



Monetary Authority of Singapore

A nighttime aerial photograph of the Singapore city skyline, featuring the Marina Bay area with its iconic buildings and light trails from vehicles on the surrounding roads.

macroeconomic review

economic policy group

Volume XVIII, Issue 1

April 2019



macroeconomic
review

Volume XVIII, Issue 1
April 2019

Economic Policy Group
Monetary Authority of Singapore

ISSN 0219-8908

Published in April 2019

Economic Policy Group
Monetary Authority of Singapore

<http://www.mas.gov.sg>

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanised, photocopying, recording or otherwise, without the prior written permission of the copyright owner except in accordance with the provisions of the Copyright Act (Cap. 63). Application for the copyright owner's written permission to reproduce any part of this publication should be addressed to:

Economic Policy Group
Monetary Authority of Singapore
10 Shenton Way
MAS Building
Singapore 079117

Printed by Xpress Print Singapore

Contents

Preface	i
Monetary Policy Statement	ii-iv
1 The International Economy	2
1.1 G3 Economies	4
1.2 Asia	9
1.3 Global Inflation	15
<i>Box A: Regional Trade Diversion And Production Relocation: A Simulation From A CGE Model</i>	17
2 The Singapore Economy	24
2.1 Recent Economic Developments	25
2.2 Economic Outlook	29
2.3 Productivity Differences Between The Tradable And Non-Tradable Sectors	34
<i>Box B: Forecasting GDP Growth At Business Cycle Turning Points</i>	39
3 Labour Market And Inflation	46
3.1 Labour Market	47
3.2 Consumer Price Developments	52
4 Macroeconomic Policy	62
4.1 Monetary Policy	63
4.2 Fiscal Policy	70
<i>Box C: Enhancements To The Fiscal Block Of The Monetary Model Of Singapore</i>	80
Special Features	
Special Feature A: Digital Currency Economics And Policy Workshop	84
Special Feature B: Rethinking Fiscal Policy In An Era Of Low Interest Rates	90
Special Feature C: Revisiting Monetary Policy Autonomy In Asia And Beyond: Trilemma, Dilemma Or 2.5 Lemma?	100
Statistical Appendix	106

LIST OF ABBREVIATIONS

ACU	Asian Currency Unit
ASEAN	Association of Southeast Asian Nations
COE	Certificate of Entitlement
CPF	Central Provident Fund
CPI	consumer price index
DBU	Domestic Banking Unit
EIA	Energy Information Administration
EPG	Economic Policy Group
FDI	Foreign Direct Investment
F&B	food and beverage
GFC	Global Financial Crisis
GST	Goods and Services Tax
ICT	information and communications technology
IMF	International Monetary Fund
IT	information technology
JETRO	Japan External Trade Organization
m-o-m	month-on-month
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
PCE	private consumption expenditure
PMET	Professionals, Managers, Executives and Technicians
PMI	Purchasing Managers' Index
PPI	producer price index
q-o-q	quarter-on-quarter
REER	real effective exchange rate
SA	seasonally adjusted
SAAR	seasonally adjusted annualised rate
SME	small and medium enterprise
ULC	unit labour cost
UN	United Nations
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, which distils views and insights from leading academics, central bankers and industry practitioners who participated in a two-day workshop on "Digital Currency Economics and Policy" jointly organised by the Asian Bureau of Finance and Economic Research (ABFER), the National University of Singapore (NUS) Business School and MAS in November 2018. We are grateful to Professor Martin Eichenbaum of Northwestern University for contributing Special Feature B on the potential role of fiscal policy as a macroeconomic stabilisation tool when the zero lower bound on interest rates is a binding constraint on monetary policy. Our appreciation also goes to Professor Ramkishen Rajan of the Lee Kuan Yew School of Public Policy at NUS for a survey article on the interaction of monetary and macroprudential policies in Asia in Special Feature C, which articulates the challenges to monetary policy autonomy from large capital flows, and the responses of policymakers in the region. In addition, we are also pleased to collaborate with the ASEAN+3 Macroeconomic Research Office (AMRO) in producing Box A in Chapter 1, which investigates a production relocation scenario for the Asian region in light of the US-China tariffs, using simulations of a computable general equilibrium (CGE) model of the world economy. 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: Ang Ziqin, Alvin Jason s/o John, Andrew Colquhoun, Angeline Qiu, Betty Chong, Brian Lee, Celine Sia, Chia Yan Min, Choy Keen Meng, Cyrene Chew, Edward Robinson, Geraldine Koh, Grace Lim, Harry Lee, Hema d/o Sevakerdasan, Huang Junjie, Ian Chung, Irineu de Carvalho Filho, Jensen Tan, Kenny Ho, Li Tiansheng, Liew Yin Sze, Linda Ng, Michael Ng, Neha Varma, Ng Ding Xuan, Ng Yi Ping, Nicholas Koh, Priscilla Ng, Seah Wee Ting, Shem Ng, Soh Wai Mei, Tan Boon Heng, Tan Choon Leng, Tan Yin Ying, Thasreen Refaya, Toh Ling Yan, Tu Suh Ping, Wu Jingyu and Xiong Wei.

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.



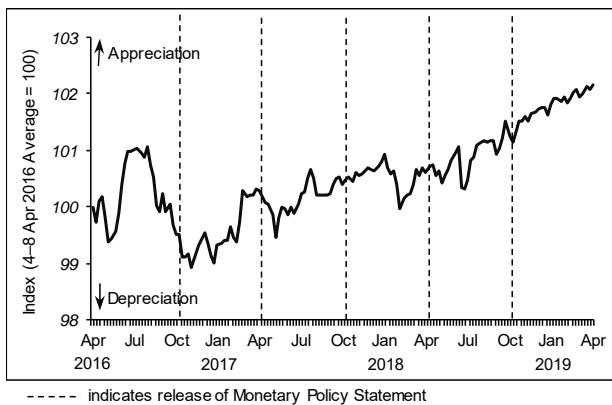
12 April 2019

Monetary Policy Statement

INTRODUCTION

1. In its October 2018 Monetary Policy Statement, MAS announced a slight increase in the slope of the S\$NEER policy band. There was 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 the expectation that MAS Core Inflation would rise modestly in the near term before stabilising at just below 2%. The Singapore economy was also projected to remain on its steady expansion path.

Chart 1
S\$ Nominal Effective Exchange Rate (S\$NEER)



2. The S\$NEER has appreciated in the upper half of the policy band since October 2018. This mainly reflected the weakening of the US dollar alongside the shift in the US Federal Reserve's monetary policy stance, and of the Euro and Sterling. The three-month S\$ SIBOR rose from 1.6% in October 2018 to 1.9% as at end-March 2019.

OUTLOOK

3. The Singapore economy has slowed, and is likely to expand at a modest pace in the coming quarters. Core inflation has come in lower than projected due to weaker global oil prices and a stronger impact from the liberalisation of the retail electricity market. Consequently, MAS is downgrading its 2019 forecast range for MAS Core Inflation to 1–2%.

Growth Backdrop

4. According to the *Advance Estimates* released by the Ministry of Trade and Industry today, the Singapore economy expanded by 1.3% on a year-ago basis in Q1 2019, following the 1.9% growth in Q4 2018. Over the last six months, the contribution of the manufacturing sector to GDP growth has waned, reflecting the maturing of the global electronics cycle and the economic slowdown in China. Meanwhile, activity in the services sectors stayed firm, supported mainly by financial and business services, as well as information & communications services. The construction sector has also recovered from a protracted period of weakness.

5. The growth momentum of the global economy has moderated by more than expected at the turn of the year alongside sluggish trade. Significant uncertainty remains over the short-term outlook. However, policy stances in China and the US have become more accommodative, while global financial conditions have eased. All in, global growth for 2019 is forecast to slow, following the strong expansions in the last two years.

6. Against this backdrop, Singapore's GDP growth is expected to come in slightly below the mid-point of the 1.5–3.5% forecast range in 2019. Even as growth in the trade-related cluster decelerates, pockets within the financial, business and ICT services sectors will continue to benefit from steady domestic demand in the region and increased investments in digitalisation. Meanwhile, domestic-oriented sectors such as construction and consumer-facing services are expected to stay on a recovery path.

7. In all, the pace of growth will be slightly below potential this year, following two years when it was above trend. With the positive output gap expected to narrow, inflationary pressures will be kept in check.

Inflation Trend

8. MAS Core Inflation, which excludes the costs of accommodation and private road transport, fell to 1.6% year-on-year in January–February 2019, from 1.8% in Q4 2018. This was mainly due to a smaller increase in the price of electricity & gas, in light of lower global oil prices and higher adoption of cheaper electricity plans by consumers. Reflecting the decline in core inflation, CPI-All Items inflation eased to 0.4% from 0.5% over the same period.

9. In 2019, external sources of inflation are likely to be benign, as global oil prices are expected to come in lower for the year as a whole than in 2018, while food prices should only pick up slightly on average. On the domestic front, labour market conditions remain firm and will support moderate wage increases, such that unit labour costs should continue to rise. However, an acceleration in inflationary pressures is unlikely against the backdrop of slower GDP growth, uncertainties in the global economy, as well as the continuing restraining effects of MAS' monetary policy tightening in 2018.

10. At the same time, the decline in electricity prices due to the roll-out of the Open Electricity Market (OEM) has been sharper than anticipated, as a larger number of households have switched to plans that are priced lower than the regulated tariffs. The take-up rate is likely to increase in the months ahead, which should further reduce electricity prices. Accordingly, MAS is revising the 2019 forecast range for MAS Core Inflation to 1–2%, from 1.5–2.5% previously. Core inflation is likely to come in near the mid-point of the revised forecast range.

11. On the non-core components of the CPI, private road transport costs should be largely unchanged from 2018. Although petrol prices will likely be lower, car prices could see some increase given an anticipated tapering in the supply of COEs. Meanwhile, imputed rentals on owner-occupied accommodation are set to decline at a slower pace this year, compared to 2018. The 2019 forecast for CPI-All Items inflation was revised down to 0.5–1.5% from 1–2% in February, taking into account the decline in global oil prices in late 2018. This forecast for headline inflation remains unchanged.

MONETARY POLICY

12. GDP growth in the Singapore economy has eased, bringing the level of output closer to its underlying potential. Despite some pickup in labour costs, inflationary pressures are mild and should remain contained.

13. MAS will therefore maintain the current rate of appreciation of the S\$NEER policy band. There will be no change to its width and the level at which it is centred. This policy stance is consistent with a modest and gradual appreciation path of the S\$NEER policy band that will ensure medium-term price stability.

Chapter 1

The International Economy

1 The International Economy

Global economic growth slackened and turned more uneven in 2018, after a robust and synchronised expansion in the previous year. Slowing activity in China, brought on by tightening domestic financial conditions, spilled over to other economies via weaker trade flows. Trade tensions between the US and China posed another headwind to growth, with attendant negative effects on business confidence and investment. Towards the end of 2018, waning frontloading activity by US importers of goods from China exacerbated the slowdown in Asia's exports.

More recently, the near-term growth momentum of the global economy is showing signs of stabilisation, although the pace of expansion for 2019 as a whole is still expected to ease from last year. Increased policy support in China, and a loosening in US and global financial conditions, should help to support activity. Labour market conditions have remained tight in most regions and wage growth has been picking up in the US and Eurozone. To date, the global services sector has stayed resilient even as manufacturing is undergoing a downturn. Trade tensions remain a key downside risk for the economic outlook, although the risks could come on the upside as well: a meaningful reduction in tensions would boost confidence and spur investment. On balance, global growth is projected to slow from 4.3% in 2018 to 3.9% this year and in 2020. (Table 1.1)

**Table 1.1
Global GDP Growth**

	Q3 2018	Q4 2018	2018	2019F	2020F	(%)
	q-o-q SAAR		y-o-y			
Total*	3.5	3.6	4.3	3.9	3.9	
G3*	1.0	1.6	2.0	1.5	1.4	
US	3.4	2.2	2.9	2.4	2.0	
Japan	-2.4	1.9	0.8	0.6	0.5	
Eurozone	0.6	0.9	1.9	1.1	1.3	
	y-o-y					
Asia ex-Japan*	4.8	4.7	5.0	4.7	4.7	
NEA-2*	2.2	2.4	2.6	2.2	2.2	
Korea	2.0	3.1	2.7	2.4	2.4	
Taiwan	2.4	1.8	2.6	2.0	2.0	
ASEAN-4*	4.6	4.8	4.9	4.7	4.6	
Indonesia	5.2	5.2	5.2	5.1	5.1	
Malaysia	4.4	4.7	4.7	4.4	4.4	
Philippines	6.0	6.3	6.2	6.1	6.1	
Thailand	3.2	3.7	4.1	3.6	3.5	
China	6.5	6.4	6.6	6.2	6.1	
Hong Kong	2.8	1.3	3.0	2.2	2.3	
India**	7.0	6.6	7.0	7.2	7.3	

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

* 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.

Global trade volumes stepped down in Q4 2018 ...

The global business and electronics cycles peaked in early 2018, even as macroeconomic policies tightened in some major economies. The resultant slowdown in global trade flows intensified towards the end of 2018, as US firms reduced their imports from China after stocking up in the months before. (Chart 1.1)

Consequently, global growth came in at 3.6% q-o-q SAAR in Q4 2018, well below the average of 4.3% in H1 2018. G3 growth was propped up by mild recoveries in the Eurozone and Japan from the one-off factors that weighed on activity in Q3. However, both the US and China recorded slower expansions in Q4, owing to a reduced fiscal impulse in the former and the effects of the financial deleveraging drive in the latter.

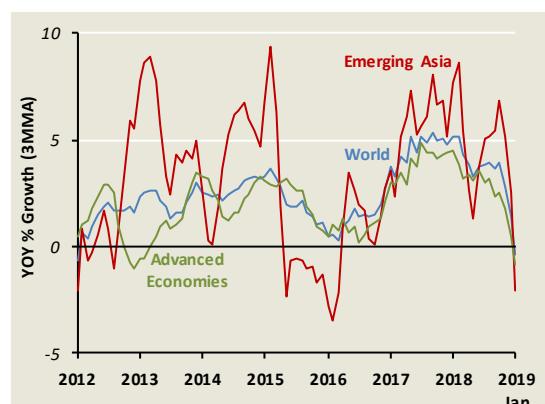
The global trade slowdown was mirrored by similar downturns in the manufacturing sector and in investment, as business sentiment weakened amid elevated uncertainty. The global manufacturing PMI fell in Q4 2018 and slipped further in Q1 this year, while growth in imports of capital goods into Asia ex-Japan—a proxy for investment spending in the region—began declining in the final months of 2018. (Chart 1.2)

... but signs of a growth stabilisation emerged in early 2019.

Activity in the services sector has stayed resilient, as the manufacturing downturn has not, thus far, spilled over into labour markets. In part due to the growing importance of domestic demand, and household consumption in particular, growth in the ASEAN-4 economies, and to a lesser degree in the NEA-3, has been relatively steady.

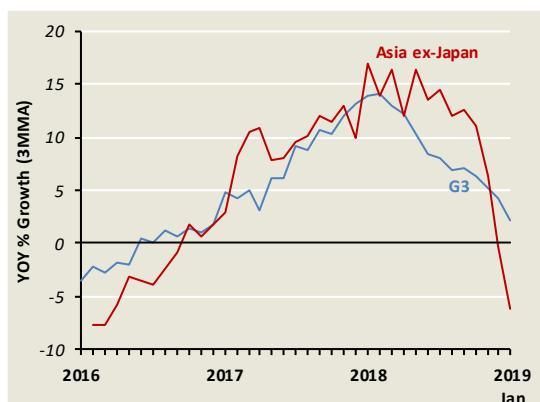
The latest global composite PMI and other leading indicators point tentatively to a stabilisation of growth momentum, with the economic outlook supported by an easing of policy stances in the US and China. (Chart 1.3) Nonetheless, uncertainty remains elevated: the *Global Economic Policy Uncertainty Index* stayed at a high level in March, although it remained below its December peak. Downside risks have persisted, stemming mainly from trade tensions as well as developments in Europe, including uncertainties surrounding the exit of the UK from the EU.

Chart 1.1
Global Trade Volumes



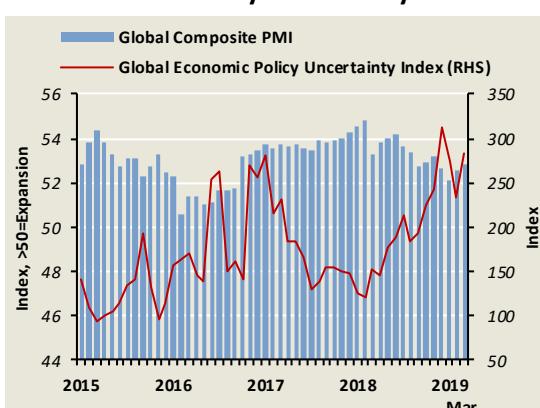
Source: CPB Netherlands Bureau for Economic Policy Analysis, and EPG, MAS estimates

Chart 1.2
Capital Goods Imports



Source: Haver Analytics and EPG, MAS estimates

Chart 1.3
Global Composite PMI and Economic Policy Uncertainty Index



Source: PolicyUncertainty.com, Haver Analytics and EPG, MAS estimates

1.1 G3 Economies

Growth Momentum Wanes

Growth in the G3 economies rose to 1.6% q-o-q SAAR in Q4 2018 from 1.0% in the preceding quarter, as the Eurozone and Japan recovered from idiosyncratic shocks. However, the rebound in both economies was constrained by weak global trade. Domestic demand slowed in the US, partly on account of the government shutdown. Nonetheless, the US is expected to continue leading G3 growth in the coming quarters, even though the boost from its fiscal stimulus is expected to diminish gradually. In comparison, the Eurozone and Japan will settle closer to their respective potential rates of expansion, supported mainly by private consumption. All in, G3 growth is expected to moderate to 1.5% this year and 1.4% in 2020, from 2.0% in 2018.

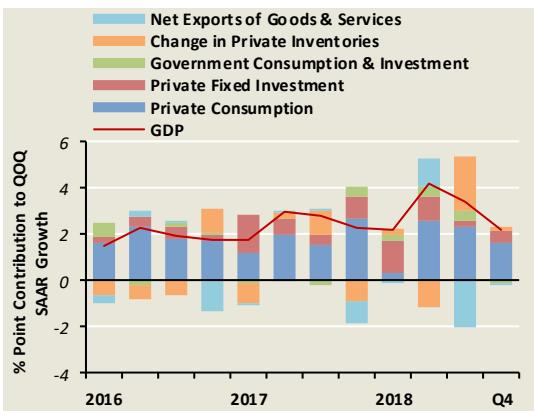
Domestic demand moderated in the US in Q4 2018.

GDP growth in the US slowed to 2.2% q-o-q SAAR in Q4 2018, from 3.4% in the previous quarter. The more subdued outturn in the fourth quarter was driven entirely by domestic demand. Net exports posed a smaller drag of 0.1% point on growth, as frontloading of imports from China waned. This in turn reduced inventory accumulation, resulting in a zero net contribution of these two components to overall growth. (Chart 1.4)

In Q4 2018, final sales to domestic purchasers eased to 2.1% q-o-q SAAR from 2.9% in the previous quarter, on the back of weaker household consumption and government expenditure. Private consumption growth slowed to 2.5% q-o-q SAAR from an average of 3.7% in Q2–Q3, while government spending contracted by 0.4% q-o-q SAAR, led by a steep decline in non-defence expenditure. To some extent, the fall in spending reflected the partial government shutdown that lasted from 22 December 2018 to 25 January 2019, with the US Bureau of Economic Analysis estimating that it directly subtracted 0.1% point from GDP growth in Q4.

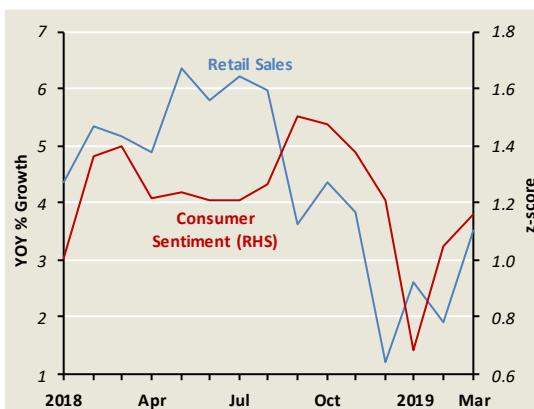
Business fixed investment surprised on the upside in Q4, increasing at 5.4% q-o-q SAAR, on account of higher spending on equipment and intellectual property products. However, residential investment contracted for a fourth consecutive quarter, falling by 4.7% q-o-q SAAR, as the rise in mortgage interest rates over the past year and higher house prices reduced affordability.

Chart 1.4
Contribution to US Growth by Expenditure



Source: Haver Analytics and EPG, MAS estimates

Chart 1.5
Retail Sales and Consumer Sentiment



Source: CEIC, Haver Analytics and EPG, MAS estimates

Note: The z-score measures the number of standard deviations a data point is from the average, computed over the period January 2012 to March 2019.

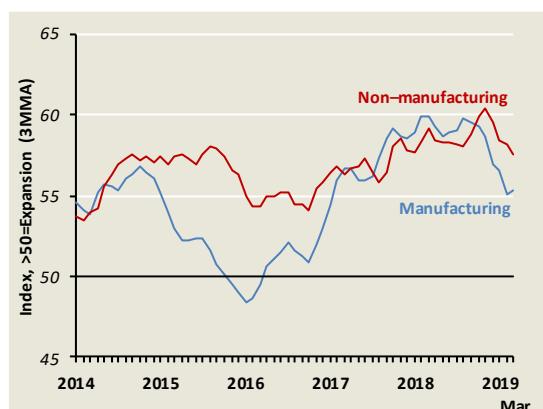
US growth will slow but remain above trend.

High-frequency data suggests that the US economy ceded some momentum early this year, although this was likely to be partly due to the federal government shutdown. Coinciding with the timing of the shutdown, consumer sentiment weakened sharply around the turn of the year. Retail sales also began this year on a weak note, but rebounded in March. Still, the average growth of 2.7% y-o-y in Q1 was slower than the 3.1% registered in the previous quarter. (Chart 1.5) Business conditions have also softened, with the manufacturing and non-manufacturing PMI indices coming off in the three months to March, compared to December 2018. However, they remained well above the average levels reached in the 2015–16 slowdown. (Chart 1.6) Forward-looking orders of core capital goods were sluggish in the first two months of the year, suggesting a subdued outlook for business equipment spending.

Looking ahead, the prospects for consumption will be partly supported by the still-robust labour market. At 3.8% in March, the unemployment rate has fallen to multi-decade lows. The three-month moving average for job gains was 180,000 in March 2019, far exceeding the rate of about 100,000 needed to absorb labour force growth. After remaining relatively sluggish since the GFC, nominal wage growth has picked up to 3.4% y-o-y in February, the fastest in the post-GFC period, before easing to 3.2% in March. (Chart 1.7) Overall labour productivity growth also improved to 1.8% y-o-y in Q4 2018 from an average of 1.2% in the first three quarters of the year. If sustained, the pickup in productivity growth will help to keep core PCE inflation subdued and may raise the potential GDP growth rate in the long run.

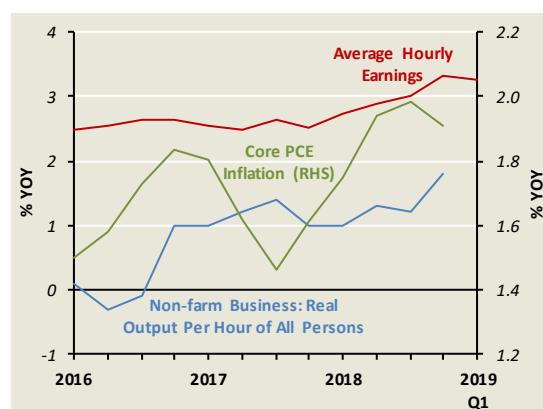
For this year, US growth is expected to moderate as the tailwinds from the fiscal stimulus fade, but it should remain above trend. At the same time, the economy will receive some additional support from the easing of financial conditions due to the Federal Reserve's shift to a "patient" stance on monetary policy and its decision to terminate balance sheet unwinding by the end of September 2019. From a high of 3.24% in early November, the 10-year US Treasury yield fell to under 2.5% in early April. Corroborating this, the Federal Reserve Bank of Chicago's gauge of financial conditions has shown a decline in the first quarter of this year, which reversed the tightening that occurred in Q4 2018. (Chart 1.8) On balance, the US economy is projected to grow by 2.4% this year and 2.0% in 2020.

Chart 1.6
ISM Manufacturing and Non-manufacturing PMI



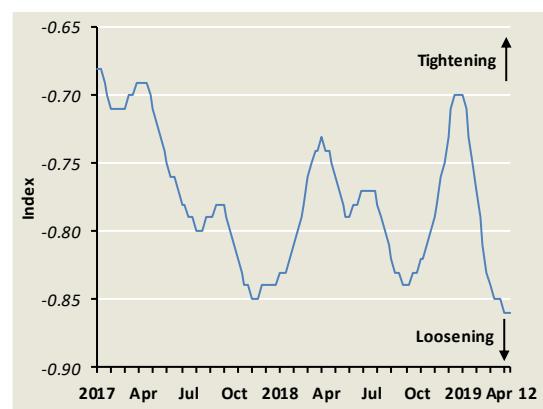
Source: CEIC and EPG, MAS estimates

Chart 1.7
Labour Productivity Growth, Wage Growth and Core PCE Inflation



Source: Haver Analytics and EPG, MAS estimates

Chart 1.8
US Financial Conditions Index



Source: Federal Reserve Bank of Chicago

Economic conditions in the Eurozone remained subdued in Q4 2018.

Eurozone GDP growth picked up mildly to 0.9% q-o-q SAAR in Q4 2018 from 0.6% in Q3, but stayed lacklustre amid weak global trade. Growth performances diverged among the major economies. (Chart 1.9) The German economy stagnated in Q4 as stalling exports and inventory destocking more than offset continued strength in domestic demand. These factors blunted the recovery from the sharp slowdown in Q3, when changes to emissions standards hit automobile production. Meanwhile, the Italian economy entered a technical recession as renewed concerns over sovereign and bank debt led to a tightening in financial conditions, thus curtailing domestic demand. In contrast, France and Spain recorded firm growth outturns, driven by a rebound in exports and increased government spending.

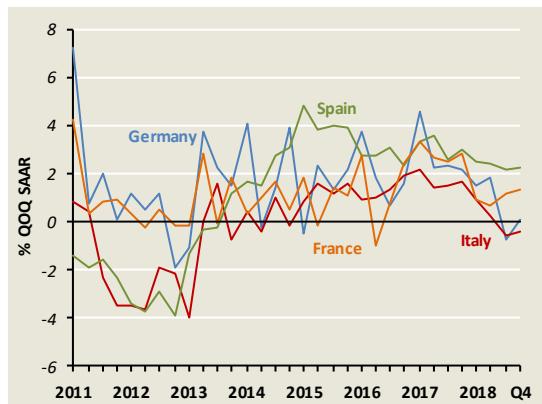
Growth in 2019 will be underpinned by stronger policy support.

The Eurozone's exports are expected to grow at a subdued pace in the coming quarters. Leading indicators of foreign trade such as the ifo *Export Expectations Index* and manufacturing PMIs have fallen sharply across the regional bloc since the start of the year. Notably, in March 2019, the Eurozone's manufacturing PMI for new export orders dropped to its lowest level since 2012. (Chart 1.10)

Despite the headwinds on the trade front, there are signs of greater resilience in domestic demand. Firm labour market conditions should underpin household income growth and consumer confidence. The unemployment rate declined to a decade low of 7.8% in February 2019, alongside an acceleration in nominal wage growth to 2.4% y-o-y in H2 2018 from 1.6% in 2017.

Further, economic activity will benefit from more accommodative fiscal and monetary policies. The region-wide fiscal stance is estimated to be mildly expansionary in 2019, mainly due to scheduled cuts to direct taxes and social security contributions in Germany and France, as well as higher projected government expenditure in Italy and Spain. (Chart 1.11) Concurrently, monetary and financial conditions have turned more supportive since Q4 last year. The benchmark 10-year German bund yield fell from a

Chart 1.9
Eurozone GDP Growth by Country



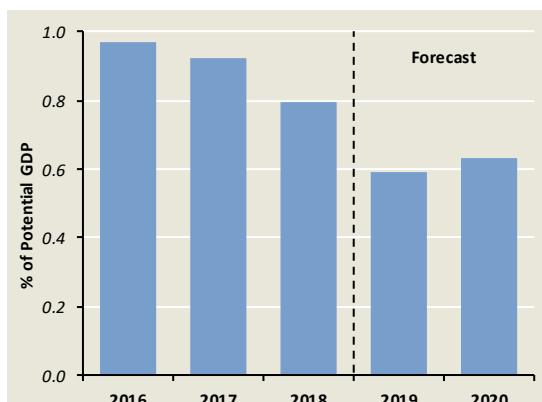
Source: Haver Analytics and EPG, MAS estimates

Chart 1.10
Eurozone PMIs



Source: Haver Analytics and EPG, MAS estimates

Chart 1.11
Eurozone Cyclically-adjusted Primary Balance



Source: IMF

recent high of 0.56% in October to just below zero at the end of March, dipping into negative territory again for the first time in over two years. Further, to support lending to the real economy, the ECB will soon roll out a new series of Targeted Longer-Term Refinancing Operations (TLTRO III), the latest round of cheap bank funding following two preceding auctions in 2014 and 2016. Accordingly, Eurozone banks reported that lending standards have eased in Q2 2019, thus alleviating potential credit constraints on growth. (Chart 1.12)

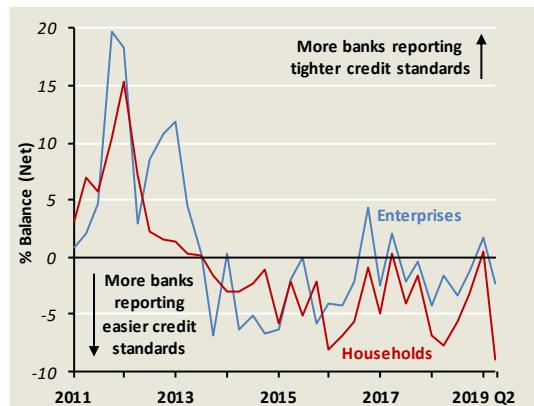
However, downside risks to the growth outlook remain pronounced. First, the Eurozone's relatively high dependence on exports (the region's export-to-GDP ratio of 48% surpasses that of other major economies) renders the bloc vulnerable to any escalation in global trade tensions, including new US tariffs on automobiles and parts. Second, a disorderly Brexit could adversely affect the Eurozone through the trade, investment and confidence channels—with the first being especially important, as the Eurozone has a trade surplus with the UK that amounted to around 1% of the region's GDP in 2018. Barring the materialisation of these risks, economic growth in the Eurozone is expected to come in at 1.1% in 2019 and 1.3% in 2020.

The Japanese economy is confronted with domestic and external headwinds.

GDP growth in Japan rebounded to 1.9% q-o-q SAAR in Q4 2018, after the Hokkaido earthquake precipitated a 2.4% contraction in Q3. (Chart 1.13) Consumption recovered in an environment of very low unemployment, helped by a modest pickup in real wages. Business investment also bounced back to some extent from the disruption in Q3, in part driven by firms' spending on automation to boost productivity. However, net exports deducted 1.2% points from GDP growth.

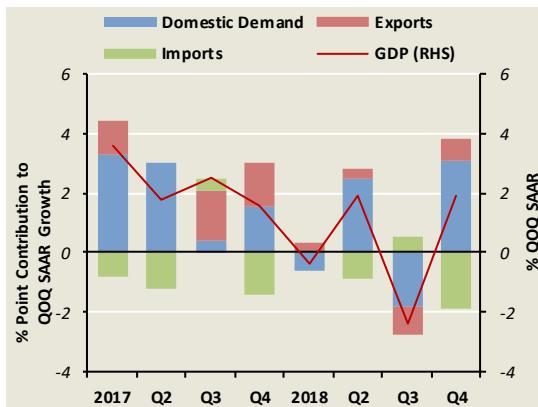
Leading indicators in Japan suggest the near-term growth outlook has weakened further. The latest Tankan Survey shows business sentiment at its lowest in two years, weighed down by a pullback in global demand. Consumer sentiment has also flagged despite low unemployment (averaging just 2.4% over 2018), as real wages have failed to stage a durable increase, and fell in early 2019 to below the 2015–17 average level. (Chart 1.14)

Chart 1.12
Eurozone Bank Lending Conditions



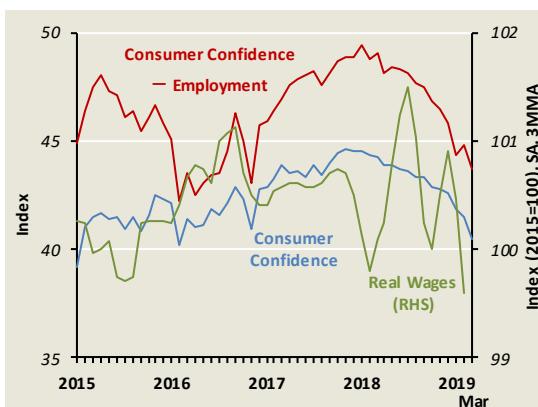
Source: ECB Bank Lending Survey

Chart 1.13
Contribution to Japan's GDP Growth



Source: Haver Analytics and EPG, MAS estimates

Chart 1.14
Japan's Labour Market and Consumer Sentiment

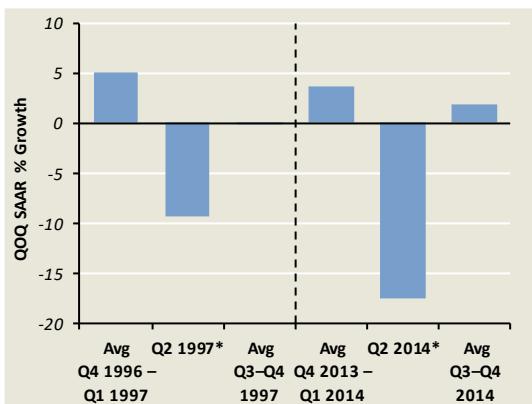


Source: Cabinet Office of Japan, Haver Analytics and EPG, MAS estimates

The less upbeat mood among consumers may be partly attributed to the impending consumption tax hike from 8% to 10% in October 2019. Previous tax hikes in 1997 and 2014 saw some frontloading in consumption spending, followed by a subsequent pullback and relatively depressed spending levels for some time thereafter. (Chart 1.15) When the tax was last raised from 5% to 8% on 1 April 2014, Japan's economy came close to recession in the post-tax period. Both consumption and investment rose strongly in Q1 2014, causing GDP growth to surge by 3.7% q-o-q SAAR, and then fall sharply in the subsequent quarter, resulting in an output contraction of 7.2%.

The overall impact should be less pronounced this time for several reasons. First, the incremental tax rise is smaller. Second, the increase will not apply to all goods, with most food items exempt. Third, the government plans to implement a fiscal stimulus package of around 2 trillion yen, or 0.4% of GDP, to soften the impact on households. These measures include the provision of subsidised gift vouchers to households with young children, and incentives for the purchase of energy-efficient homes and related equipment. However, the impact of tax hikes on consumer behaviour has been difficult to forecast in the past and remains a source of downside risk this time. On balance, GDP growth in Japan is projected to be around 0.6% in 2019 and 0.5% in 2020.

Chart 1.15
Impact of Previous Tax Hikes on
Japan's Private Consumption



Source: Haver Analytics and EPG, MAS estimates

Note: This chart shows: (i) the average private consumption growth rate in the two quarters preceding the consumption tax hike; (ii) the impact on consumption in the quarter of the tax hike, as indicated with an asterisk; and (iii) the average growth rate in the subsequent two quarters.

1.2 Asia

Subdued Trade Prospects Dampen Outlook

Asia ex-Japan grew at a slightly slower pace of 4.7% y-o-y in Q4 2018, compared with 4.8% in the preceding quarter. While economic activity in some ASEAN economies picked up, this was more than offset by slower expansions in China, India, Hong Kong and Taiwan. The region's export growth has eased in tandem with the downswings in the global economic and IT cycles, accentuated by the spillover effects of US tariffs on China. Meanwhile, weakening domestic demand in China began to weigh more heavily on the regional economies in H2 2018 and this is expected to continue in the first half of this year. Elsewhere, private consumption will remain resilient, particularly in ASEAN where labour markets have stayed robust. Financial conditions have also eased, which should impart a boost to domestic demand. On balance, GDP growth in Asia ex-Japan is projected to come in at 4.7% both this year and in 2020.

China's growth eased in 2018 on weaker domestic demand.

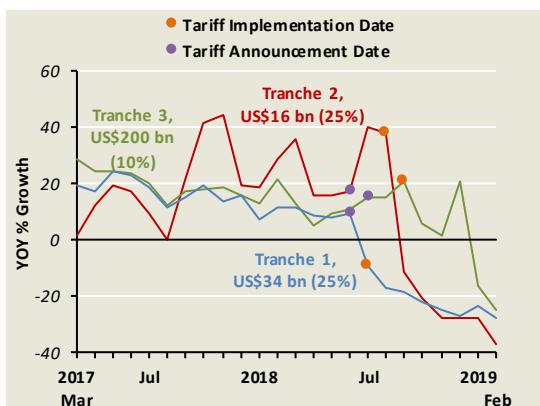
China's GDP growth came in at 6.4% y-o-y in Q4 2018, a shade below the 6.5% recorded in the previous quarter. This brought full-year growth to 6.6%, which was broadly in line with the authorities' 2018 growth target. The moderation was due mainly to the lagged effects of the authorities' deleveraging drive which caused credit conditions to tighten and curtailed public and private investment. Consequently, fixed asset investment (FAI) growth slowed to 5.9% in 2018 from 7.2% in the previous year. Retail sales growth also slowed to 9.0% in 2018, dragged down by the soft Q4 outturn as labour market conditions weakened.

Meanwhile, ongoing US-China trade frictions dampened domestic sentiment and exacerbated the slowdown in exports alongside the downswing in the global tech cycle. The initial boost to China's exports from US firms' stockpiling activities has started to unwind, especially for goods in the earlier tariff tranches. (Chart 1.16)

Recent policy measures will help to support growth.

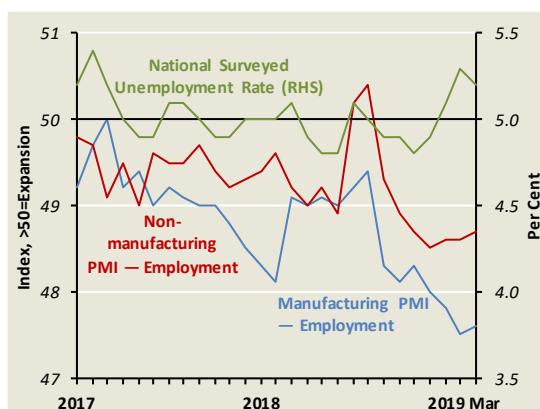
China's economic growth held steady at 6.4% y-o-y in Q1 2019, supported by accommodative policies and gradually improving sentiment. FAI has picked up on the back of higher infrastructure spending while household consumption growth also firmed as tax cuts boosted disposable incomes. Meanwhile, the labour market showed tentative signs of stabilisation in March as the national urban unemployment rate fell by 0.1% point to 5.2%, while the employment sub-indices of PMI surveys halted their decline. (Chart 1.17)

Chart 1.16
US Imports of Tariff-affected Goods from China



Source: US Census Bureau and EPG, MAS estimates
Note: Figures in parentheses denote the tariff increases.

Chart 1.17
China Employment Indicators



Source: CEIC and EPG, MAS estimates

The authorities in China have stepped up fiscal and monetary easing measures, and shifted their focus more decisively from financial deleveraging to supporting growth and stabilising employment. A range of measures were announced at the National People's Congress in March, including tax cuts and higher local government special bond issuances for infrastructure spending. At the same time, the official budget deficit target for 2019 was raised to 2.8% of GDP, from 2.6% in 2018, although the broad fiscal impulse including off-budget items will likely be significantly greater.

The authorities have also attempted to revive credit growth to head off a sharp slowdown in activity. The stock of total social financing, a broad measure of credit in the economy, grew by 10.7% y-o-y in March, up from 9.8% in December 2018. This pickup in aggregate financing has translated into an uptick in the credit impulse, which tends to lead the official manufacturing PMI by about three to four quarters. (Chart 1.18) Previous experience suggests that the full impact of policy easing on the real economy is likely to become more discernible only in the second half of 2019. Accordingly, China's growth is projected to come in at 6.2% in 2019, before easing to 6.1% in 2020.

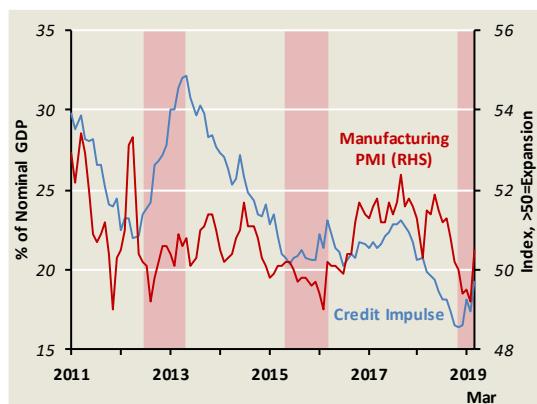
China's importance to the world economy has risen since the Global Financial Crisis.

China has become an increasingly important engine of global growth over the past decade. Its share of world nominal GDP increased from 7.2% in 2008 to 15.8% in 2018, while its share of global trade has gone up over the same period from 7.9% to 12.0%. (Chart 1.19)

In line with China's growing clout in global trade, the proportions of the G3 economies' exports going to China have risen. The share of Japan's exports to China grew from 16.0% in 2008 to 19.6% in 2018. The corresponding share for the EU increased from 1.9% in 2008 to 3.9% in 2018. As for the US, shipments to China made up 5.5% of its total exports in 2008 and reached 8.4% in 2017, before sliding to 7.2% in 2018 (in part due to the retaliatory tariffs imposed by China on US products).

