Alternatively, if fast payment systems are introduced and combined with open banking (i.e., the use of open source application program interfaces (API) in banking), then monetary policy transmission will be much more immediate—when the central bank raises the policy rate, deposit rates will adjust very quickly; otherwise, consumers will move their deposits to a bank that offers a higher return. This will lead to an increase in the pass-through from the policy rate to market rates. While this will be beneficial to central

banks, traditional commercial bank models could be disrupted.

There are also financial stability concerns with the introduction of a CBDC. Since virtually all deposits will be kept with the central bank, its balance sheet will be much larger than it is today. Moreover, CBDC transactions processed by central banks will eliminate financial institutions’ payment intermediation role. With CBDC accounts, banks will have to offer competitive savings deposit rates benchmarked tightly to CBDC deposit returns. This could lower the profitability of banks and weaken their financial position, forcing them to take fewer risks. Given the interconnected nature of credit creation, significant stress in some banks could have large adverse spillovers onto other banks and threaten the banking system as a whole. Accordingly, there may be a need for increased liquidity coverage requirements or other ways to protect the weaker banks and strengthen their financial position. There could also be unforeseen operational risks if central banks were to run an entirely new payment system.

Regardless of whether central banks adopt CBDCs, existing payment systems are likely to be superseded by faster alternatives. Currently, payment rails operate in most countries during business hours on a five-days-a-week basis. However, a number of countries such as Korea have introduced fast payment systems that run around the clock. By using cryptocurrencies and open source APIs, the next generation of payment systems will be an improvement over current fast payment systems in Asia, Europe and the US, including in cross-border payments.⁴ Technology platforms in China such as Alibaba’s Alipay and Tencent’s WeChat have already dramatically changed the country’s payment system. Firms in other countries may do the same. An efficient and convenient payment

³ This figure was from a survey conducted by the BIS Committee on Payments and Market Infrastructure (CPMI) referenced in the welcome remarks by Benoît Cœuré, Chair of the CPMI, at the Economics of Payments IX Conference on 15 November 2018.

⁴ When an individual wants to make a payment, he or she will use the API to make a cryptocurrency transfer. The payment is effected instantly using two ledgers—one for the individual to transfer the funds out of his or her bank account ledger and the other for the bank to move the funds across the interbank ledger. While this may appear to be just a traditional money transfer within or across borders, technological advancement gives everyone with a smartphone easy access to the system.

system expands depositors' freedom of choice and raises the competition for deposits.

In sum, substantial financial changes are expected to take place in the next ten years in the developed markets. Fast payment systems will be the norm, whether payments are processed through banks' payment rails, a CBDC or a private stablecoin. The payment systems that are most likely to prevail are those which continue to utilise current bank payment rails, but operate with faster and more efficient technology. Irrespective of how this will transpire, traditional bank

models will be disrupted on both the payment and deposit sides. On their part, central banks will encourage the development of fast payment systems that are safe and effective, while ensuring financial stability and keeping operational risks to a minimum. If this outcome is not assured, then it is likely that they will step in and issue their own CBDCs.

Conclusion

The juxtaposition of a slowdown in the global economy, rising protectionism and a potential fragmentation of the international monetary system pose significant risks to global economic and trade activity over the medium term. Meanwhile, with policy rates constrained by the ZLB, some have argued that future countercyclical policy measures would increasingly blur the distinction between monetary policy and fiscal policy, posing risks to central bank independence.

At the same time, recent research highlighting the international dominance of the US dollar across the trade, financial and monetary spheres holds significant implications for monetary policy. Dominant currency pricing suggests that changes in the exchange rate will have asymmetrical effects on inflation and exports in many

economies. In addition, policymakers may have to contend with the financial channel of exchange rate movements, further complicating the calibration of monetary and exchange rate policies in response to shifts in capital flows.

Over the longer term, while the adoption of digital currencies could enhance payment efficiency and overcome the ZLB constraint, it could also raise financial stability risks. Central banks would need to be well-prepared to meet the challenges of operating in these unchartered waters. These issues and challenges will remain into the foreseeable future. While the discussions at AMPF 2019 did not arrive at definitive conclusions, the engaging debates and lively exchange of views gave policymakers much to ponder and explore at future AMPFs.

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Special Feature B

Mind the Gaps! Output Gaps for Monetary Policy and Financial Stability Assessments

by Douglas Laxton¹

Introduction

It is critical to make a clear distinction between the concepts of output gaps that are relevant for monetary policy and those measures that are relevant for analysing financial stability. The policy relevance of this distinction is closely related to the “leaning against the wind” (LAW) debate, which has been at the fore in recent years. The proponents of LAW argue that monetary policy should also focus on financial stability objectives, and specifically, should systematically react to the financial cycle by raising interest rates to discourage excessive credit expansions. The antagonists argue that the costs of low inflation and depressed output exceed the potential benefits of trying to rely upon higher interest rates to reduce the probability of financial crises.

The first measure of the output gap we consider is the standard Okun’s measure that is used by inflation forecast-targeting central banks to communicate how they are managing the short-run output-inflation trade-off.² The second measure is the output gap relevant for assessing financial stability, based on a simple atheoretical model that incorporates information on the growth rates of real credit and real property prices. See Chart 1 for a comparison of the two measures for the US.

The monetary policy output gap is constructed from a small Monetary Policy Model (MPMOD) that includes a Phillips curve; a dynamic Okun’s law equation; a monetary policy reaction function; a term-structure equation; and an equation that links the economy-wide output gap to measures of capacity utilisation in the manufacturing sector. The exact model specification is based on a simplified version of a model presented in Aliche *et al.* (2018).

To construct the measures of output gaps for assessing financial stability, we specify a simple atheoretical model that includes a cyclical and trend decomposition for output. Specifically, we use information on real credit growth and real property price growth to help measure the lower-frequency cyclical component in US GDP. We refer to this simple atheoretical model as the Financial Cycle Model (FCMOD). For clarity, the underlying output measure in FCMOD will be referred to as “trend output” to distinguish it from the concept of potential output, which is based on the notion of imbalances between aggregate demand and supply in the goods market. We emphasise that FCMOD is an atheoretical model, as there is no accepted theory to support a structural link between deviations of aggregate demand and supply in the goods market and growth in these two financial variables.

¹ Douglas Laxton is an Adjunct Professor at the NOVA School of Business and Economics in Portugal and Director of Saddle Point Research. He was formerly Division Chief of the Economic Modeling Division in the IMF’s Research Department. Douglas Laxton visited MAS in July 2019 as a consultant to EPG, MAS. This Special Feature is based on Laxton *et al.* (2019) and the views in it are solely those of the author and should not be attributed to MAS. The author thanks the Rockefeller Project for financing some of the development of the models described.

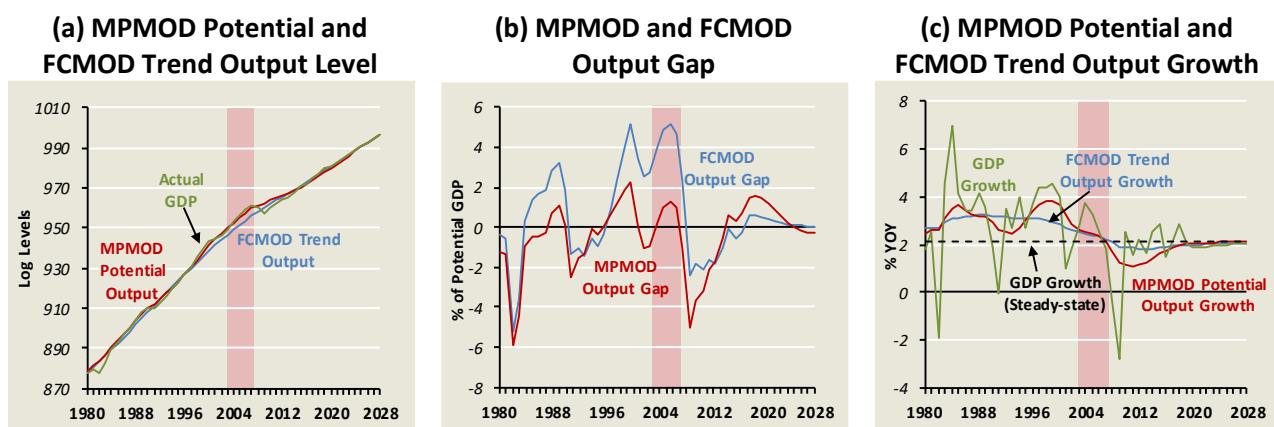
² See Clinton *et al.* (2015) and Adrian, Laxton and Obstfeld (2018).