To better understand the evolving impact of economic developments in China on the ASEAN-5¹, Japan, EU and US, the effects of industrial production

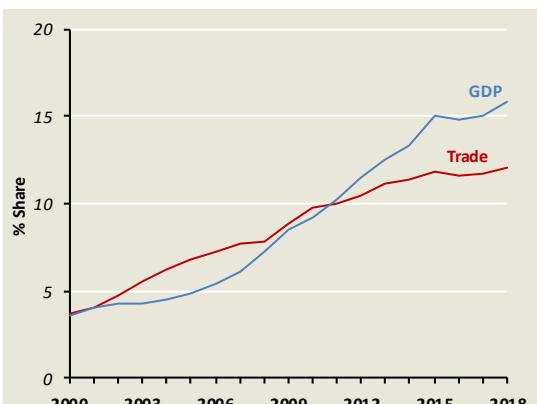
Chart 1.18
China's Credit Impulse and Manufacturing PMI



Source: Haver Analytics and EPG, MAS estimates

Note: The policy easing periods are shaded. The credit impulse is estimated as the ratio of aggregate financing flows to the four-quarter moving sum of nominal GDP.

Chart 1.19
China's Shares of World Nominal GDP and Global Trade



Source: IMF and EPG, MAS estimates

¹ The ASEAN-5 economies are Indonesia, Malaysia, the Philippines, Singapore and Thailand.

shocks in China on their respective GDPs are estimated using a vector autoregressive (VAR) model over two sub-sample periods: 2000–10 and 2010–18. The generalised impulse response functions derived from the model show that the impact on the ASEAN-5 economies was stronger in the earlier period, compared with the G3. Since then, while the impact of a positive shock to China's production on the ASEAN-5 countries has remained broadly unchanged, its effects on Japan's and the EU's GDPs have become larger. In the more recent period, a typical positive shock to China's industrial value-added growth (of about 0.8% point) raises GDP in the ASEAN-5 by about 0.54% point after two years. The corresponding impact on the G3 economies are 0.44% point for Japan, 0.25% point for the EU and 0.23% point for the US. (Chart 1.20)

Hong Kong's economic activity will ease further in 2019.

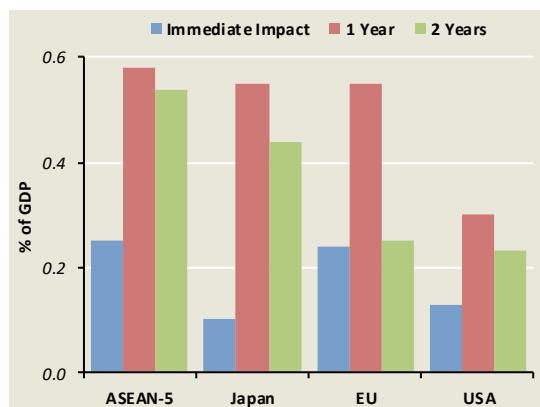
Hong Kong's real GDP growth decelerated to 1.3% y-o-y in Q4 2018, from 2.8% in Q3. On a sequential basis, the economy contracted by 1.4% q-o-q SAAR, after expanding by 0.5% in Q3. Capital spending fell in Q4, especially in the building and construction sector, as property developers adjusted to tighter domestic monetary conditions and government cooling measures in the property market. Private consumption growth also eased as wealth effects turned less supportive following corrections in the property and equity markets in the second half of 2018. (Chart 1.21) Meanwhile, export growth dipped to 0.2% y-o-y in Q4, after growing by 4.8% in Q3, amid slackening global demand as well as rising US-China trade frictions.

Looking ahead, Hong Kong's economy will continue to face headwinds in 2019, although the tight labour market and proactive fiscal policy—including short-term relief measures announced in the recent budget—should provide some support to growth. All in, the Hong Kong economy is expected to expand by 2.2% in 2019 and 2.3% in 2020, compared to 3.0% in 2018.

Slowing domestic demand will impede India's growth.

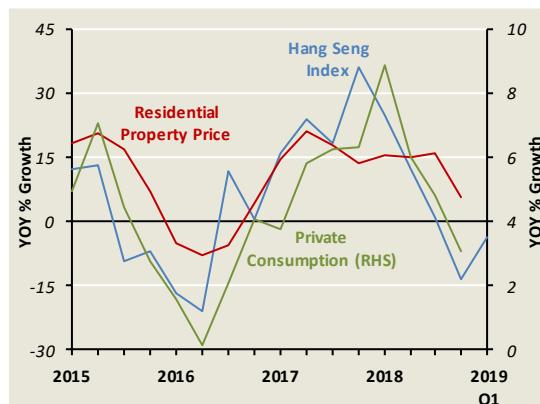
India's GDP growth moderated to 6.6% y-o-y in Q4 2018, its slowest pace since Q2 2017. The slowdown was driven mainly by weakening domestic demand. (Chart 1.22) Private consumption growth eased compared with the preceding quarter, partly due to falling food prices, which weighed on rural incomes.

Chart 1.20
Impact of a Positive China Production Shock
(Sample Period 2010–18)



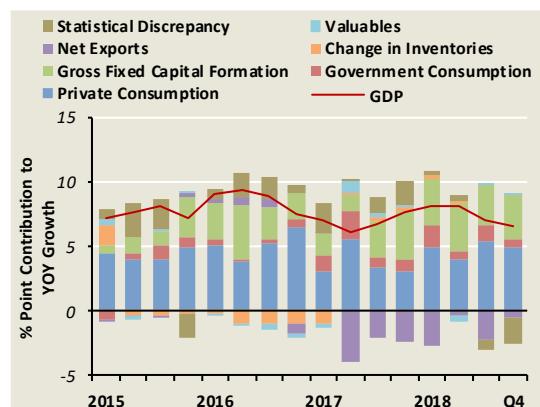
Source: Haver Analytics, Bloomberg and EPG, MAS estimates

Chart 1.21
Hong Kong Private Consumption, Equity and Property Prices



Source: CEIC and EPG, MAS estimates

Chart 1.22
Contribution to India's GDP Growth by Expenditure



Source: CEIC and EPG, MAS estimates

Meanwhile, government consumption also slowed amid fiscal consolidation as the financial year drew to a close. In contrast, gross fixed investment growth stayed resilient, while net exports also posed a smaller drag on the economy compared with previous quarters.

On a sectoral basis, the growth moderation in Q4 was driven in part by weaker expansions in the agriculture and public administration sectors, consistent with the slowdown in public consumption. Growth in the agriculture sector declined to 2.7% y-o-y from 4.2% in Q3 2018.

In the near term, high-frequency indicators suggest domestic demand in India will remain subdued. (Chart 1.23) Domestic vehicle sales fell by 14.2% y-o-y in March 2019, the fourth straight month of decline. Meanwhile, growth in machinery imports, a proxy for fixed capital investment, moderated to 15.9% y-o-y in Q1 2019 from 25.6% in Q4 2018.

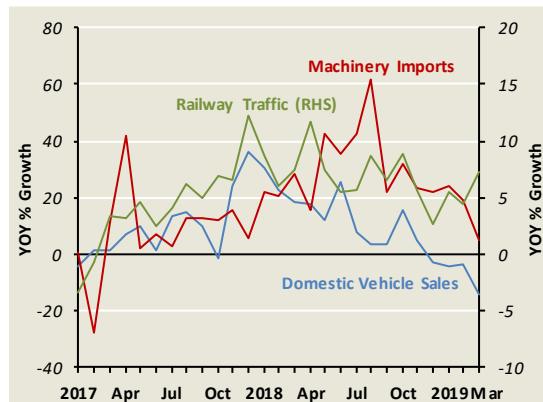
Over the next few quarters and into the medium term, economic growth is expected to remain broadly stable as more supportive policies facilitate a gradual recovery in investment and household spending. First, monetary policy has eased amid lower-than-expected headline inflation. Second, the government has opted for a more gradual pace of fiscal consolidation, thus affording it greater scope to increase public spending. On balance, growth in the Indian economy is likely to come in at 7.2% in FY2019 (ending March 2020), and pick up to 7.3% in FY2020.

The NEA-2 and ASEAN-4 economies will continue to face external headwinds in 2019.

Korea and Taiwan grew by 3.9% and 1.5% q-o-q SAAR, respectively, in Q4 2018. Net exports in both economies detracted from growth, owing to significant weakness in electronics components and softer demand from China. (Chart 1.24) However, private consumption and government spending offered some support. Construction investment growth also remained firm in both economies.

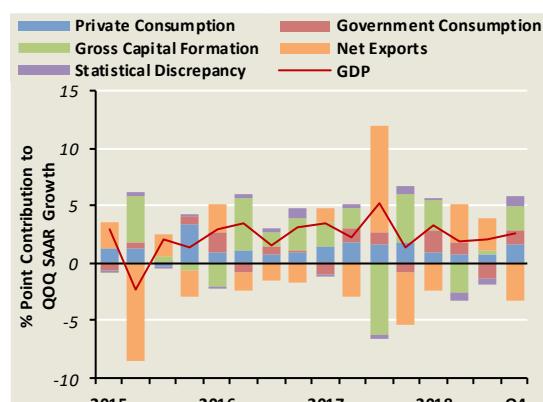
In the ASEAN-4 region, GDP growth picked up from 4.6% y-o-y in Q3 2018 to 4.8% in Q4. The expansion was undergirded by continued strength in household spending, in turn supported by favourable labour market conditions. However, investment activity in

Chart 1.23
India's Domestic Demand Indicators



Source: CEIC and EPG, MAS estimates

Chart 1.24
Contribution to Korea and Taiwan GDP Growth



Source: CEIC, Haver Analytics and EPG, MAS estimates

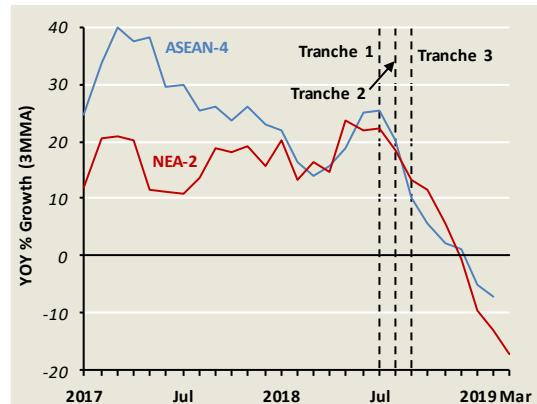
most economies slowed as business sentiment weakened and fiscal consolidation hit public investment, particularly in Indonesia and Malaysia. Meanwhile, net trade exerted a smaller drag on GDP growth compared with the previous quarter, as increases in imports decelerated by more than that of exports. Export growth has slowed partly due to the late phases of the global business and technology cycles, but also reflected negative spillovers from US-China trade frictions. In particular, ASEAN-4's export growth to China has declined sharply since Q3 last year when the first tranche of tariffs was imposed, and has fallen into negative territory in recent months. (Chart 1.25) Meanwhile, import growth of capital goods slackened in line with slowing investment activity. In Indonesia, the authorities acted to rein in the current account deficit by delaying or cutting back on public projects, thereby curbing imports of capital goods.

Looking ahead, the growth outlook for the NEA-2 and ASEAN-4 will be impacted by several common trends—the downswing of the electronics cycle, slowing growth in China and spillovers from US-China trade tensions. Leading indicators such as declining global semiconductor equipment billings suggest that the current weakness in the electronics cycle is likely to persist in the near term. Export growth has also continued to contract in both Taiwan and Korea in March 2019, as shipments of electronic components stayed weak and the associated inventory-to-shipment ratios rose. (Chart 1.26)

As discussed earlier, a production shock in China has a substantial impact on regional growth. In addition, final demand from China accounted for 5.1% of the ASEAN-4's and Vietnam's total value-added in 2015, up from 2.9% in 2005. As such, the ongoing growth deceleration in China is expected to exert a drag on the region. Taiwan will be the most severely impacted, with China accounting for almost 14% of the country's total value added. Meanwhile, Korea, Malaysia and Thailand will also be significantly affected, with demand from China accounting for 7–9% of total value added in each of these countries in 2015. (Chart 1.27)

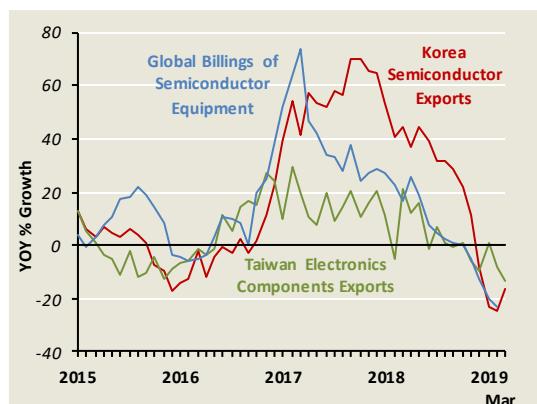
Ongoing US-China trade tensions are expected to have a mixed impact on the region in the near term. High-frequency import data from the US Census Bureau suggest that there has been some trade diversion to Korea, Taiwan and Vietnam as a result of the US-China tariffs. However, the effects were not large and it

Chart 1.25
ASEAN-4 and NEA-2 Exports to China



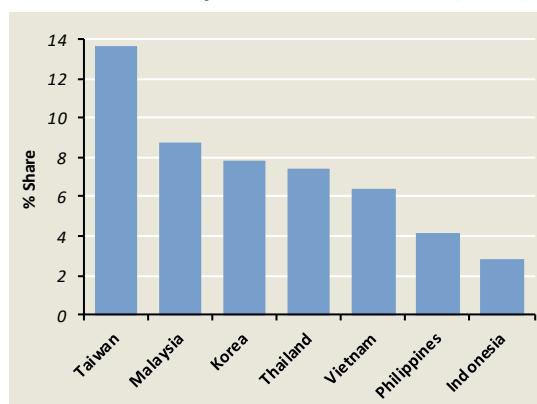
Source: CEIC and EPG, MAS estimates

Chart 1.26
Korea and Taiwan Electronic Exports and Global Billings of Semiconductor Equipment



Source: Haver Analytics and EPG, MAS estimates

Chart 1.27
Demand from China as a Share of Source Country Total Value-added (2015)



Source: OECD TiVA and EPG, MAS estimates

remains to be seen if they will be sustained. In the longer term, however, some Asian economies could benefit from a shift in production networks from China. Approvals of foreign manufacturing investment in Malaysia and the Philippines spiked in H2 2018, while Vietnam saw an upsurge in newly-registered capital in the manufacturing sector over Q2 2018 – Q1 2019. FDI approvals have also generally increased in Thailand. If these FDI trends persist, they could translate into a pickup in capex in ASEAN in the later part of 2019, while also providing evidence that the process of production relocation to ASEAN has taken root. (See Box A for an analysis of the impact of tariffs and ongoing supply chain shifts on trade and production patterns in Asia in both the short and long term.)

In sum, weak external demand will continue to hamper growth in the NEA-2 and ASEAN-4 economies in the immediate quarters ahead. Nevertheless, this will be partly ameliorated by resilient domestic demand. In Korea and Taiwan, the rotation in growth drivers is set to continue with fiscal support propping up domestic demand in 2019. Increased social transfers and job creation initiatives should boost household spending in Korea, while infrastructure spending in Taiwan would provide a lift to private investment, particularly in the construction sector. Overall, growth in the NEA-2 is expected to come in at 2.2% for both 2019 and 2020, down from the 2.6% recorded in 2018.

In the ASEAN-4 economies, private consumption should stay robust, supported by firm labour market conditions. Fiscal measures will also help to lift growth, especially in Indonesia, the Philippines and Thailand. For instance, the Indonesian government doubled its expenditure on the Family Hope Program while the Thai government provided a one-off handout at the start of the year, aimed at assisting low-income households. Average growth in the ASEAN-4 economies is projected to slow to 4.7% in 2019 and 4.6% in 2020, from 4.9% in 2018.

1.3 Global Inflation

Muted Demand-side Pressures

Consumer prices around the world rose at a slower pace in the last quarter of 2018 and softened further in early 2019, in line with the deceleration in economic growth, and reinforced by a sharp drop in oil prices towards the end of the year. Meanwhile, a gradual pickup in wages has yet to feed through to prices. Consequently, inflation continued to fall short of policy targets across the G3. In Asia ex-Japan, average CPI inflation eased on the back of lower food and fuel prices. Global headline inflation is projected to ease to 1.5% in 2019 from 2.2% in 2018, before rising to 2.0% in 2020.

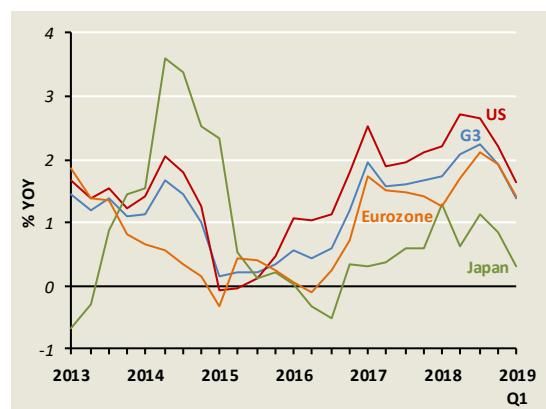
G3 inflation has eased and is projected to remain modest.

Average CPI inflation in the G3 eased in Q1 2019 on the back of lower energy prices and softening demand pressures. (Chart 1.28) In the US, inflation remained modest, despite a pickup in nominal wage growth. Both the headline and core PCE inflation came in at 1.9% y-o-y in Q4 2018—below the US Federal Reserve’s 2% target—and eased to 1.4% and 1.8%, respectively, in January 2019. Labour productivity picked up to 1.3% in 2018, compared to an average of 0.8% per annum from 2012–17, which may have helped to contain prices. The US core PCE inflation rate is expected to hover around 2% in the coming quarters.

In the Eurozone, headline CPI inflation slipped to 1.4% y-o-y in Q1 2019 from 1.9% in Q4 2018, led by lower energy and unprocessed food prices. Although core inflation remained steady at 1.0%, it is still expected to rise gradually, driven by strengthening wage growth and a steady increase in producer price inflation.

In Japan, headline CPI inflation moderated sharply to 0.3% y-o-y in Q1 2019 from 0.9% in the preceding quarter, as the boost to fresh food prices caused by the Hokkaido earthquake continued to wane. Core inflation, however, held relatively steady at 0.8% y-o-y in Q1, down from 0.9% in Q4 2018. Looking ahead, underlying inflation is expected to pick up, albeit temporarily, with the tax hike contributing around 0.2% point and 0.1% point to consumer prices in FY2019 and FY2020, respectively. While some further cost pressures may result from the labour shortage in Japan, the outcome is more likely to be a squeeze on corporate profits rather than a pass-through to prices. Overall, G3 inflation is projected to fall to 1.5% this year, before rising to 1.8% in 2020.

**Chart 1.28
G3 CPI Inflation**



Source: Haver Analytics and EPG, MAS estimates

Inflation in Asia ex-Japan is expected to be stable.

Inflation in most Asia ex-Japan economies softened further in Q1 2019, bringing the average rate to 1.9% y-o-y from 2.3% in Q4 2018. (Chart 1.29) Headline inflation in the region is projected to remain relatively stable at 2.4% this year, and increase slightly to 2.6% in 2020, supported by firm domestic demand.

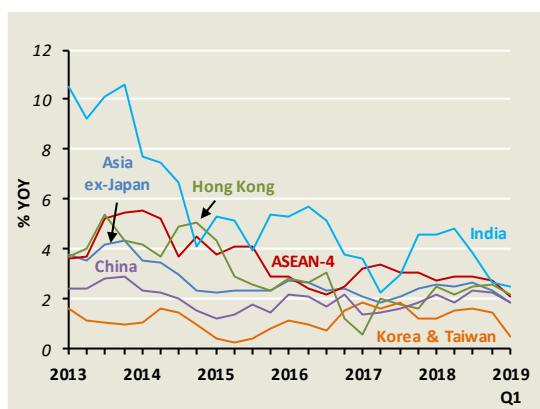
Price pressures in China have picked up slightly, mainly due to higher pork and regulated oil prices. CPI inflation rose to a five-month high of 2.3% y-o-y in March, while the PPI increased by 0.4% y-o-y, partly due to seasonal influences caused by the timing of the Lunar New Year. Given that inflationary pressures are likely to remain muted reflecting relatively modest growth prospects, CPI inflation is expected to come in at 2.1% in 2019–20.

India's CPI inflation eased slightly to 2.5% y-o-y in Q1, partly on account of active supply management policies which tempered food prices. Core inflation eased to 5.5% in the quarter from 5.7% in Q4 2018, on the back of muted domestic demand. Inflation in India is expected to remain modest in the coming months, although pre-election spending could contribute to mild demand-pull pressures. CPI inflation is projected come in at 3.9% in FY2019, before rising to 4.3% in FY2020.

After rising slightly in Q4 2018 due to higher prices for housing rentals and utilities, Hong Kong's headline inflation fell back to 2.2% y-o-y in Q1 2019 on account of lower food price inflation and government relief measures, including public housing rental waivers and electricity charge subsidies. Meanwhile, relative to H2 2018, CPI inflation in Korea and Taiwan decelerated to 0.5% y-o-y and 0.3% in Q1 2019 due to weaker non-food prices. Inflationary pressures in all three economies are expected to weaken in 2019, largely due to a softening in demand amid slower growth as well as lower energy prices. On average, inflation in the NEA-3 is projected at 1.3% in 2019 and 1.6% in 2020.

Amid smaller increases in food prices, average inflation in the ASEAN-4 came in at 2.8% y-o-y in Q4 2018 and declined further to 2.1% in Q1 2019. Government measures, such as changes in Malaysia's fuel pricing mechanism and the switch from a quota to a tariff system for rice imports in the Philippines, helped to ease upward pressure on prices. Overall, headline inflation across the ASEAN-4 is projected to be broadly stable at 2.6% in 2019, and rise to 3.0% in 2020.

Chart 1.29
Asia ex-Japan CPI Inflation



Source: Haver Analytics and EPG, MAS estimates

Box A**Regional Trade Diversion and Production Relocation: A Simulation from a CGE Model^{1/}*****Introduction***

The contours of Asian trade and production are being reshaped by the ongoing reconfiguration of supply chains. In recent years, Chinese firms and foreign MNCs have increasingly diversified their production bases into other Asian economies in an environment of shifting comparative advantages.^{2/} This process could be expedited by the current US-China tariffs as firms relocate their production away from China. To shed some light on the potential outcomes, this box presents a production relocation scenario, based on simulations of a computable general equilibrium (CGE) model of the world economy that takes into account the tariffs in force.

The box is divided into two parts: in the first, the short-term impact of tariffs levied by the US and China are simulated. Due to the higher import prices that result and the immobility of factors of production in the short run, there would be some degree of trade diversion to producers outside of the US and China. The attendant changes in the prices and trade flows of selected key products, and the economies that are likely to gain export shares, are discussed.

From a longer-term perspective, production relocation from China to the rest of Asia is already underway due to shifts in competitiveness arising mainly from rising labour costs in China, as well as concurrent improvements in the investment climate elsewhere.^{3/} This process is likely to gather pace in the next few years, with some foreign direct investment (FDI) being diverted to the other regional economies, particularly the ASEAN countries. In the second part of this box, a scenario capturing such a shift in the pattern of investment flows, incorporating demographic changes, is simulated to examine the gains to real incomes and welfare.

Model and Assumptions

The quantitative analysis of the impact of tariff measures on global production, prices and trade flows (at both the aggregate and sectoral levels) is undertaken using the Global Trade Analysis Project (GTAP) model, a widely-used tool for trade and policy analysis. The GTAP model is a multi-country, multi-sector CGE model, with built-in assumptions of perfectly competitive firms and constant returns to scale. Regions and sectors are linked through trade flows, which are in turn determined by the optimising decisions of firms, households, governments and investors. The model can allow production and trade patterns to adjust at the sectoral level in response to policy changes and shifts in factor endowments. In addition, it captures inter-country linkages through global value chains (GVCs) by including tradable intermediate inputs used in production in an input-output accounting framework.^{4/}

The model specifications underpinning the empirical analysis are set out in Table A1. In the simulation exercises, 20 countries/regions are covered, of which 14 are in Asia. For each country/region, production is disaggregated into 28 sectors, with 20 of them being manufacturing-based. To simulate the impact of the US-China tariffs, weighted tariff rates for each commodity group are computed by applying the rates announced by the respective countries on 2017 trade data.

^{1/} This feature is a collaborative project between the economists in EPG, MAS and the ASEAN+3 Macroeconomic Research Office (AMRO), and does not necessarily represent the official views of AMRO or MAS.

^{2/} The Asian economies covered in this study are shown in Table A1.

^{3/} Special Feature C on “The Changing Labour Landscape in Emerging Asia: Challenges and Opportunities” in the April 2015 issue of the *Macroeconomic Review* provides a more detailed discussion of the key beneficiary economies of the ongoing shift in production from China to the region.

^{4/} For details, please refer to Corong *et al.* (2017). The analysis utilises GTAP Database version 9A from the Center for Global Trade Analysis, Purdue University, with reference year 2011 as the baseline.

At the broad level, the US measures involve tariff rates of 25% on US\$50 billion of imports from China and 10% on another US\$200 billion worth of goods. The types of products affected initially included predominantly capital and intermediate goods such as engine parts, semiconductors, telecommunications equipment and computer parts, but the most recent measures covered some consumption goods such as furniture, lamps, computers and resource-based products. In response to the US actions, the Chinese government imposed 25% tariffs on US\$50 billion of imports from the US, and 5–10% tariffs on an additional US\$60 billion of US products. These range from medical equipment to milking machines and soybeans.

Table A1
GTAP Model Specifications

Model Specifications	
Regions	China, Hong Kong, Korea, Taiwan, Singapore, Indonesia, Malaysia, Philippines, Thailand, Cambodia, Lao PDR, Vietnam, India, Japan, US, Canada, Mexico, European Union, Oceania (Australia and New Zealand) and Rest of the World.
Sectors	Crops, Animal Products, Forestry, Fishing, Coal, Oil, Gas, Mining, Meat, Processed Food, Textiles, Wearing Apparels, Basic Manufacturing, Petrol, Chemicals, Mineral Products, Metals, Transport Equipment, Electronics, Machineries, Utilities, Construction, Trade, Transport, Communication, Financial, Business Services and Other Services.
Factor Endowments	Land and Natural Resource, Labour (Skilled and Unskilled), and Capital.

The GTAP is a comparative static model. Accordingly, the long-run simulation is conducted by running the model iteratively over five years to capture the cumulative impact of investment decisions. Labour endowments are set exogenously, based on the United Nations' demographic projections, while productivity growth is assumed to follow a pre-determined trend. The model generates investment endogenously in response to changes in its determinants, including rates of return across sectors or countries, thus changing the future paths of capital stocks in each economy. Both labour and capital are assumed to be perfectly mobile across the sectors of a country or region.

The model solutions for each year take into account the impact of the US and China tariffs, and these are overlaid with the effects of FDI diversion from China to the rest of the region.^{5/} Specifically, it is assumed that the growth in China's domestic capital stock slows gradually, by 0.5% point per annum on average over the next five years as Chinese firms increase their outward investments due to the US tariffs and rising domestic production costs, and foreign firms also divert some investments to other parts of the region.^{6/} The boost in greenfield FDI inflows into these economies would have positive spillover effects by stimulating the growth of upstream and downstream industries, and encouraging infrastructural improvements.

Accordingly, the difference in China's capital stock in this scenario, and one in which its growth is maintained at firmer rates, is then distributed among the other 13 economies in Asia. Thus, at the beginning of each period, every regional economy except China would receive an exogenous boost to the capital stock that was inherited from the previous period. The allocation of FDI flows (and hence increase in capital stock) to each

^{5/} Note that FDI does not enter as a variable in the GTAP model directly. As such, the diversion of investment flows from China to the rest of Asia has to be exogenously assumed and modelled. It is also assumed that the additional inflow of FDI due to production relocation causes other components of investment to increase proportionally, such that the change in overall capital stock will be proportional to the additional inflow.

^{6/} The assumed rate of decline in the growth of China's capital stock is based on the average rate of deceleration observed over 2010–14 (2014 is the most recent datapoint available from the Penn World Tables).

economy is in turn determined by its relative attractiveness to foreign investors, which is postulated to depend on relative labour costs, and the quality of infrastructure and institutions.^{7/}

Empirical Findings

Short-term Trade Effects

The imposition of US-China trade tariffs would have differential impacts across countries/regions and sectors in the short run, depending on consumer preferences and production costs. Given the nature and setup of the GTAP model, the simulation results may not fully capture the negative income or confidence effects on the rest of the world that result from slower growth in the US and China. Nonetheless, the rich trade and production structure of the model is well-suited for quantifying the varied impact of higher tariff barriers on individual sectors within each country. This section focuses on the impact for three sectors of interest—electronics, machinery and equipment (henceforth “machinery”) and crops. The electronics and machinery sectors are two of the largest export industries in the Asian region, while crops such as soybeans have featured prominently in China’s tariffs on US products.

Initially, the imposition of US tariffs on goods from China drive up the import prices faced by US consumers and producers, leading to a cutback in imports and a corresponding fall in demand. The simulation results suggest that the import prices of electronics products and machinery would both increase by 2.4%. The higher import prices in turn put US domestic producers at a competitive advantage and they produce more to satisfy the increased home demand for their goods. As a result, firms produce less for export, causing the export quantities of electronics and machinery to fall by 8.7% and 4.9%, respectively.

Conversely for China, electronics and machinery exports fall by 2.0% and 4.8%, resulting in 0.3% and 0.6% point declines in the country’s global export shares of these products. Due to reduced demand from US importers, China’s export prices for electronics and machinery fall by 0.9% in both cases.^{8/} Elsewhere in Asia, production of electronics and machinery would also be cut back given their strong GVC linkages to China in these industries. However, there are offsetting effects that cause these countries’ exports to rise. First, as a result of higher import prices for China’s goods, US firms would seek alternative suppliers in countries other than China. Second, production in Asia ex-China countries would be stimulated by access to cheaper intermediate inputs of electronics and machinery from China.

The model simulation results suggest that for most economies in the region, such pure trade diversion effects and the availability of cheaper inputs mitigate the output losses due to production linkages with China. As expected, Japan, Korea and Taiwan gained the largest global export shares, amounting to about 0.1% point each, reflecting their leading positions as electronics producers in the region. ASEAN electronics manufacturers located in Malaysia, Singapore and Thailand would see somewhat smaller increases in export shares of about 0.05% point each. (Chart A1) For machinery exports, Japan recorded the largest gain in market share, of 0.14% point, followed by Korea and Taiwan with gains of about 0.04% point each. For Asia ex-China as a whole, a net gain of 0.5% point in the export share for electronics goods is recorded, and the corresponding estimate is 0.3% point for machinery. (Chart A2)

^{7/} The increase in capital stock is distributed among the economies according to their normalised scores for attractiveness to foreign investment, which are obtained from equally-weighted scores for wage cost, infrastructural and institutional quality. The scores for wage cost are based on the annual salary of manufacturing workers in various economies relative to China, obtained from the 2018 *JETRO Survey on Business Conditions of Japanese Companies in Asia and Oceania*. The scores for the quality of infrastructure and institutions are based on the World Economic Forum’s respective sub-indices in the 2018 Global Competitiveness Index.

^{8/} Within the GTAP model, shifts in demand between goods from different sources are modelled using Armington import substitution functions, with goods coming from different sources considered to be imperfect substitutes. Hence, the export prices of goods produced in individual economies can deviate from each other.

At the same time, China's retaliatory tariffs result in a 5.6% increase in its import prices for crops and a corresponding 8.5% fall in the import quantity. Domestic production of crops increases to offset some but not all of the reduction in imports, engendering a spike in the domestic supply price and causing crop exports to fall. Consequently, both the US and China lose global market shares in agricultural and related products. Instead, countries and regions that have comparative advantages in these goods show the largest export gains, namely, the EU, Canada, Australia and New Zealand, and Rest of the World (which includes large agrarian producers such as Brazil).

Chart A1
Electronics: Changes in Global Export Shares

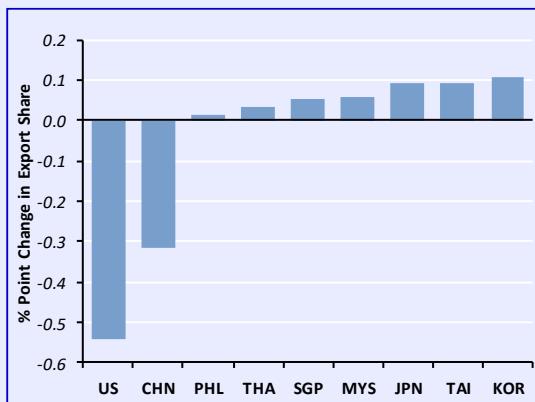
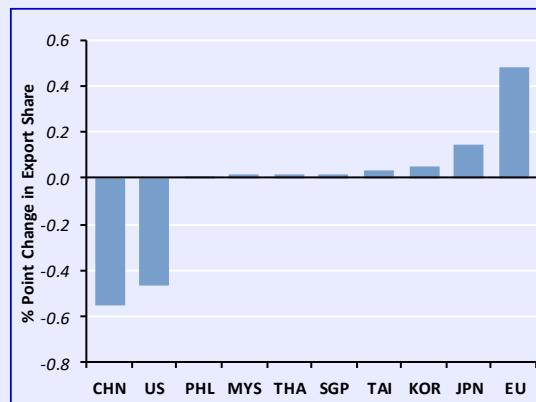


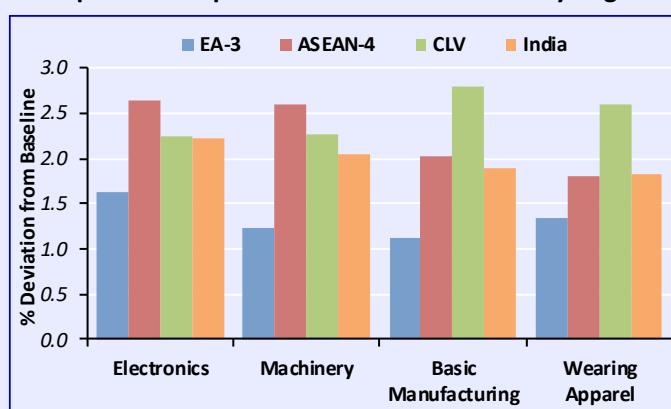
Chart A2
Machinery: Changes in Global Export Shares



Longer-term Production Reconfiguration

In the medium to long term, the diversion of FDI from China, hastened by US tariffs, will bring about a moderate reconfiguration of production structures and GVCs in the Asian region. This process will affect a broad swathe of sectors in China—both higher value-added industries such as electronics and machinery, and lower value-added ones such as the production of metal and wood, paper and other products (basic manufacturing). (Chart A3)

Chart A3
Long-run Impact on Output of Selected Sectors for Key Regions in Asia



Note: The EA-3 consists of Korea, Singapore and Taiwan. CLV consists of Cambodia, Lao PDR and Vietnam.

The simulation results suggest that the ASEAN-4 countries would benefit the most from the shift in manufacturing investment from China to the rest of the region. These economies offer an attractive investment proposition for industries exiting China, given their relatively youthful workforces and lower labour costs *vis-à-vis* Korea, Singapore and Taiwan, and improved infrastructural quality and governance relative to the other lower-income countries in the region. Higher value-added sectors such as electronics and

machinery would see the strongest output gains, followed by lower value-added activities such as basic manufacturing and wearing apparel.

Among the ASEAN-4 economies, Malaysia is expected to see the strongest production gains in electronics and machinery, given that the country already hosts a relatively large production base. The other ASEAN economies of Cambodia, Lao PDR, and Vietnam (CLV) would see the largest gain in basic manufacturing and wearing apparel.^{9/} This reflects their comparative advantage of an abundant supply of low-cost and low-skilled labour. India is also expected to record sizeable gains across a range of sectors, including metal products, electronics, machinery and wearing apparel. Meanwhile, the more technologically advanced but labour scarce economies of Korea, Singapore and Taiwan would see output increases in higher value-added sectors such as electronics and machinery, though to a lesser extent than in the ASEAN-4 and CLV countries.

Aggregating the sectoral output outcomes allows the simulation results to be expressed as changes in real GDP, which provide a more general measure of welfare. The GTAP results show that economies other than China will experience real income gains in the longer run due to production relocation, although the distribution varies across countries (between 0.9% to 2.0%). China's real income is estimated to fall by 1.0%, which is offset by a gain of 1.1% in the rest of Asia, resulting in an income increase of 0.3% for Asia as a whole. Economies in ASEAN are among the key beneficiaries, particularly Malaysia and the Philippines (average 2.0%). The advanced economies of Korea and Taiwan would also receive net welfare gains (average 1.0%), although the positive impact is smaller.

Sum-up

This Box has examined the short and longer-term consequences of the US-China tariffs and reconfiguration of supply chains on the region's trade flows and production patterns. Two key findings were obtained from the simulation of a possible future scenario based on an applied CGE model. First, abstracting from global income and confidence effects in the short run, the analysis focused on the relative price impact of the tariffs and found that the US and China would cede global export shares in the affected products, while the rest of Asia benefits modestly from cheaper intermediate inputs as well as US demand diverted from China.

In the longer term, as investment is redirected from China to the rest of the region, all economies in Asia will experience a gain in real income, although to varying degrees. Broadly, the ASEAN-4 economies will see the largest improvements, followed by the CLV and India, with the advanced economies in Asia receiving positive but generally smaller gains in welfare.

While the simulations provide useful insights into the intricate optimising and resource reallocation decisions that take place across the regional trade and production networks, several caveats are in order. First, the model is based on the structure of the economies as at 2011, and there could have been substantial changes in input-output and other relationships since then, particularly for fast-growing economies. Most noticeably, the simulations did not identify particularly strong gains for Vietnam's manufacturing sector from trade diversion and production relocation, even though recent trends in inward investment suggest that the burgeoning electronics industry in the country would have benefitted more.^{10/} Second, the quantitative results from the model simulations rest on important assumptions, including the calibration of the quantum of investment diversion from China, which is subject to considerable uncertainty in view of the multiple factors affecting firms' decisions on where to locate production. Third, it assumes that there is no subsequent round of tariff increases i.e., the production that has been relocated away from China would not be subject to higher tariff rates. Fourth, the version of the GTAP model utilised here assumes perfect competition—the robustness of the results to alternative market structures and refinements such as firm heterogeneity can be investigated in future work.

^{9/} Results for Myanmar are not available as it is not included as a separate economy in the GTAP database.

^{10/} Since 2011, the structure of Vietnam's economy has changed significantly, with production moving from agriculture to industry and construction. Correspondingly, exports have diversified from primary products to manufactures. Within manufacturing, the electronics industry has expanded rapidly in recent years.

References

- Center for Global Trade Analysis, "GTAP Resources: Frequently Asked Questions", (URL: https://www.gtap.agecon.purdue.edu/resources/faqs/faqs_display.asp?F_ID=147).
- Corong E L, Hertel T W, McDougall R, Tsigas M E and van der Mensbrugghe, D (2017), "The Standard GTAP Model, Version 7", *Journal of Global Economic Analysis*, Vol. 2(1), pp. 1–119.
- Hertel, T W (1997), *Global Trade Analysis: Modeling and Applications*, Cambridge University Press.
- Japan External Trade Organization (2018), *JETRO Survey on Business Conditions of Japanese Companies in Asia and Oceania*, December 2018.
- Monetary Authority of Singapore (2015), "The Changing Labour Landscape in Emerging Asia: Challenges and Opportunities", *Macroeconomic Review*, Vol. XIV(I), pp. 94–103.
- Rosyadi, S A and Widodo, T (2017), "Impacts of Donald Trump's Tariff Increase against China on Global Economy: Global Trade Analysis Project (GTAP) Model", Munich Personal RePEc Archive, (URL: <https://mpra.ub.uni-muenchen.de/79493/>).
- World Economic Forum (2018), *The Global Competitiveness Report 2018*, World Economic Forum.

Chapter 2

The Singapore Economy

2 The Singapore Economy

Following several quarters of above-potential growth, the Singapore economy experienced a step-down in growth in Q4 2018 and Q1 2019. The moderation was mainly driven by weakness in the trade-related cluster, especially in electronics-related production and trade, alongside the downswing of the global electronics cycle. Amid the negative cyclical impulses imparted by external developments, there were pockets of support from the modern services and domestic-oriented clusters. Notably, activities related to digitalisation continued to outperform the overall economy, underpinned by robust structural demand.

The domestic economic outlook over the next few quarters continues to be clouded by uncertainty in the global economy. Broadly, the subdued prospects for global growth will weigh on the externally-oriented segments in Singapore. Further, the global electronics sector faces significant headwinds owing to market oversupply, exacerbated by the softening of demand due to the uncertain business environment. Given the external challenges, the Singapore economy will have to turn towards domestic drivers for growth this year. This will be led by the ongoing expansion in services arising from the digital transformation of the economy and the recovery of the construction sector. Meanwhile, the broadly supportive conditions in the domestic labour market should benefit consumer-facing industries. Overall, barring a significant setback in global growth, Singapore's GDP growth in 2019 is expected to come in slightly below the mid-point of the 1.5–3.5% forecast range.

Beyond short-term cyclical developments, the Singapore economy will be influenced by differential productivity performances of the tradable and non-tradable sectors, which reflects in part their structural differences. There is, however, scope for the productivity gap to narrow. This can be achieved by increasing the exportability of goods and services in the non-tradable sector, as well as strengthening the linkages between the two sectors, which will generate positive spillovers to the non-tradable sector.

2.1 Recent Economic Developments

Evidence of Growth Weakness

The Singapore economy expanded at a slower pace in the last two quarters. This growth step-down can be attributed mainly to weakness in the trade-related cluster, particularly electronics-related production and trade. Certain pockets in the modern services cluster, such as the externally-oriented segments of financial intermediation, also showed signs of sluggishness amid the downturn in the Chinese economy and the maturation of the global economic cycle. Nonetheless, the modern services cluster provided the key support to GDP growth, underpinned by the robust expansion of digital-related activities. Meanwhile, the domestic-oriented cluster saw an uptick in activity, alongside the recovery of the construction sector.

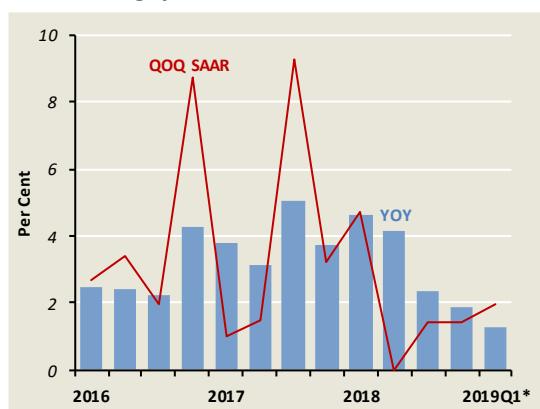
The pace of expansion of the Singapore economy has slowed further.

In the last two quarters, the domestic economy continued its transition to a slower pace of expansion, which began in Q3 2018. Real GDP grew by an average of 1.6% y-o-y in Q4 2018 and Q1 2019, a step down from 3.3% posted in the two preceding quarters. (Chart 2.1) On a q-o-q SAAR basis, growth of the Singapore economy averaged 1.7% in Q4 2018 – Q1 2019, following from 0.7% in the previous two quarters.

EPG's Economic Activity Index (EAI)¹ suggests that the weakening in growth on a year-ago basis largely reflected the drag from the trade-related cluster. (Chart 2.2) In particular, IT-related activities such as electronics production, subtracted from growth for the first time since Q1 2016. In comparison, the contribution to growth from the modern services cluster remained firm. Meanwhile, green shoots have emerged in the previously lacklustre domestic-oriented cluster, as the construction sector expanded for the first time in ten quarters.

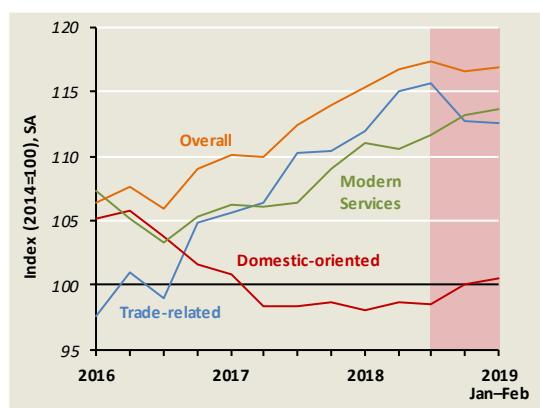
A detailed analysis of industries across the domestic economy points to a dip in the mean and median of Singapore's value-added (VA) growth distribution (i.e., shift to the left) in Q4 2018 – Q1 2019 compared to Q2–Q3 2018. (Chart 2.3) This was due in part to the deterioration in IT-related production and trade, as well as the decline in segments such as security dealings and financial intermediation. The distribution also displayed a lower degree of kurtosis in Q4 2018 – Q1 2019, reflecting a more compressed growth profile with less extreme deviations. Former outliers, which came

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 Singapore economy.

mainly from the trade-related cluster, recorded a narrower range of outturns in the recent two quarters.

Trade-related activity moderated following the downturn in the global tech cycle and softer external environment.

Within the trade-related cluster, the softening in activity was most evident in the manufacturing sector, which contracted by 1.9% y-o-y in Q1 2019, the first quarterly decline in three years. The pullback in the electronics-related segments² outweighed the modest gains in the non-electronics segments. In particular, the semiconductors segment shrank by 0.9% in Jan–Feb 2019, in tandem with the decline in global chip sales. Similarly, production in the precision engineering cluster saw a 16% cutback amid waning upstream demand for semiconductor equipment.

More broadly, global trade volumes had begun contracting towards the end of 2018. In Singapore, real total exports started to fall on a year-ago basis since December 2018. Sea cargo handled at Singapore's ports also fell by an average of 1.4% between Q4 2018 and Q1 2019.

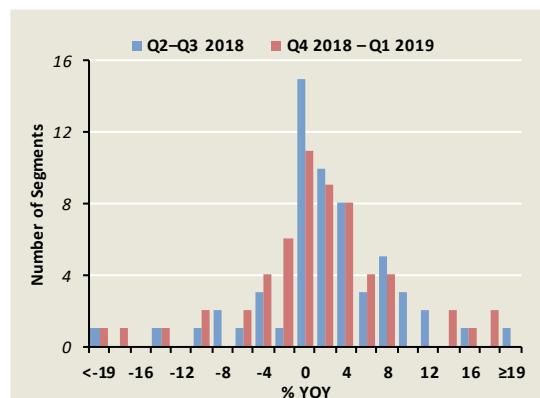
Nevertheless, there were other manufacturing industries which turned in creditable performances. For instance, the traditionally volatile biomedical cluster expanded by 11.6% y-o-y in Jan–Feb 2019, while the transport engineering cluster grew by 7.5%, supported by healthy demand for aircraft maintenance work.

While modern services remain a key pillar of growth, weakness has emerged in some segments.

The modern services cluster was the main driver of domestic economic growth in Q4 2018 and Q1 2019. Specifically, the 'others' segment in financial services registered strong gains due to the robust performance of payment-related activities. Resilient demand for insurance products, as well as the continued boost from capacity expansions in the reinsurance sub-segment, also bolstered growth.

However, pockets of weakness have emerged more recently. Financial intermediation has moderated, weighed down by the slowing Chinese economy and maturation of the global economic cycle. Growth in

Chart 2.3
Distribution of Industry VA Growth



Source: EPG, MAS estimates

² These segments include electronics manufacturing, precision engineering, and part of wholesale trade and transportation & storage.

ACU non-bank loans fell to a 22-month low of 1.3% y-o-y in February 2019 amid waning loan demand from East Asia. At the same time, the growth of DBU non-bank loans to the general commerce sector turned more negative—outstanding loans contracted by 7.7% in February, the largest decline on a year-ago basis since end-2016.

Meanwhile, heightened uncertainty in the external environment cast a pall over sentiment-sensitive segments like security dealings and fund management. Total forex and stock market turnovers have fallen sharply by 7.5% in February 2019 and 40.2% y-o-y in Q1 2019 respectively, on poorer risk appetite.

Within the business services sector, real estate activities were buttressed by improvements in the construction sector. Growth in the ICT sector also stayed firm, owing to healthy demand for corporate IT solutions.

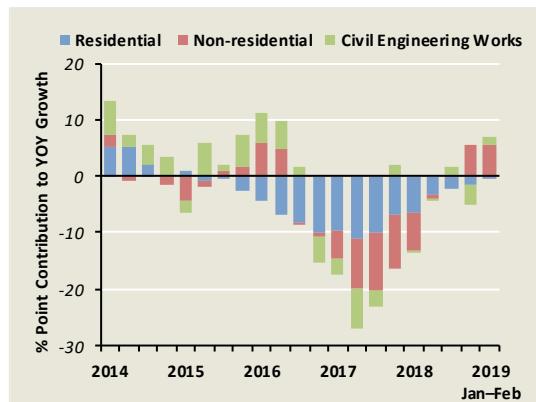
There are nascent signs of recovery in the domestic-oriented cluster.

Following a protracted period of weakness, the domestic-oriented industries finally saw signs of improvement. Notably, the construction sector contracted marginally in Q4, before posting growth of 1.4% in Q1, the first expansion in ten quarters. The turnaround was supported by a surge in the non-residential segment as well as the dissipation of sluggishness in the residential segment. (Chart 2.4) Specifically, certified payments for industrial projects increased by 57.1% y-o-y in Oct 2018 – Feb 2019, due to the ramping up of new projects, which included semiconductor fabrication plants and data centres.

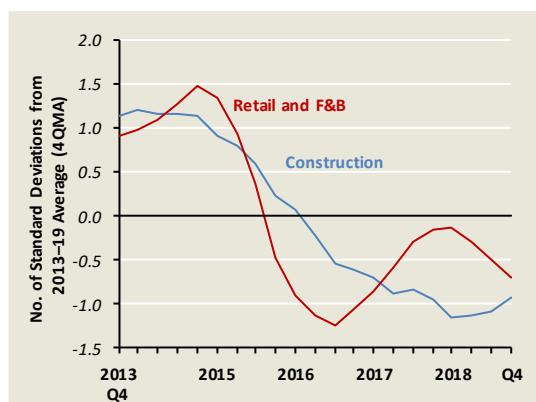
Although slack is still evident, EPG's factor utilisation indicator³ for the construction sector shows a tentative bottoming out over the past two quarters. (Chart 2.5) Data from the Singapore Commercial Credit Bureau also point to a mild improvement in the proportion of delayed payments in the sector, from 47.3% in Q2–Q3 2018 to 45.5% in Q4 2018 – Q1 2019.

While consumer sentiment remained firm, this has not translated into a boost for F&B, and retail sales. Retail sales volumes (excluding motor vehicles) declined on

**Chart 2.4
Certified Construction Payments**



**Chart 2.5
Factor Utilisation in the Construction, Retail and F&B Sectors**



Source: EPG, MAS estimates

³ The factor utilisation indicator measures 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.

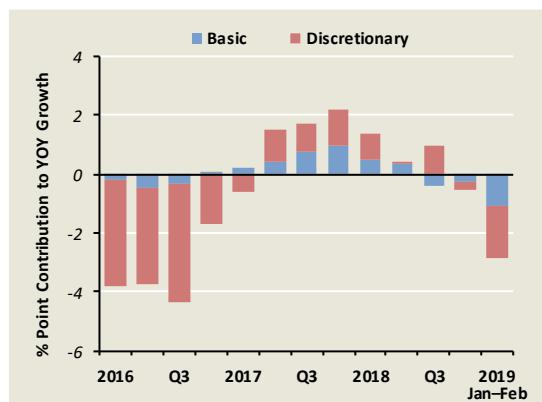
a year-ago basis in Q4 2018 and early 2019. (Chart 2.6) Nonetheless, motor vehicle sales rebounded by an average of 10.6% y-o-y in Jan–Feb 2019, a reversal of the 11.1% decline in Q4 2018.

Meanwhile, F&B spending expanded by 1.6% in Q4, but dipped to 0.2% in Jan–Feb 2019, following modest gains of 0.2% in Q2–Q3 2018. The sluggish performance is congruent with EPG's factor utilisation indicator for the retail and F&B segments, which shows that there is still considerable slack overall. Indeed, these industries have scaled back on employment over the past year. (Chart 2.7)

The tourism-related industries cooled in Q1.

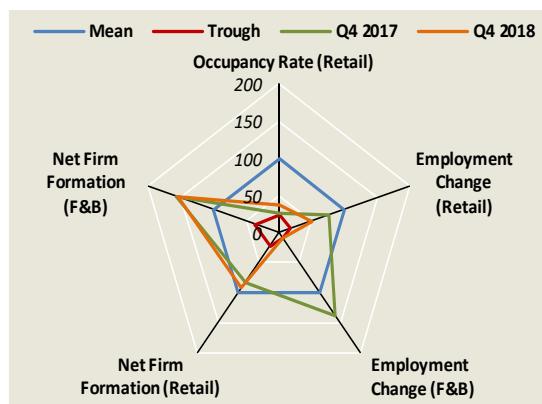
Growth in tourist arrivals, which averaged a robust 7.5% y-o-y in Q2–Q3 2018, declined to 2.3% between Oct 2018 – Feb 2019, with the dips seen across all source countries. Nonetheless, revenue per available room⁴ slipped only marginally as higher average room rates for luxury hotels partially offset the mild decline in overall occupancy.

Chart 2.6
**Growth in Retail Sales Volumes
(Excluding Motor Vehicles)**



Source: EPG, MAS estimates

Chart 2.7
**Factor Utilisation Indicators for
Retail and F&B**



Source: EPG, MAS estimates

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

⁴

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

2.2 Economic Outlook

An Uncertain Growth Trajectory

Looking ahead, slower economic growth in Singapore's key trading partners will continue to weigh on the economy, especially the trade-related sectors. The downswing of the global electronics cycle will also pose a further drag on electronics-related production and trade. However, upsides in modern services arising from digital transformation as well as domestic-oriented activities should provide some support to growth. Within modern services, the expansion of payment processing and ICT services is set to persist. Meanwhile, the domestic-oriented cluster should be aided by the recovery of the construction sector and steady private consumption growth, reflecting a supportive labour market. In all, Singapore's GDP growth is expected to come in slightly below the mid-point of the 1.5–3.5% forecast range in 2019.

Slower growth in its key trading partners will weigh on the domestic economy in 2019.

Global growth eased considerably in Q4 2018 as a deceleration in China rippled out to other economies via weaker trade flows, exacerbated by trade tensions. This has carried over into 2019. Higher-frequency data suggest that the downswing, centred on industrial production and trade, has persisted into Q1. However, broader activity measures including those for services have thus far been more resilient.

Subdued global growth in 2019 will exert a drag on the Singapore economy. Based on the OECD's Trade in Value-Added (TiVA) estimates, the four economic regions/partners with the largest final demand impact on the domestic economy, namely China, ASEAN-5⁵, the Eurozone and the US, collectively account for some 30% of Singapore's GDP. Thus, the expected moderation of growth in these economies will make a discernible dent directly and through global supply chain linkages with the negative effects largely concentrated in sectors which are more exposed to foreign final demand, such as trade services and pockets of modern services.

With demand from Singapore's key export markets softening, its impact has already been reflected in domestic economic indicators. (Table 2.1) Broadly, growth of exports to these markets, including tourist arrivals, have lost momentum over the last six months. The exception is Singapore's exports to China, which rebounded in Q1 2019 on the back of an increase in exports of chemical products, following four consecutive quarters of contraction.

⁵ The ASEAN-5 economies are Indonesia, Malaysia, the Philippines, Vietnam and Thailand.

Table 2.1
Differences in YOY Growth by Export Market, Q4 2018 – Q1 2019 vs Q2–Q3 2018

	Exports	Domestic Exports	Re-exports	Tourist Arrivals*		Non-bank Lending*
China	5.6	0.1	12.3	-7.9	East Asia	-14.2
ASEAN-5	-15.0	-21.9	-8.4	-7.6		
NEA-3	3.5	-0.5	6.5	3.4		
Japan	-12.1	-32.0	6.2	-6.4		
Eurozone	-9.0	-17.5	4.5	-4.1**	Europe	-2.5
US	-5.9	-20.9	10.9	-4.8	The Americas	-17.3
India	-10.8	-20.9	-1.3	-7.6	Others	-2.1

Note: Cells which are highlighted in green indicate an acceleration in growth, while those highlighted in red reflect a deceleration in growth. The shade of the colours is graduated to reflect magnitudes.

* Data for Q1 refers to Jan–Feb 2019.

** Refers to tourist arrivals from Europe.

Overall, Singapore's GDP growth in 2019 is set to come in slightly below the mid-point of the 1.5–3.5% forecast range, a step-down from the 3.2% growth last year.⁶

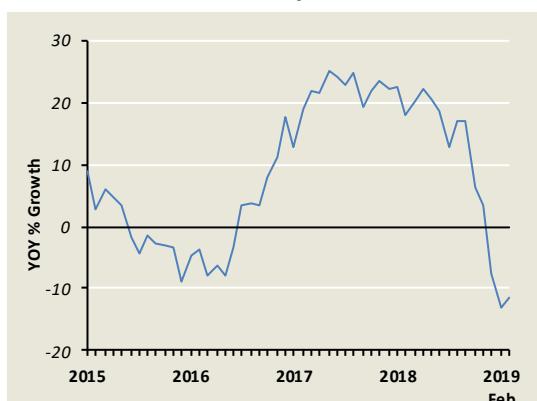
The contribution from the trade-related sectors is expected to recede. Instead, modern services will be the key driver of growth, as digitalisation and innovation-driven activities continue apace. Meanwhile, domestic-oriented sectors such as construction and consumer-facing services are expected to stay on a recovery path. (A deeper dive of the medium-term performance of the tradable and non-tradable sectors can be found in Chapter 2.3)

The global electronics down-cycle will pose a further drag on IT-related production and trade.

Within the trade-related cluster, the electronics-related industries were the main drivers of the cluster's growth over the last two years. Nonetheless, this contribution had waned over the course of 2018, and eventually turned negative in Q4 alongside the downswing in the global tech cycle. Moving into 2019, the latest indicators point to continued softness in electronics-related production and trade.

Global chip sales began declining on a year-ago basis in December 2018, amid diminishing demand for final products in both the corporate and retail space. (Chart 2.8)

Chart 2.8
Global Chip Sales



Source: World Semiconductor Trade Statistics

⁶ The dimmer prospects for 2019 are reflected in the results of the latest *MAS Survey of Professional Forecasters*. MAS has published assessments of the accuracy of local professional forecasters in past issues of the *Review*. Refer to Box B at the end of this chapter for a further study on forecast accuracy at business cycle turning points.

The initial phase of the global electronics upturn, which began in H2 2016, was driven by several consecutive quarters of inventory restocking. Subsequently, from Q4 2017, the positive cycle was bolstered by strong investment demand from firms building servers and data centres, even as chipmakers had completed their inventory restocking. However, investment demand moderated significantly in Q4 2018. This was most evident in the US, where investment spending on IT equipment suffered its first sequential decline in nearly two years. (Chart 2.9) In addition, the growth of global smartphone sales has been lacklustre in recent quarters due to saturated demand. While the Chinese brands saw strong growth, they were unable to fully offset the falling sales experienced by heavyweights such as Samsung and Apple, among others. (Chart 2.10)

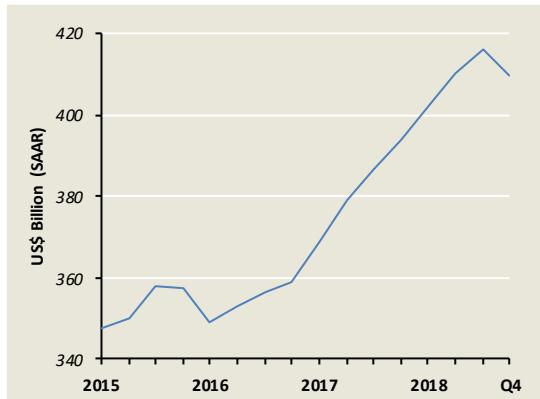
In the coming quarters, global chip sales are expected to face significant headwinds. On the investment front, the decline in spending on IT equipment is likely to continue amid the uncertain business environment. On the retail front, the support from Chinese companies is likely to fade alongside the slowdown in their home market, which will in turn weigh further on activity across global production supply chains. Further, inventory levels increased sharply in early 2019. (Chart 2.11) Likewise, chip prices plummeted in Q1 2019, pointing to a growing oversupply in the market.

Against this backdrop, the electronics-related activities are expected to turn in sluggish growth in the near term. According to EDB's Q4 2018 *Business Expectations Survey of the Manufacturing Sector*, a higher number of the relevant firms expect their business outlook to worsen over the next six months, with sentiment at its lowest since the Global Financial Crisis (GFC). (Chart 2.12)

Upsides to 'digital' activities will help offset the slowdown in the mainstays of modern services.

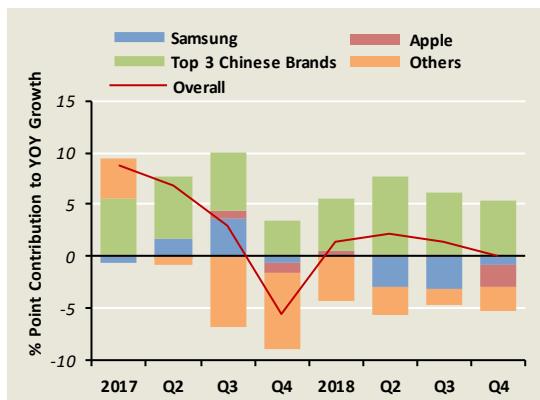
This year's overall financial sector outturn is projected to ease from 2018's full-year growth of 5.9%, largely due to weaker prospects in the financial intermediation and insurance segments. While a resolution in global trade tensions could boost demand for trade financing within the ACU segment, non-bank lending will continue to be soft. (Chart 2.13) Growth in the insurance segment is also expected to taper off, with the impact of capacity expansions in reinsurance running its course.

Chart 2.9
Investment in IT Equipment in the US



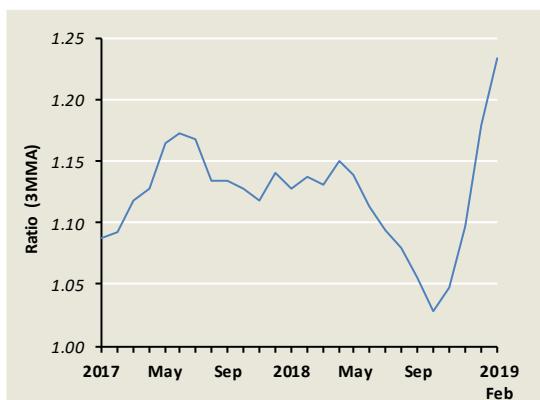
Source: Haver Analytics

Chart 2.10
Global Smartphone Sales



Source: Gartner and EPG, MAS estimates

Chart 2.11
Electronics Inventory-to-Shipment Ratio



Source: Haver Analytics and EPG, MAS estimates

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

Even as the traditional growth drivers within the modern services cluster are likely to weaken in 2019, digital-related activities (comprising IT & information as well as payment services) should see growth extend firmly into the quarters ahead.

Activities of payment services players should continue to pick up as Singapore progresses towards a more cashless society. Competition, improved product offerings amongst incumbents, and entry of newer players will drive the momentum of this segment.

Elsewhere in modern services, ICT and business services will benefit from the ongoing push towards a “Smart Nation”. Public investment in digitalisation, in accord with the “Digital Government Blueprint”, will provide a further fillip to these sectors.

The domestic-oriented cluster should remain on a recovery path, led by the construction sector.

The positive impulse in the construction sector is expected to continue for the rest of 2019 given the recovery in contracts awarded (a leading indicator of construction activity) since H2 2017. (Chart 2.14) In the public sector, industrial projects such as JTC’s upcoming developments at Punggol Digital District and Bulim, NEA’s Integrated Waste Management Facility, as well as civil engineering projects such as the Jurong Regional Line and North South Corridor should boost outturns. Private sector construction is also expected to gain momentum in 2019, spurred by the redevelopment of en-bloc residential sites and institutional building activities. However, growth in private industrial construction is expected to ebb in view of the tepid business environment.

While stable labour market conditions may provide some support, structural changes such as increased competition from overseas e-commerce players could dampen domestic retail sales. Nonetheless, consumer-facing industries, particularly F&B and retail services, are expected to benefit in the medium term from initiatives to lift productivity through innovation and improved processes.

Chart 2.12
Business Expectations for Electronics & Precision Engineering Firms

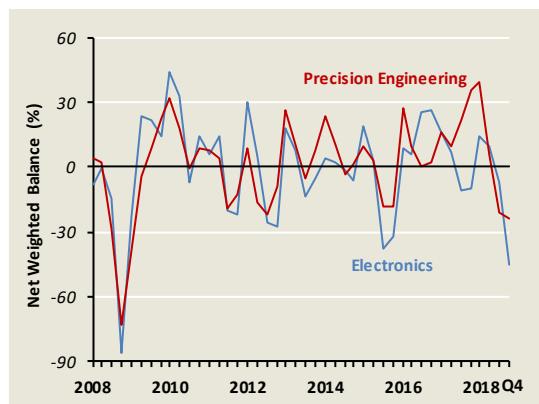


Chart 2.13
ACU Non-bank Loans

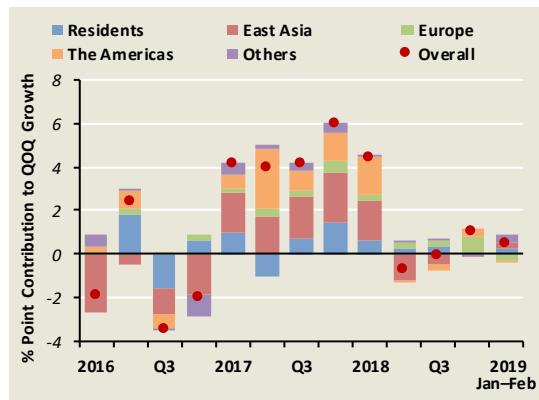
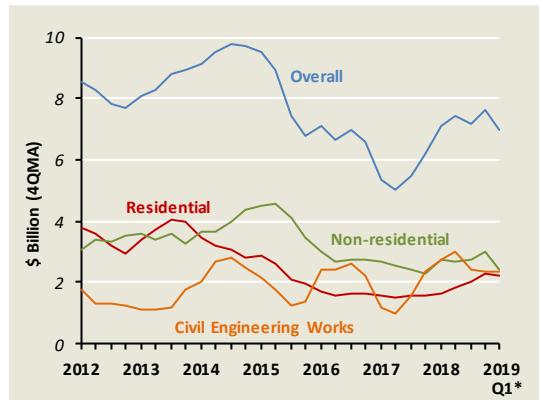


Chart 2.14
Construction Contracts Awarded



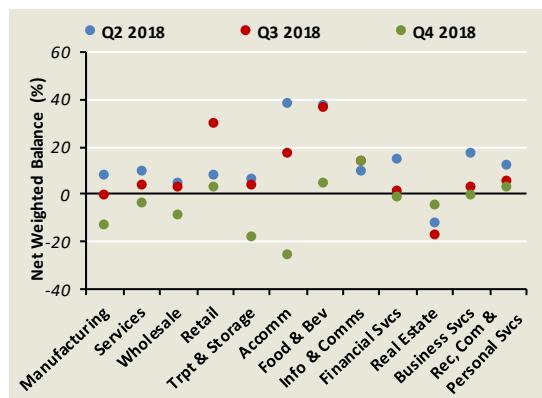
* Estimated based on Jan–Feb 2019 data.

Firms are optimistic about the medium term despite a more subdued short-term outlook.

Amid the weakening growth prospects, firms have turned more pessimistic about the short-term business outlook. The latest Q4 2018 *Business Expectations* surveys by EDB and DOS suggest that both manufacturing and services firms anticipate business prospects to deteriorate in H1 2019. (Chart 2.15)

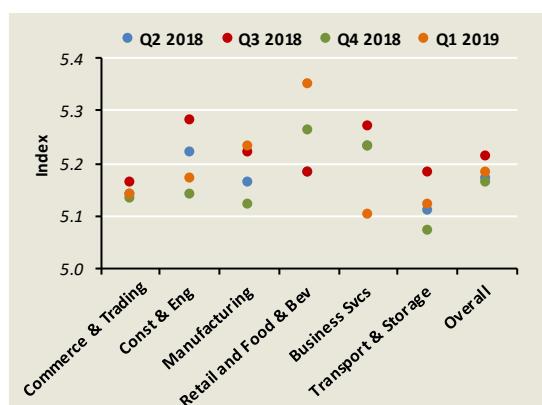
Despite the cautious near-term sentiment, SMEs are generally sanguine about the medium term, and continue to make plans for investment and growth. The quarterly SME business survey, conducted jointly by the Singapore Business Federation and DP Information Group, shows that compared to Q4 2018, nearly all sectors exhibited increased optimism in Q1 2019 for greater capital investment in the next six months. (Chart 2.16) Firms in the retail and F&B sectors, in particular, are expected to step up capital investment as they continue to embrace technology innovation and digital solutions, such as e-payment methods, to improve customer experience and service.

Chart 2.15
Business Expectations for Manufacturing and Services Firms



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

Chart 2.16
Two-quarter Ahead Capital Investment Outlook



Source: DP Information Group and Singapore Business Federation.

Note: The SBF-DP SME index uses a weighted approach that balances qualitative and quantitative measures. The quantitative components track movements in SMEs' expectations on various business indicators, including profitability, capacity utilisation and capital investments. A higher reading indicates greater optimism and a reading below 5 indicates uncertainty.

2.3 Productivity Differences Between The Tradable And Non-tradable Sectors

The Singapore economy is characterised by differences in productivity performance across the tradable and non-tradable sectors, reflecting in part their inherent structural characteristics. There is, however, scope for the productivity gap to narrow. A key approach is to increase the exportability of goods or services in the non-tradable sector. Various government programmes are in place to help firms in this regard, including facilitating access to global markets through digital platforms, opening up distribution channels and matching firms with suitable partners overseas. Another demand-side measure is to enhance the linkages between the two sectors, which will in turn increase positive spillovers to the non-tradable sector. On the supply side, the improvement in human capital of the resident labour force also provides a strong impetus to continued restructuring in the non-tradable sector.

Singapore's economic growth has been driven by the tradable sector.

The Singapore economy expanded by 3.2% y-o-y in 2018, alongside the strong performance of the global economy and the continued growth of the global electronics sector. From the sectoral perspective, most of the growth was driven by the trade-related and modern services clusters. Most industries in these two clusters are highly exposed to external demand.⁷

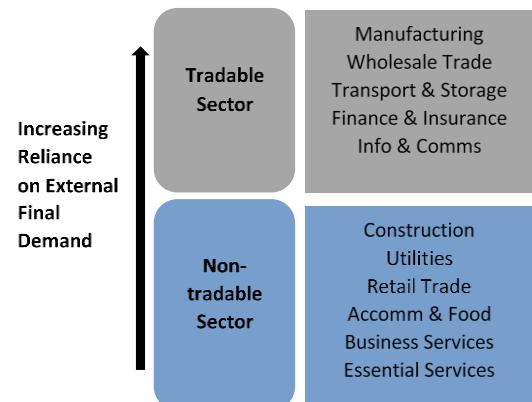
Industries that are more exposed to foreign demand are henceforth called the ‘tradable sector’. Conversely, industries which are less exposed to external demand and mainly serve domestic demand are referred to as the ‘non-tradable sector’. (Figure 2.1)

Given the highly open nature of Singapore’s economy, it is unsurprising that growth has been primarily driven by the tradable sector. Between 2011 and 2018, this source contributed on average about 65% to overall GDP growth. (Chart 2.17)

Productivity-driven growth in the tradable sector ...

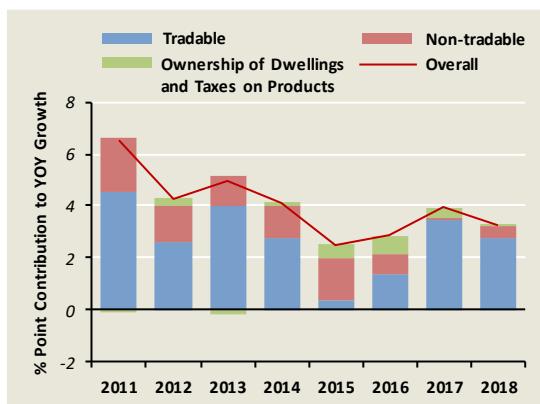
Despite a higher contribution to GDP growth, the tradable sector accounted for only 40% of total employment in Singapore over the past decade. (Chart 2.18) Growth in this sector has been more productivity-driven than labour-driven. (Chart 2.19) EPG’s estimates show that productivity growth in the tradable sector averaged 3.3% p.a. over the period 2011 to 2018, compared to 0.3% in the non-tradable sector.

Figure 2.1
Tradable and Non-tradable Sectors



Source: EPG, MAS estimates

Chart 2.17
Decomposition of Singapore’s GDP Growth



Source: EPG, MAS estimates

⁷ Based on computations using the OECD Inter-Country Input-Output tables data.

... reflected in part its structural make-up.

There are inherent structural differences between the tradable and non-tradable sectors.

First, the tradable sector is characterised by a small number of large firms. (Table 2.2) In comparison, the average firm in the non-tradable sector tends to be smaller.

Second, the capital intensity of the two sectors differs. EPG's estimates based on data for fixed asset formation show that firms in the tradable sector are about four times more capital-intensive than those in the non-tradable sector.

There is scope to raise productivity in the non-tradable sector.

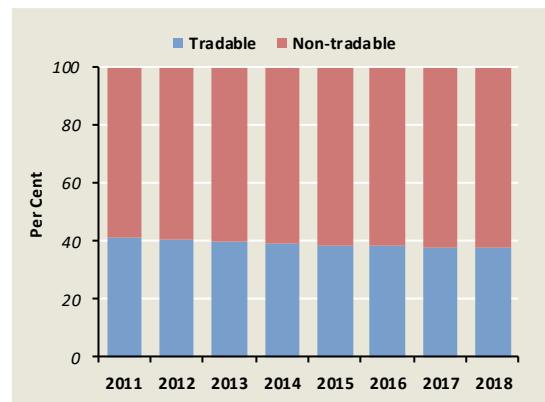
A cross-country estimate of the productivity gap between the tradable and non-tradable sectors shows that the gap in Singapore is about twice that of some advanced economies. There is thus opportunity for the productivity of the non-tradable sector to catch up.

Productivity levels within firms are generally closely associated with supply-side factors, such as the intensity of capital and IT usage. However, demand-side conditions play an important role as well. For instance, a larger firm could potentially benefit from economies of scale, which allow production inputs to be utilised more efficiently. At the same time, a firm's market power and the size of the market it operates in will affect its return on investment, and hence influence its decision to embark on capital deepening.

To understand such demand channels better, EPG traced the origins of VA within the non-tradable sector using data from Singapore's input-output tables. Figure 2.2 illustrates the four channels through which VA in the non-tradable sector is created.

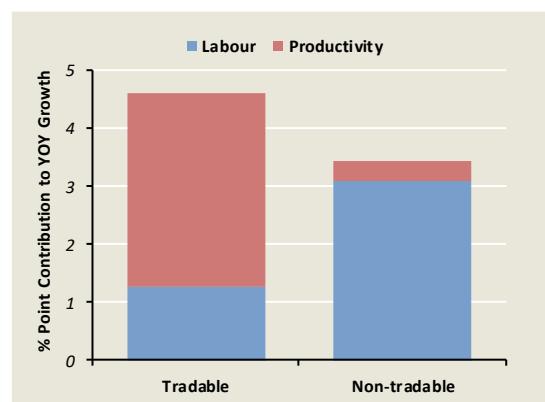
Broadly, non-tradable sector VA can arise through the 'direct' and 'indirect' channels. The former takes place through exports or domestic investment/government spending.

Chart 2.18
Employment by Sector



Source: EPG, MAS estimates

Chart 2.19
Supply-side Decomposition of GDP Growth, 2011–18 Average



Source: MAS, EPG estimates

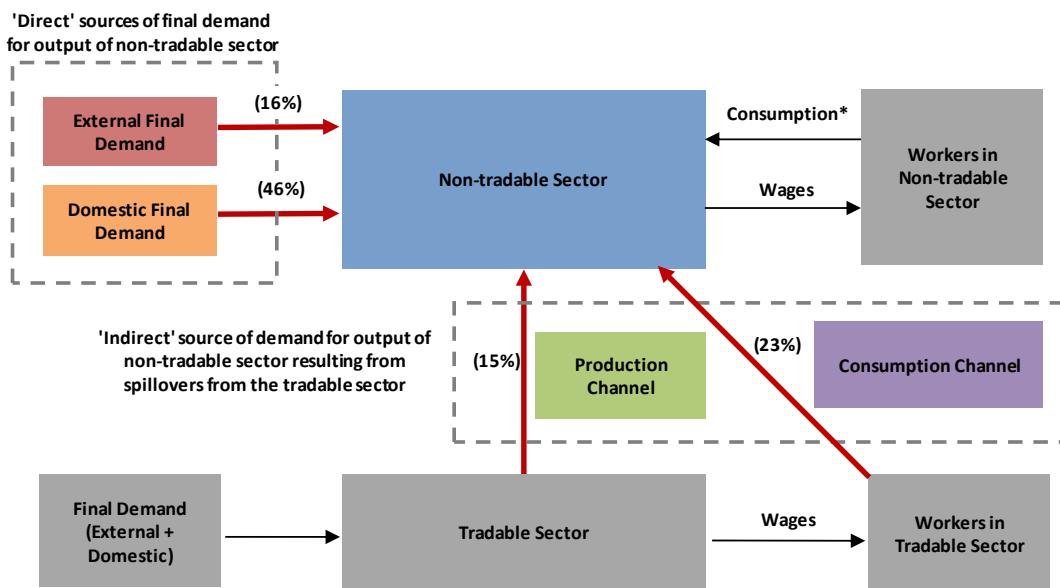
Table 2.2
Firm Characteristics in Tradable & Non-tradable Sectors, 2017

	Tradable	Non-tradable
Number of Establishments	86,600	139,000
External Orientation (%)*	79	37
Average Operating Receipts per Establishment (\$ million)	40	2.4

Source: EPG, MAS estimates

* External orientation refers to the share of VA that serves external demand, which is calculated using the OECD's TiVA estimates. Data refers to 2015.

Figure 2.2
Origins of VA in Non-tradable Sector



Source: OECD Inter-Country Input-Output Tables and EPG, MAS estimates.

Note: Numbers in parentheses represent the respective channel's share of total nominal VA in the non-tradable sector in 2014.

* Private consumption is considered to be endogenous in this framework, based on the closed input-output model. This means that consumption varies in a static manner in response to changes in income, and income is generated when there is production in the economy.

The 'indirect' demand for non-tradable sector output originates from activity in the tradable sector and acts through the production or consumption channel. The former occurs when the tradable sector sources for intermediate inputs from the non-tradable sector, while the latter takes place when workers employed in the tradable sector purchase final goods and services from the non-tradable sector.

Based on the latest available data, direct external and domestic final demand contributed 16% and 46% of total nominal VA in the non-tradable sector in 2014, respectively. Meanwhile, spillovers from the tradable sector accounted for a substantial 38%. Of this indirect demand, roughly three-fifths stemmed from the consumption channel and the remainder from the production channel.

Increased export content in the non-tradable sector would boost productivity ...

The above analysis point to two sets of demand-side levers to raise productivity for the non-tradable sector. First, expanding the market base beyond Singapore could potentially provide a boost to non-tradable productivity. Direct external final demand currently accounts for a relatively small share of nominal VA in the non-tradable sector. Hence, venturing out to the

international market would help firms in the non-tradable sector to scale up. Being exposed to greater competition could also sharpen incentives for such firms to invest more in technology and innovation, which would in turn help them produce more differentiated products to gain market share.

Currently, the share of output exported by some industries within Singapore's non-tradable sector lags that of other comparable economies. For example, Luxembourg and Hong Kong currently export a larger share of their business and essential services compared to Singapore. (Chart 2.20)

In recognition of both the need and potential to tap external final demand, one of the key thrusts of the Industry Transformation Maps (ITMs) is to assist companies in finding new markets for their products, thereby creating regional and global brands.

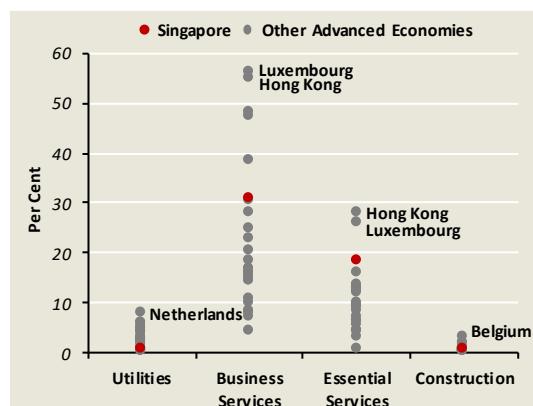
For instance, in the retail industry, e-commerce will be a key enabler, especially in Asia.⁸ In Southeast Asia alone, the market size for e-commerce is expected to reach US\$102 billion by 2025.⁹ To accelerate companies' internationalisation, Enterprise Singapore has facilitated access to global markets through various digital channels, including e-commerce platforms which can connect companies with new consumers abroad. In the food services industry, Enterprise Singapore has partnered companies to open up distribution channels and introduce suitable partners with the relevant capabilities.

... as would strengthening production linkages between the tradable and non-tradable sectors.

Second, the tradable sector can play an important part in creating positive productivity spillovers to the non-tradable sector. Strong production linkages between the two sectors would allow the non-tradable sector to benefit more from activity in the tradable sector.

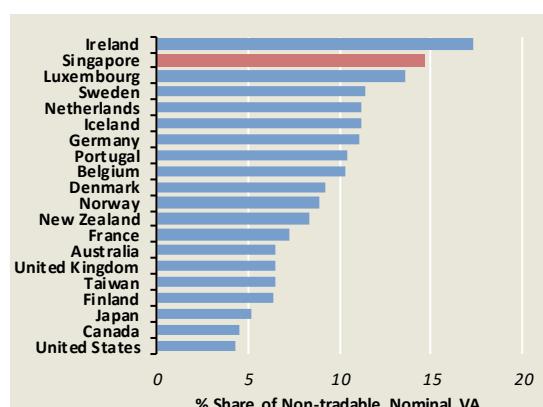
Production spillovers from the tradable sector account for 15% of nominal VA in Singapore's non-tradable sector, a larger share compared to that in other countries. (Chart 2.21) This is largely due to the

Chart 2.20
Share of Output Exported in Non-tradable Sector



Source: OECD Inter-Country Input-Output Tables and EPG, MAS estimates.

Chart 2.21
Tradable Sector Contribution to Non-tradable Sector VA via the Production Channel



Source: OECD Inter-Country Input-Output Tables and EPG, MAS estimates.

⁸ Iswaran, S (2016), Speech at the Singapore Retail Industry Conference, 15 September.

⁹ Google-Temasek (2018), "e-Economy SEA 2018: Southeast Asia's Internet Economy Hits an Inflection Point", available at <https://www.thinkwithgoogle.com/intl/en-apac/tools-resources/research-studies/e-economy-sea-2018-southeast-asias-internet-economy-hits-inflection-point/amp/>.