While the cyclical component of GDP from FCMOD is correlated with conventional measures of the output gap, the FCMOD output gaps covering the boom phase of the financial cycle before the GFC (shaded areas in Chart 1) were over double the size of the measures of the output gaps that are useful for conventional monetary policy analysis. This is consistent with the observation that large financial imbalances were building up before the GFC that were financing a bubble in real estate prices but with little underlying inflation pressure in core markets for goods and services.³

In addition to the importance for monetary and macroprudential policies, trend output has

important implications for fiscal policy. Information about the sustainable or trend level of output is important to obtain measures of the sustainable tax base over the medium term, a key input for fiscal policy. While not presented here, the working paper by Laxton *et al.* (2019) provides a methodology to incorporate projections of trend output during the boom phase of a financial cycle (constructed from FCMOD) into medium-term projections of potential output from MPMOD. In other words, during the boom phase of the financial cycle, this modelling framework would indicate that the longer-term sustainable tax base is smaller than what would be suggested by standard contemporaneous measures of potential output.

Chart 1
MPMOD and FCMOD Output Gaps for the US



Source: US Bureau of Economic Analysis and authors' estimates

Historical Narrative for the United States

Charts 1 and 2 provide a summary of the MPMOD results over the historical period from 1980 to 2018 for the US, as well as the model's projected paths to 2028. These projections are not realistic forecasts, but are presented simply to show the convergence to the steady state; a professional forecast would obviously use much more information than the list of variables considered in the model.

To provide a historical narrative, it is useful to divide the sample into three time periods. The first period (1980–1995) is characterised by

disinflation and the anchoring of long-term inflation expectations to around 2%. The second period (1996–2007) is characterised by anchored long-term inflation expectations and a large reduction in the variability of the output gap and inflation. Finally, the third period (2008–2018) includes the GFC and a prolonged period of economic slack, when conventional and unconventional policies were deployed very aggressively to support the economy and prevent long-term inflation expectations from ratcheting downwards.

³ Inflation in the US picked up before the GFC, but that was primarily due to high commodity prices. It is also important to note that when a financial cycle results in a large increase in investment in residential construction, this produces a flow of housing services that is measured as output in the national accounts.

Period I: Anchoring Long-term Inflation Expectations (1980–1995)

The sample starts with the Volcker disinflation in the early 1980s. Facing double-digit inflation, the Federal Reserve increased and kept short-term interest rates high enough to generate sufficient economic slack to reduce inflation and anchor long-term inflation expectations. The output and unemployment costs of reducing inflation were substantial; the output gap went below -5% of potential output and unemployment peaked at around 10%. The cumulative output gap from 1980 to 1987 was -14.9%. With inflation declining from 12.7% in 1980 to 3.5% in 1985, this was consistent with a sacrifice ratio of 1.6⁴, a number that is broadly in line with other studies that focus on that particular period. As a result, inflation gradually fell to around 3% in the mid-1980s. (Chart 2)

After inflation bottomed out in 1985, in parallel with the recovering output gap and declining unemployment, inflation started to pick up, rising to about 5% in 1990. This was partly a result of an aggressive policy response to the 1987 stock market crash, which entailed massive liquidity injections. These inflationary forces then required another disinflationary episode, where inflation was brought down to 3% by 1992. Long-term inflation expectations declined only gradually, as the build-up of confidence that inflation would remain low took time. Indeed, the MPMOD estimates suggest that the decline in long-term bond yields was a result of lower levels of both inflation expectations and inflation uncertainty. This is reflected in a gradual decline in the term premium and the expected path of short-term interest rates.

Period II: The Great Moderation (1996–2007)

This is a period with much lower output and inflation variability. MPMOD's estimates show a dramatic reduction in the variability of both gaps. Indeed, the standard deviation of the output gap

fell from 1.8% in the period 1980–1995 to 1.0% in 1996–2007. All other measures of macroeconomic variability in MPMOD were very low in this period including GDP growth, CPI inflation, unemployment, short-term and long-term interest rates.

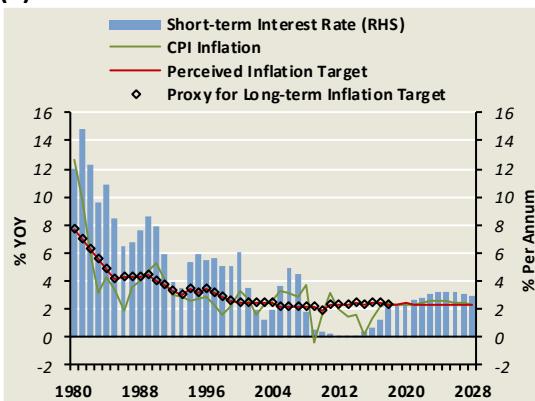
Period III: The Global Financial Crisis and Fighting Economic Slack (2008–2018)

The GFC erupted after the failure of Lehman Brothers on September 15, 2008. It resulted in a massive contraction in output followed by persistent economic slack and high unemployment. The cumulative size of the output gap was similar in magnitude to the Volcker disinflation, but this masked the large downward level adjustments to potential output growth. These large downward adjustments in potential growth were to a large extent associated with excessively optimistic expectations about sustainable output growth before the crisis, the underpricing of risks and a large bubble in property prices. After a large coordinated fiscal expansion in 2009 and 2010 by the G20 countries, the Federal Reserve was left with the primary responsibility of fighting economic slack with unconventional monetary policies. The large expansion of the Federal Reserve's balance sheet and unconventional forward guidance resulted in a dramatic reduction in term premia on long-term bonds and expectations that short-term interest rates will stay low for many years. The Federal Reserve was eventually successful in eliminating the large economic slack and reducing unemployment to low levels. Inflation gradually increased to numbers that are consistent with its 2% inflation target.

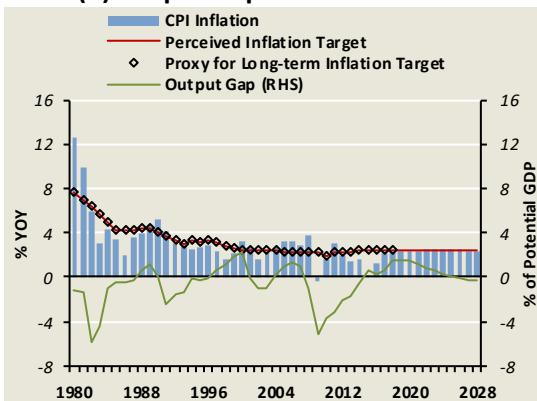
⁴ Calculated as 14.9/(12.7–3.5).

Chart 2
MPMOD Detailed Results

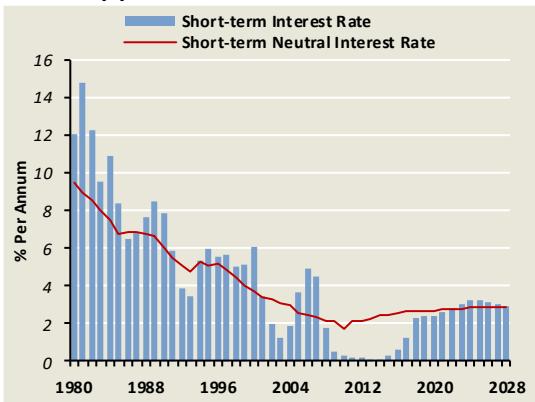
(a) Short-term Interest Rate and CPI Inflation