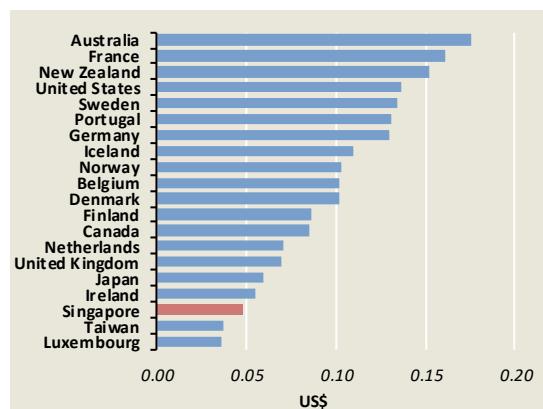
openness of the domestic economy and its greater reliance on external sources of demand.

However, linkages on a per dollar basis are comparatively weaker in Singapore. This implies that final demand in the tradable sector is less efficient in generating VA for the non-tradable sector, via the production channel, as compared to other countries. (Chart 2.22) In part, this could reflect the higher import leakage in Singapore across both the tradable and non-tradable sectors.

There is scope to further enhance production linkages between the tradable and non-tradable sectors. One nexus that can potentially be strengthened would be that between tradable services (e.g., wholesale trade and transportation & storage) and the domestic business services industries. Given the corporate-facing nature of the business services industry, it generally has the tightest links to the tradable sector within the non-tradable sector. Tradable services in countries with relatively strong linkages on a per dollar basis, such as Australia and the US, tend to demand a larger share of domestically sourced inputs from business services as compared to Singapore. At the same time, the import content of their business services sector is much lower. Taken together, this suggests that Singapore could further develop a strong ecosystem of local firms with deep expertise in the professional, scientific and technical services to better leverage upon the existing synergies between these industries.

Increasingly, the government is adopting a cluster-based approach towards industry development. Such an integrated approach helps bring diverse capabilities together, by deepening linkages between complementary industries. Under the ITMs, the government has grouped the 23 sectors in the economy into six clusters¹⁰ to maximise opportunities for collaboration within clusters.

Chart 2.22
VA Generated in Non-tradable Sector Via the Production Channel Per Dollar Output of Tradable Sector



Source: OECD Inter-Country Input-Output Tables and EPG, MAS estimates.

¹⁰ The six clusters are manufacturing, built environment, trade & connectivity, essential domestic services, modern services and lifestyle.

Box B
Forecasting GDP Growth at Business Cycle Turning Points

Introduction

There is a consensus among economists that it is difficult to predict the timing of business cycle turning points, as well as the amplitudes of recessions and recoveries. In particular, studies have noted a tendency to systematically underestimate the depth of economic recessions and concomitantly, the strength of recoveries.

These challenges are well-documented in the academic literature and media. A recent paper by An *et al.* (2018) found that even though forecasters were generally aware that recession years are different from other years, they tended to miss the magnitude of a recession by a wide margin until the year had drawn to a close. *The Economist* (2018) came to a similar conclusion, while also finding that forecasters made the largest errors ahead of GDP contractions. Lewis and Pain (2014) pointed to “a common failing to predict downturns and to predict their size” and added that “these difficulties have been found across forecasters, across countries and over longer periods of time”, including in studies such as Zarnowitz (1991), Loungani (2001) and Abreu (2011).

Although less is known about the track record in forecasting recoveries, some studies have found that upturns were easier to predict than downturns. Using data from 26 industrialised countries, Loungani (2002) reported that forecast errors at the beginning of recovery years were smaller than those made in recession years. In other words, recessions were more likely to catch forecasters by surprise than recoveries. In this respect, Zarnowitz (1986) observed that “predicting a general downturn is always unpopular, and predicting it prematurely ahead of others may prove quite costly to the forecaster and his customers. In comparison, most users are likely to await eagerly an upturn during a recognised recession, so forecasts of a recovery will be welcome”.

Why are business cycle turning points difficult to forecast? The literature suggests three types of explanations, which are not mutually exclusive:

1. *Forecasters lack the necessary information.* This could arise for various reasons—data on the economy may only become available with long lags, or be of poor quality. Another related argument is that macroeconomic models are designed to work well ‘on average’ but break down during unusual periods, such as recessions. In addition, recessions may occur because of events which are themselves difficult to predict.
2. *Forecast errors may be due to strategic behaviour.* Forecasters might have other objectives besides minimising forecast errors. For instance, they may be interested in presenting forecasts which allow them to maximise publicity, revenue or prestige (Pons-Novell, 2003). Forecasters might also lack incentives to break away from the consensus, as the reputational loss from being wrong may be high. Indeed, behavioural explanations point out that analysts are prone to ‘herding’, i.e., a tendency to cluster around a common forecast, instead of issuing an ‘outlier’ forecast (Scharfstein and Stein, 1990; Banerjee, 1992).
3. *Due to inertia, forecasters only revise their estimates slowly and insufficiently in response to new information.* According to Nordhaus (1987), “people tend to smooth their forecasts too much. That is, we break the good or bad news to ourselves slowly, taking too long to allow surprises to be incorporated into our forecasts”.

This Box aims to assess the extent to which GDP growth predictions made by professional forecasters in Singapore accord with these stylised facts. For this purpose, prediction errors in recession and recovery years are compared to more normal periods to ascertain if forecasters were indeed challenged when making quantitative projections around business cycle turning points.

Data

The GDP growth forecasts used in this evaluation are taken from the *MAS Survey of Professional Forecasters* (SPF). The SPF was first conducted in Q4 1999, with the aim of establishing a consistent benchmark for private sector forecasts of key economic variables that are relevant to the Singapore economy. The views of close to 30 respondents are collated every quarter on a host of indicators, the most important of which are real GDP growth, the unemployment rate and CPI inflation. Survey questionnaires are sent to participants after the MTI's *Quarterly Economic Survey of Singapore* is released to the public, so forecasters would have knowledge of the economic data for the preceding quarter when making their projections.

The present study focuses on median GDP growth forecasts, which were extracted from surveys conducted from Q1 2000 to Q4 2017. The year for which forecasts are made is referred to as the 'target year', and the projections themselves are known as 'fixed event forecasts', being made either in the year before the target year ('year-ahead forecasts'), or during the target year ('current-year forecasts'). For example, the first forecast for 2017 was made in March 2016 and the last forecast was made in December 2017. This survey structure makes it possible to track the evolution of median GDP growth forecasts for every target year, over a period of roughly two years.

The recession and recovery phases of the Singapore economy are identified from the growth cycle chronology compiled by the Department of Statistics (DOS, 2012). Specifically, two major recessions are identified: (i) from August 2000 to October 2001, following the bursting of the dot-com bubble; and (ii) from March 2008 to October 2009, coinciding with the Global Financial Crisis (GFC). The corresponding recovery periods were from November 2001 to April 2002 and from November 2009 to May 2010, respectively. Accordingly, 2001, 2008 and 2009 were classified as recession years, 2002 and 2010 as recovery years, and all other years as normal years.

Forecast Accuracy Criteria

To assess the accuracy of SPF forecasts, two conventional measures are used: the root mean squared error (RMSE) and mean absolute error (MAE). In general, the two measures give fairly similar results, although the RMSE criterion penalises large errors more severely.

Another related criterion is the standard error of forecasts, which provides information on the heterogeneity among individual forecasters. A larger standard error suggests stronger disagreement among forecasters, stemming from greater uncertainty surrounding point forecasts. One would intuitively expect the standard errors to be larger for longer horizon projections, and to be smaller over time as more information becomes available and uncertainty diminishes.

A recurrent issue in evaluating forecast accuracy is deciding on the vintage of macroeconomic data to be used for comparison. The conventional view is that forecasters should be judged by their ability to predict preliminary data (released in real-time), rather than revised data, which often incorporate methodological changes and information not available at the time of forecasting. However, although the conclusions drawn about forecast accuracy may depend on the benchmark used for evaluation, research has concluded that no single choice is optimal.^{1/}

Accordingly, the SPF forecasts are compared against both real-time preliminary data as well as the latest revised data. Preliminary GDP growth estimates for each year were taken from the *Annual Economic Survey of Singapore* (AES). This means, for instance, that the preliminary data for the growth outturn in 2007 was taken from the AES released in Q1 2008.

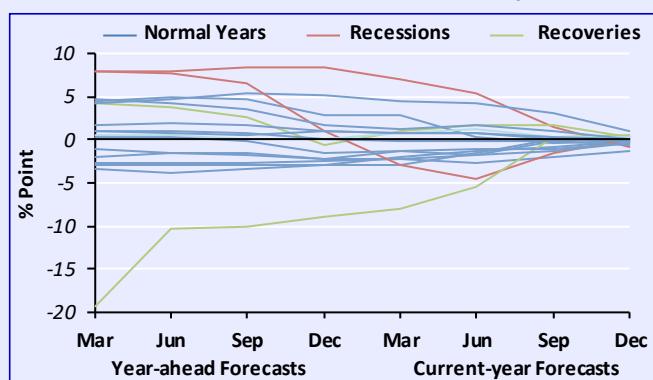
^{1/} Zarnowitz and Braun (1993) reported that judgmental forecasts that rely heavily on real-time information may hold up better when compared with preliminary data, while econometric model forecasts that incorporate long series of revised data may be more favoured by evaluations using later vintages.

Empirical Findings

- 1) In general, forecasts become more accurate and converge to the actual outcomes over time as more information is obtained. However, in recession and recovery years, the dispersion of forecasts tends to be wider and they do not exhibit clear signs of convergence over time.

Professional forecasters' median predictions tend to get closer to actual GDP growth outturns as the forecast horizon shortens. Chart B1 below shows the evolution of forecast errors (relative to preliminary GDP growth data) for each of the years surveyed. On the whole, year-ahead forecasts were quite disparate and remained so for about three to four quarters, before gradually converging towards the actual outcome. This suggests that forecasts become more accurate as additional information becomes available. Similar trends are observed when median predictions are compared against revised GDP data.

Chart B1
Forecast Errors Relative to Preliminary Data



These observations are confirmed by the average RMSE, MAE and standard error statistics. (Table B1) For instance, relative to preliminary data, the MAE of the median forecasts in the sample falls steadily and substantially from 4.1% points for year-ahead forecasts made in March, to 0.4% point for current-year forecasts made in December. Aside from the unexpectedly strong recovery year of 2010, forecasters tended to over-predict outcomes, particularly in the initial periods and during downturn years. For instance, forecast errors for eight-quarter ahead forecasts average a positive 1.7% point (without taking 2010 into account).

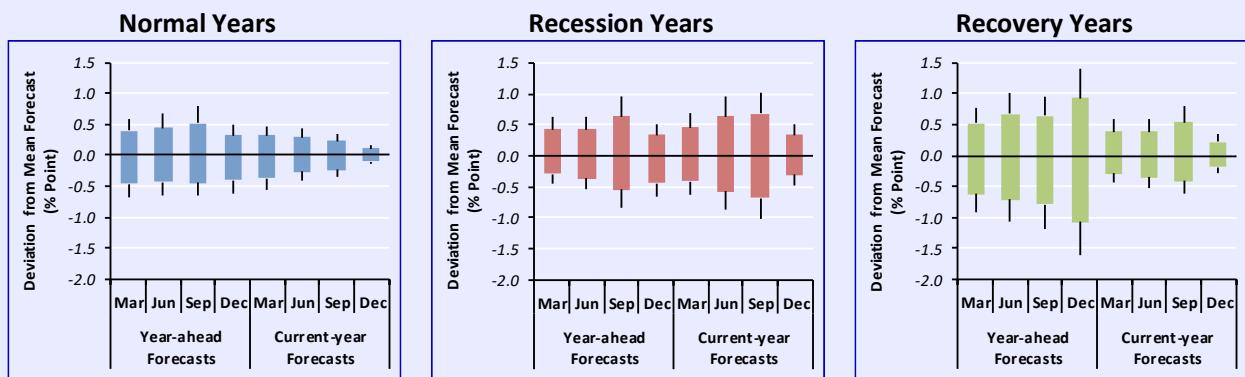
On average, forecast errors are larger when revised data is used as the basis for comparison instead of preliminary data, suggesting that revised data contain new information not available at the time when forecasts were made. Nevertheless, the RMSE and MAE of year-ahead forecasts made in March, June and September are smaller relative to revised data as compared to preliminary data. This suggests that forecasters were more accurate in their early predictions than initially thought.

Table B1
RMSE, MAE and Standard Error of GDP Growth Forecasts

		Year-ahead Forecasts				Current-year Forecasts				(% Point)
		Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	
Relative to preliminary data	RMSE	6.1	4.5	4.3	3.7	3.3	2.7	1.2	0.5	
	MAE	4.1	3.6	3.3	2.7	2.5	2.2	1.0	0.4	
Relative to revised data	RMSE	5.9	4.2	4.1	3.8	3.5	3.1	1.8	1.6	
	MAE	3.7	3.2	3.1	2.8	2.7	2.4	1.5	1.3	
Standard Error		0.8	0.7	0.8	0.8	0.6	0.6	0.5	0.3	

On closer inspection, the stylised facts of forecast convergence and clustering are found to be the norm only in normal growth periods. Around the neighbourhood of business cycle turning points, forecasts continued to be widely dispersed well into the horizon of the fixed event. Notably, in recession and recovery years, the interquartile range is increasing even after two quarters of data for the target year had become available. (Chart B2) This is in line with the observation made for other economies that during periods of accentuated cyclical fluctuations, forecasters tended to exhibit greater differences in their views on the economic outlook.

Chart B2
Dispersion of Forecasts Across Different Phases

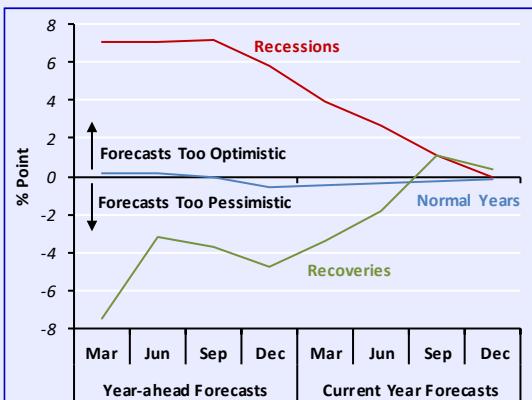


Note: Solid boxes refer to the forecast values that fall within the inter-quartile range (i.e., the middle 50% of all observations). The whiskers denote values that fall within 1.5 times of the inter-quartile range.

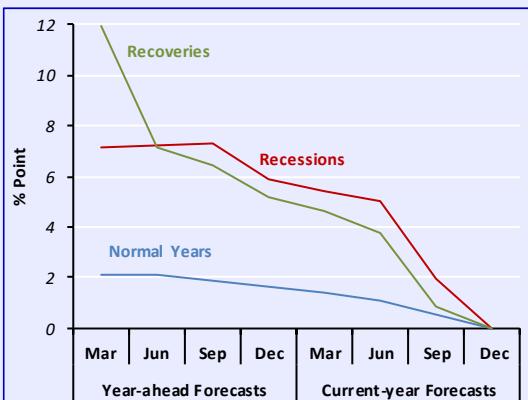
2) *Forecast errors in recession and recovery years are larger compared with other years.*

Forecasters committed larger errors when making GDP growth predictions for years associated with upturns or downturns in the business cycle. Compared to normal years, forecast errors for recession and recovery years tended to be significantly larger. (Chart B3) The errors are more pronounced for longer-horizon forecasts: for year-ahead forecasts made in March, forecasters overestimated growth during the recession years by an average of 7.1% points and underestimated growth during the recovery years by 7.6% points (relative to preliminary data). This was in contrast to normal years, when forecasters were able to make more accurate early forecasts, with an average forecast error of just 0.2% point even as early as March of the previous year. The directions of the forecast errors are also consistent with the results in Dovern and Jannsen (2017).

When considering the magnitude of forecast errors, the two recession episodes tell somewhat different stories. In the dot-com episode, forecasters appeared to be rather accurate in predicting the timing and magnitude of the recovery, with an average forecast error of 2.0% points, compared to 1.5% points in non-recession/recovery periods. This was in spite of the larger forecast errors made during the recession itself, averaging 5.9% points. In contrast, the average forecast error during the GFC, at 4.1% points, is comparatively mild, whereas that for the recovery is significantly higher, averaging 7.9% points.

Chart B3**Forecast Errors During Recessions and Recoveries (Relative to Preliminary Data)**

Note: Lines denote the average difference between the median SPF projection of GDP growth in a given quarter and preliminary data.

Chart B4**Forecast Revisions During Recessions and Recoveries (Relative to Final Forecast)**

Note: Lines denote the average of the absolute difference between the median forecast of GDP growth in a given quarter and the final current-year forecast.

- 3) *Forecasters tended to make larger revisions to their predictions for years which include business cycle turning points.*

In line with the findings in An *et al.* (2018), forecasters made larger changes to their predictions during periods of uncertainty. On average, over the eight forecast quarters, a revision of 7.2% points was made to forecasts in recession years and 12% points in recovery years. For comparison, the adjustments made in other years averaged just 2.1% points. (Chart B4) Only after three quarters of actual data for the target year have become available, do forecasters revise their projections sufficiently to account for the initial under- or over-estimation.

Taken together, the findings suggest that forecasters in Singapore find it challenging to predict business cycle turning points, i.e., peaks, troughs and the recessions or recoveries that follow. This is consistent with the existing literature on macroeconomic forecasting. On average, forecasters underestimated the depth of the two recessions (the dot-com bust and the GFC), as well as the strength of the subsequent recoveries. These trends hold regardless of whether preliminary data (released in real-time) or revised data are used as the basis for comparison.

In recession years—which according to empirical findings elsewhere are generally more difficult to predict than recoveries—forecasters were alert to incoming information about potentially negative prospects for the coming year and revise their forecasts accordingly over successive surveys. However, the magnitudes of the revisions are much smaller than needed to correctly predict the depth of recessions. Indeed, forecasters only caught up by December of the recession year, when the scale of the downturn became known. Similar trends are observed in the case of recoveries, particularly in the case of the post-GFC upturn.

Conclusion

This Box highlights the challenges inherent in forecasting, especially when it concerns predicting the timing and magnitude of business cycle turning points. It is found that professional forecasters in Singapore, like those in other countries, are not able to capture the onset of recessions or recoveries in a timely way, and the extent of output decline or expansion is also often misestimated, especially for year-ahead projections.

The academic literature offers some likely reasons for these phenomena, including a lack of information, few incentives to depart from the consensus, and behavioural factors. Regardless of the explanation for why business cycle turning points are difficult to predict, users of forecasts need to be aware of this feature.

References

- Abreu, I (2011), "International Organisations' vs. Private Analysts' Forecasts: An Evaluation", *Banco de Portugal Working Paper* No. 20/2011.
- An, Z, Jalles, J and Loungani, P (2018), "How Well Do Economists Forecast Recessions?", *IMF Working Paper* No. 18/39.
- Banerjee, A (1992), "A Simple Model of Herd Behavior", *Quarterly Journal of Economics*, Vol. 107(3), pp. 797–817.
- Dovern, J and Jannsen, N (2017), "Systematic Errors in Growth Expectations Over the Business Cycle", *International Journal of Forecasting*, Vol. 33(4), pp. 760–769.
- Dovern, J, Fritzsche, U, Loungani, P, and Tamirisa, N (2015), "Information Rigidities: Comparing Average and Individual Forecasts for a Large International Panel", *International Journal of Forecasting*, Vol. 31(1), pp. 144–154.
- Lewis, C and Pain, N (2014), "Lessons from OECD Forecasts During and After the Financial Crisis", *OECD Journal: Economic Studies*, Vol. 2014(1), pp. 9–39.
- Loungani, P (2001), "How Accurate are Private Sector Forecasts? Cross-Country Evidence from Consensus Forecasts of Output Growth", *International Journal of Forecasting*, Vol. 17(3), pp. 419–432.
- Loungani, P (2002), "There Will Be Growth in the Spring: How Credible are Forecasts of Recovery?", *World Economics*, Vol. 3(1).
- Loungani, P, Stekler, H and Tamirisa, N (2013), "Information Rigidity in Growth Forecasts: Some Cross-country Evidence", *International Journal of Forecasting*, Vol. 29(4), pp. 605–621.
- Nordhaus, W (1987), "Forecasting Efficiency: Concepts and Applications", *Review of Economics and Statistics*, Vol. 69(4), pp. 667–674.
- Pons-Novell, J (2003), "Strategic Bias, Herding Behaviour and Economic Forecasts", *Journal of Forecasting*, Vol. 22(1), pp. 67–77.
- Scharfstein, D S and Stein, J C (1990), "Herd Behavior and Investment", *American Economic Review*, Vol. 80(3), pp. 465–479.
- Singapore Department of Statistics (2012), "Singapore's Growth Cycle Chronology and Performance of Composite Leading Indicators", *Economic Survey of Singapore 2011*, pp. 56–62.
- The Economist* (2018), "The worst except for all the others", December 15.
- Zarnowitz, V (1986), "The Record and Improvability of Economic Forecasting", *NBER Working Paper* No. 2099.
- Zarnowitz, V (1991), "Has Macro-Forecasting Failed?", *NBER Working Paper* No. 3867.
- Zarnowitz, V and Braun, P (1993), "Twenty-Two Years of the NBER-ASA Quarterly Economic Outlook Surveys: Aspects and Comparisons of Forecasting Performance", pp. 11–94, in Stock, J H and Watson, M W (eds.), *NBER Studies in Business Cycles: Business Cycles, Indicators and Forecasting, Volume 28*, Chicago, University of Chicago Press.

Chapter 3

Labour Market and Inflation

3 Labour Market and Inflation

The labour market continued to recover in H2 2018, with overall employment growing at a faster pace than in H1 as well as H2 the year before. Job creation was fairly broad-based across the modern services, domestic-oriented and trade-related clusters. For the year as a whole, retrenchments declined, job vacancies rose, and the resident unemployment rate fell by 0.2% point to 2.9%. The steady improvement in labour market conditions also translated to higher resident wage growth of 3.5% in 2018, compared to 3.1% in the previous year. In 2019, the labour market is expected to remain firm despite the moderation in economic growth. With changes in labour demand and supply being broadly balanced, wage growth is projected to ease only slightly.

MAS Core Inflation moderated to 1.6% y-o-y in Q1 2019, from 1.8% in Q4 2018, mainly due to a smaller rise in the cost of electricity & gas. Despite the fall in core inflation, CPI-All Items inflation was unchanged from the previous quarter at 0.5% y-o-y in Q1 2019, as the decline in accommodation and private road transport costs eased. The lower-than-expected core inflation outturns in recent months reflected the sharp decline in global oil prices in Q4 2018, as well as the increased adoption of cheaper electricity plans by households under the Open Electricity Market (OEM). Consequently, the 2019 forecast range for MAS Core Inflation was revised down to 1–2% in the April 2019 Monetary Policy Statement, from 1.5–2.5% previously. The forecast range for CPI-All Items inflation was downgraded in February, and remains at 0.5–1.5%.

Although oil prices have recovered from their trough in late 2018, they are currently expected to average lower this year than in 2018. Other sources of external inflation are also likely to remain benign. Meanwhile, underlying domestic cost pressures continue to be present in the economy. The step-down in productivity growth, coupled with the improvement in labour market conditions, contributed to firmer unit labour cost increases over the second half of 2018. Non-labour costs such as commercial rentals have also picked up. However, these cost pressures appear to be taking longer than expected to translate into a discernible pickup in consumer price inflation.

3.1 Labour Market

Labour Market Conditions Remain Firm

Overall employment increased by about 35,000 in H2 2018, picking up from H1 and the same period the year before. This reflected broadening job growth across the domestic-oriented, modern services as well as trade-related clusters. Retrenchments fell across a number of sectors and the ratio of overall vacancies to unemployed persons has remained above unity for four consecutive quarters. Forward-looking indicators, such as job vacancies and survey readings, suggest that labour demand remains firm, with resident wage growth likely to moderate only slightly in 2019.

Employment growth broadened during the second half of 2018.

Overall employment expanded by a robust 35,200 in H2 2018, bringing the increase for the year as a whole to 45,300. (Chart 3.1) In contrast to prior periods when growth was concentrated in modern services, the gains in the second half of last year were fairly broad-based across the trade-related, domestic-oriented and modern services clusters. The improvement in the trade-related cluster was driven by a turnaround in the transport equipment industry which had been shedding jobs since H1 2014, as well as some improvement in wholesale trade. Meanwhile, the rate of job loss in construction continued to abate from the first half of the year, while the retail trade and F&B industries benefitted from seasonal hiring in the fourth quarter. Employment in the modern services cluster continued to grow robustly, driven by the ICT industry amid increased digitalisation, as well as by the professional services and financial & insurance industries.

Resident employment increased by 20,900 in H2 2018, largely supported by the headcount boost from the modern services and domestic-oriented clusters. This brought the gains in resident employment to 27,400 for the full year, slightly higher than in 2017. Foreign employment also expanded at a faster pace in H2, by 14,300 compared to 3,600 in the first half, as a result of the turnaround in construction and stronger hiring in the trade-related cluster. For 2018 as a whole, foreign employment grew by 17,900, reversing the decline in the previous year. (Chart 3.2)

Chart 3.1
Employment Change by Cluster¹

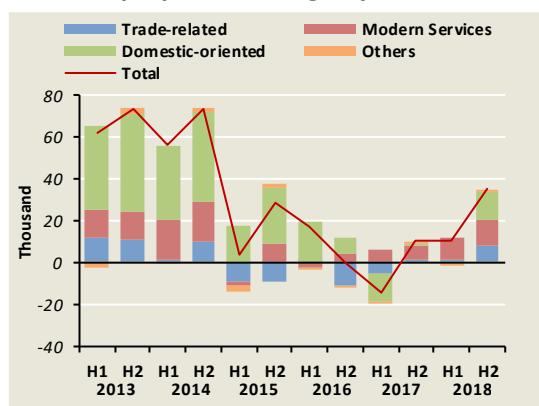
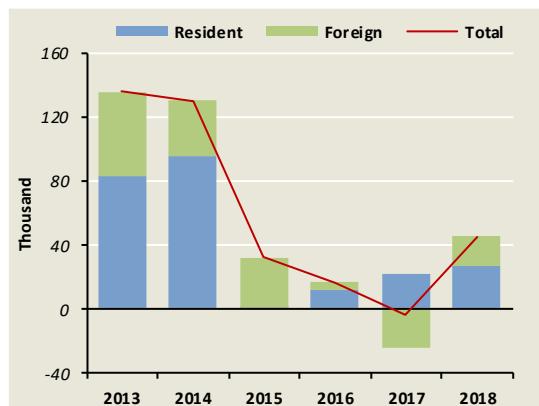


Chart 3.2
Resident and Foreign Employment Change



¹ The ‘modern services’ cluster comprises ICT, financial & insurance, real estate services 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.

Labour market conditions remained firm in H2 2018.

Both the resident and overall unemployment rates (SA) edged up by 0.1% point to 3.0% and 2.2%, respectively, in Q4 2018. (Chart 3.3) On an annual average basis, however, the resident unemployment rate fell from 3.1% in 2017 to 2.9% in 2018, while the overall unemployment rate fell from 2.2% to 2.1% over the same period.

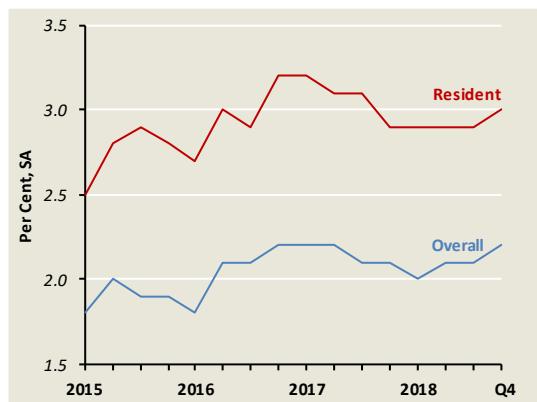
Retrenchments remained broadly stable at a low level in H2 2018, with a decline in the number retrenched in the domestic-oriented and trade-related services clusters offsetting a slight uptick in the modern services cluster. (Chart 3.4) The most common reason cited for retrenchment across industries continued to be ‘reorganisation/restructuring’, which relates to firm-specific, rather than industry or economy-wide, factors. Meanwhile, the number of employees on short work-week or temporary layoff declined further in H2, with the fall being more pronounced in the manufacturing sector.

The number of job vacancies (SA) continued to rise to 62,300 in Q4 2018, exceeding the increase in unemployed persons. Consequently, the ratio of job vacancies to unemployed persons (SA) edged up to 1.10 in Q4, the fourth successive quarter in which the ratio exceeded unity. (Chart 3.5) In addition, EPG’s Labour Market Pressure Indicator (LMPI)—a summary statistic which captures the extent of labour market tightness using 31 indicators—also remained above zero for the fourth straight quarter. (Chart 3.6)

Targeted labour market programmes provide support for the long-term unemployed.

Notwithstanding the cyclical recovery observed over 2018, some retrenched workers could be taking more time to seek jobs that match their skills and salary expectations. After falling to 0.6% in Q3, the seasonally-adjusted resident long-term unemployment rate rose by 0.2% point to 0.8% in Q4. The increase in the number of residents unable to secure employment within half a year was relatively higher for older workers: the long-term unemployment rate for those aged 50 and over increased by 0.3% point to 1.0%, while that for individuals aged below 30 remained at 0.5%. (Chart 3.7)

Chart 3.3
Unemployment Rates



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

Chart 3.4
Retrenchments by Cluster

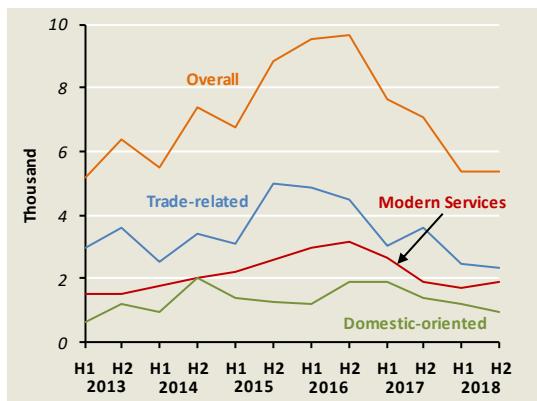


Chart 3.5
Ratio of Vacancies to Unemployed Persons



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

Older retrenched workers tend to have a more difficult time returning to employment. Indeed, the rate of resident re-entry into employment six months after retrenchment decreases with age. For retrenched residents aged 50 and above, the re-entry rate was 53% in 2018, below the overall rate of 63%. (Chart 3.8) This was compounded by the fact that the share of this age group among retrenched residents has generally risen since 2012 for all occupation groups, especially production and related workers. PMETs also typically exhibited below-average re-entry rates, likely as a result of their more specialised skills and higher wage expectations, while their share of retrenched residents has also increased over time.

With the pickup in job vacancies, the unemployed are more likely to regain employment if they possess the relevant skillsets. In this regard, the Adapt and Grow initiative will continue to provide support for jobseekers. In particular, the Professional Conversion Programmes have been expanded to help jobseekers acquire the relevant training to move into new growth industries, while the Career Support Programme, which helps to reduce mismatches in wage expectations, has been extended to provide wage support to employers who hire long-term unemployed PMET jobseekers or retrenched mature PMET workers.

Vacancy rates suggest that hiring intentions remained generally positive ...

The general rise in vacancies bodes well for jobseekers. The overall vacancy rate² in H2 2018 (non-SA) rose by 0.1% point compared to H1 2018, and 0.4% point compared to the same period a year ago. Consistent with firm demand for workers in modern services, vacancy rates improved in financial & insurance, as well as professional services. While the vacancy rate in ICT eased compared to H1 2018, it remained high at 4.7% and will likely be supported by continued demand for corporate IT solutions. (Chart 3.9)

Chart 3.6
Labour Market Pressure Indicator

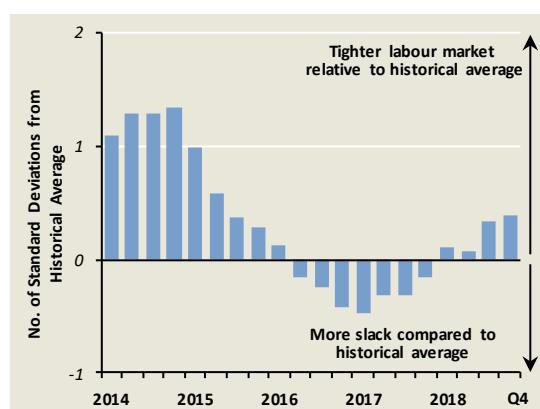
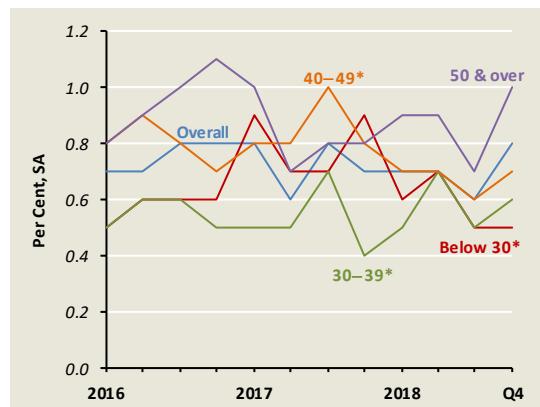
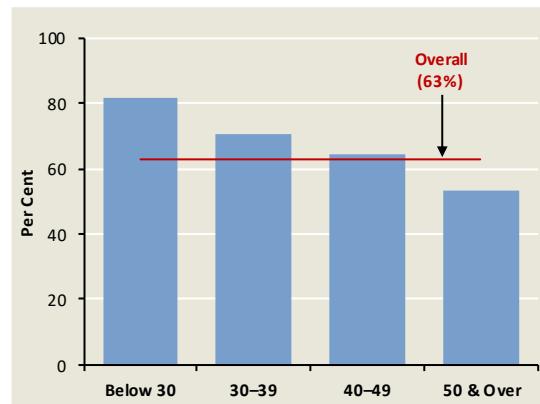


Chart 3.7
Resident Long-term Unemployment Rate by Age



Note: Series with asterisks (*) are not SA as they do not exhibit clear seasonal patterns.

Chart 3.8
Rates of Re-entry into Employment by Age



Note: The rates refer to the proportion of retrenched residents who re-enter employment within six months of retrenchment in the year 2018.

² The job vacancy rate for a quarter is defined as the number of job vacancies divided by the sum of the number of employees and job vacancies at the end of the quarter. Semi-annual figures are the simple averages of the quarterly figures.

... although some segments could be affected by external headwinds.

Meanwhile, within the trade-related cluster, the vacancy rate fell in transport & storage services. This was a result of the drag from the land transport segment, even as the vacancy rate rose in the air transport segment. The vacancy rates in wholesale trade and manufacturing also edged down, particularly in Q4, as businesses exercised caution in hiring amid external headwinds. This is corroborated by EDB's *Business Expectations of the Manufacturing Sector*, which showed an overall net weighted balance of -2 for the employment outlook. (Chart 3.10) Significantly negative readings were registered for electronics (-8) and precision engineering (-13), which more than offset the improvement in transport engineering (+12).

In the domestic-oriented cluster, vacancies rose in F&B services in H2 2018, reflecting recovering sales in restaurants and caterers. However, the vacancy rate in the retail industry fell in H2 from H1 2018, although it remained higher than the same period a year ago. As shown by the rise in vacancy rate, hiring in the construction industry is expected to turn positive in 2019, alongside increased private residential construction as well as ongoing public infrastructure projects. The growth rates of real output and employment in construction have been historically close, as shown in Chart 3.11. Employment growth in community, social and personal (CSP) services is also likely to remain stable, with continued demand for healthcare services to meet the needs of an ageing population.

More recently, the ManpowerGroup's Q2 2019 *Employment Outlook Survey* reported that the seasonally-adjusted net employment outlook³ for the overall economy was 11%, with only 4% of surveyed firms expecting to decrease headcount.

Labour productivity growth should moderate in 2019.

Labour productivity growth declined to 1.0% y-o-y in H2 2018, from 4.1% in H1. (Chart 3.12) This was primarily due to the slowdown in the manufacturing sector resulting from the maturation of the global electronics cycle. In addition, productivity growth saw a cyclical

Chart 3.9
Vacancy Rates by Industry

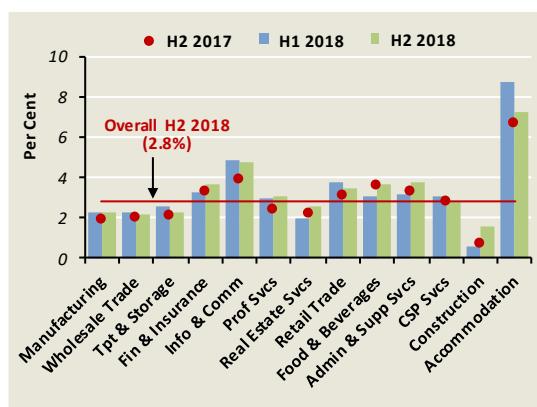
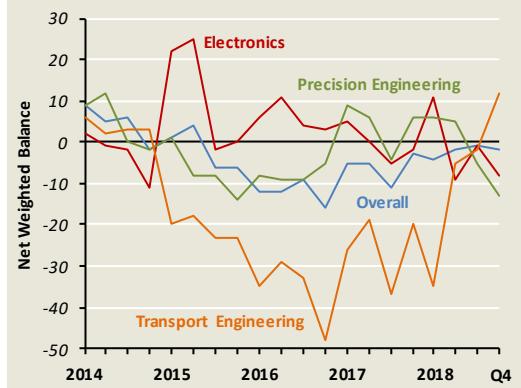
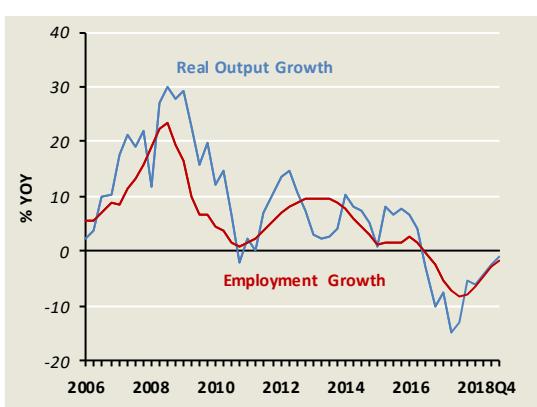


Chart 3.10
Manufacturing Employment Outlook



Note: The net weighted balance is the difference between the weighted percentage of 'up' responses and the weighted percentage of 'down' responses. Firms are asked to compare their next quarter's outlook against the current quarter during the survey.

Chart 3.11
Output and Employment Growth in the Construction Sector



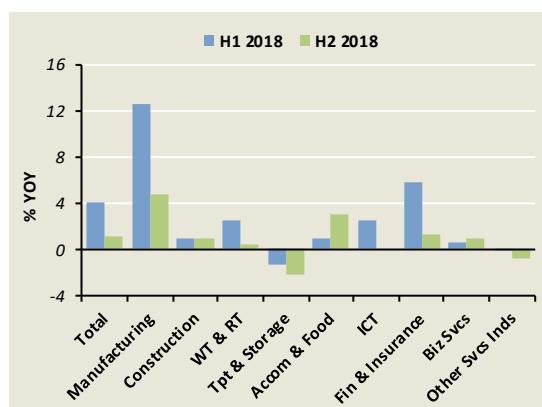
³ Net employment outlook is calculated as the percentage of employers anticipating total employment to increase less the percentage expecting to see a decrease in employment.

moderation across the services sector in general, with the exception of the accommodation & food and business services industries. For 2019, productivity growth is likely to come in lower than the 2.5% recorded in 2018, as GDP growth slows.

Wage growth is likely to taper slightly in 2019.

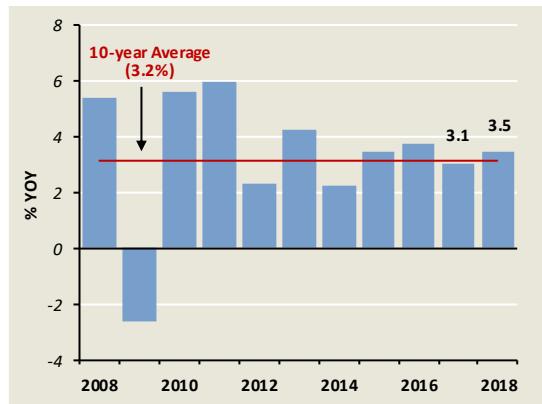
Resident wage growth eased to 3.1% y-o-y in H2 2018 from 3.8% in the first half of the year, bringing the full year increase to 3.5%. (Chart 3.13) With labour demand and supply growth projected to be broadly balanced, the average resident unemployment rate in 2019 is not expected to be significantly different from that in 2018. The projected moderation in GDP growth in 2019 should dampen the pace of wage increases. However, this effect will be partially offset by the fact that the economic slowdown is primarily concentrated in the capital-intensive manufacturing sector (especially electronics), which has limited impact on resident wages in the short term. All in, wage growth is likely to taper only slightly this year from that in 2018.

Chart 3.12
Productivity Growth by Sector



Note: Other Services Industries (labelled 'Other Svcs Inds') corresponds approximately to CSP services.

Chart 3.13
Resident Wage Growth



Note: Based on average monthly earnings.

3.2 Consumer Price Developments

Core Inflation Is In Check

MAS Core Inflation edged down in Q1 2019, largely due to a smaller increase in the cost of electricity & gas. Meanwhile, CPI-All Items inflation was unchanged from the previous quarter as the declines in accommodation and private road transport costs eased, offsetting the weaker core inflation outturns. Reflecting lower global oil price projections since the previous Review, as well as the impact of the liberalisation of the retail electricity market on electricity prices, the forecast range for MAS Core Inflation in 2019 has been revised downwards to 1–2%, from 1.5–2.5% previously. Meanwhile, the forecast range for CPI-All Items inflation remains at 0.5–1.5%, after it was lowered from 1–2% in February in view of the sharp decline in oil prices in Q4 last year.

MAS Core Inflation has eased, mainly due to lower price increases for energy-related components.

MAS Core Inflation edged down to 1.6% y-o-y in Q1 2019, from 1.8% in Q4 2018. While services inflation picked up due to the increase in bus and train fares, this was more than offset by lower inflation in retail items and electricity & gas. The latter was driven by the fall in global oil prices in Q4, as well as the phased nationwide launch of the OEM. Despite the decline in core inflation, CPI-All Items inflation was unchanged from the previous quarter at 0.5% y-o-y, as the fall in accommodation and private road transport costs eased. (Charts 3.14 and 3.15)

Non-oil import price inflation has picked up in recent months.

On the external front, Singapore's overall import price index (IPI) rose by 3.2% y-o-y in Jan–Feb 2019, moderating from the 6.2% increase recorded in Q4 last year. (Chart 3.16) However, non-oil import price inflation picked up to 3% y-o-y from 1.2% over the same period, largely driven by the machinery & transport equipment category, with intermediate goods such as electrical machinery, apparatus, appliances and electrical parts accounting for the bulk of the increase.

Global oil prices have recovered after reaching a trough in Q4 2018 ...

Brent crude, a global benchmark for oil prices, tumbled from a high of US\$86 in early October last year to US\$54 at the end of December, weighed down by concerns about oversupply and the weaker outlook for oil demand amid signs that global growth was faltering.

Chart 3.14
CPI-All Items and MAS Core Inflation

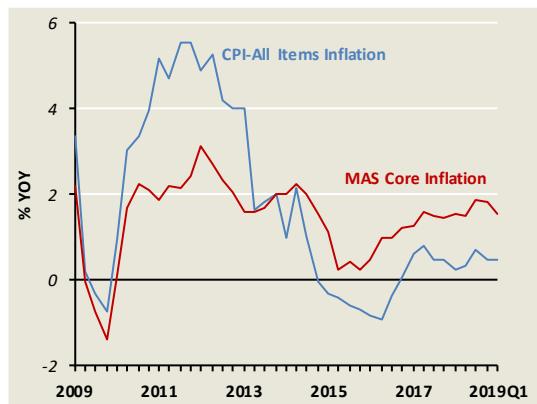
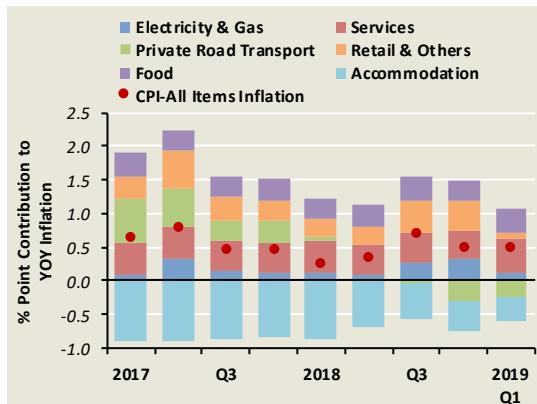


Chart 3.15
Contribution to CPI-All Items Inflation



Source: EPG, MAS estimates

Oil prices have since recovered, rising steadily to around US\$74 towards the end of April 2019. This was mostly driven by tighter supply as OPEC+⁴ delivered larger-than-expected production cuts, and oil production in some of the OPEC countries suffered unplanned outages. (Chart 3.17) Tougher US sanctions on Iran, political turmoil in some oil-producing countries, as well as optimism about a resolution to the ongoing US-China trade dispute have also supported oil prices.

... but are still expected to average lower this year compared to 2018.

Output cuts under the current OPEC+ production agreement should continue to support oil prices before they are reviewed in June. Despite some near-term tightness in oil markets, global oil inventories are anticipated to build over 2019 on the back of still-robust non-OPEC supply growth, driven largely by the US, which should cap upward pressure on oil prices. However, oil prices could be volatile amid ongoing uncertainty about the macroeconomic environment and the impact of geopolitical events on oil production. Against this backdrop, prices are expected to average around US\$67 in 2019, lower than the projection of US\$78 in the previous *Review*, the US\$71 outturn in 2018, and comparable to the forecasts by other international agencies.⁵ (Chart 3.18)

The progressive liberalisation of the retail electricity market will dampen inflation in 2019.

The progressive roll-out of the OEM since November last year has lowered electricity prices substantially. In its February 2019 press release, the Energy Market Authority indicated that a sizeable proportion of consumers had taken up plans offered by electricity retailers. For example, about 40% of households in Jurong had switched to retailers within ten months of the launch of the OEM pilot. Consumers who switched enjoyed electricity charges that were about 20–30% lower than the regulated tariff, which, in addition to the decline in oil prices in Q4 last year, lowered electricity CPI inflation in Q1 2019. (Chart 3.19)

Chart 3.16
Components of Import Price Inflation

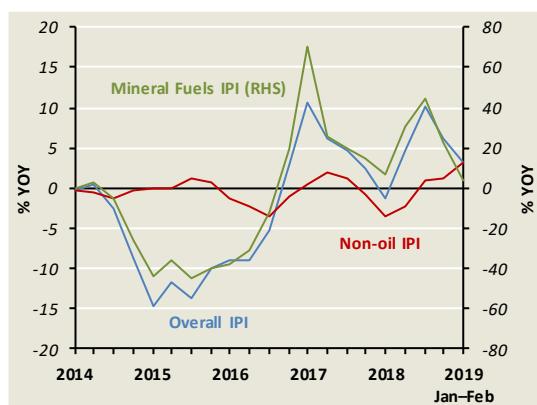
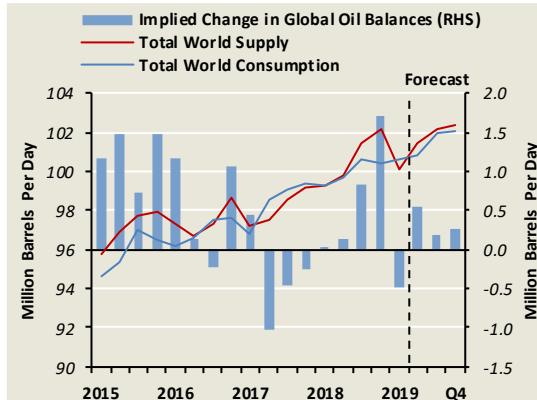
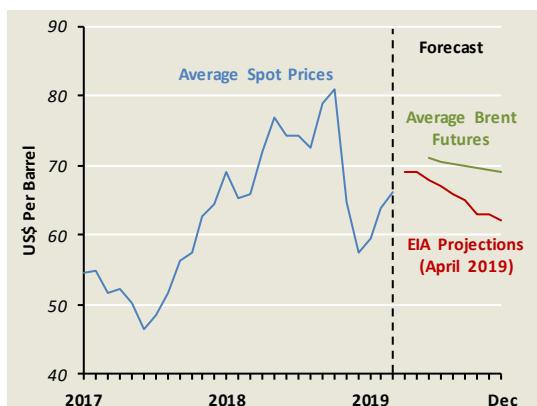


Chart 3.17
World Oil Demand and Supply



Source: EIA

Chart 3.18
Brent Oil Price Projections and Futures Prices



Source: Bloomberg and EIA

Note: Brent futures prices are averaged over working days from 1 to 23 April 2019.

⁴ OPEC+ include OPEC's 14 members as well as 10 other non-OPEC nations such as Russia, Mexico and Kazakhstan.

⁵ For example, the US EIA projected Brent crude oil prices to average US\$65 per barrel this year in its latest *Short-Term Energy Outlook* published on 9 April 2019. Similarly, the IMF expected Brent crude oil prices to average around US\$62 in 2019 in its April 2019 *World Economic Outlook*.

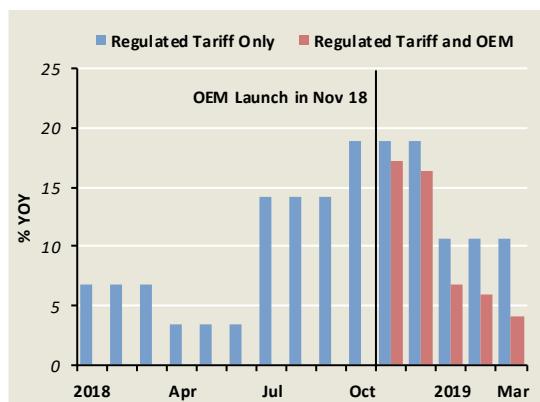
The proportion of households switching to price plans offered by electricity retailers is set to rise further in the months ahead, with the launch of the final phase of the OEM in May 2019. Competition between electricity retailers is also expected to keep their rates substantially lower than the regulated tariff. Taking into account the impact of the OEM on electricity prices, the energy-related components⁶ in the CPI basket are likely to lower headline and core inflation by around 0.1% point and 0.2% point in 2019, respectively, after adding 0.2% point and 0.3% point in 2018.

Global food prices are falling at a slower pace, and import prices are unlikely to accelerate.

The decline in global food prices slowed recently across a number of food categories, amid tighter supply and still-firm demand. (Chart 3.20) This was mirrored in food import prices for Singapore, which reversed a decline of 0.2% y-o-y in Q4 last year to rise by 0.9% in Jan–Feb 2019, largely driven by a turnaround in the prices of dairy products, as well as a slower pace of decline in meat and sugar prices. A decomposition of the changes in food prices for Singapore's top ten food import sources in H2 2018 into the price changes in foreign currency terms and bilateral currency movements *vis-à-vis* the S\$ shows that the strengthening of the currency has helped in part to offset higher foreign food prices. (Chart 3.21)

The outlook for global food price inflation is benign, with markets for food commodities generally well-supplied. Buffer stocks of key food commodities remain ample and are forecast to rise over 2019 in major exporting countries⁷, which should mitigate the impact of weather-related disruptions to food production should El Niño conditions worsen.⁸ Imported food inflation should remain modest on the whole, although price pressures may emerge for certain food categories affected by transitory shocks. For example, the recent spike in fresh vegetable prices in China due to low harvest yields could feed through to vegetable import

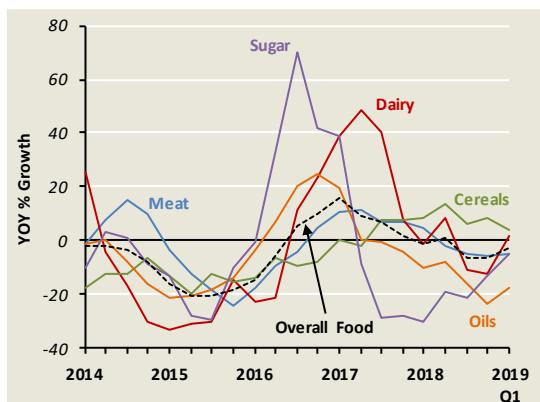
Chart 3.19
Electricity CPI Inflation under Regulated Tariff and OEM



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 outturns.

Chart 3.20
Global Food Commodity Prices



Source: UN Food and Agriculture Organization

⁶ These include electricity, liquefied petroleum gas and gas for domestic use.

⁷ In its April 2019 *World Agriculture Supply and Demand Estimates*, the US Department of Agriculture projected increases in ending stocks of staple food commodities such as rice and wheat in 2019.

⁸ The Diagnostic Discussion issued by the Climate Prediction Center and the International Research Institute for Climate and Society on 11 April 2019 projected that El Niño conditions in the Northern hemisphere would continue through the summer of 2019 with a 65% probability, and possibly through the autumn with a 50–55% probability.

prices.⁹ Prices of imported eggs picked up by close to 30% y-o-y in Jan–Feb, reflecting supply constraints in Malaysia, which accounted for around 84% of the total value of Singapore's egg imports in 2018. (Chart 3.22)

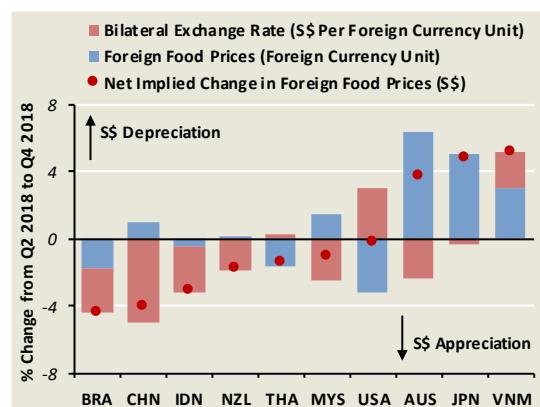
Domestic food inflation has been stable, but is expected to see modest increases over 2019.

Inflation for non-cooked food items was 1.3% y-o-y in Q1 this year, unchanged from the previous quarter. While meat prices reversed declines in the past two quarters and the prices of non-alcoholic beverages registered larger increases, these were offset by the smaller rise in the prices of fish & seafood and dairy products. Although import prices for food are expected to pick up slightly this year—in line with the modest increase in global food commodity prices—the general strengthening of the S\$ against other currencies, as well as recent discounts announced by supermarkets, should cap inflation for non-cooked food items.¹⁰

Reflecting a larger increase in the prices of hawker meals and a turnaround in the cost of fast food, overall food services inflation edged up to 1.6% y-o-y in Q1 2019 from 1.5% in the previous quarter. Consumer spending on food services has picked up since Q2 last year, with the F&B Services Volume Index rising by a creditable 1.6% in Q4 2018, before moderating to 0.2% in Jan–Feb 2019. (Chart 3.23)

The projected rise in non-cooked food prices and labour costs, coupled with signs of a nascent pickup in demand for prepared meals, are likely to translate to firmer inflation for prepared meals. For 2019, overall food inflation is expected to average higher than the 1.4% recorded in 2018.

Chart 3.21
Foreign Food Prices and Bilateral Exchange Rates



Source: EPG, MAS estimates

Note: Foreign food prices refer to food export prices, where available. Otherwise, producer, wholesale or consumer price indices were used instead.

Chart 3.22
CPI for Eggs in Malaysia and IPI for Eggs in Singapore

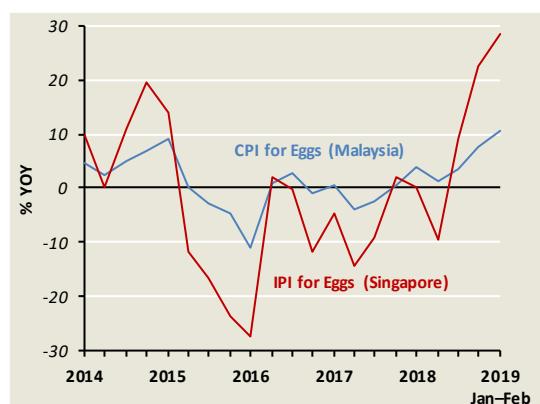
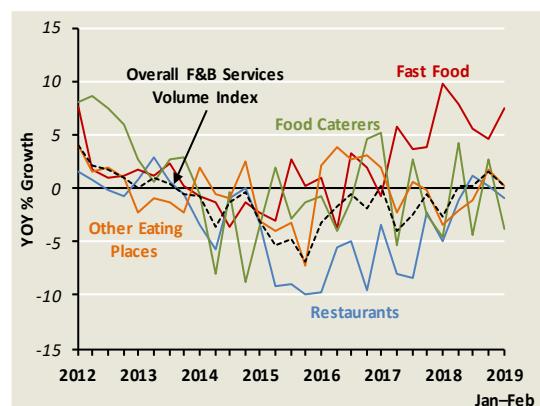


Chart 3.23
F&B Services Volume Index



⁹ China accounted for around 25% of the total value of vegetables imported into Singapore in 2018.

¹⁰ NTUC FairPrice announced on 18 March 2019 that it would lower the prices of 50 essential products under their house brand and keep prices of 100 essential products unchanged till June 2020. This could limit price pressures on non-cooked food, given that around 75% of the promotional products are non-cooked food items.

Indicators point to continuing domestic cost pressures.

Unit labour cost (ULC) for the overall economy rose by 1.3% y-o-y in Q4 2018, the same rate as in the previous quarter. While growth in resident nominal wages slowed to 2.8% y-o-y in Q4 from 3.5% in Q3, labour productivity growth fell by more to 0.6% y-o-y from 1.4% in the previous quarter. ULC growth in the services sector continued to firm in Q4 2018, offsetting a slightly larger decline in ULC in the goods-producing industries. (Chart 3.24) The stronger rise in ULC in the domestic-facing services industries such as retail trade in particular, could see cost pressures filter through to consumer prices eventually. For 2019 as a whole, overall ULC is expected to rise by around 2%, compared to 0.5% in 2018. As for non-labour costs, retail and industrial rents appear to have bottomed out, while office rents remain elevated, reflecting the limited availability of prime office space in the Central Business District. (Chart 3.25)

Services inflation rose in Q1, largely due to the increase in bus and train fares.

Services inflation rose to 1.6% y-o-y in Q1 2019, from 1.4% in Q4 2018, mainly due to the upward revision in bus and train fares in December last year. (Chart 3.26) Excluding bus and train fares, services inflation was 1.5% in Q1, marginally lower than 1.6% in the previous quarter, as the disinflationary impact of a smaller rise in holiday expenses and education services fees outweighed a slower decline in telecommunication services fees. (Chart 3.27)

Essential services will be the main driver of the rise in overall services inflation in 2019.

Discretionary services inflation is expected to be broadly similar to last year. Holiday expenses and airfares, which are influenced by global factors, were a major driver of discretionary services inflation in 2018. Prices of these items rose by 2.0% and 1.5%, respectively, as firm global economic growth fuelled demand for travel while higher fuel costs pushed up airfares. In 2019, airlines are likely to continue facing increased operating costs as labour costs rise amid stiff global competition for pilots.¹¹ However, the moderation in global economic growth will weigh on

Chart 3.24
Unit Labour Cost Indices

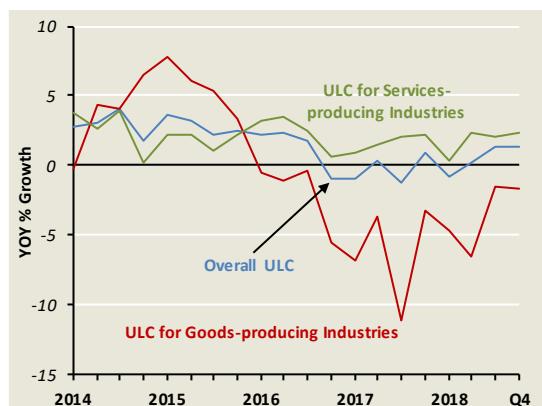


Chart 3.25
Industrial and Commercial Rentals

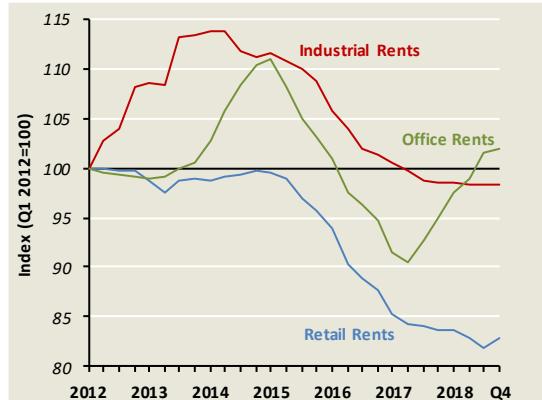
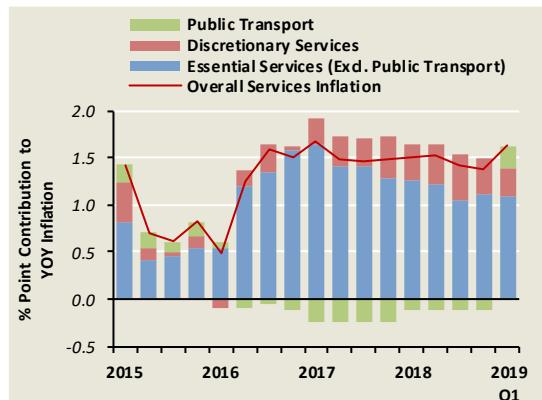


Chart 3.26
Contribution to Overall Services Inflation



Source: EPG, MAS estimates

¹¹ In its 2018 *Economic Performance of the Airline Industry* report, the International Air Transport Association (IATA) is projecting both hiring and wages to pick up in 2019, translating to a 2.1% increase in ULC in the airline industry in 2019.

discretionary consumer spending, and in turn, inflation for holiday expenses. On balance, holiday expenses and airfares are forecast to see slightly smaller increases this year compared to 2018.

Meanwhile, essential services¹² inflation should pick up further when the increase in the non-concessionary foreign domestic worker levy takes effect from April 2019. In comparison, healthcare subsidies under the Merdeka Generation Package will come into effect only in the latter half of 2019, with a limited disinflationary impact on services inflation this year.

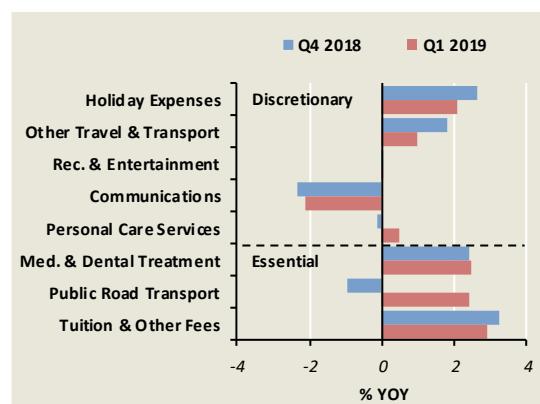
Essential services inflation is estimated to be around 3% in 2019 compared to 2% last year. More broadly, the firmer growth in ULC for services-producing industries over the recent quarters is expected to filter through to services costs. In 2019, overall services inflation should come in higher than the 1.5% recorded in 2018.

Meanwhile, retail prices are likely to stay relatively flat this year.

Retail inflation was 0.9% y-o-y in Q1 this year, easing from 1.4% in Q4 2018, largely on account of a smaller increase in the prices of alcohol & tobacco and clothing & footwear, as well as a steeper fall in the prices of consumer electronics.¹³ (Chart 3.28) Inflation outturns across the various components of the retail basket pointed to a broad-based weakening in Q1 2019.

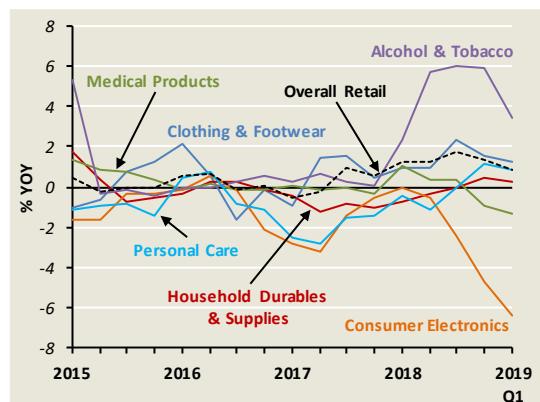
However, both labour and non-labour costs in the retail sector have increased. ULC for the wholesale and retail trade sector picked up by 5.4% y-o-y in Q4 2018 compared to 2.9% in Q3, while the decline in retail rents decelerated to 1.0% y-o-y from 2.7%. Import price inflation for miscellaneous manufactured articles, a proxy measure of the cost of finished consumer goods imports, also rose to 1.7% y-o-y in Jan–Feb 2019, reversing declines in the latter half of 2018. (Chart 3.29)

Chart 3.27
Components of Services Inflation



Note: The ‘Other Travel & Transport’ category largely comprises airfares, even as it includes expenditures on other forms of transport, such as fares for sea travel and moving fees. The ‘Recreation & Entertainment’ and ‘Communications’ categories comprise mainly recreation & culture and telecommunications services respectively, although they also include some retail goods items. ‘Public Road Transport’ includes fares for trains and buses.

Chart 3.28
Selected Components of Retail Inflation



Source: EPG, MAS estimates

¹² Essential services include CPI components which tend to be more income-inelastic and are influenced by broader demographic trends, such as healthcare, education and domestic services. They account for roughly half the weight of the services component in the CPI basket.

¹³ ‘Consumer Electronics’ includes audio-visual, photographic & information processing and telecommunication equipment.

Despite indications that the costs facing the retail sector have risen since the previous *Review*, the expected moderation in economic activity in H1 2019 and lingering uncertainty over growth prospects could constrain the ability of retailers to pass on rising input and labour costs. Competition amid the ongoing shift towards e-commerce is also likely to weigh on retail inflation.

Accordingly, overall retail inflation¹⁴ is expected to come in lower in 2019 than the 1.4% seen last year, as the y-o-y impact of the hike in tobacco excise duty in February 2018 and phased increases in water tariffs over the past two years fade away by H2 2019. Excluding components related to water supply and tobacco, retail prices are expected to remain largely flat in 2019.

Private road transport costs are projected to be mostly unchanged this year.

After declining over the course of 2018 to a low of around \$27,800 in December, car Certificate of Entitlement (COE) premiums rose to around \$31,000 in Q1 2019, and picked up further to \$38,400 in April. In addition to a smaller COE quota for the current Feb–Apr quota period, car dealers cited fleet building and renewal by private-hire car rental companies, as well as the boost to car sales from the Singapore Motor Show in January, as factors that had contributed to increased bidding for quotas in Q1. (Chart 3.30) Reflecting the recovery in COE premiums, the decline in private road transport costs eased in Q1 this year, compared to Q4 2018. (Chart 3.31)

COE quotas for the upcoming May–Jul quota period will be around 10% lower than the current quota. Combined with a near-term increase in vehicle demand from private-hire companies, this could lead to some upward pressure on COE premiums in the coming months. Overall, private road transport costs are projected to be largely unchanged from the previous year, as lower petrol prices offset the anticipated increase in car prices over 2019.

Chart 3.29
Measures of Retail Sector Cost Pressures

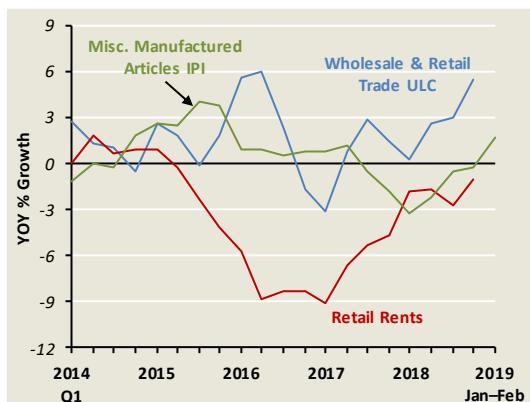


Chart 3.30
Car Registrations

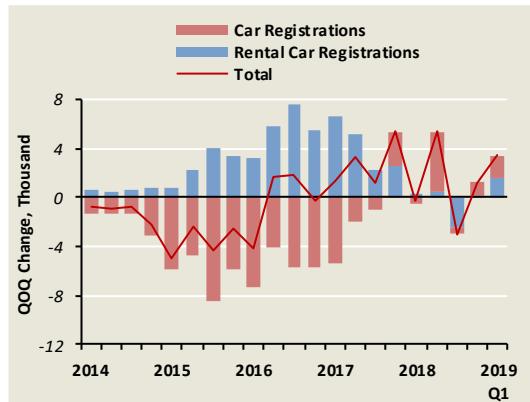
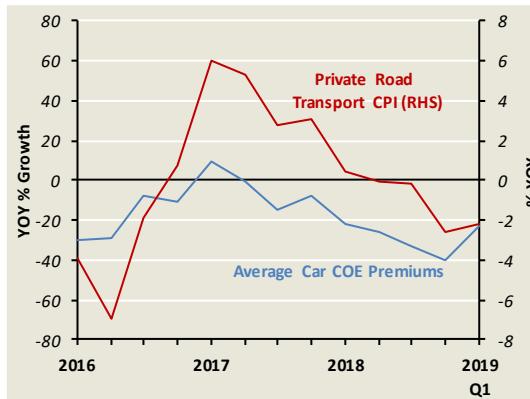


Chart 3.31
Car COE Premiums and Private Road Transport CPI



Source: EPG, MAS estimates

Note: Car COE premiums refer to those for vehicles in Category A and Category B.

¹⁴ This refers to inflation for the ‘Others’ category in the CPI, which include retail goods and water supply.

The pace of decline in accommodation costs should ease further.

Accommodation costs fell by 1.7% y-o-y in Q1 2019, moderating from the 2.2% drop in Q4 2018 as the decline in housing rentals continued to ease. While the URA Rental Index fell by 1.0% q-o-q in Q4 2018 after rising over three consecutive quarters, more recent indicators such as the SRX Residential Rental Index suggest that non-landed private residential and HDB housing rentals picked up in Q1 2019. (Chart 3.32)

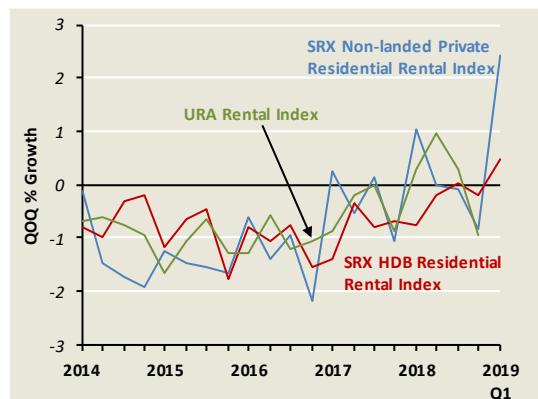
Vacancy rates for private residential units trended lower in Q4 2018, reflecting tighter supply as fewer completed units came on-stream. (Chart 3.33) Net additions to the stock of private housing units are projected to continue tapering off in 2019 and 2020, with an increase in the number of completed units partly offset by the withdrawal of en-bloc units sold to developers. Overall, the decline in imputed rentals is expected to moderate over 2019, with accommodation costs lowering headline inflation by less than the 0.6% point drag in 2018.

Underlying inflationary pressures are in check.

In sum, MAS Core Inflation is currently expected to come in near the mid-point of the revised forecast range of 1–2% in 2019, as conveyed in the April 2019 Monetary Policy Statement. The downward shift in the forecast range from 1.5–2.5% was largely due to revised estimates of the impact of OEM on electricity prices following higher-than-anticipated take-up rates, and the downgrade in forecasts for global oil prices since the previous *Review*. In terms of the quarterly profile, y-o-y core inflation is likely to moderate in H2 2019, as a result of the dissipation of the contribution from both energy-related items and the phased increases in water tariffs.

Underlying cost pressures continue to be present in the domestic economy, although weaker inflation outturns in recent months suggest that they could be taking longer to translate into materially higher consumer price inflation. Excluding energy-related components, core inflation held steady at 1.4% y-o-y in Q1 2019, and is expected to come in moderately higher for the full year, compared to the 1.4% recorded in 2018. (Chart 3.34)

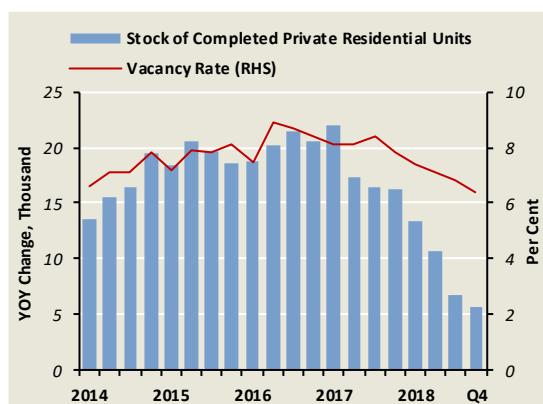
Chart 3.32
SRX Residential Rental Index and
URA Rental Index



Source: Haver Analytics and Singapore Real Estate Exchange (SRX)

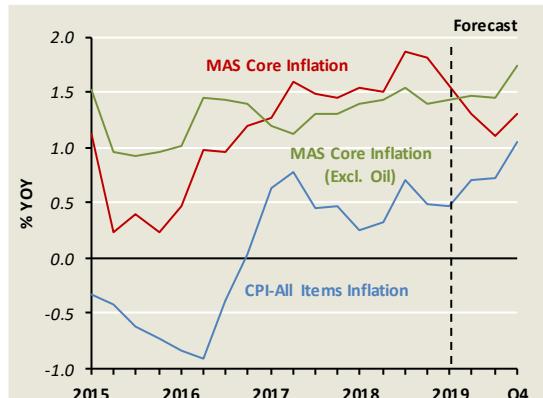
Note: The URA Rental Index includes rentals for landed and non-landed private residential properties.

Chart 3.33
Vacancy Rate and the Change in Stock of
Completed Private Residential Units



Note: Figures exclude executive condominiums.

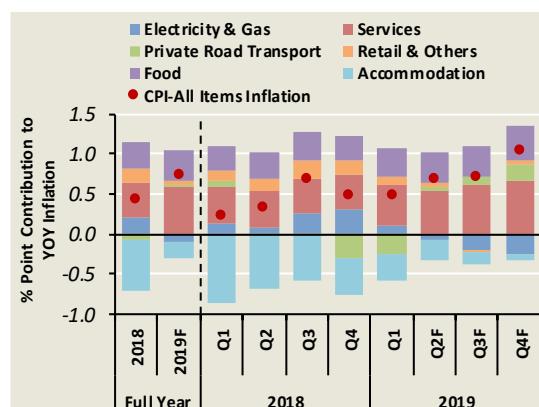
Chart 3.34
CPI-All Items and MAS Core Inflation



Source: EPG, MAS estimates

The forecast for CPI-All Items inflation remains at 0.5–1.5% as announced in the January 2019 *Consumer Price Developments* report. Headline inflation is anticipated to come in higher than the 0.4% recorded last year, reflecting the smaller decline in accommodation and private road transport costs compared to 2018. (Chart 3.35)

Chart 3.35
Contribution to CPI-All Items Inflation



Source: EPG, MAS estimates

Chapter 4

Macroeconomic Policy

4 Macroeconomic Policy

In April 2019, MAS maintained the rate of appreciation of the S\$NEER policy band, after increasing it slightly in the October 2018 policy review. Amid slowing global activity and trade, GDP growth in the Singapore economy has eased and is now expected to come in slightly below its potential rate. Consequently, the positive output gap will be smaller in 2019 than the year before. The narrower output gap, together with benign imported inflation and a gradual pace of cost pass-through, should keep inflation in the domestic economy contained despite the presence of some underlying cost pressures.

On the fiscal front, Budget 2019 pressed on with efforts to secure sustainable long-term growth for the Singapore economy. It built on past measures to help viable firms upgrade and become more productive, and sought to strengthen social safety nets for more inclusive growth outcomes. The government also elaborated on its plans to ensure ongoing fiscal sustainability. For CY2019, the overall fiscal stance is projected to be mildly expansionary.

Overall, the macroeconomic policy mix is assessed to be appropriate for ensuring price stability and sustainable growth in the medium term.

4.1 Monetary Policy

Maintaining The Prevailing Stance

Since the last review in October 2018, cyclical headwinds have intensified with the global economy and IT cycle slowing by more than anticipated at the turn of the year. Against this backdrop, the Singapore economy is projected to expand at a below-potential pace in 2019, causing the positive output gap to narrow. Domestic cost pressures, while present, appear to be taking longer to pass through materially to consumer prices, while external sources of inflation are likely to be more benign than previously expected. At the same time, the restraining effects of MAS' incremental tightening over 2018 will continue to filter through the economy. Inflationary pressures should thus be kept in check. Accordingly, MAS assessed that the monetary policy stance adopted in October 2018 remained appropriate for ensuring medium-term price stability at this juncture. The slope and width of the policy band, as well as the level at which it is centred, were kept unchanged in the April 2019 policy review.

In October 2018, MAS increased slightly the slope of the S\$NEER policy band, continuing the gradual pace of policy normalisation.

At the time of the October 2018 policy review, the global business and IT cycles were maturing, trade frictions between the US and China had intensified, while rising US interest rates were leading to tighter global financial conditions. These developments were expected to weigh more heavily on economic activity in Singapore's major trading partners in 2019 compared with 2018. Against this backdrop, domestic GDP growth was expected to ease to a more moderate pace, but the Singapore economy would remain on a steady expansion path with the level of output slightly above potential. GDP growth would be mainly underpinned by services, given healthy expansions in the region and still-firm domestic demand, while the contribution of the electronics and trade-related industries would wane.

Meanwhile, domestic price pressures were accumulating. Unit labour costs had risen alongside the fading of cyclical productivity growth and were expected to increase further in 2019, as the shift in growth drivers towards the less capital-intensive services sectors would keep the labour market tight and sustain wage growth at a pace above 3%. Imported inflation was also likely to pick up, on account of higher global oil and food prices. In addition, firms could pass on higher labour and import costs to consumer prices in an environment where domestic demand was recovering, although heightened competition would constrain the

extent of price increases. Reflecting the gradual but discernible turnaround in underlying inflationary pressures, MAS Core Inflation had risen progressively from a low of 0.5% in 2015 to 1.9% y-o-y in Q3 2018. Core inflation was projected to edge up in the near term, before levelling off at just below 2% over the medium term.

Accordingly, MAS assessed that a further withdrawal of policy accommodation was in line with the steady evolution of real and nominal economic variables, and appropriate for ensuring medium-term price stability. MAS therefore decided to increase slightly the slope of the S\$NEER policy band in the October 2018 policy review. This measured adjustment followed the slight increase in the slope in April 2018, from an earlier zero percent rate of appreciation, and was calibrated to take into account the persistent uncertainties in the external environment.

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

Since the October 2018 policy review, global growth has decelerated. A sharper downturn in the global IT cycle and a step-down in Chinese domestic demand have weighed on global trade and production by more than anticipated. Trade tensions have exacerbated the situation by dampening business confidence and corporate investment. Consequently, GDP outturns in Singapore's major trade partners have underperformed expectations.

Nevertheless, the global slowdown is unlikely to deteriorate into a broad-based recession at this stage. First, labour markets remain tight in most economies, underpinning the resilience of domestic demand. Activity in the services sectors has stayed firm, and the easing in global growth momentum has been largely confined to the manufacturing sector. Second, policymakers have moved to support their respective economies through macroeconomic policy stimuli. The US Federal Reserve is now expected to hold off further monetary policy tightening for the rest of 2019, while the authorities in China have rolled out a series of supportive fiscal measures. As a result, global financial conditions have eased, while recent data suggest that China's near-term growth momentum has stabilised.

Still, the outlook is clouded by significant uncertainty, and growth prospects for the world economy as a whole have weakened since the start of the year. GDP growth in Singapore's major trading partners is projected to slow to 3.9% in 2019 from 4.3% in 2018.

Mirroring developments on the external front, the domestic economy also began 2019 on a softer footing. According to *Advance Estimates*, Singapore's GDP grew by 1.3% y-o-y in Q1 2019, following the 1.9% expansion in Q4 2018. Over these two quarters, growth has halved to an average of 1.6% y-o-y from the 3.3% recorded over Q2–Q3 2018. As previously envisaged, the growth drivers have shifted from the IT- and trade-related industries to modern services, while the construction sector has picked up.

In the near term, the weakness in the IT- and trade-related industries in Singapore should persist in tandem with the global downturn. Meanwhile, steady demand from the region and efforts to encourage digitalisation domestically are expected to undergird growth in the modern services cluster, while ongoing public non-residential and infrastructure projects should sustain the recovery in construction activity for the rest of the year.

All in, Singapore's GDP growth should come in slightly below the mid-point of the 1.5–3.5% forecast range in 2019. In contrast to the previous two years (2017–18) when GDP growth in excess of the economy's potential rate had led to a widening

of the positive output gap, the pace of expansion projected for 2019 is slightly below the economy's potential growth rate, which will cause the positive output gap to narrow.

With the moderation in GDP growth largely confined to the more capital-intensive IT-related sectors, productivity growth is expected to bear the brunt of the cyclical adjustment and ease from its 2018 pace. In comparison, steady expansions in the modern services and domestic-oriented clusters are expected to support job creation. Overall labour market conditions should remain firm this year, and wage growth is only expected to ease slightly from the 3.5% recorded in 2018. Consequently, unit labour costs will rise further in 2019, after edging up by 0.5% last year.

Consistent with the positive but smaller output gap, domestic cost pressures remain, but are not at risk of accelerating at this stage of the cycle. The dimmer growth backdrop, as well as still-elevated global uncertainties, are likely to dampen confidence and thereby constrain the extent and pace at which firms can pass on higher business costs to consumers in the short term.

At the same time, external sources of inflation are more benign than anticipated in the October 2018 policy review. Global oil prices fell sharply in Q4 last year, and are currently expected to average lower for 2019 as a whole compared to 2018, even as they have picked up from their trough in December 2018. With the external economic environment in a soft patch, inflation in Singapore's major trading partners is likely to remain subdued for the rest of the year, and only rise modestly in 2020.

Moreover, MAS' previous rounds of monetary policy tightening in 2018, which set the S\$NEER policy band on an appreciation path, will continue to impart a restraining effect in the period ahead.

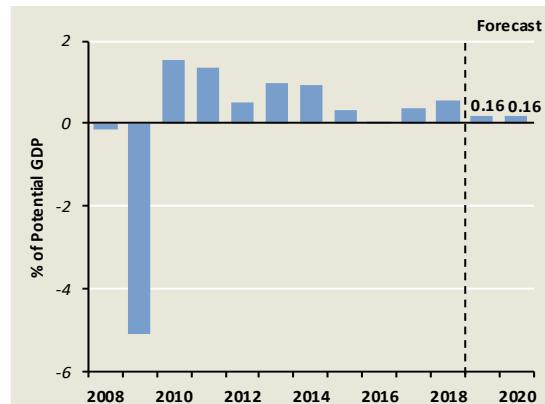
MAS has revised down its forecast for core inflation in 2019, primarily due to weaker global oil prices and the larger-than-expected disinflationary impact from the liberalisation of the retail electricity market. The first two phases of the Open Electricity Market (OEM) roll-out have already resulted in a sharper-than-anticipated decline in electricity prices, as a larger number of households switched to plans that are priced lower than the

regulated tariffs. The take-up rate is likely to increase in the months ahead as more housing estates become eligible for the OEM, which would further reduce electricity prices. MAS Core Inflation is currently expected to average 1–2% in 2019, down from 1.5–2.5% previously, and is likely to come in near the mid-point of the range. The forecast range for CPI-All Items inflation in 2019 remains at 0.5–1.5%, having been downgraded from 1–2% in February on account of the decline in global oil prices in late 2018.