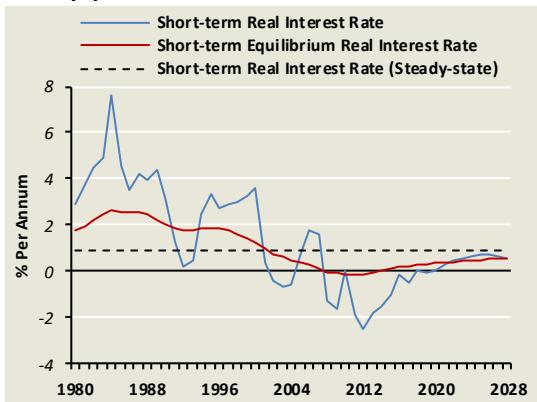
(b) Output Gap and CPI Inflation



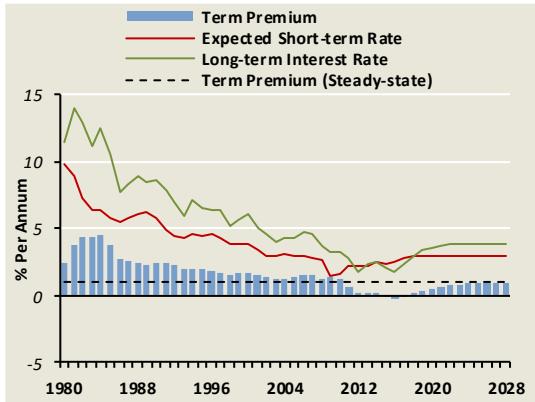
(c) Short-term Interest Rates



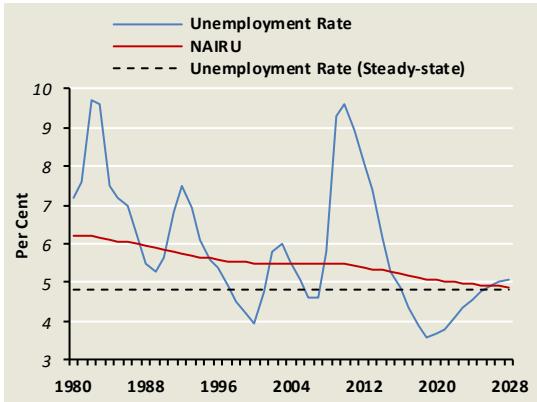
(d) Short-term Real Interest Rates



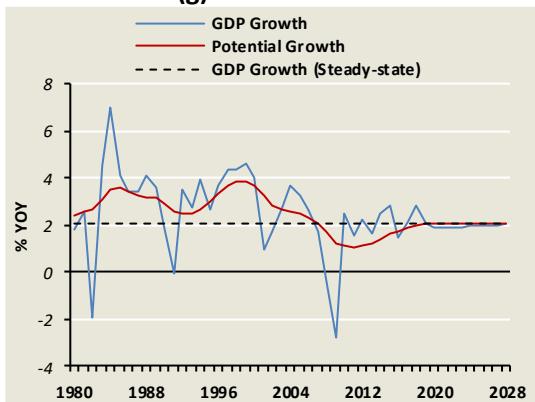
(e) Long-term Interest Rate, Expected Short-term Interest Rate and Term Premium



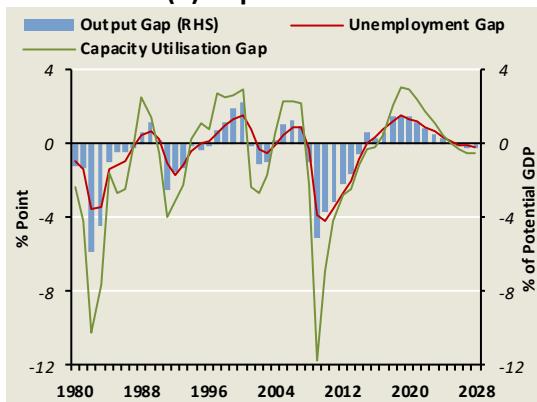
(f) Unemployment



(g) GDP Growth



(h) Gap Estimates



Source: US Bureau of Economic Analysis, US Bureau of Labor Statistics, Federal Reserve System and authors' estimates

A Simple Athetheoretical Model of the Financial Cycle (FCMOD)

We now describe the simple atheoretical model used to create measures of the financial cycle and trend GDP. This work builds on Borio, Disyatat and Juselius (2014), henceforth referred to as BDJ (2014), in the sense that it uses the same BIS measures of real credit and property prices.⁵ The concept of trend output that BDJ (2014) used is based on a simple notion of sustainability and lower-frequency financial cycles. While understanding the causes of lower-frequency cycles in the economy is obviously important for thinking about where potential output is converging to over the medium and long term, it is not sufficient for thinking about output gaps that are useful for managing the short-run output-inflation trade-off. The concept of the output gap dates back to Okun (1962) and is based on balancing aggregate demand and supply in the goods market and labour market.⁶

It is important to emphasise that we should not expect a simple one-way causal relationship between these two financial variables (credit and property prices) and the difference between aggregate demand and supply. Indeed, in structural models, shocks to credit supply will cause both aggregate demand and supply to increase and typically put upward pressure on property prices. In addition, positive shocks to potential growth that are extrapolated into the future will drive property prices up, but may result in aggregate demand and supply increasing roughly together, resulting in little inflationary pressures in the goods market. This is why we will be careful and refer to FCMOD explicitly as an atheoretical model and not a model of potential output.

Getting the concepts down correctly is critical if central banks and other policymaking institutions are going to use such measures for policymaking.

The empirical literature suggests that the best two variables for estimating the probability of a financial crisis are real growth rates in credit and property prices.⁷ We will not be estimating probabilities, but instead will be focusing on developing simple models of trend GDP and the financial cycle as well as forecasts of actual GDP that gradually converge to these trends over the medium and longer term. In Laxton *et al.* (2019), we show how it is straightforward to impose information about these trends on the forecasts of potential output from MPMOD.

The three observable variables of the model require data on GDP, and the growth rates of credit and house prices. Unlike BDJ (2014), we will not be estimating all of the model's parameters. The reason for this is simply that the sample is too short to do meaningful estimation and statistical inference. For example, BDJ (2014) have to impose strong priors on the parameter on the lagged output gap in the output gap equation. The unrestricted likelihood function clearly wanted high values for this parameter which BDJ (2014) constrained to be a maximum of 0.95. Our basic research strategy is to write down very simple models that are motivated by large-sample multi-country empirical evidence on financial cycles, develop experience using these models in real time and then eventually implement a pooled cross-country estimation process.

⁵ The difference is that we will use BIS annual data for property prices and credit to the non-financial sector while Borio, Disyatat and Juselius (2014) used quarterly BIS data.

⁶ In an earlier paper that maps out the proposed empirical methodology, Borio, Disyatat and Juselius (2013) argue that inflation should not be used to help measure the output gap because there is no tight simple relationship between the output gap and inflation. Interestingly, the more successful central banks are at managing the short-run output-inflation trade-off and eliminating the positive correlation between the output gap and inflation, the more difficult it will be to find evidence that simple Phillips curves exist. Successful central banks have learned to deal with this uncertainty as well as other forms of uncertainty in the monetary transmission mechanism.

⁷ For a discussion of this empirical literature and structural models of the financial cycle that feature endogenous money creation, see Benes, Laxton and Kumhof (2014a, b) and Benes, Laxton and Mongardini (2016).

Chart 1 depicts the FCMOD estimates of the output gap and trend output growth based on the sample period 1980–2018. The output gap estimate serves as a measure indicating the position of the economy through the financial cycle. It can be observed that the FCMOD output gap shows more prolonged cycles with higher volatility compared to its MPMOD counterpart. This comes as no surprise taking into account the stylised fact that financial cycles last longer than typical business cycles. In addition, financial variables incorporated into the FCMOD output gap contribute to its more prolonged build-ups and sharp drops.

Corresponding to the more volatile output gap, the FCMOD trend output growth rate is much smoother compared to its MPMOD counterpart. By definition, the FCMOD trend output is neutral to the cyclical fluctuations in the financial system. As Borio, Disyatat and Juselius (2013) argue, the main distinctive feature of finance-neutral trend output is sustainability. Even when output is at its non-inflationary path (which is captured in MPMOD as potential output), it might still be unsustainable if financial imbalances are building up.

Some Concluding Thoughts

This Special Feature argues that the relevant output gap for monetary policy is conceptually and quantitatively much different from the financial cycle. Indeed, failure to make this important distinction could lead to misguided policies where central banks allow long-term inflation expectations to ratchet downwards. In situations where monetary policy is constrained by the effective lower bound on interest rates, it is critical that fiscal policy be prepared to support the economy to prevent it from falling into a low-inflation trap.

Interestingly, in cases where monetary and fiscal policies are well-coordinated and comprehensive, this will be consistent with more favourable growth, inflation and debt dynamics. This will be the case for example in economies where policymakers are successful in delivering inflation rates that are, on average, close to their targets. Effectively, systematic negative deviations from the target results in lower cumulative nominal GDP growth, which puts upward pressure on the government debt-to-GDP ratio.

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Special Feature C

Upgrading and Inflation Expectations in Singapore: A Survey Experiment

by Sumit Agarwal, Yeow Hwee Chua and Changcheng Song¹

Introduction

Inflation expectations of households are crucial for the analysis of business cycles and formulation of monetary policy. The central questions are how expectations are formed, their magnitude, and whether they are adaptive or sensitive to policy changes. To obtain a better understanding of the pass-through of inflation expectations to wage and price setting, it is essential to address the first question on the formation of inflation expectations. However, there is no consensus in the empirical literature on how households' inflation expectations are formed (Bernanke, 2007; Bachmann *et al.*, 2015 and Coibion *et al.*, 2018).

One strand of the literature focuses on consumers' personal experiences as a key driver of their inflation expectations. Malmendier and Nagel (2016) showed that individuals adapt their forecasts to new data but inflation realised during their lifetimes has a large influence on their decision-making. Individual consumer shopping experiences have also been shown to play an important role in influencing inflation

expectations. Using survey experiments, Cavallo *et al.* (2017) showed that shoppers tend to assign heavier weights to goods that they have recently purchased. In studying the drivers of inflation expectations among firms in New Zealand, Kumar *et al.* (2015) found that managers in New Zealand rely on their personal shopping experience, and not the inflation targets of the Reserve Bank of New Zealand.

Indeed, it is plausible that changes in goods purchased by households could influence the prices they pay and, ultimately, inflation expectations. To our understanding, shifts in inflation expectations due to the changing composition of goods purchased by households is largely unexplored. Lifestyle changes, together with economic growth over the past decades, have influenced consumer choice. Items that were not previously available (such as smartphones) are now considered necessities for many households. As standards of living increase for the median household, inflation expectations will change accordingly.

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As observed by Singapore's Prime Minister Lee Hsien Loong, "*Things that were considered luxury items or did not even exist before ... have now become everyday necessities ... Our standards of living have gone up ... to sustain this higher quality of life, people are spending more than before, and this can put pressure on households.*"²

Survey Experiment

Modelled after the *Survey of Consumer Expectations* conducted by the New York Federal Reserve, we ran a personal interview survey with surveyors asking questions about households' inflation expectations in different parts of Singapore via a street-intercept survey. We also obtain information on their demographics, as well as perception of financial well-being. Each respondent was given \$20 to complete the survey.

Within the survey, we embedded a randomised control trial (RCT). Our experimental framework follows several studies such as Bruin *et al.* (2011), Armantier *et al.* (2015) and Cavallo *et al.* (2017). We first elicit subjects' inflation expectations for the next 12 months. We then provide subjects with information related to different treatment goods before eliciting their inflation expectations again.

For this survey, we randomly assign respondents to three treatment arms. Information about the treatment arms are provided in Table 1. We introduce prices of two well-known ice-cream brands, Walls and Häagen-Dazs, which most Singaporeans can relate to. While Walls caters to the mass market, Häagen-Dazs positions itself as a premium brand. In 2009, 1.5 litres of Walls Neapolitan ice-cream cost \$5, while 1 pint (0.473 litres) of Häagen-Dazs Strawberry ice-cream cost \$11.90. The prices of both brands of ice-cream increased by approximately 20% between 2009 and 2019 to \$6 and \$14.45 respectively. Since Walls and Häagen-Dazs ice-cream can be considered a normal good and luxury good, respectively, we sought to see how the subjects update their inflation expectations

Consequently, this study seeks to shed light on an additional channel of inflation expectations formation in the Singapore economy: as households are exposed to better quality products, their expectations about overall inflation may be biased upwards. We term this the "upgrading channel".

given price information about these different types of goods.

Survey respondents in the three groups were given different information about ice-cream prices in 2009, and in 2019. For Treatment 1, they were given prices of Walls in 2009 and 2019. For Treatment 2, they were given prices of Walls in 2009 and Häagen-Dazs in 2019. For Treatment 3, they were given prices of Walls in 2009 and 2019, as well as Häagen-Dazs in 2019.

The experimental design is centred on how households react to different information about price changes. We test for the presence of the upgrading channel by examining whether households have higher inflation expectations when given only price information about better quality goods in 2019. As subjects in Treatment 2 were given only prices of Walls in 2009 and Häagen-Dazs in 2019, an increase in inflation expectations *vis-à-vis* subjects in Treatment 1 will suggest an upward bias on their inflation expectations when they are exposed to prices of the higher-quality good in 2019.

Unlike Treatment 1 and Treatment 2, Treatment 3 provides information about the prices of both Walls and Häagen-Dazs ice-cream in 2019. The latter gives respondents information on relative price differences for the same mass-market option over time, as well as relative price differences between the mass-market and luxury options in the current time period. In this case, we seek to examine whether providing current price information about lower-priced products will reduce the upward bias on inflation expectations from the upgrading channel.

² Excerpt from the English translation of the 2018 National Day Rally Speech by Prime Minister Lee Hsien Loong in Chinese (<https://www.pmo.gov.sg/Newsroom/national-day-rally-2018-speech-chinese>).

Table 1
Treatment Categories

Treatment 1			Treatment 2			Treatment 3		
Year	Products	Price	Year	Products	Price	Year	Products	Price
2009	Walls Neapolitan 1.5L	\$5	2009	Walls Neapolitan 1.5L	\$5	2009	Walls Neapolitan 1.5L	\$5
2019	Walls Neapolitan 1.5L	\$6	2019	Häagen-Dazs Strawberry Pint (0.473L)	\$14.45	2019	Walls Neapolitan 1.5L	\$6
						2019	Häagen-Dazs Strawberry Pint (0.473L)	\$14.45

To further quantify the extent to which the provision of current price information will de-bias households' inflation expectations, we introduce an upgrading parameter (α) which is the ratio of the difference in 12-month ahead inflation expectations between respondents in Treatment 3 and Treatment 1 to the difference between those in Treatment 2 and Treatment 1:

$$\alpha = \frac{E_t \pi_{t+12}^{T3} - E_t \pi_{t+12}^{T1}}{E_t \pi_{t+12}^{T2} - E_t \pi_{t+12}^{T1}}$$

The larger the value of α , the more emphasis is placed on the luxury good (Häagen-Dazs) in 2019, suggesting that the upgrading channel is stronger in influencing inflation expectations. Intuitively, α measures the weight that respondents place on the additional price information about the luxury good in forming inflation expectations. We note that α should lie between 0 to 1.

When α is equal to 0, it suggests that there is no difference between Treatment 3, where respondents know the price of Häagen-Dazs ice-cream in 2019, and Treatment 1, where they do not. In this case, the respondents in Treatment 3 form inflation expectations only using the information on price changes in Walls ice-cream from 2009 to 2019, ignoring the additional price information on Häagen-Dazs ice-cream in 2019. Conversely, α is equal to 1 when there is no difference between Treatment 3 and Treatment 2. In this case, the respondents in Treatment 3 form inflation expectations only using the additional price information on Häagen-Dazs ice-cream in 2019, and not the price changes in Walls ice-cream from 2009 to 2019. Hence, exposure to better quality products will influence inflation expectations completely, giving rise to the upgrading channel.

Results

Table 2 shows the summary statistics of the survey results. In all, we had 1,086 respondents across the three treatment groups. The demographic characteristics of the respondents provide a good representation of Singapore's population. The average age across all samples is around 38. 48% of the respondents are female, 45% are married, and 81% live in public housing (HDB). The average number of years of education is 13.22, and average household size is 3.92.

More importantly, as shown by the p -values of the Wald test of equal means in Table 2, our

random assignment of subjects does create balanced treatment and control groups in terms of demographics and inflation expectations. We present the pre-treatment and post-treatment inflation expectations of all the treatment groups in Charts 2a and 2b. While Treatment 1 led to a decline in inflation expectations relative to pre-treatment levels, Treatment 2 resulted in a rise in inflation expectations. The fall in inflation expectations of respondents in Treatment 3 is smaller than that in Treatment 1.