In sum, inflationary pressures are expected to be contained, given the backdrop of a narrowing positive output gap, benign imported inflation, and an environment less conducive to cost pass-through. Accordingly, in April 2019, MAS kept the rate of appreciation of the S\$NEER policy band unchanged from that adopted in October 2018. There was also no change to the width of the band and the level at which it is centred.

This policy stance is consistent with a modest and gradual appreciation path of the S\$NEER policy band that keeps the economy close to potential and ensures medium-term price stability. (Chart 4.1) The longer-term evolution of monetary policy in relation to growth and inflation outcomes in the Singapore economy is depicted in Chart 4.2.

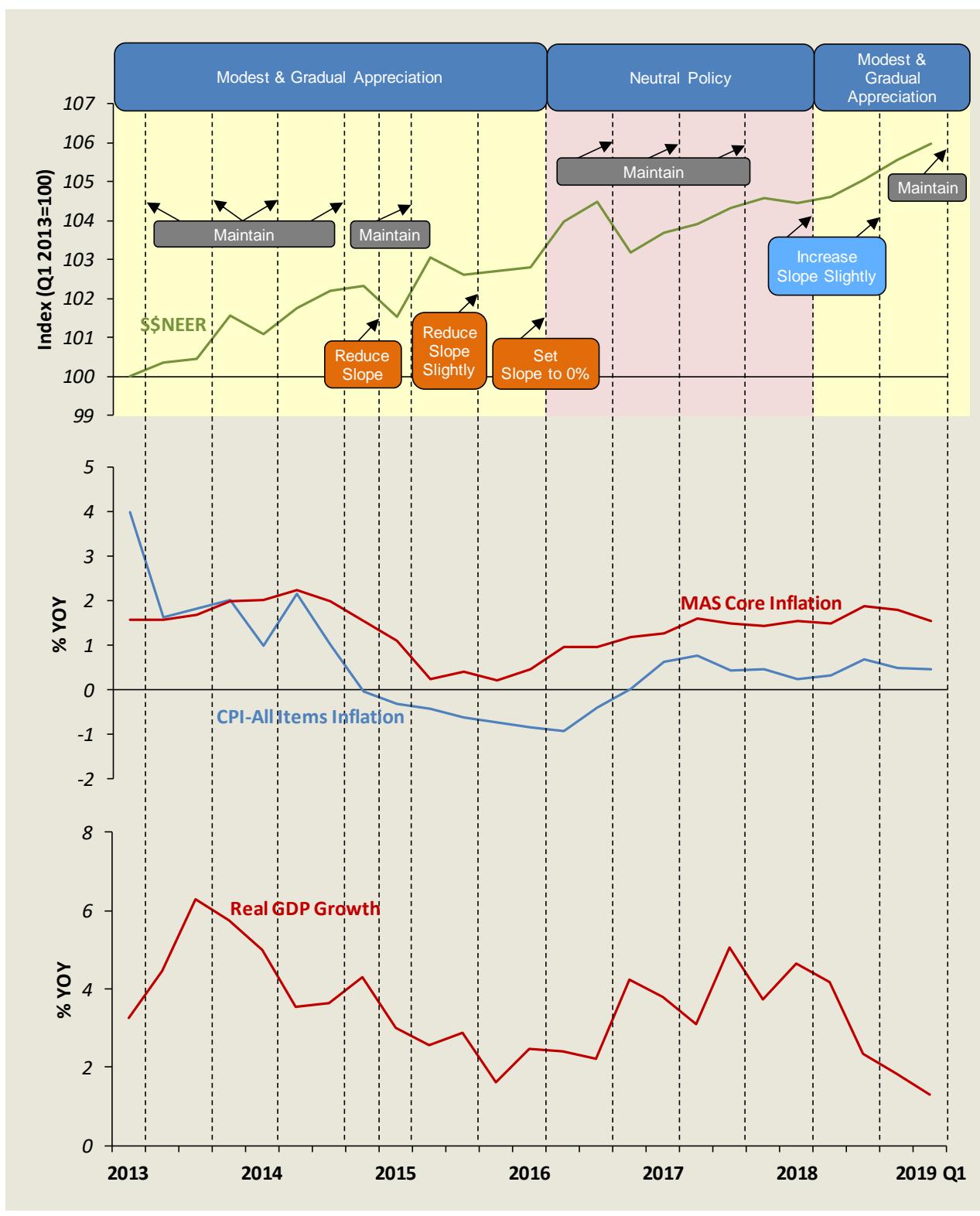
**Chart 4.1
Output Gap**



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 April 2019.

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



---- indicates release of Monetary Policy Statements

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

In the six months since the October 2018 Monetary Policy Statement (MPS), the S\$NEER has been on an appreciating trend within the upper half of the policy band. This largely reflected the strengthening of the S\$ against a few major currencies, even as it weakened slightly against a number of regional currencies. (Chart 4.3)

Between the week ending 12 October 2018 and that ending 5 April 2019, the S\$ rose by 1.4% against the US dollar alongside the US Federal Reserve's decision to pause from further policy tightening in 2019. (Chart 4.4) The S\$ also appreciated by 4.9% and 2.5% against the Euro and the pound sterling, respectively, as the former came under pressure amid a string of soft economic data, while the latter was weighed down by heightened uncertainty around Brexit. At the same time, the S\$ depreciated against a number of regional currencies, such as the Indonesian rupiah, Thai baht, and Chinese renminbi.

The CPI-deflated S\$REER rose in H2 2018.

The S\$ real effective exchange rate¹ (S\$REER) with the CPI as the measure of prices, picked up in H2 2018, rising by a cumulative 0.4% from its trough in Q2 2018. (Chart 4.5) The turnaround was entirely driven by a 0.9% appreciation in the S\$NEER. In comparison, relative prices continued to fall over this period, as domestic CPI-All Items inflation was lower than headline inflation in Singapore's major trading partners.

S\$ interbank rates have generally increased.

The three-month US\$ LIBOR rose steadily from 2.6% in October last year to peak at 2.8% in December, before retracing its earlier gains to settle at 2.6% in March 2019. (Chart 4.6) The US\$ LIBOR fell as market participants priced in the US Federal Reserve's more dovish stance. In line with the initial increase in the US\$ LIBOR, the three-month S\$ SIBOR rose from 1.6% in October to 1.9% in December. However, instead of moderating in tandem with the US\$ LIBOR, the S\$ SIBOR edged up by another 6 bps through to March. Accordingly, the S\$ SIBOR's discount relative to the US\$ LIBOR narrowed from 92 bps to 66 bps over the same period. Following a

Chart 4.3
S\$NEER

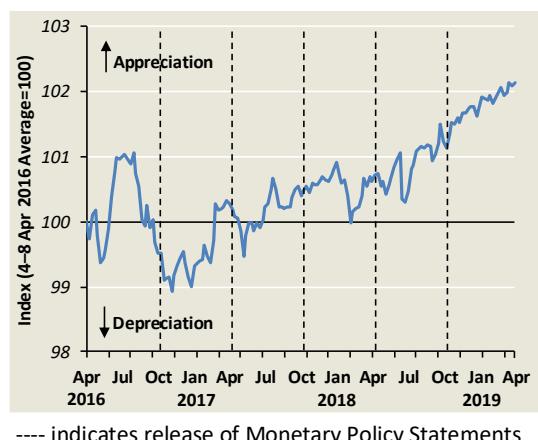


Chart 4.4
Singapore's Bilateral Exchange Rates

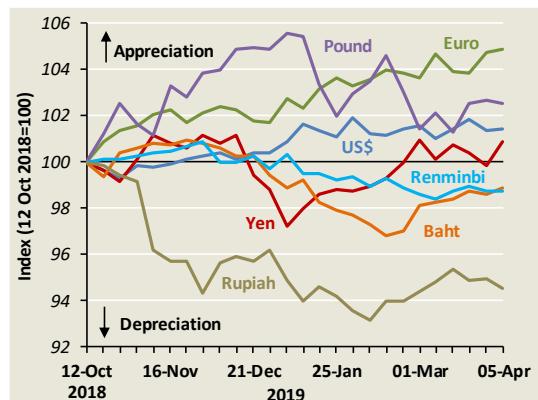
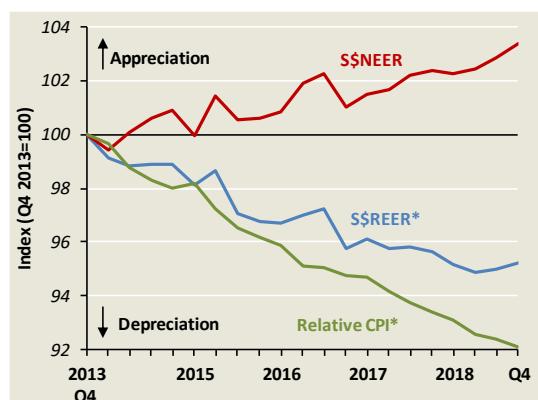


Chart 4.5
Components of the S\$REER (CPI-deflated)



* 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.

similar trajectory as the S\$ SIBOR, the three-month S\$ Swap Offer Rate came in higher at 1.9% in March, compared to 1.7% in October last year.

In line with the rise in domestic interbank rates, fixed deposit rates have generally increased since October. As at March 2019, the 12-month fixed deposit rate stood at 0.55%, 15 bps higher than in October 2018. However, the savings deposit rate has remained unchanged at 0.16% since March 2017.

Domestic liquidity conditions tightened over the last six months.

As measured by the Domestic Liquidity Indicator (DLI)², overall liquidity conditions have tightened since July 2018, due to a rise in both the S\$NEER and S\$ SIBOR. (Chart 4.7) The extent of the tightening was greater over Aug 2018 – Jan 2019 when a stronger appreciation in the exchange rate was seen. Thereafter, the degree of tightening moderated.

DBU non-bank loan growth picked up at end-2018 and in early 2019.

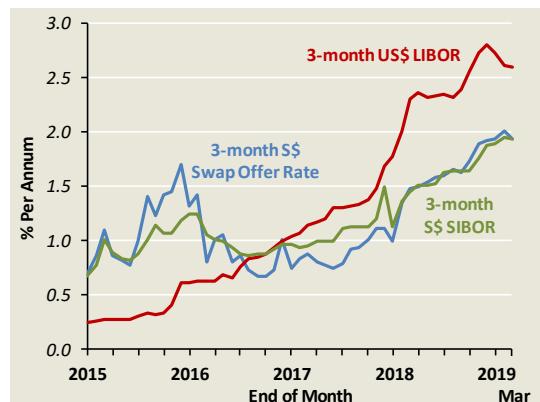
DBU non-bank loan growth edged up over Dec 2018 – Feb 2019 on a year-ago basis, after slowing in the second half of 2018. (Chart 4.8) The faster pace of credit expansion came on the back of stronger lending to businesses, particularly firms in the manufacturing, building & construction, and transport, storage & communication sectors.

In comparison, growth in consumer borrowing continued to trend down, easing to 0.5% y-o-y in February 2019. The slower rate of increase in the outstanding stock of consumer loans in the recent period reflected softer demand for housing loans, which in turn could be due to the additional property cooling measures introduced by MAS in July 2018.

Growth in M1 diverged from that of M2 and M3 as funds shifted to fixed deposits.

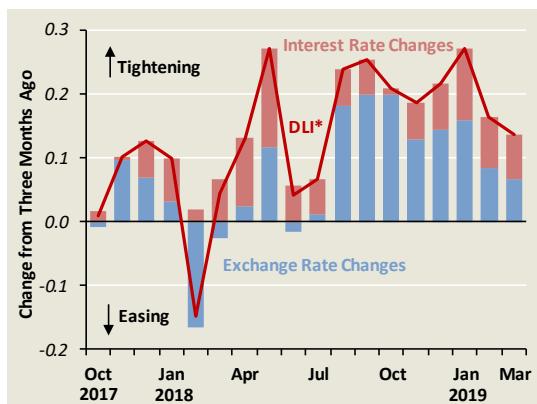
Growth in the supply of M1 has been slowing since its peak in July 2017. (Chart 4.9) In Jan–Feb 2019, M1 registered its first decline in three years, contracting by 0.2% y-o-y on average. The decrease in the stock of

Chart 4.6
Interbank Rates and the Swap Offer Rate



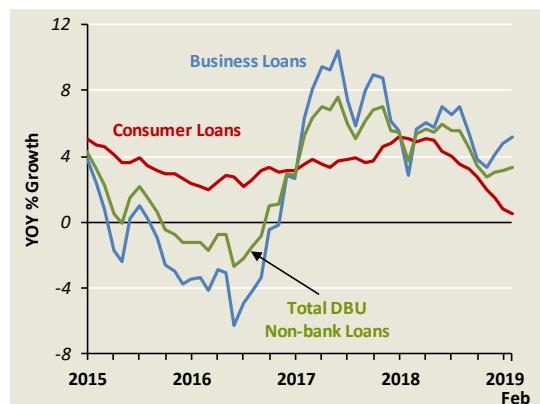
Source: ABS Benchmarks Administration Co Pte Ltd and ICE Benchmark Administration Ltd

Chart 4.7
Domestic Liquidity Indicator



* EPG, MAS estimates.

Chart 4.8
DBU Non-bank Loans



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

narrow money was driven primarily by a reduction in demand deposits. (Chart 4.10)

Meanwhile, growth of the broader monetary aggregates M2 and M3 picked up in early 2019, after being relatively stable over 2018. This largely reflected a faster pace of expansion in the stock of fixed deposits. The higher fixed deposit rates offered by banks had likely attracted more customers to place their funds in fixed deposits instead of other forms of deposits.

Chart 4.9
Money Supply

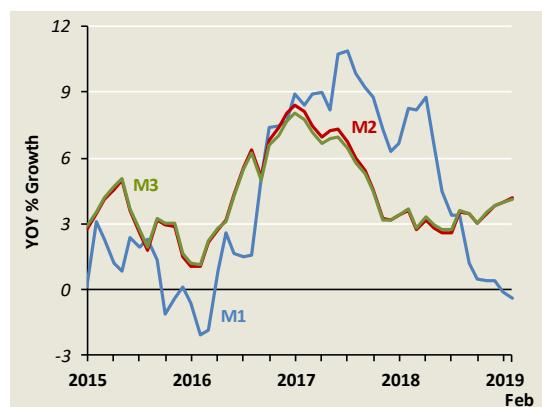
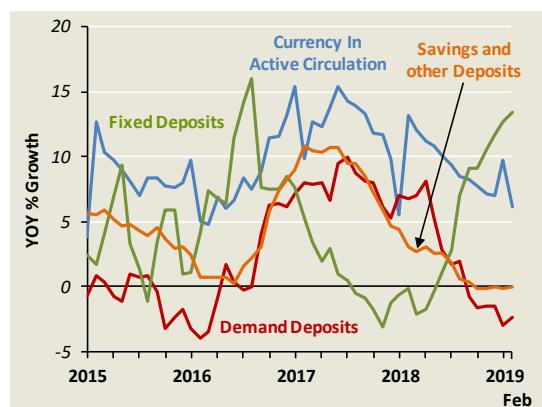


Chart 4.10
Money Supply Components



4.2 Fiscal Policy

Strengthening Productivity And Social Inclusivity

Budget 2019 focused on strengthening Singapore's long-term economic prospects in an inclusive and prudent manner. Measures directed at businesses, particularly SMEs, were largely designed to support the upgrading of viable enterprises so as to raise aggregate productivity in the economy. Specifically, these initiatives sought to encourage a more efficient allocation of resources across firms, greater capital deepening and technology adoption within firms, while fostering a more conducive environment for investment, utilisation of technology and innovation. At the same time, the Budget took steps to ensure that the fruits of growth are shared among all Singaporeans by broadening social safety nets, addressing inequality of access to opportunities, and offering greater assistance to low-wage workers and lower-income households. Budget 2019 also elaborated on the Government's strategies to ensure fiscal sustainability as Singapore's expenditure needs grow. Overall, the fiscal stance is expected to be mildly expansionary for CY2019.

Budget 2019 focused on enhancing Singapore's long-term sustainable growth prospects.

Budget 2019 was delivered against the backdrop of a dimming external economic outlook and some slippage in the domestic growth momentum since H2 2018. At the same time, the economy was facing significant uncertainties, amid risks of an intensification of the US-China trade war, a disorderly Brexit, and a slowing Chinese economy. Against this backdrop, domestic GDP growth is set to slow this year, with the economy expected to operate closer to its potential path.

While the Budget acknowledged the challenges posed by the near-term cyclical slowdown, it also recognised that leaning strongly against the winds of the maturing global business cycle would be counterproductive for the unfinished task of economic restructuring. Consequently, the overarching thrust of Budget 2019 was to enhance the economy's long-term sustainable growth prospects by raising productivity growth. This goal was to be pursued in tandem with efforts to strengthen social inclusivity and improve social welfare.

Raising aggregate productivity involves the efficient allocation of resources across firms ...

The Government's recent Budgets have sought to uplift the productivity of firms across the economy

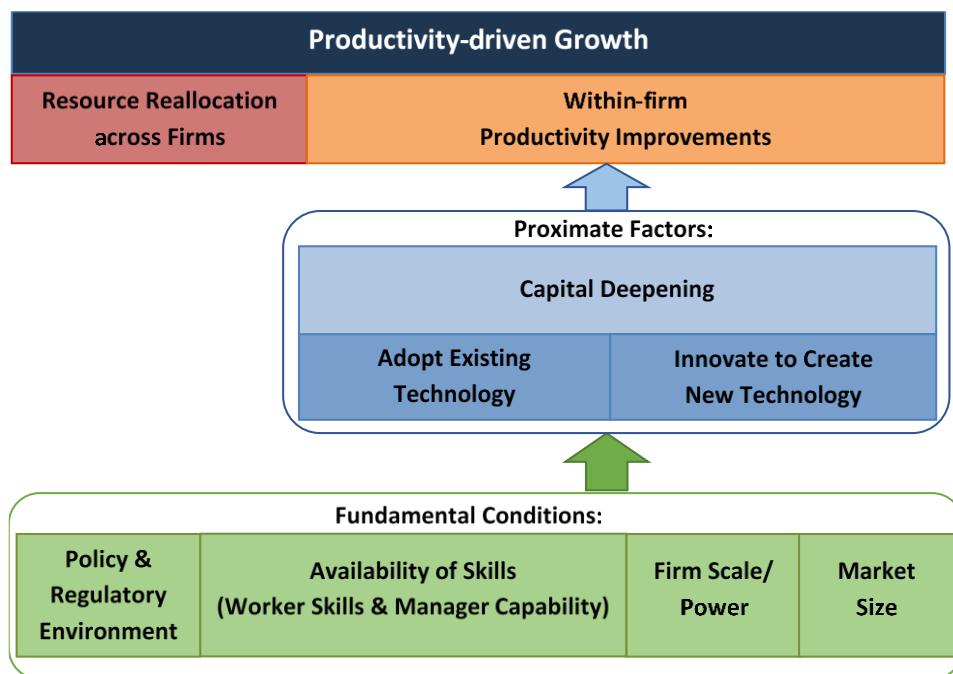
and in doing so, boost the real incomes of a broad swathe of Singaporeans.

Figure 4.1 provides a stylised summary of the means by which productivity-driven growth in individual sectors and the overall economy can occur. This framework draws on the economic literature on technology diffusion and endogenous technological change, where the fundamental starting point is that firms' decisions to invest, adopt technology and innovate—factors which ultimately drive long-term GDP growth—depend on the conditions and incentives facing them. These models of endogenous growth imply that there may be scope for government intervention when knowledge spillovers (positive externalities) exist or where there are barriers to technology adoption and innovation. Most of the economic measures in Budget 2019, which built on and reinforced past initiatives, can be contextualised within this framework.

Productivity-driven growth within sectors and the overall economy can be uplifted when scarce factor inputs are reallocated from firms where they are less efficiently used to companies where they are more productively deployed.

To facilitate efficient resource allocation, Budget 2019 announced a two-step reduction in the Dependency Ratio Ceilings (DRCs) for the services sector in 2020 and 2021. This measure should

Figure 4.1
Endogenous Productivity Growth Framework



encourage firms that use mid- to low-skilled foreign labour intensively to automate and raise productivity.³

... as well as increasing within-firm productivity.

Another important means of increasing aggregate productivity growth is to raise productivity levels within firms. The literature finds that several proximate factors are associated with firm-level productivity, including the firm's adoption of existing or frontier technologies, outlays on research and development to develop new technology or products, as well as the intensity of capital and IT usage. Budget 2019 thus extended and expanded on several past measures that directly incentivised and facilitated capital deepening and the adoption of technology.

First, it reduced the costs of automation and tech-adoption. The Budget extended the Productivity Solutions Grant (PSG) for three more years under an expanded scope, and provided for the Automation Support Package to run for another two years to support businesses in deploying large-scale automation technologies.

Second, the Budget sought to reduce SMEs' adjustment costs in utilising automation and digital solutions. Readily-available technology solutions are typically optimised for the conditions and needs of firms in advanced economies or for production processes in highly capital-intensive firms. SMEs that are only just beginning to shift away from labour-intensive methods would thus face a 'mismatch' between their needs and the solutions available to them. In this regard, Budget 2019 expanded the SMEs Go Digital programme which was first introduced in 2017 to help such firms identify technologies that are suitable for their level of development. Specifically, Budget 2019 increased the number of Industry Digital Plans to cover more sectors, and offered a wider range of pre-approved digital solutions. The expanded programme will allow more SMEs to receive advice on the appropriate firm-level technology they can adopt at each stage of growth.

Third, recognising that some firms faced unique challenges and thus needed assistance to innovate, Budget 2019 piloted the Innovation Agents programme, as well as the Digital Services Lab. The former will allow enterprises to obtain advice on innovation prospects from expert mentors, while

³ Simulations using the Monetary Model of Singapore (MMS) showed that the DRC changes could raise economy-wide labour productivity growth by an average of about 0.2% point per annum over 2020–21.

the latter will bring together industry and the research community to capture digitalisation opportunities in the services sector.

The Budget improved the ‘fundamental conditions’ that influence firms’ decisions to invest, use technology and innovate.

Firms’ decisions to invest in physical and human capital, use technology, and innovate, are also influenced by exogenous ‘fundamental conditions’ such as the policy and regulatory environment, the availability of skilled labour, as well as market size and the scale of the firm.

In this respect, the measures introduced in previous Budgets that facilitated the adjustment of relative factor prices (e.g., foreign worker levies and Productivity Innovation Credit) and built up the base stock of human capital (e.g., SkillsFuture programmes) have been essential for firms to successfully adopt productivity-enhancing measures. Budget 2019 built on these in several ways.

First, it improved the policy and regulatory environment for food services firms by piloting a one-stop portal for firms to transact with the Government. As the efficiency of government services was a key input to the production of most firms, this could indirectly raise productivity in the latter.

Second, Budget 2019 sought to ensure that Singapore’s human capital was of the quality required to enable technology adoption. For instance, the Budget expanded the scope of the PSG to include a subsidy for firms’ out-of-pocket training costs, to help workers acquire the appropriate skills and know-how to use new productivity and technology solutions. In addition, Budget 2019 launched new Professional Conversion Programmes (PCPs) relating to blockchain, embedded software development, and prefabrication to support the entry of mid-career professionals into new growth areas.

Third, the Budget included measures to encourage SMEs to scale up. The Government will invest another \$100 million through the SME Co-Investment Fund III to catalyse private sector funding of SMEs that are ready to scale up. In

addition, the Budget introduced the Enterprise Financing Scheme, which streamlined existing schemes to support SMEs’ access to bank financing, and extended the Working Capital Loan Scheme to FY2020. The Scale-up SG programme was also launched to assist high-growth local firms in their efforts to innovate, grow and internationalise.

Further strengthening of social safety nets and securing inclusivity formed the other key prong of Budget 2019.

Moving the country’s development agenda forward also requires the government to plough back part of the dividends from growth into strengthening support policies and institutions.

The past decade has been marked by a significant expansion of globalisation and technological progress. However, the impact on individuals has varied. The negative impact of globalisation and technological progress—e.g., structural unemployment—could perpetuate across individuals, reduce opportunities for subsequent generations, and cause social structures to ossify. Mitigating these effects is therefore necessary to secure continued support for globalisation and the openness which has been fundamental to the Singapore economy. Greater equality of opportunities, and removing the constraints that prevent seizing of these opportunities, will also allow more individuals to develop to their full potential.

Earlier Budgets had established key structural measures to strengthen the system of social safety nets, such as the permanent GST Voucher scheme, the Pioneer Generation Package, and Silver Support Scheme. Previous Budgets also focused on helping disadvantaged children and families, through programmes such as the Fresh Start Housing Scheme and KidSTART, as well as initiatives to strengthen early childhood education and improve access to childcare.

Budget 2019 built on these policy initiatives through a slew of new measures. First, the Bicentennial Bonus shared the fruits of Singapore’s growth and development with Singaporeans, but more benefits were allocated to lower-income and older Singaporeans.

Second, Budget 2019 sought to maximise the potential of Singaporeans at various stages of life. The Uplifting Pupils in Life and Inspiring Families Taskforce (UPLIFT) had earlier recommended providing highly-targeted care and support programmes to help disadvantaged students seize education opportunities. These will go some way to address the non-financial impediments faced by such students. To continue encouraging the employment of older workers, the Special Employment Credit (SEC) and the Additional Special Employment Credit (ASEC) were extended by another year.

Third, Budget 2019 expanded on critical social services. Through the Merdeka Generation Package (MGP) and the extension of the Community Health Access Scheme (CHAS) to all Singaporeans for chronic illnesses, the government provided greater healthcare assurance. The establishment of the Long-term Care Support Fund also acknowledged the increased needs for healthcare in the context of an ageing population and rising life expectancy. It will fund subsidies for CareShield Life and ElderFund, which provides financial support to severely disabled, lower-income older Singaporeans. At the same time, the quantum of ComCare Long-Term Assistance for individuals who are permanently unable to work and have little family support was increased. For low-wage workers, the qualifying income cap and the quantum of benefit under the Workfare Income Supplement (WIS) scheme was raised.

Fourth, the Budget provided further support to community assistance efforts. The Bicentennial Fund and Public Service Cares Initiative were launched to encourage Singaporeans—especially public servants—to be more involved in

volunteering and giving, thereby laying the foundation for greater social mixing and engagement. This should, over time, strengthen social solidarity and cohesion, thereby mitigating social stratification.

**The Government will continue to address
Singapore's long-term challenges in a fiscally
sustainable manner.**

The longer-term aim of enhancing Singapore's growth prospects has to be achieved in a fiscally prudent and sustainable manner.

In Budget 2018, it was noted that borrowing by Statutory Boards and Government-owned companies which build infrastructure was a more equitable means of financing long-term infrastructure investments, as both the benefits and the costs of such projects would accrue across several generations. At the same time, the Government's backing would also help reduce the borrowing costs on these investments. Budget 2019 implemented this approach by announcing that the Government would guarantee the loans taken out by the Changi Airport Group for the development of Changi East.

In addition, to further strengthen the capacity of Singapore's tax system to meet recurrent spending, the Budget reduced the GST import relief for travellers and the alcohol duty-free allowance. The Budget also reiterated that the GST rate would be raised by 2% points sometime in the period from 2021 to 2025.

Table 4.1 summarises some of the key measures from Budget 2019.

Table 4.1
Key Budget Initiatives in FY2019

A. For Businesses	
General Measures	
(A1) Reduction in Dependency Ratio Ceilings (DRCs) for Services Sector	<ul style="list-style-type: none"> Reduce services sector DRC from 40% to 38% from 1 Jan 2020 and 35% from 1 Jan 2021. Lower services sector S pass sub-DRC from 15% to 13% from 1 Jan 2020 and 10% from 1 Jan 2021.
(A2) Enhancement of Enterprise Development Grant (EDG) and Productivity Solutions Grant (PSG)	<ul style="list-style-type: none"> Extended funding of up to 70% of qualifying expenses to FY2022. Firms are required to commit to positive outcomes for workers e.g., wage increases, to qualify for EDG from April 2020. Expanded scope of PSG to include funding support for out-of-pocket training expenses, capped at \$10,000 per firm.
(A3) Digital Services Lab	<ul style="list-style-type: none"> Help companies in services sector capture opportunities from digitalisation through collaboration with industry and research partners.
(A4) Extension of Automation Support Package	<ul style="list-style-type: none"> Extended to FY2020 to encourage adoption of impactful and large-scale automation technologies.
(A5) Innovation Agents Programme	<ul style="list-style-type: none"> Two-year pilot for enterprises to tap on experienced industry experts for advice on innovation opportunities.
(A6) Launch of One-stop Portal for the Food Services Sector	<ul style="list-style-type: none"> To streamline regulatory touch-points with Government.
(A7) Scale-up SG Programme	<ul style="list-style-type: none"> Help high-growth local firms to identify and build new capabilities, innovate, grow and internationalise, in partnership with public and private sectors.
SMEs	
(A8) Expansion of SMEs Go Digital Programme	<ul style="list-style-type: none"> Introduce digitalisation plans for SMEs in the accountancy, sea transport and construction industries. Extend support to a wider range of pre-approved digital solutions, including artificial intelligence and cybersecurity.
(A9) SME Co-Investment Fund III	<ul style="list-style-type: none"> Government will set aside an additional \$100 million to catalyse private sector investment in SMEs that are ready to scale up.
(A10) Enterprise Financing Scheme	<ul style="list-style-type: none"> Streamlines eight existing financing schemes offered by Enterprise Singapore into one scheme to better support SMEs in accessing bank financing. Up to 70% risk sharing with the Government for loans to companies incorporated for less than five years. Extension of SME Working Capital Loan Scheme to FY2020.
B. For Households and Individuals	
Workers and Job Seekers	
(B1) New Professional Conversion Programmes	<ul style="list-style-type: none"> Help mid-career professionals enter new growth areas such as blockchain, embedded software development and prefabrication.
(B2) Extension of Career Support Programme	<ul style="list-style-type: none"> Extended to FY2020 to encourage hiring of retrenched mature or long-term unemployed citizens for PMET jobs.
(B3) Global Ready Talent Programme	<ul style="list-style-type: none"> Participating local firms to receive funding support of up to 70% of students' monthly stipends for internships. Support firms in sending Singaporeans with up to three years of working experience for overseas job postings in key markets.
(B4) Enhanced Workfare Income Supplement	<ul style="list-style-type: none"> Raise qualifying monthly income cap from \$2,000 to \$2,300 from January 2020. Increase maximum payout from \$3,600 to \$4,000 from January 2020.
(B5) Extension of Special Employment Credit (SEC) and Additional SEC	<ul style="list-style-type: none"> Extended to 31 December 2020 to encourage employers to hire older Singaporeans.

Households, Families and Community	
(B6) Bicentennial Bonus	<ul style="list-style-type: none"> Up to \$300 in GST Voucher — Cash for lower-income Singaporeans. Beneficiaries of Workfare Income Supplement Scheme to receive bonus amounting to 10% of total payouts for work done in 2018, with minimum payout of \$100. 50% Personal Income Tax rebate for YA2019, capped at \$200. \$150 top-up to Edusave accounts for all Singaporean primary and secondary school students. Up to \$500 top-up to Post-Secondary Education Accounts for Singaporeans aged 17–20. Up to \$1,000 CPF top-up for lower-income Singaporeans aged 50–64 in 2019 with CPF balances less than \$60,000.
(B7) Merdeka Generation Package (\$6.1 billion)	<ul style="list-style-type: none"> One-time \$100 top-up to PAssion Silver Card to support active ageing. \$200 MediSave top-ups each year from 2019 to 2023. <ul style="list-style-type: none"> Additional subsidies for outpatient care at Community Health Assist Scheme (CHAS) clinics, polyclinics, and public Specialist Outpatient Clinics for life. Additional subsidies for MediShield Life annual premiums (5% for seniors aged 60–74 and 10% for seniors aged 75 and above). Additional participation incentive of \$1,500 for joining CareShield Life.
(B8) Enhancement of CHAS	<ul style="list-style-type: none"> To cover all Singaporeans for chronic conditions, regardless of income. Extended subsidies for common illnesses to Orange CHAS card holders. Increase subsidies for complex chronic conditions for existing CHAS cardholders.
(B9) MediSave Top-ups	<ul style="list-style-type: none"> \$100 MediSave top-ups per year from 2019 to 2023 for citizens born in 1969 or earlier who do not receive Merdeka or Pioneer Generation benefits.
(B10) ComCare Long-term Assistance	<ul style="list-style-type: none"> Higher cash assistance rates for those permanently unable to work and have little family support.
(B11) Establishment and Top-up of Funds	<ul style="list-style-type: none"> Bicentennial Community Fund to provide dollar-for-dollar matching for donations made to Institutions of a Public Character (IPCs) for FY2019 (\$200 million). Long-Term Care Support Fund (\$5.1 billion). Public Transport Fund (\$10 million).
(B12) Service & Conservancy Charges (S&CC) Rebate (\$132 million)	<ul style="list-style-type: none"> 1.5–3.5 months of rebates for households.
C. Environmental Sustainability	
(C1) Diesel Tax Reforms	<ul style="list-style-type: none"> Raise excise duty for diesel from \$0.10 per litre to \$0.20 per litre. Permanently reduce the annual special tax on diesel cars and taxis by \$100 and \$850, respectively. Road tax rebates of 100% in 2019, 75% in 2020, and 50% in 2021 for commercial diesel vehicles. Additional cash grants of up to \$1,800 for eligible diesel buses that ferry students to mitigate impact of diesel duty on school bus fees.
D. Fiscal Sustainability	
(D1) Reduction in GST Import Relief for Travellers	<ul style="list-style-type: none"> Reduce value of goods granted GST import relief from \$150 to \$100 for travellers who spend less than 48 hours outside Singapore, and from \$600 to \$500 for travellers who spend at least 48 hours outside Singapore.
(D2) Lower Alcohol Duty-free Concession for Travellers	<ul style="list-style-type: none"> Reduce alcohol duty-free allowance from three litres to two litres.
(D3) Borrowing for Infrastructure	<ul style="list-style-type: none"> Government to provide guarantee for loans taken out by Changi Airport Group for the development of Changi East. Explore the use of government debt in the financing of long-term infrastructure investments for more equitable distribution of funding costs across generations.

Source: MOF

Table 4.2
Budget Summary

	FY2018 Revised		FY2019 Budgeted	
	\$ Billion	% of GDP	\$ Billion	% of GDP
Operating Revenue	73.7	15.0	74.9	14.8
Total Expenditure	79.0	16.1	80.3	15.8
Operating Expenditure	58.6	12.0	60.8	12.0
Development Expenditure	20.4	4.2	19.5	3.8
Primary Surplus/Deficit (-)	(5.3)	(1.1)	(5.4)	(1.1)
Less: Special Transfers (excluding top-ups to endowment/trust funds)	1.7	0.3	1.7	0.3
Basic Surplus/Deficit (-)	(7.0)	(1.4)	(7.1)	(1.4)
Less: Special Transfers (top-ups to endowment/trust funds)	7.3	1.5	13.6	2.7
Add: Net Investment Returns Contribution	16.4	3.4	17.2	3.4
Budget Surplus/Deficit (-)	2.1	0.4	(3.5)	(0.7)

Source: MOF

An overall budget deficit is projected for FY2019.

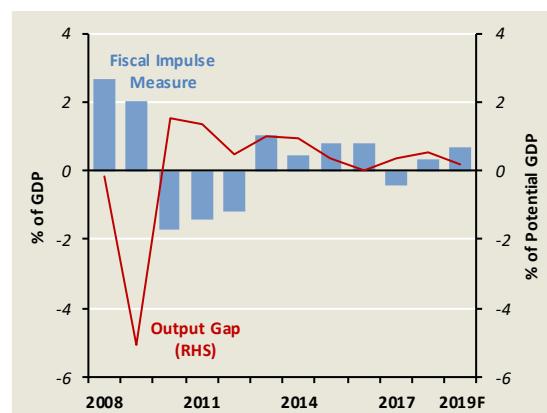
The overall budget balance is projected to be in a deficit of \$3.5 billion or 0.7% of GDP for FY2019, compared with a surplus of \$2.1 billion or 0.4% of GDP in FY2018. (Table 4.2)

The primary balance is expected to record a deficit of \$5.4 billion in FY2019, broadly similar to the preceding FY. Special transfers including top-ups to endowment and trust funds are estimated to be larger in FY2019, mainly on account of the injections into the new Merdeka Generation Fund (\$6.1 billion) and Long-Term Care Support Fund (\$5.1 billion).

The fiscal policy stance will be mildly expansionary in 2019.

The fiscal impulse (FI) is estimated to be mildly positive at around 0.7% of GDP in CY2019. (Chart 4.11) The positive FI encapsulates the short-term stimulus to aggregate demand and is appropriate, given the continuing external headwinds and uncertainties. To quantify the impact of specific budget measures on the Singapore economy, EPG used the Monetary Model of Singapore (MMS) to simulate some of the key initiatives announced. (See Box C for recent enhancements to the fiscal levers of the MMS.)

Chart 4.11
Fiscal Impulse and Output Gap



Source: EPG, MAS estimates

The largest component of household-related spending was the one-off Bicentennial Bonus of \$1.1 billion in FY2019. Together with initiatives targeted at supporting older or lower-income Singaporeans (e.g., the MGP, expansion of WIS, and changes to CHAS), household-related measures will raise disposable incomes across all income segments and hence boost private consumption in 2019.

Budget 2019 also enhanced several existing measures and added new initiatives to help businesses defray costs, build deep enterprise capabilities and leverage on local and international opportunities. Measures such as the extension of the SEC and ASEC, as well as refinements to the EDG and PSG, will help allay some labour-related costs for firms. Other initiatives such as the Scale-up SG and SMEs Go Digital programmes should help to boost investment spending.

Table 4.3 shows the combined macroeconomic impact of Budget 2019 over the near term. The Budget will have a positive impact on GDP levels, raising it by 0.17% in 2019. CPI-All Items inflation is expected to rise by 0.07% point, largely due to the boost to private consumption stemming from the household-related measures. However, the main impact on CPI inflation will only be felt in 2020 because of the lags in the price transmission mechanism, though it will remain relatively modest.

Table 4.3
**Impact of Selected Budget 2019 Measures
on Real GDP and CPI-All Items Inflation**

	2019	2020
Real GDP (% deviation)	0.17	0.01
CPI-All Items Inflation (% point deviation)	0.07	0.15

Note: The total value of the measures simulated is \$1,633 million and \$1,279 million in 2019 and 2020, respectively. The simulations include the deferment of foreign worker levies in the Marine Shipyard and Process sectors as well as measures related to the diesel excise duty.

Review Of The Government's CY2018 Basic Balance

Government operating revenue increased in 2018.

This section compares the government's budgetary outturn in CY2018 with CY2017.

In 2018, government operating revenue increased by \$6.9 billion to \$77.1 billion (15.8% of GDP) mainly on the back of higher collections from income taxes⁴, 'other taxes'⁵ and stamp duty. (Chart 4.12) These increases more than offset the decline in revenue from fees & charges.

Receipts from income taxes rose by \$7.1 billion in 2018. Apart from a one-off contribution from MAS in H1 2018,⁶ revenues from corporate and personal income taxes were also bolstered by the strong economic and labour market outturns. Meanwhile, collections from 'other taxes' went up by \$1.3 billion, mainly due to the higher-than-expected number of en-bloc transactions that attracted development charges. Stamp duty recorded gains of \$0.5 billion due to higher Additional Buyer's Stamp Duty rates and property prices, even as transaction volumes moderated. (Chart 4.13)

In contrast, fees & charges were weighed down by declines in both COE premiums and new vehicle registrations in 2018 compared to 2017. (Chart 4.14) Overall, vehicle quota premiums collected fell by \$2.8 billion in 2018.

Both operating and development expenditures rose modestly.

Total government expenditure rose by \$3.6 billion to \$75.2 billion (15.4% of GDP) on account of higher operating and development expenditures. In terms of sectors, the increase can be attributed to greater spending on economic development, which more than

Chart 4.12
Selected Components of Operating Revenue

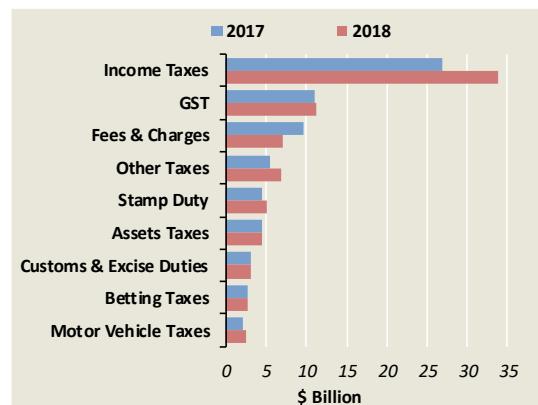
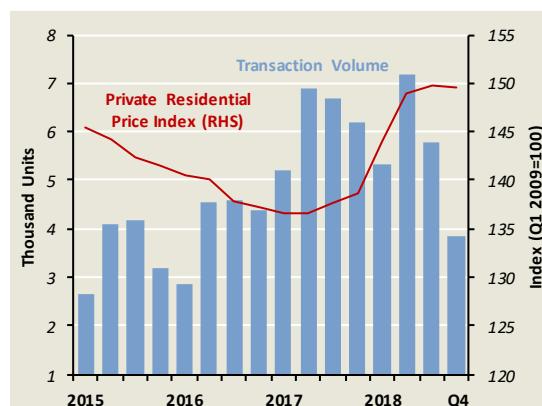


Chart 4.13
Residential Price Index and Property Transaction Volume



⁴ Income taxes include corporate and personal income tax, withholding taxes and contributions by statutory boards.