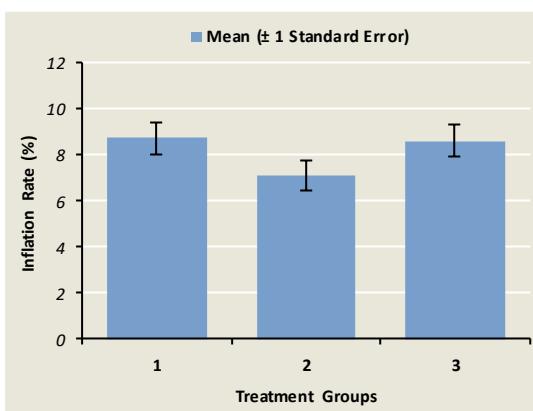
Table 2
Summary Statistics of Survey Results

	Total	T1	T2	T3	p-value
Panel A: Pre-treatment					
Age	38.61 (15.83)	38.46 (16.21)	38.26 (15.18)	39.02 (15.91)	0.80
Female (% of respondents)	0.48 (0.50)	0.50 (0.50)	0.46 (0.50)	0.46 (0.50)	0.49
Married (% of respondents)	0.45 (0.50)	0.44 (0.49)	0.45 (0.50)	0.46 (0.50)	0.83
Log Monthly Income	7.32 (1.41)	7.40 (1.13)	7.35 (1.43)	7.23 (1.61)	0.29
Stay in HDB (% of respondents)	0.81 (0.39)	0.83 (0.38)	0.81 (0.39)	0.80 (0.40)	0.92
Years of Education	13.22 (2.96)	13.00 (2.77)	13.44 (2.81)	13.30 (3.13)	0.10
Household Size	3.92 (1.50)	3.84 (1.37)	3.92 (1.54)	4.01 (1.45)	0.25
12-month Ahead Inflation Expectations (%)	8.15 (12.93)	8.75 (13.27)	7.11 (12.81)	8.61 (12.62)	0.17
Panel B: Post-treatment					
12-month Ahead Inflation Expectations (%)	7.28 (14.08)	6.11 (9.67)	9.17 (20.44)	6.56 (8.62)	0.03
Sample Size	1,086	378	366	342	-

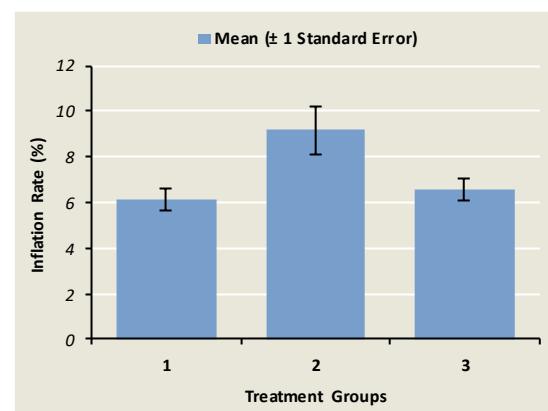
Note: This table presents the demographic characteristics, as well as pre- and post-treatment inflation expectations for each treatment group. *p*-values shown are for the Wald test of equal means across all treatment groups. Robust standard errors are reported in parentheses.

Chart 2
12-month Ahead Inflation Expectations

(a) Pre-treatment



(b) Post-treatment



More formally, we run an Ordinary Least Squares (OLS) regression of the change in inflation expectations on Treatment 2 and Treatment 3 relative to Treatment 1. Column 1 in Table 3 reports the results of the benchmark experiment. For subjects in Treatment 2, there is an increase in inflation expectations by 426 basis points relative to those in Treatment 1. Hence, there is evidence that exposure to prices of higher-priced goods over time, without retaining price information about lower-priced products, leads to higher inflation expectations. This suggests that

the displacement of lower-priced products by higher-priced products from the market biases inflation expectations upwards. Subjects in Treatment 3 experience an increase in inflation expectations of 39 basis points. However, the difference in inflation expectations relative to Treatment 1 is not statistically significant. Based on these results, the upgrading parameter α is computed to be 0.09, providing support for the presence of a small upgrading channel in influencing 12-month ahead inflation expectations.

Table 3
Treatment Effects on Inflation Expectations

Independent Variables:	Change in 12-month Ahead Inflation Expectations		
	-	Non-negative Financial Well-being for the Past 12 Months	Non-negative Expected Financial Well-being for the Next 12 Months
	(1)	(2)	(3)
Treatment 2 (T2)	4.264*** (1.138)	7.240** (2.850)	12.73* (6.504)
Treatment 3 (T3)	0.386 (0.891)	5.615*** (2.082)	1.691 (2.288)
Variable	-	1.778 (1.770)	0.789 (1.911)
T2 × Variable	-	-3.014 (3.159)	-9.310 (6.580)
T3 × Variable	-	-6.007*** (2.292)	-1.342 (2.471)
Constant	-12.11** (4.355)	-4.124** (1.646)	-3.275* (1.808)
Observations	1,067	1,067	1,067
R-squared	0.021	0.023	0.030

Note: Robust standard errors are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively.

To examine how financial well-being plays a role in influencing the upgrading channel, we ask subjects the following questions:

- *Do you feel that you, and your family, are currently better off, worse off, or roughly the same, financially, compared to 12 months ago?*
- *Looking forward, do you feel that you, and your family, will be better off, worse off, or roughly the same, financially, in 12 months' time compared to now?*

Respondents who replied “Much better off”, “Somewhat better off”, and “About the same” were considered to have a non-negative financial well-being. We then include indicators for non-negative financial well-being for the past 12 months and next 12 months in our regression and interact them with Treatment 2 and Treatment 3. Columns 2 to 3 in Table 3 report results of the heterogeneous treatment effects. We find that the interaction terms for Treatment 2 and Treatment 3 with non-negative financial well-being for the past 12 months and next 12 months are negative.

Specifically, the interaction term for non-negative financial well-being for the past 12 months and Treatment 3 is statistically significant. The coefficient on this interaction term is negative, suggesting that the additional information about the price of Häagen-Dazs ice-cream in 2019 did not upwardly bias inflation expectations for those with non-negative financial well-being for the past 12 months as much as for those with negative financial well-being. Moreover, the coefficient on

Treatment 3, which includes information on the price of Walls ice-cream in 2019, becomes significant once we control for financial well-being and the interaction terms, and it is smaller than the coefficient on Treatment 2, suggesting that the additional information helps to reduce the upward bias on inflation expectations from the upgrading channel.

Discussion

Our results show that exposure to prices of luxury goods upwardly biases inflation expectations. Hence, one plausible reason for the high inflation expectations in Singapore could be changes in product variety. Using the Nielsen Homescan Shopper Panel, which tracks household purchases of all grocery goods based on a provided scanner sample of households that is demographically and geographically representative of households in Singapore, we study changes in product variety by examining the total amount of unique choices made by these households across 79 categories of goods. On average, there is an increase in the variety of goods from 2016 to 2017. Nonetheless, this increase is not consistent across all categories of goods. For example, while there has been an increase in the variety of biscuits, there is a fall in the variety of toilet paper.

Both decreases and increases in the variety of goods could increase inflation expectations. Lower quality and less profitable products have been removed by retailers, leading to a fall in the variety of some products. However, retailers have also introduced new products that are of better

quality in other categories of goods. As documented in our survey experiment, both will contribute to an increase in inflation expectations.

Our results suggest that even if consumers are increasingly exposed to higher-priced products, providing current price information about lower-priced products can help to mitigate the upward bias on inflation expectations from the upgrading channel. Policymakers could seek to increase the availability of goods at the lower end of the price spectrum to provide households with more choices. To reduce the search cost for households, more information on affordable goods should be given. This could be in newspapers, notice boards in estates or even through handphone apps. Moreover, with rising standards of living and exposure to better quality products, greater awareness by households of the role of changing consumption habits in shaping their perceptions of inflation can help to temper inflation expectations.