⁵ Other taxes comprise the foreign worker levy, water conservation tax, development charge and annual tonnage tax.

⁶ The FY2017 contribution from MAS that was paid to the Government in H1 2018 was based on MAS' actual net profit for FY2016. This turned out to be higher than projected, due to strong investment gains and lower valuation provisions as global financial markets rose in FY2016.

offset the slight decrease in social development outlays.⁷ Operating expenditure, which includes expenses on manpower, operating grants and subventions to statutory boards and other organisations, rose by a modest \$1.4 billion to \$56.2 billion (11.5% of GDP) in 2018. The Ministry of Health incurred operating expenditure of \$9.0 billion in 2018, up from \$8.4 billion in the preceding year, on account of larger subsidies for patient and elderly social care services. (Chart 4.15) Meanwhile, in line with expanding public transport capacity, the operating expenditure of the Ministry of Transport increased by \$0.3 billion.

Development expenditure, which comprises longer-term investment in capitalisable assets, such as roads and buildings, increased by \$2.2 billion to \$19.0 billion (3.9% of GDP) in 2018. This mainly reflected higher spending by the Ministry of Transport and the Ministry of Trade and Industry. (Chart 4.16) The former's expenditure was largely attributable to the development of MRT projects. Meanwhile, the latter devoted more resources to support EDB's 'Attract, Transform and Create' strategy as part of a broader industry restructuring initiative to secure longer-term competitiveness and economic growth.

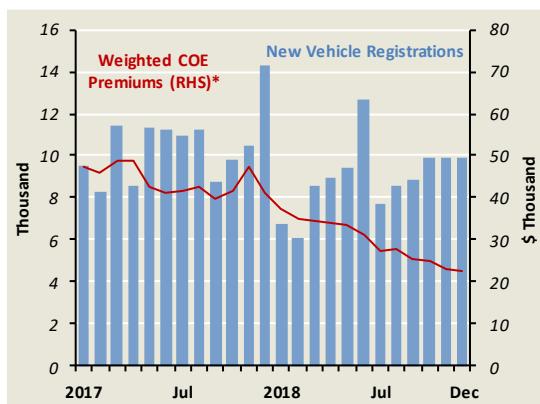
The government's basic deficit narrowed.

As the increase in operating revenue exceeded that of total expenditure, which in part reflected the one-off contribution from MAS, the government recorded a primary surplus of \$1.9 billion (0.4% of GDP) in 2018.

Special transfers, excluding top-ups to endowment and trust funds, remained largely unchanged at \$2.2 billion in 2018, mainly because higher transfers to households under the Wage Credit Scheme and the SG Bonus offset lower disbursements to firms under the Productivity Innovation Credit Scheme and Temporary Employment Credit Scheme.

Taken together, the deficit in the government's basic balance narrowed to \$0.3 billion in 2018, from \$3.6 billion previously.

Chart 4.14
COE Premiums and New Vehicle Registrations



* Weighted by the COE quota of each category.

Chart 4.15
Selected Components of Operating Expenditure

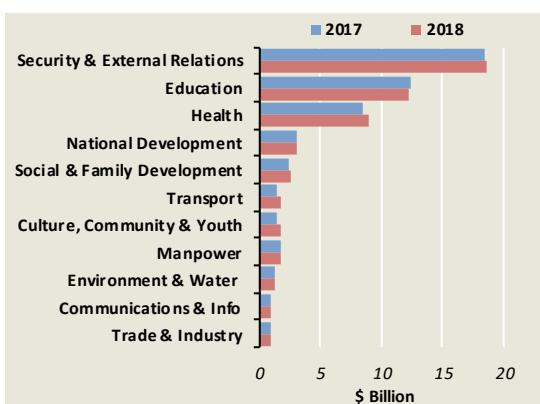
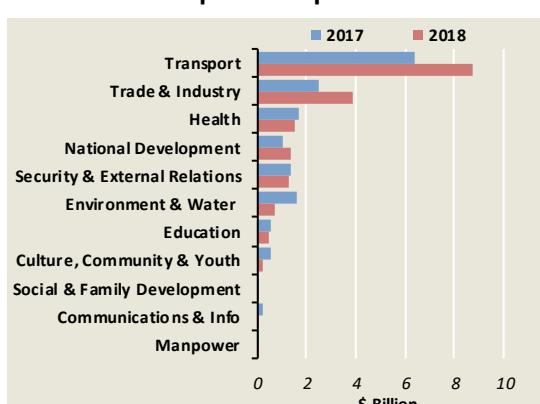


Chart 4.16
Selected Components of Development Expenditure



⁷ The economic development category comprises Transport, Trade and Industry, Manpower (excluding Financial Security) and Info-Communications and Media Development. The social development category comprises Education, National Development, Health, Environment and Water Resources, Culture, Community and Youth, Social and Family Development, Communications and Information and Manpower (Financial Security).

Box C
Enhancements to the Fiscal Block of the Monetary Model of Singapore

Introduction

Launched in 2000, the Monetary Model of Singapore (MMS) is the flagship model used by the Economic Policy Group (EPG) at MAS.^{1/} The model is routinely used to generate economic forecasts, conduct scenario analysis and perform policy simulations. EPG continually refines the model to improve its analytical and simulation capabilities, including for example, incorporating an optimal control feature in 2017.^{2/}

In 2018, EPG made enhancements to the fiscal block in MMS as part of a larger model development exercise, by increasing the number of fiscal levers and allowing for some sector-specific instruments. These changes aim to ensure that the model's representation of taxes, subsidies and other fiscal measures is up-to-date and is kept abreast with fiscal policy developments in Singapore. With these refinements, both the macroeconomic and sectoral impact of targeted fiscal initiatives—including the measures announced in recent Budgets—can be better analysed.

This Box presents two fiscal policy simulations for illustrative purposes that aim to highlight the improved capabilities resulting from the latest model enhancements. In the first, temporary production subsidies to firms in the manufacturing and services sectors are simulated, while in the second, the effects of a permanent product tax in the manufacturing sector are examined.

A Production Subsidy to Firms

In general, production taxes (or subsidies) are levied (or given) on labour, machinery, buildings or other assets that are used in production by firms. This definition is followed in the MMS, although foreign worker levies and property taxes are treated separately. In the previous version of the model, production taxes were taken to be economy-wide in nature, but with the latest refinements, they have been applied to specific sectors. By the same token, production subsidies can be targeted at specific sectors, enabling EPG to more accurately capture a number of major fiscal initiatives in recent years, such as government grants that support innovation and the Wage Credit Scheme (WCS). These subsidies are implemented in the MMS as a negative production tax and they result in cost savings to firms.

In this section, the results from simulating a temporary subsidy of \$1 billion (about 0.2% of nominal GDP or 1% of manufacturing nominal GDP) to firms in the manufacturing sector will be compared with those from a similar subsidy to firms in the 'other services' sector, which largely comprises the services industries.^{3/} These subsidies create a wedge between the cost of, and the returns to, the primary factors of production. Therefore, they directly reduce business costs by lowering the post-tax marginal cost of primary factor inputs used by the targeted sector, which in turn reduces the cost of domestically-produced intermediate goods. Positive spillovers are then generated for the other sectors in the economy that use these cheaper intermediate goods in their production. As intermediate goods become relatively cheaper than imports, both of which are used to produce final goods and services, firms would substitute imported inputs with domestically-produced intermediate goods, which further stimulates production. In turn, the lower production costs in the other sectors generate some spillback effects on the subsidised sector, thus amplifying the overall impact on the economy. Notably, the size and profile of the macroeconomic impact will depend on the sector the production subsidy is targeted at.^{4/}

^{1/} MAS (2014) describes EPG's suite of models.

^{2/} MAS (2017) provides a summary of the optimal control feature.

^{3/} In the MMS, the 'other services' sector refers to all services excluding financial & insurance and business services, which are modelled as a separate sector.

^{4/} The extent of import substitution and the second-round increase in demand for intermediate goods, as well as how a production subsidy will affect upstream production or gets passed through to consumers, differ between sectors according to the demand and supply elasticities calibrated from the Singapore Input-Output tables.

In the MMS, a \$1 billion production subsidy targeted at the manufacturing sector lowers business costs as explained above, thus encouraging production for export. In addition, firms substitute away from imports towards cheaper domestically-produced manufactured intermediate goods. Overall, real value added in the manufacturing sector is lifted by 0.26% and overall real GDP by about 0.1% in the first year, with net exports contributing about 70% of the GDP increase. (Chart C1a) To a lesser extent, investment is also stimulated as the bulk of capital equipment is produced by the manufacturing sector. In line with increased production, demand for labour rises, with about a third of the employment gains going to residents, while nominal wages increase by about 0.12% at the peak. (Chart C2) The pass-through from firms' cost savings to headline inflation in the first year is negligible as manufacturing output is principally exported. Thereafter, in line with rising wage costs, headline inflation increases by 0.06% point on average in the third year. (Chart C3)

Chart C1a
Breakdown of GDP Impact from Manufacturing Subsidy

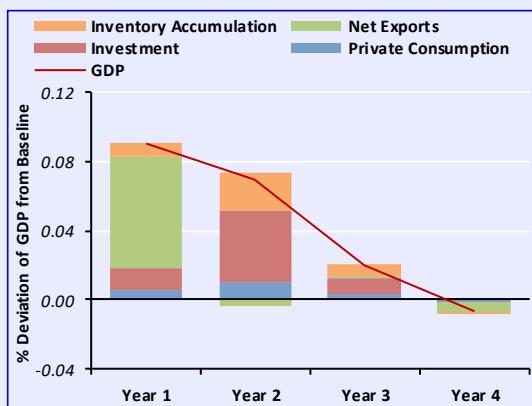
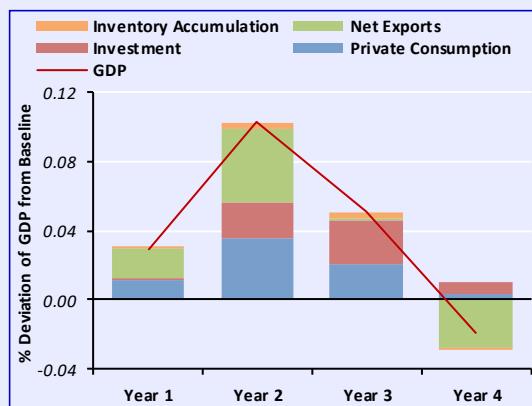


Chart C1b
Breakdown of GDP Impact from 'Other Services' Subsidy



In comparison, a subsidy to the 'other services' sector has a smaller real GDP impact in the first year because a lower proportion of intermediate goods needed for its production is sourced from its own sector. (Chart C1b) Moreover, there is less import substitution towards domestically-produced intermediate goods as the elasticity of substitution between imports and intermediate goods is much lower in services compared to manufacturing. Nonetheless, the positive GDP impact is more sustained when the production subsidy is targeted at these essentially non-tradable services, primarily because domestic consumption is stimulated by cost savings to firms which are ultimately passed on to consumers. In comparison, in the tradable manufacturing sector, the subsidy is expended on exports. Turning to the labour market, about half of the employment gains from a services subsidy accrue to residents, compared to a third from the manufacturing subsidy. Accordingly, nominal resident wages rise by about 0.15% at the peak.

Chart C2
Impact on Nominal Resident Wage

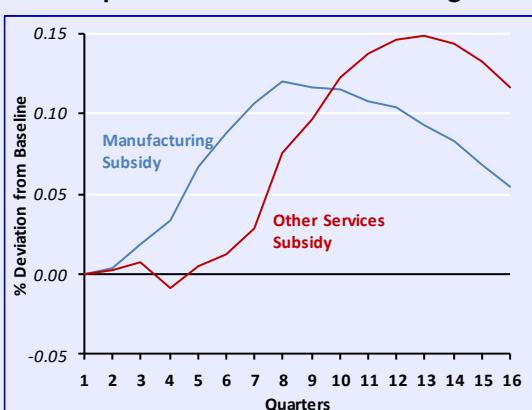
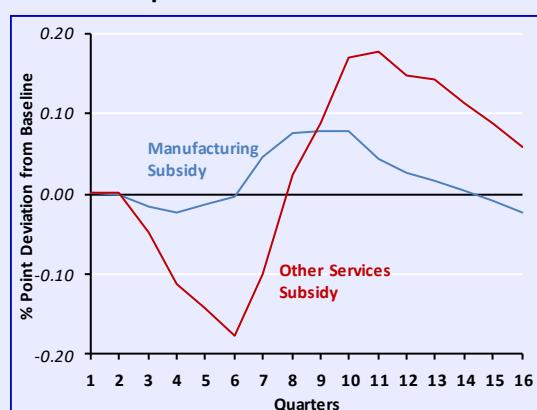


Chart C3
Impact on Headline Inflation



A Product Tax on the Manufacturing Sector

In contrast to production taxes and subsidies which are levied on factor inputs, product taxes are imposed on final products, and the incidence of such measures can be either economy-wide or sector-specific. The model simulation in this section involves a category of product taxes levied only on the manufacturing sector, which includes the Additional Registration Fee for motor vehicles and general excise duties. The diesel excise duties introduced in 2017 would also fall under this category. Other types of product taxes such as the Goods and Services Tax (GST) and customs duties are treated separately in MMS.

The results reported here pertain to a permanent increase in a product tax that is levied on manufacturing and is equivalent to an annual tax collection of \$500 million. Initially, the increase in the tax rate would have a direct impact on the price of final goods produced by the manufacturing sector. Within the domestic economy, these final manufactured goods are either consumed or invested. Since the product tax will directly increase the prices of consumer and investment goods, headline inflation will rise by about 0.2% point on average in the first year. (Chart C4) The effects on inflation recede thereafter, as the hike in the tax rate is taken to be one-off.

Private consumption of goods and services, which becomes more expensive, declines by an average of 0.2% each year over the next four years. Investment in equipment similarly falls, by an average of 0.15% over the same period. This decline affects all sectors that make use of equipment investment, with the bulk of it taking place in the manufacturing sector itself. Since product taxes do not apply to exports, the impact on net exports is positive as imports decline in tandem with consumption and investment. (Chart C5) Still, this is insufficient to offset the fall in aggregate demand and overall GDP is lowered by an average of 0.06% each year over the next four years.

Chart C4
Impact on Headline Inflation from
Manufacturing Tax

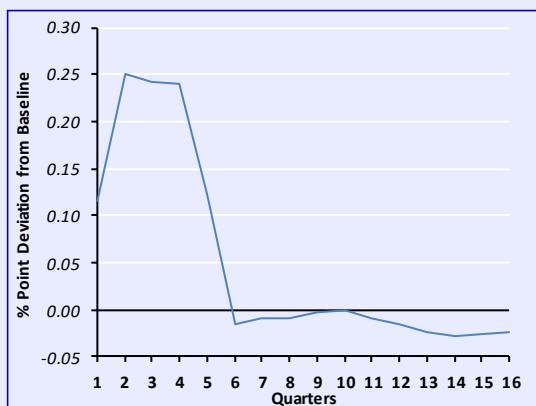
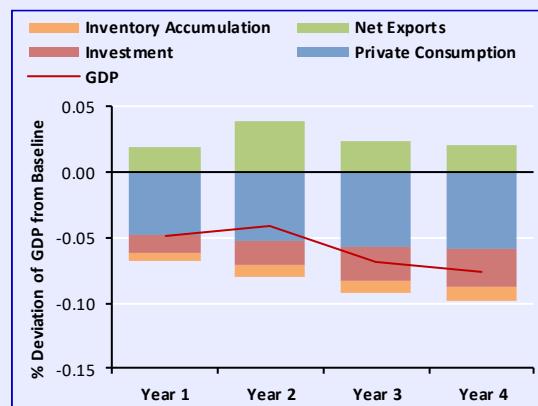


Chart C5
Breakdown of GDP Impact from
Manufacturing Tax



Conclusion

This Box presents the latest enhancements to the fiscal levers in the MMS, which have improved EPG's ability to analyse the macroeconomic impact of a variety of fiscal measures. The two model simulations also illustrate the more refined transmission channels. In particular, they capture how the macroeconomic impact can differ when a production tax is applied to different sectors, and the mechanisms through which a product tax on the manufacturing sector can affect the broader economy. These new capabilities of the MMS will enable more nuanced and detailed general equilibrium analyses of Singapore's fiscal policy measures.

References

- Monetary Authority of Singapore (2014), "MAS Macroeconomic Modelling Workshop 2014", *Macroeconomic Review*, Vol. XIII(2), pp. 76–85.
- Monetary Authority of Singapore (2017), "Optimal Control in the Monetary Model of Singapore", *Macroeconomic Review*, Vol. XVI(1), pp. 78–84.

Special Features

Special Feature A

Digital Currency Economics And Policy Workshop¹

"I think that the Internet is going to be one of the major forces for reducing the role of government. The one thing that's missing, but that will soon be developed, is a reliable e-cash, a method whereby on the Internet you can transfer funds from A to B, without A knowing B or B knowing A. The way I can take a \$20 bill, hand it over to you, and then there's no record of where it came from."

– Milton Friedman, 1999

Introduction

In November 2018, the Economic Policy Group (EPG) of MAS, together with the Asian Bureau of Finance and Economic Research (ABFER), and the National University of Singapore (NUS) Business School co-organised a two-day workshop to explore the economics of digital currencies and their implications for monetary and regulatory policies. Leading academic researchers in monetary and financial economics were invited to speak at the workshop, which attracted a large number of participants, including central bankers, academics, and practitioners in the financial industry.²

Digital forms of currency are not new. Over the last few centuries, money has taken various forms other than physical cash. For instance, payments by telegraphic wire began to be effected in the nineteenth century, while modern credit cards emerged in the 1950s. Present-day monetary systems are already mostly digital, comprising customer deposits held with commercial banks, and bank reserves held by commercial banks with

the central bank. The latter, together with cash in circulation, forms the monetary base which is the basis for money creation by commercial banks through lending activities. Notably, the system requires a trusted third party to keep track of transactions on a centralised ledger—the commercial bank for customer deposits, and the central bank for commercial bank reserves.

The innovation behind the distinctively new form of digital currency that was the workshop's focus is Distributed Ledger Technology (DLT), which allows transactions to be recorded and verified on a decentralised ledger, without the need for a trusted third party acting as central bookkeeper of the system. Applied to currencies, it renders possible the private 'e-cash' which Milton Friedman hypothesised two decades ago, with no single authority responsible for, or privy to, the history of transactions.

DLT has in turn given rise to two novel developments. The first is the proliferation of

¹ This article is a summary of the workshop discussions and does not necessarily reflect the views of the MAS. It has further benefitted from comments by Professor Bernard Yeung, President of the Asian Bureau of Finance and Economic Research, Dean and Stephen Riady Distinguished Professor, NUS Business School and co-organiser of the Digital Currency Economics and Policy Workshop.

² The speakers and discussants at the workshop were Franklin Allen (Imperial College London), Robleh Ali (MIT), Markus Brunnermeier (Princeton University), Barry Eichengreen (University of California, Berkeley), Charles Engel (University of Wisconsin-Madison), Gur Huberman (Columbia University), Randall Morck (University of Alberta), Danny Quah (NUS), Kenneth Rogoff (Harvard University), Andrew Rose (University of California, Berkeley), Prateek Saxena (NUS), Beatrice Weder di Mauro (INSEAD Singapore), David Yermack (New York University) and Bernard Yeung (NUS Business School). Materials from the workshop are available at the ABFER website.

private digital currencies following the emergence of Bitcoin in 2008, which are outside the fractional reserve banking system in that they are not liabilities of the central bank. The rise of these so-called ‘cryptocurrencies’ has compelled policymakers to address illegal transactions using this medium as well as the associated consumer protection issues. More important, the advent of digital currencies has implications for the effectiveness of monetary policy and financial regulation. Some central banks are also considering issuing their own digital currency (CBDC). The novelty of a general-purpose CBDC accessible to the public is that it puts retail

money creation in the hands (and on the balance sheets) of central banks, and not commercial banks.

Accordingly, the workshop discussion centred around three questions. First, what are the macroeconomic and financial implications of private digital currencies, and do they have a future? Second, what are the concerns and gains in introducing a CBDC? Third, what potential does DLT hold, regardless of whether it is applied to private or public currencies? This Special Feature summarises the key points and views presented at the workshop on each of these issues.

Private Digital Currencies: Have They A Future?

At the workshop, speakers took reference from the economic functions performed by money to illustrate their arguments. Traditionally, money can be viewed as providing a means of payment, a unit of account, a store of value, and a standard for deferred payment.³

A substantial part of the discussion on private digital currencies revolved around the issue of whether they might fulfil these functions more efficiently than existing monies. It was almost a consensus at the workshop that, in practice, private digital currencies are found wanting.

The value of private digital currencies is too volatile to serve as a meaningful unit of account and store of value. Recent history bears this out, with the market capitalisation of cryptocurrencies falling by 80% over 10 months from January to November 2018. While some cryptocurrencies have adopted various collateralisation strategies to minimise price volatility, they continue to face constraints. For example, so-called ‘stable’ coins such as Tether that require 100% backing by a traditional currency are very expensive to operate, while partially collateralised coins are vulnerable to losses in confidence, akin to currency pegs.

Participants also pointed out that, at present, payments using private digital currencies form only a minuscule share of total global

transactions, and are by and large confined to illegal activities such as money laundering, black market transactions and drug trades.

One often-raised concern is that private digital currencies could replace government-backed money entirely. However, most discussants held the view that private digital currencies will have only a very limited, if not totally negligible, impact on money creation. Historically, only countries with very high inflation rates have experienced large-scale currency substitution. This observation implies that private digital currencies are highly unlikely to affect the operation of monetary policy and the functioning of the international monetary system.

Several speakers pointed out a clear historical tendency towards the central sovereign control of currency issuance. The driving forces behind this centralising tendency—even though it has been incomplete at most times in history, with the co-existence of commercial bank-issued cash such as in Scotland—are three-fold. First, governments require control of currency creation (and seigniorage) to be a lender of last resort and possibly to mobilise resources in case of a national emergency. These are important responsibilities which cannot be relinquished to a system for which no one is fully accountable. Second, having a uniform national currency

³ Jevons (1875) defined money by these four characteristics in *Money and the Mechanism of Exchange*. However, textbooks nowadays skip the fourth item, see for example Mankiw (2007).

reduces transaction costs and raises efficiency, since there is no need to retain information about the creditworthiness of multiple means of payment. Third, as private digital currencies do make it easier to evade capital controls, bypass financial regulation, and facilitate illegal activities, governments have little incentive to allow private digital currencies to flourish.

Governments can secure their control over money creation by reducing the liquidity of private digital currencies, for example through banning their use in making payments and disallowing their convertibility into legalised currencies. Moreover, if governments can cooperate internationally to make these currencies almost completely illiquid, their use in tax evasion and other criminal activities would be drastically reduced. Once outlawed, it would be difficult to launder cryptocurrencies back into the financial system.

Relatedly, one scenario presented at the workshop showed that access to a digital currency helps to discipline governments: the ability of private agents to substitute into digital currency could serve as a credible threat forcing governments to constrain their setting of overtly punitive inflation taxes. At the same time, private digital currencies offer investors portfolio diversification options.

The potential for cryptocurrencies to exert a disciplining effect on sovereigns otherwise tempted to inflate rests on its status as ‘digital gold’—an asset that is fixed in supply by its nature. However, some participants noted that the code for Bitcoin is open source and therefore replicable. An individual cryptocurrency’s supply may be limited, but the potential for ‘forking’, resulting in an instant doubling of the number of coins in circulation, renders the aggregate supply limitless in principle. The risk of such debasement is not just theoretical, as a forking of Bitcoin Cash occurred in November 2018 and precipitated a sharp decline in the value of most cryptocurrencies, including the original Bitcoin.

To sum up, it is difficult to identify a clear basis for the demand for private cryptocurrencies, so long as there is a reasonably well-functioning, rules-based monetary and financial system. More importantly, private digital currencies fall short of the characteristics necessary for them to function as money; in particular, in-built price volatility makes them poor stores of value. In the absence of a compelling business case, outside of extreme situations of hyperinflation or financial system collapse, a broad consensus emerged among workshop participants that such cryptocurrencies remain at best ‘a solution in search of a problem’; and even then a solution with flaws of its own.

What About Central Bank Digital Currencies?

Another theme taken up at the workshop was the prospect of digital forms of currency supplanting physical cash. In Sweden for example, cash has already fallen to around 1% of GDP. Participants discussed the implications of this trend and whether it might compel central banks to ultimately issue their own digital currencies. The most radical innovation on this front would be the introduction of CBDC on a retail level, accessible by households and businesses throughout the economy.

The implications of such a change would be profound, with participants expressing some concerns. First, speakers noted that CBDCs would have grave financial stability implications. It would compete away private banks’ low-cost deposits, which would fundamentally raise the banking

system’s risks. Facing a reduced supply of low-cost loanable funds and lower profitability, banks would be forced to seek costlier sources of funding and accordingly have to make riskier investments, leading to increased risks to financial stability.

Second, a comprehensive CBDC could increase both the likelihood and severity of bank runs. If the financial system comes under stress, a general-purpose CBDC would be perceived as the safest and most liquid asset, which might induce depositors to move their savings out of private banks into the central bank—this could be done with a click of a button. Depending on how a CBDC is introduced, a ‘digital run’ could be triggered even without a financial crisis. In principle, the resulting system would resemble

the narrow banking proposals of Irving Fisher in the 1930s Chicago Plan, or the more recent plans for ‘sovereign money’.⁴

Third, a host of separate issues would arise with respect to how the central bank should manage its greatly-expanded balance sheet and recycle deposits back into the economy. It is not clear that central banks should engage in the business of credit creation from an allocative efficiency point of view.

On the positive side, participants noted some potential benefits of a CBDC. If cash were replaced entirely, central banks could be accorded greater flexibility and potency in monetary policy implementation. Negative interest rates can be imposed on CBDC deposits, thus circumventing the ‘zero lower bound’ constraint. Furthermore, the authorities could effect ‘helicopter drops of money’ in a targeted manner by crediting households’ bank accounts directly.

Another potential benefit was cited in connection with the fight against crime. CBDC can give policymakers access to digital records (assuming the central bank managed the ledger), yielding useful real-time information. The authorities could then improve the enforcement of rules aimed at anti-money laundering, countering the financing of terrorism, and curtailing informal economic activities and tax evasion.

Some participants considered whether a CBDC could replicate the anonymity of cash. Although a general-purpose CBDC may promise privacy in payments by keeping transactions data housed within the central bank, concerns about data security imply that a CBDC may fall short of guaranteeing full anonymity. Ultimately, privacy can substitute for anonymity only if there is

sufficient trust in the ability of public institutions to keep data secure. Some participants questioned whether an anonymous payments system was in fact a core public good that governments should provide, while others thought that this was an issue that should be resolved through the broader political process.

On the whole, it remains unclear if the benefits of having a CBDC outweigh the challenges. Some central bankers at the workshop suggested that a focus on developing a digital payment infrastructure that relies on a mix of public and private entities may be a superior alternative to a general-purpose CBDC. Policymakers can then continue to ensure price and financial stability while commercial banks hold the majority of deposits. In other words, accelerating the adoption of digital payments while retaining the current foundations of money creation would preserve public trust in a well-functioning monetary system, and avoid the macroeconomic distortions that could come with a CBDC.

As a case in point, Sweden is actively pursuing this strategy. Commercial banks in Sweden are jointly building a payment infrastructure to support cashless transactions, such as shared automated clearing houses and instant payment mobile applications. At the same time, the Swedish population is highly adaptable to new technology and merchants are also under no legal obligation to accept cash. Such a rapid adoption of digital payment technologies by commercial banks, within a system where digital cash is underwritten by accountable public institutions such as the deposit insurance agency and central bank, may have obviated the need for a general-purpose CBDC.

⁴ Proposals for a narrow banking system call for a separation of household savings from risky lending by financial intermediaries. Practically, this can be achieved by having safe banks (possibly the central bank) park deposits in liquid and safe assets, while other financial intermediaries invest in risky assets. Proposals for sovereign money, such as the Swiss National Bank’s Vollgeld Initiative, call for giving central banks the sole authority to create money. This stands in contrast to fractional reserve banking systems in most countries where private commercial banks are responsible for the bulk of money creation.

The Promise Of Distributed Ledger Technologies

A number of speakers at the workshop discussed the perceived merits of DLT. This technology allows transactions and data information to be distributed in an encrypted and digitised manner across a network of different participants. After all participants have collectively verified the authenticity of the shared information according to a pre-defined algorithmic validation process, the transferred digital information will be identically recorded by all. Thus, information transfers can be achieved without verification by a centralised third party. This feature has the potential to be tremendously useful in a range of financial and non-financial applications.

Aside from filling gaps in the provision of payment services, DLT payment systems promise to bring gains in economic efficiency. Specifically, DLT allows for the free entry of ledger writers; hence, it will tend to prevent a centralised ledger keeper from earning economic rents. Moreover, the forking feature on platforms like Bitcoin, which allows competing ledger writers access to the same information as the incumbent writer, provides an additional layer of competition that can further reduce rents.

DLT-based payment systems will also bolster financial system resilience by eliminating central points of failure. Specifically, such systems insulate users from the default and operational risks arising from the reliance on a central counterparty in a centralised ledger. For example, if a traditional commercial payment system defaults or experiences a cyber-attack, all transactions performed using that system may be rendered void, a risk that users of a DLT-based system will not face.

Fundamentally, there is a trilemma facing payment systems in general, where only two out of three appealing traits of correctness (i.e., ensuring the payment record is accurate), decentralisation, and energy efficiency, are achievable. DLT payment systems attain decentralisation but achieve correctness in an energy-expensive manner. Essentially, energy-wasting replication of validation efforts is necessary to incentivise correct record-keeping among decentralised ledger writers. This limits the number of transactions that DLT payment systems can process, making such platforms very difficult to scale up. These trade-offs suggest that the potential for DLT-based private digital currencies to replace traditional currencies as the dominant medium of exchange is still limited at present. Even the largest DLT private currency, Bitcoin, performs merely a small fraction of the transactions currently processed by Visa or MasterCard, while consuming much larger amounts of energy.

Besides the application to payments, DLT has also been increasingly harnessed for another key function of the financial system—borrowing and lending services. On this note, one speaker provided an overview of Initial Coin Offerings (ICOs), an increasingly popular way for firms to raise capital. ICOs allow firms to borrow by issuing coins that can then be traded on cryptocurrency exchanges. Thus, ICOs enable firms to raise funds from international investors without needing to meet local legal standards of issuing debt or equity. At the same time, however, the lack of regulatory oversight has led to relatively high instances of scams among ICOs. Hence, there is a need to regulate ICOs, along the lines of Rule 144A in the US, to ensure only qualified investors can participate in them.

Conclusion

A key conclusion that emerged from the workshop was that cryptocurrencies such as Bitcoin do not currently pose an existential threat to traditional central bank-managed monetary systems.

Traditional monetary systems continue to provide money that meets society's needs as a means of payment, store of value and unit of account in almost all jurisdictions globally.

Further, independent but accountable central banks are still needed for stability in the value of money, and existing payment systems continue to be relatively secure and efficient. Conversely, cryptocurrency advocates have so far failed to make a convincing business case that private digital currencies can perform any of these functions more efficiently than traditional money, given the significant costs associated with their use arising from high energy requirements and issues of governance and replicability.

Likewise, while using e-payments instead of cash is a globally growing practice, most central banks do not expect CBDC to be introduced in the near future. Introducing a retail CBDC would be similar in many respects to moving to a narrow banking model, entailing profound and risky changes to the financial system. The putative disappearance of cash would pose the further social and ethical question of whether it should be the responsibility of the sovereign to provide an anonymous means of payment. While of great interest and importance, this question fell outside the scope of the workshop.

Blockchain and DLT technologies that underpin cryptocurrencies have many other potential applications. Central banks, including MAS, are already working on concrete applications of DLT to clear international payments, for example. The workshop saw widespread interest in exploring further how the new technologies might make existing payment systems more efficient.

By bringing together researchers and practitioners, the workshop highlighted the rapid pace of development in the field, and also showed how many of the issues raised can be understood in terms of established economic theory, even though they have new policy implications. Both theory and practical experience support the view that the capacity of private and public digital currencies to serve as money is limited at present, given the state of the technology. However, this conclusion is provisional, pending further developments in DLT and other market considerations, including a rising demand for anonymity in transactions amid growing concerns around data privacy.

References

- Jevons, W S (1875), *Money and the Mechanism of Exchange*, Cornell University Library.
- Mankiw, N G (2007), *Macroeconomics* (6th ed.), Worth Publishers.

Special Feature B

Rethinking Fiscal Policy In An Era Of Low Interest Rates

by Martin S. Eichenbaum¹

Secular stagnation and low real interest rates compel us to re-think the extent to which fiscal policy should be used to combat recessions. This paper argues that we should adopt a system of asymmetric, automatic stabilisers. Programmes like unemployment benefits would, by law, become more generous when macro indicators hit pre-specified targets indicating that the effective lower bound constraint on interest rates was binding. Programmes would revert to normal levels when those macro targets returned to pre-specified levels. An even more ambitious programme would involve legislated, asymmetric changes in tax rates.

Introduction

The natural rate of interest, R^* , is the real short-term interest rate that is expected to prevail when an economy is at full strength and inflation is stable. There is widespread agreement that R^* has fallen. This decline means that, absent a change in our current monetary policy regime, the effective lower bound (ELB) constraint on interest rates will be a binding constraint on monetary policy far more frequently in the future than in the past.

Unconventional monetary policies can play a positive role when the ELB is a binding constraint. But we should not be overly sanguine about how effective these policies are. We should also be sceptical that new monetary strategies like price-level targeting can deal effectively with the ELB constraint. Since I am not willing to adopt a higher average inflation target, I am forced to re-think the role of fiscal policy in fighting recessions.

To be clear, I believe that when the ELB isn't binding, fiscal policy isn't a very powerful

stabilisation tool.² But fiscal policy can be extremely powerful when conventional monetary policy has been neutered by a binding ELB constraint.³ A critical challenge facing macroeconomists is to devise a practical framework for using fiscal policy when we need it. A programme of asymmetric automatic stabilisers and what Correia *et al.* (2013) call 'unconventional fiscal policy' is such a framework.

The key idea is that changes in traditional stabiliser programmes and certain tax rates would kick in and out automatically when an easy to measure and simple to communicate macro variable hits a pre-specified target. On purely economic grounds, my preference would be for the target to be the short-term monetary policy rate. Asymmetric programmes would begin when the short-term policy rate hits the ELB constraint. They would end when the actual short-term policy rate returned to central bankers' self-declared long-term neutral rate.

¹ Martin S. Eichenbaum is the Charles Moskos Professor of Economics at Northwestern University. Professor Eichenbaum visited MAS in March 2019 as the MAS-NUS Term Professor in Economics and Finance. The views in this article are solely those of the author and should not be attributed to MAS.

² See Eichenbaum (1997), Auerbach (2002) and Feldstein (2002a) for pre-financial crisis expositions of the limited efficacy of discretionary fiscal policy as a stabilisation tool.

³ See for example Feldstein (2002b), Christiano, Eichenbaum and Rebelo (2011) and Blanchard and Leigh (2013).

A trigger strategy for asymmetric automatic stabilisers and unconventional fiscal policy would make the expanded use of fiscal policy for stabilisation purposes explicitly linked to a binding-ELB episode. I understand the political problems of seeming to give central bankers fiscal powers. So it might be preferable to make the key

trigger variable some measure of aggregate economic activity that is not under the direct control of monetary policymakers, e.g., a moving average of the unemployment rate. It certainly wouldn't be the first time that the second-best economic policy corresponded to the first-best politically feasible policy.

We Live In A Low R^* World

The natural rate of interest, R^* , plays a key role in monetary policy. That's because over long periods of time, in an inflation-targeting regime, when the economy's resources are fully utilised, the short-term policy rate, R , is equal to R^* plus the monetary authority's target rate of inflation, π^* .

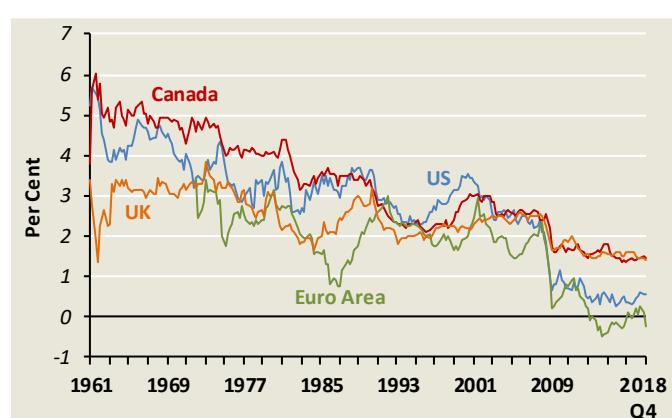
$$R = R^* + \pi^* \quad (1)$$

There is growing evidence that R^* has fallen. Chart 1 displays estimates of R^* in the US, UK, Euro Area and Canada. These estimates are updated versions of the ones in Holston *et al.* (2017).⁴ Note the pronounced decline in the estimated value of R^* in all of these countries. Williams (2017) reports that the average value of the estimates fluctuated between 2% and 2.5% in the 1990s through the mid-2000s. It then fell to about 0.5% around 2009 where it has stayed since then. Sophisticated econometrics aside, various measures of the real interest rate like the annual yield on the 10-year US Treasury inflation-indexed bonds have also fallen. (Chart 2)

There is much debate over the precise reasons for why R^* has declined. Holsten *et al.* (2017) emphasise that the fall coincided with a decline in the trend growth rate of output. Consistent with the notion that global real factors are at work, Williams (2017) notes that expected returns for various types of assets have fallen along with R^* . Financial factors like a rise in the global demand for risk-free assets may also have played a role in the decline of R^* .

Given an unchanged inflation target, equation (1) implies that central banks should have been persistently revising downwards their estimates of the long-run policy neutral interest rate. This prediction is strongly borne out by the data. The so-called 'dot plot' is published after each meeting of the US Federal Open Market Committee (FOMC). It shows the FOMC members' projections of where the Federal Reserve's target interest rate (the federal funds rate) should be at the end of various calendar years, as well as in the long run. The latter refers to the level of the federal funds rate after the Federal Reserve has

Chart 1
 R^* Estimates for Advanced Economies



Source: Federal Reserve Bank of New York and Holston *et al.* (2017)

⁴ These estimates are available at <https://www.newyorkfed.org/research/policy/rstar>.

Chart 2
10-year Treasury Inflation-Indexed Security, Constant Maturity



Source: Board of Governors of the Federal Reserve System

finished normalising policy from its current levels. In March 2014, the median projection for the 'long-term rate' was 4%. In March 2019, the corresponding projection had fallen to 2.75%.⁵ This value is strikingly close to the Federal Reserve's inflation target of 2% plus 0.58%, Holsten *et al.* (2017)'s estimate of R^* in the US as of Q4 2018.

Low R^* and Monetary Policy

The implications of the fall in R^* and the long-run neutral rate, R , for monetary policy are dramatic. In the eight recessions since 1957, the Federal Reserve dropped the nominal and real federal funds rates by about 500 basis points (see Summers, 2018). But if we start moving the federal funds rate down from around 2.75%, monetary policymakers will run out of conventional ammunition to deal with a recession. The ELB constraint on short-term interest rates will be binding.

Summers (2018) argues that the annual probability of a substantial downturn in the US economy is about 15%. This estimate implies that once in every seven years the US will be in a downturn. Assume, as Summers does, that in a recession, the policy rate will be constrained by the ELB for three years. Then we will be at the ELB for short-term interest rates about 30% of the time. Using a much more formal econometric framework, Kiley and Roberts (2017) reach similar conclusions.

The economic and social costs of ineffective monetary policy are likely to be very large. Kiley and Roberts (2017) estimate the costs to be roughly US\$2 trillion over a decade. And these large estimates abstract from political economy considerations. Surely the dangers from populism and bad policy are linked to the frequency and intensity of recessions. There is enormous uncertainty associated with any estimate of the costs of ineffective monetary policy. But prudence dictates that we give those estimates great weight.

What about unconventional policies such as quantitative easing and forward guidance? Theoretical considerations aside, the practical evidence on the efficacy of these alternatives to conventional policy is murky. My own reading of the evidence is that the policies were helpful. But I remain sceptical about the ability of these alternatives to fully substitute for conventional monetary policy measures. As I write, the 10-year US Treasury rate is roughly 2.45% and the 10-year rate on German government bonds is negative 0.01%. Presumably these rates would be even lower if the Federal Reserve and the European Central Bank (ECB) cut short-term interest rates in a race to the ELB. In the US case, the 10-year rate might fall by one percentage point before we hit the ELB. How much good do we think pushing long-term rates beyond that level would do? German short-term rates are already negative. How much lower could the ECB move those long-term rates? Even if they could, would it do more harm than good, once we take

⁵ Data available at <https://www.bloomberg.com/graphics/fomc-dot-plot/>.

into account the implications for the health of the financial system?

Forward guidance involves promises made when the ELB is binding to keep policy rates lower than normal after an ELB episode. Through the magic of rational expectations and the term-structure theory of interest rates, these promises about future short-term interest rates lower current long-term interest rates. Recent research shows that, as a matter of theory, the efficacy of forward guidance is very sensitive to the assumption of rational expectations.⁶ This sensitivity is concerning because no one should take the hypothesis of rational expectations as being literally true. Perhaps even more alarming, there is no reason to think that markets will, in the future, find forward guidance credible. The Federal Reserve moved to raise policy rates when inflation was at or below 2%. Such actions, while perhaps justified by various considerations, have considerably undercut any credibility that central banks had about future forward guidance.

What about Alternative Monetary Policy Frameworks?