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Statistical Appendix

Table 1: Real GDP Growth by Sector

Table 2: Real GDP Growth by Expenditure

Table 3: Labour Market (I)

Table 4: Labour Market (II)

Table 5: External Trade

Table 6: Non-oil Domestic Exports by Selected Countries

Table 7: Consumer Price Index

Table 8: MAS Core Inflation

Table 9: Balance of Payments – Current Account

Table 10: Balance of Payments – Capital & Financial Accounts

Table 11: Exchange Rates

Table 12: Singapore Dollar Nominal Effective Exchange Rate Index

Table 13: Domestic Liquidity Indicator

Table 14: Monetary

Table 15: Fiscal

TABLE 1: REAL GDP GROWTH by Sector

Period	Total	Manufacturing	Finance & Insurance	Business Services	Construction	Wholesale & Retail Trade	Accomm & Food Services	Transportation & Storage	Info & Comms	Total	Manufacturing	Finance & Insurance	Business Services	Construction	Wholesale & Retail Trade	Accomm & Food Services	Transportation & Storage	Info & Comms
	Year-on-Year % Change										Seasonally-adjusted Quarter-on-Quarter Annualised % Change							
2017	3.7	10.4	6.5	0.8	-11.5	1.0	1.9	4.4	5.2									
2018	3.1	7.0	5.8	2.8	-3.7	1.7	2.8	1.3	5.4									
2018 Q1	4.6	10.0	10.1	3.5	-6.4	2.9	0.8	1.8	5.5	4.9	14.2	6.8	5.7	-3.5	11.9	0.6	-3.7	1.4
Q2	4.2	10.6	5.8	2.1	-4.3	2.6	3.5	1.2	6.1	0.7	7.8	-0.2	0.8	-7.8	-5.9	6.9	0.3	4.6
Q3	2.6	3.5	3.9	3.0	-2.6	2.4	3.4	1.6	5.1	0.8	1.1	2.9	2.7	0.2	-2.7	2.9	4.5	6.5
Q4	1.3	4.6	3.7	2.6	-1.2	-0.8	3.5	0.5	5.0	-0.8	-3.4	5.5	1.8	5.3	-5.0	3.9	0.4	7.2
2019 Q1	1.1	-0.3	3.2	1.7	2.8	-2.5	2.0	0.7	5.2	3.8	-6.4	4.9	1.3	13.7	3.1	-5.3	-2.1	2.8
Q2	0.1	-3.1	5.2	0.5	2.9	-3.2	0.9	2.2	4.1	-3.3	-3.4	7.6	-3.9	-5.5	-7.9	2.3	6.5	0.5

Source: Singapore Department of Statistics

TABLE 2: REAL GDP GROWTH by Expenditure

Period	Total Demand	Domestic Demand									Year-on-Year % Change							
		Total	Consumption			Gross Fixed Capital Formation			Exports of Goods & Services	Imports of Goods & Services								
			Total	Private	Public	Total	Private	Public										
2017	6.0	6.6	3.6	3.4	4.5	6.4	8.3	-1.1			5.7			7.5				
2018	4.0	1.2	3.0	2.7	4.1	-4.0	-3.4	-6.6			5.1			4.7				
2018 Q1	5.6	2.2	4.3	3.2	7.3	-2.6	0.4	-11.5			7.1			7.2				
Q2	6.3	2.1	3.1	3.1	3.2	-1.5	-0.7	-6.1			8.1			7.4				
Q3	3.3	0.8	2.3	2.6	1.5	-7.5	-9.4	1.6			4.2			3.6				
Q4	0.9	-0.2	2.5	2.2	3.8	-4.4	-3.5	-8.9			1.4			0.9				
2019 Q1	-0.4	3.9	4.8	5.4	3.0	-0.2	0.0	-0.7			-2.2			-2.4				
Q2	-0.3	2.4	3.3	3.4	3.1	-0.3	-1.9	8.1			-1.4			-0.5				

Source: Singapore Department of Statistics

TABLE 3: LABOUR MARKET (I)

Period	Average Monthly Earnings	Value Added Per Worker ¹									Year-on-Year % Change	
		Total ²	Manufacturing	Construction	Wholesale & Retail Trade	Accomm & Food Services	Transportation & Storage	Information & Communications	Finance & Insurance	Business Services	Overall Economy	Manufacturing
2017	3.0	3.9	13.8	-5.2	1.7	0.0	2.5	3.0	2.9	-0.8	0.0	-8.8
2018	3.5	2.4	8.3	0.7	1.5	2.0	-2.0	0.7	3.4	0.5	0.4	-3.8
2018 Q1	4.0	4.4	12.5	0.4	2.9	-0.4	-1.2	2.1	7.9	1.1	-1.0	-5.4
Q2	3.6	3.7	12.6	0.8	2.5	2.7	-2.2	2.0	3.6	-0.4	0.1	-8.0
Q3	3.5	1.6	4.0	0.8	2.1	2.9	-2.0	-0.2	1.6	0.8	1.0	-1.1
Q4	2.8	0.1	4.9	0.6	-1.1	2.9	-2.7	-1.1	0.6	0.5	1.4	-0.7
2019 Q1	3.4	-0.3	-0.2	3.7	-2.6	-0.1	-2.0	-0.9	0.1	-0.4	2.4	1.7
Q2	2.1	-1.4	-2.7	2.7	-3.2	-2.1	0.3	-1.8	2.1	-1.4	3.0	5.5

¹ Based on Gross Value Added At Basic Prices In Chained (2015) Dollars.

Source: Central Provident Fund Board/Singapore Department of Statistics/Ministry of Manpower

² Based on GDP At Market Prices In Chained (2015) Dollars.

Note: The industries are classified according to SSIC 2015.

TABLE 4: LABOUR MARKET (II)

Period	Changes in Employment										Thousand	
	Total	Manufacturing	Construction	Wholesale & Retail Trade	Accomm & Food Services	Transportation & Storage	Information & Communications	Finance & Insurance	Business Services	Other Services	Others	
2017	-3.6	-10.9	-38.3	-1.7	3.5	7.1	4.0	4.5	11.2	17.6	-0.5	
2018	45.3	-2.4	-7.1	1.6	1.3	7.7	8.4	7.6	10.6	17.8	-0.1	
2018 Q1	3.7	-3.8	-5.7	-1.8	-1.1	2.0	1.2	2.2	3.2	7.4	0.1	
Q2	6.5	-0.1	-0.7	-1.7	-1.6	2.6	2.4	1.7	1.8	2.1	0.0	
Q3	19.3	3.5	-0.3	1.1	1.0	1.7	3.1	2.5	1.9	5.1	-0.3	
Q4	15.9	-2.0	-0.4	4.1	3.0	1.4	1.6	1.1	3.7	3.2	0.1	
2019 Q1	13.4	-3.1	0.1	-1.9	0.3	1.1	1.4	2.0	5.1	8.5	0.1	
Q2	5.5	-1.5	2.7	-3.0	0.4	0.2	2.0	1.6	2.4	1.2	-0.4	

Note: The industries are classified according to SSIC 2015.

Source: Ministry of Manpower

TABLE 5: EXTERNAL TRADE

Period	Total Trade	Exports	Domestic Exports						Re-exports	Imports	Exports	Domestic Exports			Year-on-Year % Change	
			Total	Oil	Non-oil			Total				Total	Oil	Non-oil	Re-exports	Imports
					Total	Electronics	Non-electronics	Total	Oil	Non-oil						
	At Current Prices														At 2018 Prices	
2017	11.1	10.3	15.8	33.4	8.8	8.0	9.2	5.2	12.1	5.8	8.1	6.5	9.1	3.5	5.9	5.9
2018	9.2	7.9	8.4	17.1	4.2	-5.5	8.2	7.4	10.6	4.2	1.0	-4.7	4.4	7.8	5.2	5.2
2018 Q1	2.5	2.3	3.5	8.6	1.1	-7.9	4.6	0.9	2.8	3.7	2.9	-0.5	5.1	4.5	3.5	3.5
Q2	10.2	9.3	12.9	20.4	9.3	-7.8	16.5	5.7	11.1	5.7	3.9	-7.5	10.9	7.7	5.7	5.7
Q3	14.7	12.7	14.5	28.9	8.0	-3.0	12.6	11.1	17.0	5.2	1.2	-6.1	5.3	9.2	6.4	6.4
Q4	9.2	7.2	3.4	12.1	-1.1	-3.6	-0.2	11.2	11.5	2.5	-3.7	-4.5	-3.2	9.3	5.1	5.1
2019 Q1	2.1	0.0	-6.4	-6.5	-6.4	-17.3	-2.6	6.8	4.5	-2.4	-7.8	-8.3	-7.5	3.5	0.7	0.7
Q2	-2.2	-4.5	-10.6	-2.9	-14.6	-26.9	-10.6	2.2	0.5	-4.9	-9.2	1.4	-14.6	-0.3	-0.8	-0.8
Q3	-6.6	-7.3	-13.1	-19.7	-9.6	-25.0	-3.9	-1.7	-5.9	-4.9	-8.4	-9.2	-7.9	-1.7	-2.7	-2.7

Source: Enterprise Singapore

TABLE 6: NON-OIL DOMESTIC EXPORTS by Selected Countries

Period	All Countries	ASEAN					NEA-3				China	EU	Japan	US				
		Total	of which			Total	Hong Kong	Korea	Taiwan									
			Indonesia	Malaysia	Thailand													
Year-on-Year % Change																		
2017	8.8	9.2	8.1	12.9	8.0	12.4	-1.0	43.5	12.2	31.1	0.1	17.1	3.8					
2018	4.2	4.5	11.3	-0.9	-1.3	-7.6	-3.9	-17.6	-4.5	-8.8	15.7	11.4	38.2					
2018 Q1	1.1	0.9	11.1	1.9	-9.6	-4.9	-7.4	8.9	-10.8	-11.5	3.3	20.6	45.8					
Q2	9.3	6.3	14.1	-5.3	-1.0	-8.2	4.3	-23.2	-9.7	-0.1	47.9	8.0	41.1					
Q3	8.0	17.8	28.1	6.1	6.9	-9.9	-12.3	-26.9	8.2	-13.3	18.4	16.2	34.6					
Q4	-1.1	-6.5	-5.8	-6.1	-2.2	-7.3	1.4	-24.1	-3.9	-10.7	-0.5	1.4	32.2					
2019 Q1	-6.4	-4.5	-14.2	-3.8	1.2	-12.7	-1.3	-31.5	-11.7	-2.2	-9.8	-29.5	8.6					
Q2	-14.6	-15.1	-12.0	-15.5	-11.4	-21.3	-18.7	-18.4	-26.4	-14.6	-17.5	-29.2	1.2					
Q3	-9.6	-18.2	-14.9	-18.3	-9.9	-15.8	-22.9	-6.0	-12.5	17.1	-10.8	-32.6	-5.0					
% Share of All Countries																		
2017	100.0	22.4	5.1	8.1	4.3	20.0	8.2	5.1	6.7	18.2	10.8	5.6	8.9					
2018	100.0	22.5	5.5	7.7	4.1	17.7	7.5	4.1	6.1	15.9	12.0	6.0	11.7					

Source: Enterprise Singapore

TABLE 7: CONSUMER PRICE INDEX

Period	All Items	Food	Clothing & Footwear	Housing & Utilities	Household Durables & Services	Health Care	Transport	Communication	Recreation & Culture	Education	Miscellaneous Goods & Services
	2014 = 100										
2017	99.5	105.5	100.9	90.2	102.2	103.5	98.7	100.5	101.6	109.8	100.3
2018	99.9	107.0	102.3	89.0	103.0	105.6	98.2	99.5	102.8	113.0	101.2
2018 Q1	99.8	106.5	101.8	89.0	102.7	105.0	98.8	100.2	102.1	112.2	100.8
Q2	99.8	106.8	102.6	88.4	102.8	105.6	98.5	99.7	102.4	112.6	101.4
Q3	100.1	107.2	102.5	89.3	103.3	106.0	98.0	99.6	102.9	113.2	101.5
Q4	100.1	107.4	102.5	89.1	103.4	105.8	97.5	98.5	103.7	113.9	101.2
2019 Q1	100.3	108.0	103.0	88.7	103.3	106.7	97.7	98.1	103.1	115.4	101.6
Q2	100.5	108.3	101.7	87.7	104.0	106.9	99.6	98.6	104.6	115.5	101.7
Q3	100.6	108.8	100.6	88.1	104.0	107.2	98.9	98.4	103.8	115.8	101.7

Source: Singapore Department of Statistics

TABLE 8: MAS CORE INFLATION

Period	Index (2014=100)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2005	82.0	82.1	82.2	82.2	82.2	82.0	82.4	82.7	82.7	83.2	83.4	83.4
2006	83.9	83.7	83.7	83.7	83.6	83.4	83.8	84.0	84.0	84.3	84.6	84.8
2007	84.8	84.9	84.8	84.7	84.8	84.8	85.9	86.1	86.3	86.8	87.3	88.5
2008	89.1	89.4	89.5	90.1	90.2	90.3	90.8	91.1	91.1	92.1	92.1	92.2
2009	91.5	91.1	91.2	90.3	90.1	90.0	90.3	90.4	90.3	90.8	90.8	90.9
2010	91.0	91.5	91.6	91.8	91.7	91.6	92.1	92.5	92.5	92.6	92.8	92.8
2011	92.8	93.1	93.2	93.8	93.7	93.7	94.1	94.5	94.4	94.7	95.0	95.2
2012	96.1	95.9	96.0	96.3	96.2	96.2	96.4	96.6	96.7	96.9	96.9	97.0
2013	97.2	97.7	97.6	97.6	97.8	97.8	97.9	98.3	98.4	98.6	98.9	99.0
2014	99.4	99.4	99.6	99.9	100.0	99.8	100.1	100.3	100.1	100.3	100.3	100.5
2015	100.4	100.7	100.6	100.3	100.1	100.0	100.4	100.5	100.7	100.6	100.5	100.8
2016	100.8	101.2	101.2	101.2	101.1	101.1	101.4	101.5	101.6	101.7	101.8	102.0
2017	102.3	102.3	102.4	102.9	102.7	102.7	103.0	103.0	103.1	103.2	103.3	103.4
2018	103.7	104.1	103.9	104.2	104.2	104.4	104.9	104.9	105.0	105.2	105.0	105.3
2019	105.4	105.7	105.4	105.6	105.6	105.6	105.7	105.8	105.8			

Note: MAS Core Inflation is the CPI less the costs of accommodation and private road transport.

Source: Monetary Authority of Singapore

TABLE 9: BALANCE OF PAYMENTS – Current Account

	Current Account Balance		Goods Account			Services Account Balance								Primary Income Balance	Secondary Income Balance
	\$ Million	% of GDP	Exports	Imports	Balance	Total	Mfg Services	Maintenance & Repairs	Transport	Travel	Financial	Intellectual Property	Others		
	\$ Million														
2017	76,510	16.4	564,163	436,431	127,733	-10,864	-7,919	7,575	-5,890	-6,487	26,644	-9,523	-15,264	-32,500	-7,859
2018	87,772	17.9	620,117	487,428	132,689	-2,220	-8,475	8,253	-3,401	-6,651	27,748	-8,713	-10,982	-33,192	-9,506
2018 Q1	20,487	17.1	144,023	112,590	31,433	-281	-2,035	2,264	-766	-1,106	6,932	-2,159	-3,411	-8,433	-2,233
Q2	24,534	20.2	156,538	121,726	34,812	-482	-2,146	2,013	-1,018	-1,760	7,099	-1,959	-2,710	-7,321	-2,474
Q3	24,781	20.2	160,585	126,160	34,424	321	-2,164	1,944	-744	-1,155	7,126	-2,141	-2,545	-7,561	-2,403
Q4	17,970	14.2	158,971	126,952	32,020	-1,777	-2,130	2,033	-873	-2,630	6,592	-2,454	-2,315	-9,877	-2,396
2019 Q1	21,618	17.6	144,002	112,789	31,213	-802	-2,028	2,047	-94	-1,922	6,941	-2,398	-3,348	-6,776	-2,017
Q2	21,497	17.5	154,976	121,909	33,067	-1,075	-2,080	1,940	-565	-2,673	7,161	-2,417	-2,441	-8,145	-2,350

Source: Singapore Department of Statistics

TABLE 10: BALANCE OF PAYMENTS – Capital & Financial Accounts

Period	Capital and Financial Account Balance					Net Errors & Omissions	Overall Balance	\$ Million Official Foreign Reserves (End of Period)
	Total	Direct Investment	Portfolio Investment	Financial Derivatives	Other Investment			
2017	35,892	-70,586	46,297	11,325	48,856	-2,777	37,841	373,994
2018	66,697	-61,654	32,224	22,502	73,625	-4,151	16,925	392,096
2018 Q1	12,637	-11,778	5,902	9,118	9,396	-1,017	6,833	376,529
Q2	15,492	-14,728	7,419	7,205	15,595	-1,263	7,780	392,758
Q3	18,547	-24,750	-6,237	1,735	47,799	-12	6,222	398,061
Q4	20,021	-10,399	25,141	4,444	835	-1,859	-3,910	392,096
2019 Q1	9,377	-22,305	6,591	2,779	22,313	666	12,907	400,696
Q2	53,513	-28,389	81,976	2,697	-2,771	-6	-32,022	370,558

Source: Singapore Department of Statistics/Monetary Authority of Singapore

TABLE 11: EXCHANGE RATES

End of Period	Singapore Dollar Per									
	US Dollar	Pound Sterling	Euro	100 Swiss Franc	100 Japanese Yen	Malaysian Ringgit	Hong Kong Dollar	100 New Taiwan Dollar	100 Korean Won	Australian Dollar
2017	1.3366	1.7987	1.5962	136.56	1.1851	0.3290	0.1709	4.5033	0.1251	1.0416
2018	1.3648	1.7318	1.5618	138.60	1.2359	0.3298	0.1743	4.4655	0.1227	0.9636
2018 Q1	1.3117	1.8470	1.6169	137.18	1.2308	0.3391	0.1671	4.5004	0.1230	1.0041
Q2	1.3650	1.7902	1.5885	137.23	1.2332	0.3380	0.1739	4.4743	0.1222	1.0078
Q3	1.3671	1.7879	1.5923	139.97	1.2044	0.3302	0.1747	4.4843	0.1233	0.9864
Q4	1.3648	1.7318	1.5618	138.60	1.2359	0.3298	0.1743	4.4655	0.1227	0.9636
2019 Q1	1.3559	1.7714	1.5223	136.15	1.2245	0.3322	0.1727	4.3991	0.1193	0.9607
Q2	1.3535	1.7152	1.5383	138.67	1.2576	0.3268	0.1733	4.3671	0.1170	0.9487
Q3	1.3813	1.6971	1.5101	139.33	1.2796	0.3299	0.1762	4.4511	0.1152	0.9334

Source: Monetary Authority of Singapore

TABLE 12: SINGAPORE DOLLAR NOMINAL EFFECTIVE EXCHANGE RATE INDEX

Index (2–6 Apr 2018 Average=100)											
Average for Week Ending	S\$ NEER	Average for Week Ending	S\$ NEER	Average for Week Ending	S\$ NEER	Average for Week Ending	S\$ NEER	Average for Week Ending	S\$ NEER	Average for Week Ending	S\$ NEER
2018 Apr 6	100.00	2018 Jul 6	99.86	2018 Oct 5	100.62	2019 Jan 4	101.20	2019 Apr 5	101.52	2019 Jul 5	101.77
13	100.09	13	100.19	12	100.51	11	101.30	12	101.54	12	101.74
20	100.13	20	100.25	19	100.72	18	101.28	18	101.58	19	101.61
27	99.93	27	100.46	26	100.90	25	101.25	26	101.55	26	101.36
May 4	100.01	Aug 3	100.52	Nov 2	100.88	Feb 1	101.32	May 3	101.53	Aug 2	101.21
11	99.82	10	100.55	9	100.97	8	101.20	10	101.57	8	101.02
18	99.94	17	100.52	16	100.90	15	101.30	17	101.45	16	100.72
25	100.04	24	100.56	23	101.04	22	101.39	24	101.14	23	101.00
Jun 1	100.21	31	100.54	30	101.05	Mar 1	101.44	31	101.06	30	101.02
8	100.34	Sep 7	100.31	Dec 7	101.12	8	101.31	Jun 7	101.45	Sep 6	101.15
14	100.44	14	100.42	14	101.14	15	101.37	14	101.53	13	101.41
22	99.74	21	100.60	21	101.14	22	101.51	21	101.63	20	101.59
29	99.69	28	100.88	28	100.99	29	101.45	28	101.78	27	101.61
										Oct 4	101.51
										11	101.58

Source: Monetary Authority of Singapore

TABLE 13: DOMESTIC LIQUIDITY INDICATOR

Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Change from 3 Months Ago
	2011	0.420	0.322	0.367	0.370	0.429	0.485	0.529	0.442	-0.216	-0.955	-1.179	-0.592
2012	0.139	0.599	0.695	0.637	0.329	0.114	0.280	0.462	0.706	0.382	0.306	0.209	
2013	0.003	-0.088	-0.190	0.082	-0.053	-0.034	-0.075	0.094	0.415	0.443	0.551	0.222	
2014	-0.054	-0.133	-0.246	0.143	0.136	0.363	0.194	0.095	0.038	0.002	-0.027	0.023	
2015	0.010	-0.071	-0.127	0.351	0.693	0.742	0.165	-0.203	-0.116	0.005	0.264	0.250	
2016	-0.069	-0.003	0.181	0.420	0.174	0.227	0.291	0.279	-0.217	-0.499	-0.402	-0.244	
2017	0.064	0.179	0.341	0.316	0.092	-0.089	0.069	0.166	0.189	0.009	0.103	0.128	
2018	0.101	-0.149	0.044	0.134	0.275	0.042	0.067	0.241	0.257	0.211	0.188	0.219	
2019	0.274	0.166	0.136	0.075	0.064	0.135	0.048	-0.150	-0.128				

Note: The DLI is a measure of overall monetary conditions, reflecting changes in the S\$NEER and 3-month S\$ SIBOR rate.

Source: Monetary Authority of Singapore

A positive (negative) number indicates a tightening (easing) monetary policy stance from the previous quarter.

Please refer to the June 2001 issue of the MAS ED *Quarterly Bulletin* for more information.

TABLE 14: MONETARY

End of Period	Money Supply								Interest Rates				
	Narrow Money M1	Broad Money M2	Broad Money M3	Reserve Money	Narrow Money M1	Broad Money M2	Broad Money M3	Reserve Money	Prime Lending Rate	3-month S\$ SIBOR	3-month US\$ LIBOR	Banks' Rates	
												Savings Deposits	12-month Fixed Deposits
	\$ Billion				Year-on-Year % Change				% Per Annum				
	2017	183.7	580.1	592.2	68.2	6.3	3.2	3.2	5.28	1.50	1.69	0.16	0.33
2018	184.5	602.4	615.0	71.8	0.4	3.9	3.9	5.4	5.33	1.89	2.81	0.16	0.45
2018 Q1	188.2	588.6	601.1	70.6	8.2	2.7	2.8	9.3	5.33	1.45	2.31	0.16	0.34
	186.1	588.6	601.4	70.2	4.4	2.6	2.7	8.9	5.33	1.52	2.34	0.16	0.37
	184.3	597.7	610.3	69.7	1.2	3.4	3.5	5.0	5.33	1.64	2.40	0.16	0.40
	184.5	602.4	615.0	71.8	0.4	3.9	3.9	5.4	5.33	1.89	2.81	0.16	0.45
2019 Q1	187.6	617.0	629.7	72.9	-0.3	4.8	4.8	3.3	5.25	1.94	2.60	0.16	0.55
	193.0	620.3	634.0	71.0	3.7	5.4	5.4	1.1	5.25	2.00	2.32	0.16	0.57

Source: Monetary Authority of Singapore/ABS Benchmarks Administration Co Pte Ltd/ICE Benchmark Administration Ltd

TABLE 15: FISCAL

Period	Operating Revenue								Expenditure			Primary Surplus (+)/ Deficit (-)	Less: Special Transfers	Add: Net Investment Returns Contribution	Overall Budget Surplus (+)/ Deficit (-)		
	Total	Tax Revenue				Non-tax Revenue	Total	Operating	Development								
		of which		Income Tax	Assets Taxes												
\$ Million																	
FY2016	68,964	58,699	26,378	4,360	3,278	11,078	10,266	71,045	52,129	18,916	-2,080	6,372	14,577	6,125			
FY2017	75,816	66,363	32,065	4,440	4,905	10,960	9,453	73,556	55,581	17,975	2,259	6,122	14,724	10,861			
FY2018 (Revised)	73,669	66,815	30,829	4,590	4,628	11,292	6,855	78,990	58,629	20,361	-5,321	9,000	16,437	2,116			
FY2019 (Budgeted)	74,895	67,721	31,354	4,690	4,024	11,691	7,174	80,252	60,786	19,466	-5,357	15,297	17,169	-3,485			
% of Nominal GDP																	
FY2016	15.4	13.1	5.9	1.0	0.7	2.5	2.3	15.9	11.7	4.2	-0.5	1.4	3.3	1.4			
FY2017	16.2	14.1	6.8	0.9	1.0	2.3	2.0	15.7	11.8	3.8	0.5	1.3	3.1	2.3			
FY2018 (Revised)	15.0	13.6	6.3	0.9	0.9	2.3	1.4	16.1	12.0	4.2	-1.1	1.8	3.4	0.4			
FY2019 (Budgeted)	14.8	13.4	6.2	0.9	0.8	2.3	1.4	15.8	12.0	3.8	-1.1	3.0	3.4	-0.7			

Source: Ministry of Finance