Policymakers and researchers have actively searched for alternatives to the current inflation-targeting framework that could better deal with the low R^* world. See Bernanke (2017) for a useful review. Price-level targeting is, in principle,

a clever way around the ELB conundrum. Basically it's a strategy for committing to forward guidance. So too is Bernanke's proposal to apply a price-level target and the associated 'lower-for-longer' principle only to periods around ELB episodes, retaining the inflation-targeting framework and the current 2% target at other times.

Of course neither strategy is without problems. First, there is the basic question of how long it would take for people to understand any new strategy. Second, there is a time consistency question involved with any version of price-level targeting. Would policymakers actually be willing to slow down the economy enough to reverse the effects of a supply shock to the price level by running inflation lower than 2%? And if they tried to do that, how would legislators react?

Of course we could simply raise π^* , from 2% to 3% or 4%. That strategy would certainly mitigate the ELB problem. We would in effect agree to pay a higher insurance premium in all normal periods to have the option of cutting interest rates sufficiently at the onset of recessions. This idea is worth considering. But I am sceptical. Granted, there is nothing special about 2%. But it took us a long time to anchor inflation expectations at that level. I have very little confidence in economists' predictions about the short-term consequences of trying to de-anchor inflation expectations from 2% and re-anchoring them to a higher number.

Discretionary Fiscal Policy

I have argued that we are now in a world where monetary policy won't, on average, be as effective at stabilising output as it used to be. If you agree with me, then you are forced to reconsider the conventional wisdom about whether fiscal policy should be assigned a large role in fighting recessions.

In Eichenbaum (1997) I wrote that "There is now widespread agreement that counter-cyclical discretionary fiscal policy is neither desirable nor politically feasible." Feldstein (2002a) wrote that "Monetary policy is ... generally accepted as the

policy of choice when ... stimulating a weak economy."

The consensus about the limited role for fiscal policy in stabilising the business cycle was one of the important themes of the 2002 Jackson Hole symposium on monetary policy. That consensus reflected two fundamental considerations. The first was political. It's hard to design and implement wise discretionary fiscal policy in the middle of a crisis. It's even harder to take away things that you give people in a fit of discretion.

⁶ See for example Angeletos and Lian (2018), Farhi and Werning (2018), Gabaix (2018), and Woodford (2018).

The second consideration is economic. Most forms of discretionary policy just aren't very powerful in a 'normal' downturn. The 'multiplier' for discretionary increases in government spending is substantially less than one (see Ramey and Zubairy, 2018). A good estimate is the one hard-wired into pre-crisis IMF spreadsheets: on average, real GDP goes up by about 50 cents for a dollar increase in government spending. Tax cut multipliers are perhaps a bit larger.

The basic reason for the small multiplier is that expansionary fiscal policy leads to higher real interest rates as governments borrow more and central banks raise rates in response to declining output gaps and rising inflation. Rising real rates crowd out private consumption and investment spending, partially offsetting the direct effect of expansionary fiscal policy.

So both politics and economics underpin the conventional wisdom that, in normal times, we should leave stabilisation policy in the hands of central bankers. But what about abnormal times? The depth and length of the Great Recession demonstrated with brutal clarity that monetary policy can't always do the job, certainly not when the ELB constraint is binding. That's the bad news. The good news is that while monetary policy is less powerful under those circumstances, fiscal policy is more powerful.

To begin with, it's highly unlikely that government borrowing will put substantial pressure on real interest rates in a deep recession. Households and most businesses weren't exactly screaming for loans in 2011. Second, when the ELB is binding and short-term nominal interest rates are stuck at zero, a rise in inflation reduces real interest rates. But that decline encourages private spending. A rise in private spending leads to a further rise in output and expected inflation, a further decline in the real interest rate and a further rise in consumption and investment. So when the ELB constraint is binding, expansionary fiscal policy leads to a virtuous cycle that crowds in private consumption and investment, precisely the opposite of what happens in normal recessions.⁷

In short, when the ELB constraint binds, we expect the multiplier to be larger than one. Of course the exact size of the multiplier depends on the precise form that discretionary policy takes, how timely it is, and a country's openness to trade, pre-existing debt situation and exchange rate regime.⁸ Still, for most countries, there is ample reason to believe that fiscal policy is more powerful when the ELB constraint binds.

Why shouldn't we just rely on emergency discretionary spending in a crisis when the ELB constraint binds? To begin with, political economy considerations make the nature and size of discretionary fiscal policy uncertain. Even worse, it takes time to actually implement the programmes that legislators agree on. In addition, some projects like large infrastructure projects naturally have slow spend-out rates. Implementation lags substantially reduce the size of the multiplier, especially if it means that stimulus planned for an ELB episode actually comes on line after the ELB is not binding any more. So multipliers that are in principle large can, in practice, be small.

What do the data say about whether we can count on discretionary fiscal policy in tough times? Consider the index of fiscal policy developed at the Brookings Institute's Hutchins Center. (Chart 3) This index depicts the contribution of federal, state and local fiscal policy to near-term changes in US GDP. It includes both the direct effects of government purchases as well as the more indirect effects of government taxes and transfers. When the index is positive, the government is contributing to real GDP growth. When it is negative, the government is subtracting from real GDP growth. The message from Chart 3 is clear: rather than being a positive force, fiscal policy was actually a drag on the US economy from 2011.

Furman (2018) reviews the fiscal actions of the US government during the Great Recession. He argues that 'political fiscal fatigue' played an important role in the premature withdrawal of stimulus during the Great Recession. He cites the evolution of unemployment benefits as a case in

⁷ For a formal exposition of these ideas see Eggertsson (2004, 2011) and Christiano, Eichenbaum and Rebelo (2011).

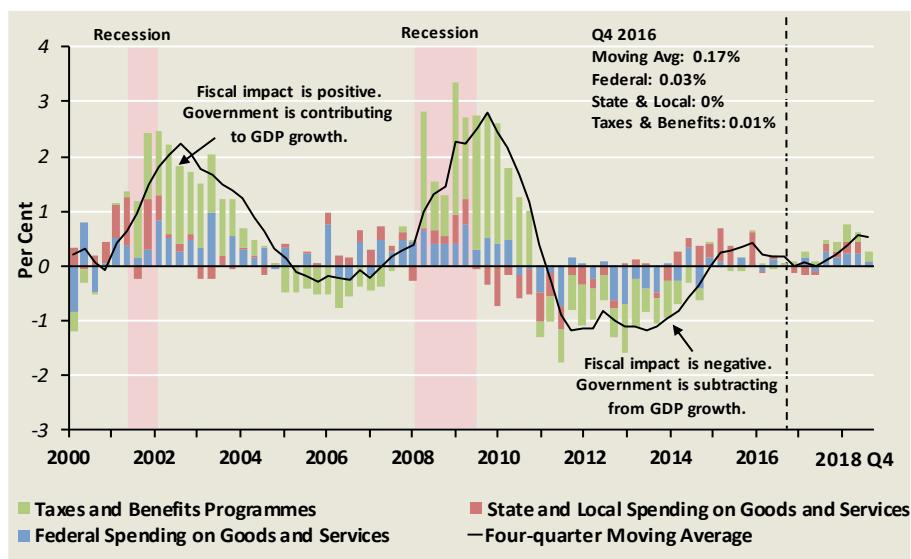
⁸ See Batini *et al.* (2014) for a discussion.

point. Consistent with practice in past recessions, the US Congress passed extended unemployment benefits in June 2008 when the unemployment rate was 5.3% and the long-term unemployment rate (defined as those unemployed six months or more) was 1%. Incredibly, Congress then allowed extended benefits to expire at the end of 2013, when the unemployment rate was 6.7% and the long-term unemployment was 2.5%. Perhaps even more dramatically, state and local government spending actually contracted, substantially contributing to the slow recovery. Chart 3 indicates that state and local governments acted as a drag on the economy from Q3 2009 until 2013. Remarkably, the Federal government

spending and taxes and benefit contributed negatively to real GDP growth from 2011. This record is hardly a testimony to the wisdom with which US policymakers conducted fiscal policy.

Arguably the situation in Europe was more complicated. But fiscal policy almost certainly contributed to the depth of the recession. See Blanchard and Leigh (2013), Eichenbaum, Rebelo and de Resende (2016) and Takagi (2016). Looking across the US and European experiences, I conclude that we just can't count on discretionary fiscal policy to pick up the mantle when monetary policy can't do what it normally does.

Chart 3
Contribution of Fiscal Policy to US Real GDP



Source: Hutchins Center calculations from Bureau of Economic Analysis data

Asymmetric Automatic Stabilisers

The previous considerations suggest that an effective way to deal with the ELB conundrum is to institute a programme of asymmetric, automatic stabilisers.

Why automatic stabilisers? First, expanded automatic stabilisers are triggered on and off by economic conditions. This trigger structure is clearly preferable to relying on the politics of the moment. By construction, stimulus starts quickly when it has the most effect and ends when it isn't needed. Second, policies that are designed and legislated outside of a crisis are far more likely to be better thought out, more carefully vetted and

better communicated than discretionary acts designed in the middle of a crisis.

Third, because expanded automatic stabilisers would be embedded in our legal framework, households, firms and sub-national governments would be more likely to factor expanded benefits into their decisions than discretionary fiscal policy. This advantage is potentially very important. For good reasons, households are afraid of losing their jobs in a severe recession. So it's natural for them to increase precautionary savings, before and during a severe recession. Even though this rise is privately optimal, it is

deeply counter-productive from a social point of view and makes a bad situation worse. In fact, the fear of a severe recession and an ELB episode could easily become self-fulfilling. The more certain people are that they'll get expanded help in a severe recession, the less they feel a need to build up precautionary savings. So expanding the help that we offer to people in such episodes reduces the amount of help that they will actually need.

Why asymmetric stabilisers? There are important negative effects associated with many automatic stabiliser programmes and limited benefits during normal times. But the benefits rise dramatically when the ELB constraint is binding.⁹ So it makes sense to invoke changes in automatic stabilisers only when we hit pre-defined macro triggers.

To be concrete, consider a programme that already exists in many countries: unemployment insurance. On the positive side, such insurance reduces precautionary savings and raises the income of people who have a high marginal propensity to consume. But the aggregate impact of these effects is reasonably small in normal recessions. After all, relatively few people become unemployed in a normal recession and, at least in the US, unemployment is for the vast majority of people a short-lived phenomenon.

On the flip side, in normal times, a rise in unemployment insurance benefits has important negative effects. By increasing workers' outside options, a high level of unemployment benefits leads to an increase in wages and a fall in the number of vacancies posted by firms. So high benefit levels tend to reduce average levels of employment. Moreover, in a normal recession, expanded benefits lead to a rise in real wages which exerts upwards pressure on inflation, potentially leading to a rise in interest rates. This effect dampens the positive effects of unemployment insurance on aggregate demand.

Christiano, Eichenbaum and Trabandt (2016) argue that the positive impact of unemployment benefits is likely to be much higher when the ELB . First, changes in demand are particularly powerful in deep recessions. This is exactly the kind of situation where you want to prevent rises in

precautionary saving. Expanded unemployment benefits do exactly that. Second, if more generous unemployment benefits put upward pressure on wages and inflation when the ELB binds, they lower real interest rates. That's just what we want.

In reality, extending unemployment insurance benefits during times of high unemployment has become standard operating procedure in many countries. In the US, unemployment insurance already has a degree of asymmetric automaticity. The extended benefits programme provides for an additional 13 or 20 weeks of jobless benefits (beyond the usual 26 weeks), and is currently triggered automatically when a state's unemployment rate rises above 5%. As noted above, Congress often enacts additional discretionary increases in unemployment insurance coverage. Normally, the federal government covers half the cost of the extended benefits. But it paid the entire bill in the aftermath of the financial crisis. This action was very important because states operate under balanced budget constraints. If states had to spend more money on unemployment insurance, they would have had to cut back on other expenses.

But why should individuals or states have to guess at the magnitude and timing of extensions? Surely it makes sense to eliminate this source of uncertainty. To be concrete, we could by law mandate that if the federal funds rate hits 25 basis points, we automatically move to an extended benefits programme under which the federal government pays 100% of the cost of up to 52 additional weeks of higher benefits for states experiencing rapid job losses or high unemployment.

More generally, in the US we could legislate automatic grants from the national to state and local governments that begin and end in response to macro triggers. Federal fiscal relief, say in the form of a higher federal share of Medicaid spending, reduces the need for states to reduce spending or cut or raise taxes, or both, in a recession. In this way we would prevent cuts in government spending during an ELB episode and shut the spigot off when the aid is no longer

⁹ See Christiano, Eichenbaum and Trabandt (2016) and McKay and Reis (2016).

required. As with unemployment benefits, something analogous to this grant approach happens now in the US with Medicaid, health care for low-income individuals. The cost-sharing formula for this programme between the states

and the federal government isn't explicitly cyclical. It should be. For a series of concrete proposals for the US, see for example Bernstein and Spielberg (2016).

Unconventional Fiscal Policy

Given the importance of the ELB conundrum, why stop with asymmetric increases and decreases of existing transfer and social insurance programmes? Why not pursue unconventional fiscal policy along the lines analysed by Correia *et al.* (2013)?

The basic idea is to write into law macro triggers for temporary tax cuts and triggers for ending those cuts. Tax schedules would automatically change in extreme circumstances when the ELB becomes binding and revert to their old levels when a crisis is over. In principle, time-varying tax rates can reproduce exactly the outcomes that would obtain if monetary policy didn't face an ELB constraint (see Correia *et al.*, 2013 for a formal analysis of this point).

The reader will no doubt find these types of proposals 'exotic'. But it's the basic idea behind the policy that Feldstein (2001, 2002a, 2002b) advocated for Japan: temporarily suspend the VAT, and commit to raising it two years later. In effect put consumption on sale. It's also the basic idea behind temporary tax credits to boost private investment.

Some countries like the US don't have a VAT or a general sales tax. But 45 of the 50 states do have a sales tax. Blinder (2001, 2016) proposed that in those cases the federal government offer to replace the lost revenue of sub-national governments that agree to cut sales tax for a fixed period of time.

The key difference between Blinder-Feldstein-like proposals and 'unconventional fiscal policy' is that changes in tax policies would, by law, be set-off by pre-defined macro triggers. This point is crucial: pre-defined triggers will lead to more sensible outcomes and avoid potentially perverse incentives associated with simple time-dependent rules.

Asymmetric automatic stabilisers and unconventional fiscal policy are not a panacea. If nothing else, they all involve potentially serious time consistency issues when times are good and tax cuts are supposed to be reversed. But writing asymmetric automatic stabilisers or unconventional fiscal policies into law in tranquil, prosperous times would surely help.

Conclusion

I have argued that, because of the fall in the natural real interest rate, the ELB constraint on monetary policy will likely bind with uncomfortable frequency. Absent changes in our policy mix, the social cost of these episodes will be large. We should by all means explore alternative monetary policy strategies to deal with the problem. But absent a willingness to permanently raise inflation targets, I am sceptical that existing alternatives can, by themselves, deal with the problem. We must look at the other tools in our policy quiver.

Surely we can do better than mad dash discretionary fiscal policy designed and implemented in the cauldron of a crisis. We should adopt a programme of asymmetric automatic stabilisers. My own preference is for the asymmetries to kick in exactly when monetary policy loses its power, i.e., when central bankers announce that the ELB constraint is binding. The asymmetries should end, when policy rates indicate that the ELB is no longer a binding constraint.

I am acutely aware of the political challenges involved in such an initiative. Also I have no doubt that the right programme of asymmetric automatic stabilisers will vary across countries. Scepticism is warranted. But it was also warranted when we moved to flexible inflation targeting and quantitative easing.

I may or may not have moved your priors about fiscal policy. If I haven't, the ball is in your court. Would you rather raise inflation targets to get around the problem of more frequent ELB episodes? And if not that, then what? Eliminate

currency and roll the dice on financial stability with negative real interest rates? No, thank you.

If I have budged your priors about fiscal policy, the time to start down the path is now, with the firm understanding that the perfect should not be the enemy of the good. It will take a long time to come up with concrete country-specific proposals and the political consensus required to adopt specific proposals. The longer we delay, the more likely it is that we will fall into the next crisis without the tools that we need.

References

- Angeletos, G-M and Lian, C (2018), "Forward Guidance without Common Knowledge", *American Economic Review*, Vol 108(9), pp. 2477–2512.
- Auerbach, A J (2002), "Is There a Role for Discretionary Fiscal Policy?", Rethinking Stabilization Policy, A Symposium Sponsored by The Federal Reserve Bank of Kansas City, Jackson Hole Wyoming.
- Batini, N, Eyraud, L, Forni, L and Weber, A, (2014), "Fiscal Multipliers: Size, Determinants, and Use in Macroeconomic Projections", *Technical Notes and Manuals*, Fiscal Affairs Department, IMF.
- Bernanke, B (2017), "Temporary Price Level Targeting: An Alternative framework for Monetary Policy", Brookings Institute, (URL: <https://www.brookings.edu/blog/ben-bernanke/2017/10/12/temporary-price-level-targeting-an-alternative-framework-for-monetary-policy/>).
- Bernstein, J and Spielberg, B (2016), "Preparing for the Next Recession: Lessons from the American Recovery and Reinvestment Act", Center on Budget and Policy Priorities.
- Blanchard, O and Leigh, D (2013), "Growth Forecast Errors and Fiscal Multipliers", *American Economic Review: Papers and Proceedings*, Vol. 103(3), pp. 117–120.
- Blinder, A (2001), "The Economic Stimulus We Need", *The New York Times*, September 28, (URL: <https://www.nytimes.com/2001/09/28/opinion/the-economic-stimulus-we-need.html>).
- Blinder, A (2016), "Fiscal Policy Reconsidered", The Hamilton Project, Policy Proposal 2016–05.
- Correia, I, Farhi, E, Nicolini, J P and Teles, P (2013), "Unconventional Fiscal Policy at the Zero Bound", *American Economic Review*, Vol. 103(4), pp. 1172–1211.
- Christiano, L, Eichenbaum, M and Rebelo, S (2011), "When is the Government Spending Multiplier Large?", *Journal of Political Economy*, Vol. 119(1), pp. 78–121.
- Christiano, L, Eichenbaum, M and Trabandt, M (2016), "Unemployment and Business Cycles", *Econometrica*, Vol. 84(4), pp. 1523–1569.
- Eggertsson, G B (2004), "Monetary and Fiscal Coordination in a Liquidity Trap", Ph.D. dissertation, Princeton University.

Eggertsson, G B (2011), "What Fiscal Policy is Effective at Zero Interest Rates?", in Acemoglu, D and Woodford, M (eds.), *NBER Macroeconomics Annual 2010*, Vol. 25, University of Chicago Press, 2011.

Eichenbaum, M (1997), "Some Thoughts on Practical Stabilization Policy", *American Economic Review*, Vol. 87(2), pp. 236–39.

Eichenbaum, M, Rebelo, S and de Resende, C (2016), "The Portuguese Crisis and the IMF", IEO Background Paper No. BP/16-02/05, International Monetary Fund.

Farhi, E and Werning, I (2018), "Monetary Policy, Bounded Rationality, and Incomplete Markets", forthcoming.

Feldstein, M (2001), "Japan Needs to Stimulate Spending", *The Wall Street Journal*, July 16.

Feldstein, M (2002a), "Commentary: Is There a Role for Discretionary Fiscal Policy?", Rethinking Stabilization Policy, A Symposium Sponsored by The Federal Reserve Bank of Kansas City, Jackson Hole Wyoming.

Feldstein, M (2002b), "The Role for Discretionary Fiscal Policy in a Low Interest Rate Environment", *NBER Working Paper* No. 9203.

Furman, J (2018), "The Fiscal Response to the Great Recession: Steps Taken, Paths Rejected, and Lessons for Next Time", Hutchins Center on Fiscal and Monetary Policy at Brookings.

Gabaix, X (2018), "A Behavioral New Keynesian Model", Working Paper, Harvard University.

Holston, K, Laubach, T and Williams, J C (2017), "Measuring the Natural Rate of Interest: International Trends and Determinants", *Journal of International Economics*, Vol. 108(S1), pp. S59–S75.

Kiley, M T and Roberts, J M (2017), "Monetary Policy in a Low Interest Rate World", Brookings Papers on Economic Activity.

McKay, A and Reis, R (2016), "The Role of Automatic Stabilizers in the US Business Cycle", *Econometrica*, Vol. 84(1), pp. 141–194.

Ramey, V and Zubairy, S (2018), "Government Spending Multipliers in Good Times and in Bad: Evidence from US Historical Data", *Journal of Political Economy*, Vol. 126(2), pp. 850–901.

Summers, L (2018), "Rethinking the Fed's 2 Percent Inflation Target", Hutchins Center on Fiscal and Monetary Policy at Brookings.

Takagi, S (2016), "The IMF and the Crises in Greece, Ireland, and Portugal", Independent Evaluation Office, International Monetary Fund, 2016.

Williams, J C (2016), "Monetary Policy in a Low R-Star World", Federal Bank of San Francisco Economic Letter 2016–23.

Williams, J C (2017), "Three Questions on R-star", Federal Bank of San Francisco Economic Letter, 2017–05.

Woodford, M (2018), "Monetary Policy Analysis When Planning Horizons Are Finite", in Eichenbaum, M and Parker, J A (eds.), *NBER Macroeconomics Annual 2018*, Vol. 33, University of Chicago Press, forthcoming.

Special Feature C

Revisiting Monetary Policy Autonomy In Asia And Beyond: Trilemma, Dilemma Or 2.5 Lemma?

by Ramkishen S. Rajan¹

Introduction

Following the Asian Financial Crisis of 1997–98 and consequent collapse of the soft US dollar pegs, emerging market and developing economies (EMDEs) in Asia grappled with the question of the appropriate choice of exchange rate regime. Drawing on Mundell's (1963) monetary trilemma, the dominant paradigm was that in an era of financial globalisation, the exchange rate choice boiled down to opting for either flexibility, on the one hand, or credible pegging, on the other. Any arrangement that lies in between these extremes was considered to be inherently unstable.

Consequently, *ceteris paribus*, the choice of exchange rate regime seemed to hinge on what was a more potent policy instrument to affect aggregate demand—domestic interest rates or exchange rates? If domestic demand is a larger share of aggregate demand, then controlling the internal price of money is crucial. In such a case, the country needs a relatively greater degree of interest rate policy autonomy and hence may prefer a more flexible exchange rate regime. However, if external demand constitutes a larger share of aggregate demand, then it is the external price of money that is paramount. In this instance the country might prefer to closely manage the exchange rate and consequently forsake its interest rate policy autonomy.²

Taking a quick scan across Asia (Rajan, 2012), it is not surprising to see that many smaller economies have fixed or heavily managed exchange rate regimes—Hong Kong and East Timor to the US dollar (the former via its Linked Exchange Rate System and the latter via complete dollarisation), Singapore to a basket of currencies (trade-weighted exchange rate), Brunei to the Singapore dollar, and Nepal and Bhutan to the Indian rupee. Larger Asian economies such as Japan and South Korea have chosen a relatively more flexible exchange rate regime, as has India, which has adopted an inflation-targeting regime since 2016. There are some exceptions, of course. China, despite having a large domestic economy, has relied on a heavily managed exchange rate regime for decades. However, as China moves in earnest to rebalance its economy and develop its financial markets, it has been gradually attempting to transition to a relatively more flexible market-determined exchange rate regime.

Some other economies in the ASEAN bloc such as Malaysia and Vietnam have chosen to continue to manage in the middle, i.e., they have forsaken some degree of both monetary policy autonomy and exchange rate stability while proactively using capital flow management measures to deal with volatile capital flows. Other ASEAN economies

¹ Ramkishen S. Rajan is Professor at the Lee Kuan Yew School of Public Policy, National University of Singapore. Without attribution, the author would like to thank Sasidaran Gopalan and Ruijie Cheng for their careful comments on earlier drafts. The views in this article are solely those of the author and should not be attributed to MAS.

² Needless to say that there may be political economy and other factors that determine the actual choice of exchange rate regimes.

such as Indonesia, the Philippines and Thailand which have in the past also ‘managed in the middle’, have instead moved more clearly in the direction of greater exchange rate flexibility in

recent times, while strengthening the use of interest rates as an independent policy instrument, as part of their inflation-targeting regimes.

International Reserves And Exchange Rate Intervention

Despite the transition towards greater exchange rate flexibility, there exists a degree of unease about this as a policy choice, and thereby whether to let the exchange rate act as the primary shock absorber in many Asian economies. To be sure, while the empirical evidence suggests that exchange rate flexibility has increased over time and there is definitely less of an inclination towards rigid US dollar pegs, central banks continue to actively intervene in foreign exchange markets (Cavoli *et al.*, 2019a).

With regard to foreign exchange interventions, there is a line of work that suggests that EMDEs in Asia have undertaken asymmetric interventions in response to shocks. In particular, interventions are more likely or more frequent when the goal is to prevent sharp appreciations than depreciations—which characterises the so-called ‘fear of appreciation’ (Levy-Yeyati *et al.*, 2013; Pontines and Rajan, 2011).

It appears that there has been ‘leaning-against-the-wind’ when the exchange rate strays too far from levels thought to be consistent with medium-run fundamentals, especially when countries are faced with balance of payments surpluses. This in turn explains in part the sustained reserve accumulation apart from those during crisis periods. However, there does not appear to be a prolonged and systematic intervention strategy *per se*.

Foreign exchange intervention is often accompanied by sterilisation with the goal of insulating interest rates from the effects of such intervention. While sterilised intervention may not be effective in advanced economies (AEs), in EMDEs it remains a viable—but not costless—policy tool (Blanchard *et al.*, 2015), thanks to imperfect asset substitutability and imperfect capital mobility.

Dilemma, Trilemma Or 2.5 Lemma?

Following the Global Financial Crisis and the advent of quantitative easing, the world has been awash with global liquidity which has impacted all EMDEs. Since then, the debate has shifted to whether exchange rates regimes—fixed, flexible or intermediate—actually matter at all in the face of the global financial cycle. Rey (2015) triggered the debate by arguing that the trilemma may not even be a valid characterisation of the constraints imposed on EMDEs in the international financial system (also see Bruno and Shin, 2015; Passari and Rey, 2015). She highlighted the role of the VIX (the Chicago Board Options Exchange volatility index) and the US Federal funds rate in impacting global capital flows, bank leverage and asset prices, which have a strong common component (i.e., they are highly correlated across economies) regardless of the exchange rate regime. According to this line of reasoning, in the face of a global

financial cycle, economies are confronted with a monetary dilemma rather than a trilemma, i.e., they would have to choose between autonomous monetary policy or free cross-border capital flows.

However, since then a growing body of work has argued that the global financial cycle may be exaggerated (for example, Cerutti *et al.*, 2017a) and the demise of the trilemma is highly premature. Exchange rate flexibility remains associated with greater monetary policy autonomy (Klein and Shambaugh, 2015 and Obstfeld *et al.*, 2019). In an important finding, Han and Wei (2018) document the existence of an asymmetric pattern or 2.5 lemma between the trilemma and dilemma whereby a flexible exchange rate affords a country a degree of monetary policy autonomy when the centre

country (the US, Europe, and UK) raises rates but not when it lowers them.

Cheng and Rajan (2019) confirm this asymmetric pattern or 2.5 lemma, but instead find that there seems to be evidence of ‘fear of capital reversal’ rather than a ‘fear of appreciation’. To be sure, when base economies³ raise their interest rates, peripheral economies may respond by raising interest rates to prevent capital outflows or the loss of reserves, since capital controls have generally proven to be rather ineffective. The authors further find that this nexus holds true specifically in the case of economies with low reserve levels. In other words, there may be a ‘fear of capital reversal’ or possibly a ‘fear of reserve loss’ (Aizenman and Sun, 2012) as noted previously.⁴ On the other hand, when interest rates in the base country decline, peripheral economies may experience massive surges in capital inflows if they stand pat on interest rates. Nevertheless, they can maintain monetary policy autonomy via a combination of sterilised foreign exchange intervention (leading to reserve accumulation) as well as tightening of capital controls, and/or use of macroprudential policies (MaPs).

The body of empirical literature on MaPs, although of relatively recent vintage, is fast growing. The primary focus of the literature to date has been on the effectiveness of MaPs in limiting pro-cyclicality of credit growth and/or house price inflation across a cross-section of economies (see the literature review in Cavoli *et al.*, 2019b). In one of the most comprehensive studies on the subject, Cerutti *et al.* (2017b) document the use of MaPs across 119 economies

from 2000–13 across various instruments. The data came from the 2013 IMF Survey on Global Macroprudential Policy Instruments (GMPI) spanning 18 different instruments (of which the study uses 12). They find that MaPs are less effective at mitigating credit booms in more open economies and those with deeper and more developed financial systems. The authors also find that MaPs work better during boom periods.

Aizenman *et al.* (2017) use the same GMPI database and divide the sample into centre economies (the US, Japan and Eurozone) and peripheral economies to understand the effect of monetary policies of the former on the latter. The authors also estimate spillover effects and global synchronisation of financial or macroeconomic variables. Their empirical results suggest that the impact of MaPs is asymmetric and MaPs tend to be most useful when lax monetary policy of a centre economy results in capital inflows into a peripheral economy.

This asymmetric finding is consistent with the argument laid out by Cheng and Rajan (2019) in that monetary autonomy is more likely to be gained or invoked with exchange rate flexibility when the centre country loosens monetary policy than when the centre country tightens policy, as in the former situation economies have other tools (such as MaPs and sterilised intervention) to manage surges in capital inflows. Along similar lines, Obstfeld *et al.* (2019) have highlighted that exchange rate flexibility along with capital controls and MaPs are important components of a broader toolkit for managing domestic financial and macroeconomic conditions.

Conclusion

Long before MaPs became prominent in the AEs (since 2009), EMDEs in Asia and elsewhere have been actively using them (credit, liquidity and capital-based), especially those that are property-related. After all, housing is the largest

component of household wealth and real estate market stability is usually closely linked to overall financial stability. According to the IMF (2018), as of April 2018, 141 economies reported a total of just over 1,300 MaPs or an average of 9.3 per

³ The choice of base country is determined by the peripheral countries’ previous pegging histories or the dominant currency in the region. There are eight base countries in the sample: the US, Germany, France, South Africa, the UK, India, Portugal and Malaysia.

⁴ Aizenman and Hutchison (2010) emphasise the importance of reserves in helping EMDEs overcome the trilemma.

country, more or less evenly divided between AEs and EMDEs. There is growing recognition that beyond their impact on financial resilience, MaPs play a role in helping economies regain some degree of monetary policy autonomy during periods of capital inflow booms by attenuating the effects of global financial cycles.

With their widespread use, there are concerns as to whether MaPs actually lead to risk mitigation or merely transfer risk internally (which could have implications for financial stability), as well as the extent to which they may cause capital flow deflection across economies, hence impacting the credit cycle in another jurisdiction. While MaPs are national in nature, given their potential spillovers on other economies, their conduct calls for a greater degree of coordinated regional monetary consultation, if not outright policy coordination. Some observers have expressed concerns that the uncoordinated use of MaPs might lead to a ‘regulatory war’ between

countries if left unchecked (da Silva and Chui, 2017). However, the empirical evidence to date remains unclear.

Given the difficulty of devising a MaP framework or code of conduct at a regional—let alone a global—level, Asian economies have thus far chosen to maintain autonomy over national financial policies in order not to compromise domestic financial stability. Following the ‘Financial Trilemma’, à la Schoenmaker (2011), this choice for financial stability and financial autonomy has come at the expense of financial integration. This contrasts with the European push towards a banking union, i.e., the Eurozone is moving towards financial stability via greater financial integration at the cost of national sovereignty over financial policies. Asian economies might benefit from regional rules of good conduct regarding the use of MaPs while still ensuring sufficient flexibility given differing country contexts.

References

- Aizenman, J and Hutchison, M (2010), “Exchange Market Pressure and Absorption by International Reserves: Emerging Markets and Fear of Reserve Loss During the 2008–09 Crisis”, *NBER Working Paper No. 16260*.
- Aizenman, J and Sun, Y (2012), “The Financial Crisis and Sizable International Reserves Depletion: From ‘Fear of Floating’ to the ‘Fear of Losing International Reserves?’”, *International Review of Economics & Finance*, Vol 24(C), pp. 250–269.
- Aizenman, J, Chinn, M D, and Ito, H (2017), “Financial Spillovers and Macroprudential Policies”, *NBER Working Paper No. 24105*.
- Blanchard, O, de Carvalho Filho, I and Adler, G (2015), “Can Sterilized Foreign Exchange Intervention Stem Exchange Rate Pressures from the Global Financial Cycle?”, *IMF Working Paper No. 15/159*.
- Bruno, V and Shin, H S (2015), “Cross-border Banking and Global Liquidity”, *Review of Economic Studies*, Vol. 82(2), pp. 535–564.
- Cavoli, T, Gopalan, S, and Rajan, R S (2019a), “Exchange Rate Policies in Asia in an Era of Financial Globalisation: An Empirical Assessment”, *The World Economy*, forthcoming, (URL: <https://doi.org/10.1111/twec.12767>).
- Cavoli, T, Gopalan, S, and Rajan, R S (2019b), “Can Macroprudential Policies Counter the Financial Dutch Disease Phenomenon? Empirical Evidence from Panel Data”, forthcoming.
- Cerutti, E, Claessens, S, and Rose, A K (2017a), “How Important is the Global Financial Cycle? Evidence from Capital Flows”, *BIS Working Papers No. 661*.

Cerutti, E, Claessens, S, and Laeven, L (2017b), “The Use and Effectiveness of Macro Prudential Policies: New Evidence”, *Journal of Financial Stability*, Vol. 28, pp. 203–224.

Cheng, R and Rajan, R S (2019), “Monetary Trilemma, Dilemma or Something in Between?”, ABFER 7th Annual Conference.

Han, X and Wei, S-J (2018), “International Transmissions of Monetary Shocks: Between a Trilemma and a Dilemma”, *Journal of International Economics*, Vol. 110, pp. 205–219.

International Monetary Fund (2018), *The IMF’s Annual Macroprudential Policy Survey — Objectives, Design, And Country Responses*, (URL: <https://www.imf.org/en/Publications/Policy-Papers/Issues/2018/04/30/pp043018-imf-annual-macroprudential-policy-survey>).

Klein, M W and Shambaugh, J C (2015), “Rounding the Corners of the Policy Trilemma: Sources of Monetary Policy Autonomy”, *American Economic Journal: Macroeconomics*, Vol. 7(4), pp. 33–66.

Levy-Yeyati, E, Sturzenegger, F, and Gluzmann, P A (2013), “Fear of Appreciation”, *Journal of Development Economics*, Vol. 101(C), pp. 233–247.

Mundell, R A (1963), “Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates”, *The Canadian Journal of Economic and Political Science*, Vol 29(4), pp. 475–485.

Obstfeld, M, Ostry, J D and Qureshi, M S (2019), “A Tie That Binds: Revisiting The Trilemma in Emerging Market Economies”, *Review of Economics and Statistics*, forthcoming, (URL: https://doi.org/10.1162/REST_a_00740)

da Silva, L A P and Chui, M (2017), “Avoiding ‘Regulatory Wars’ using International Coordination of Macroprudential Policies”, *BIS Speeches*, (URL: <https://www.bis.org/speeches/sp171003.htm>).

Passari, E and Rey, H (2015), “Financial Flows and the International Monetary System”, *The Economic Journal*, Vol. 125(584), pp. 675–698.

Pontines, V and Rajan, R S (2011), “Foreign Exchange Market Intervention and Reserve Accumulation in Emerging Asia: Is there Evidence of Fear of Appreciation?”, *Economics Letters*, Vol. 111(3), pp. 252–255.

Rajan, R S (2012), “Management of Exchange Rate Regimes in Emerging Asia”, *Review of Development Finance*, Vol. 2(2), pp. 53–68.

Rey, H (2015), “Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence”, *NBER Working Paper No. 21162*.

Schoenmaker, D (2011), “The Financial Trilemma”, *Economics Letters*, Vol. 111(1), pp. 57–59.

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	3.9	10.4	5.6	1.8	-10.2	1.9	3.0	5.2	4.5									
2018	3.2	7.2	5.9	3.0	-3.4	1.5	2.7	1.5	6.0									
2017 Q1	3.8	8.4	1.0	1.7	-7.4	6.0	1.9	5.3	2.0	1.0	-0.5	-2.1	3.5	3.2	-5.2	6.9	7.6	10.1
Q2	3.1	8.6	5.8	1.8	-14.8	1.7	2.7	4.3	2.0	1.5	5.5	9.6	1.4	-19.1	-5.3	3.5	4.2	6.1
Q3	5.1	19.3	8.8	1.4	-12.9	-0.2	2.7	5.4	4.7	9.3	32.7	13.7	-0.1	-6.1	3.2	3.5	3.1	10.7
Q4	3.7	5.8	6.9	2.1	-5.3	0.4	4.9	5.5	9.5	3.2	-9.9	7.1	4.2	1.9	8.8	6.0	6.1	9.2
2018 Q1	4.7	10.1	9.5	3.4	-6.0	2.8	0.9	2.6	6.1	4.7	16.7	7.9	7.3	-2.0	4.5	-8.5	-2.6	-0.1
Q2	4.2	10.6	6.4	2.6	-4.2	2.4	3.1	1.1	6.4	0.0	7.4	-2.3	-0.7	-8.5	-5.5	12.6	-1.1	6.4
Q3	2.4	3.5	3.9	3.3	-2.3	1.8	4.0	1.9	5.4	1.4	0.7	3.3	2.9	0.7	0.2	6.7	5.1	6.6
Q4	1.9	5.1	4.1	2.8	-1.0	-0.6	2.9	0.5	6.1	1.4	-2.7	7.8	2.3	5.1	-1.7	2.1	0.2	10.6

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	5.7	6.4	3.4	3.2	4.2	5.3	8.0	-5.1	5.4	5.2	7.0					
2018	4.1	1.1	2.7	2.4	3.6	-3.4	-3.3	-3.8								
2017 Q1	5.2	1.8	-0.2	-1.4	3.6	4.8	5.9	1.0	6.5	6.1						
Q2	4.1	7.7	2.8	2.5	3.9	3.7	9.1	-16.5	2.9	5.0						
Q3	6.7	9.6	5.6	5.1	7.5	5.3	9.0	-9.2	5.8	8.1						
Q4	6.7	6.9	5.5	6.4	2.3	7.5	7.9	5.5	6.7	8.5						
2018 Q1	4.5	2.8	4.7	3.4	8.4	-1.8	-2.0	-1.0	5.2	4.5						
Q2	5.7	1.9	2.6	2.7	1.9	-2.0	-1.1	-6.5	7.0	6.3						
Q3	4.5	1.5	2.6	2.7	2.3	-7.0	-8.9	2.0	5.6	5.5						
Q4	1.7	-1.6	1.0	1.1	0.7	-3.1	-1.6	-9.8	3.0	1.9						

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	4.1	13.8	-3.7	2.5	1.2	3.3	2.3	2.1	0.2	-0.2	-8.1
2018	3.5	2.5	8.5	0.9	1.3	1.9	-1.8	1.2	3.5	0.7	0.4	-3.5
2017 Q1	1.9	3.7	11.8	-3.3	6.9	-0.1	3.7	0.0	-2.1	0.7	-1.0	-9.5
Q2	3.1	3.4	12.2	-8.7	2.6	0.9	2.8	0.7	1.9	0.2	0.4	-6.7
Q3	3.2	5.4	23.3	-5.4	0.4	0.5	3.8	2.3	4.5	-0.4	-1.2	-14.7
Q4	4.0	3.9	8.4	2.9	0.8	3.3	2.8	6.4	4.1	0.2	1.0	-2.1
2018 Q1	4.0	4.5	12.5	0.9	2.8	-0.4	-0.4	2.7	7.3	1.0	-0.8	-4.8
Q2	3.6	3.6	12.7	0.9	2.2	2.3	-2.2	2.3	4.3	0.1	0.2	-7.1
Q3	3.5	1.4	4.0	1.1	1.5	3.5	-1.8	0.1	1.6	1.1	1.3	-0.6
Q4	2.8	0.6	5.4	0.8	-0.9	2.3	-2.7	-0.1	1.0	0.6	1.3	-0.9

¹ Based on Gross Value Added At 2010 Basic Prices² Based on GDP At 2010 Market Prices

Note: The industries are classified according to SSIC 2015.

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

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
2017 Q1	-6.8	-2.9	-12.7	-4.9	-0.3	1.4	1.0	1.6	2.0	7.8	0.2
Q2	-7.3	-3.6	-10.4	-1.7	-0.4	2.0	1.1	1.5	2.4	2.0	-0.2
Q3	-2.3	-3.2	-9.6	-0.1	1.2	0.5	1.0	2.1	2.0	3.7	0.1
Q4	12.7	-1.3	-5.6	4.9	2.9	3.3	0.9	-0.6	4.8	4.1	-0.6
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

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	
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	
2017 Q1	16.3	16.9	29.1	72.0	15.0	9.0	17.6	6.5	15.5	9.1	14.3	14.3	14.4	3.9	4.1	
Q2	9.5	8.3	9.6	26.9	3.0	13.7	-0.9	7.0	11.0	3.5	3.2	5.1	2.0	3.8	4.5	
Q3	11.6	10.1	11.0	19.3	7.6	8.9	7.0	9.3	13.4	5.7	4.0	-1.2	7.2	7.5	8.1	
Q4	7.8	6.6	15.3	26.1	10.4	1.2	14.4	-1.3	9.1	5.4	11.6	8.5	13.5	-0.8	6.8	
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	4.6	3.6	
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	
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	9.3	6.4	
Q4	9.2	7.2	3.4	12.1	-1.1	-3.6	-0.2	11.2	11.5	2.4	-3.7	-4.5	-3.2	9.2	5.0	
2019 Q1	2.1	0.0	-6.4	-6.5	-6.4	-17.2	-2.6	6.8	4.6	-2.6	-7.7	-8.0	-7.6	3.1	0.6	

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				
2017 Q1	15.0	6.8	12.8	7.6	7.9	31.8	15.4	36.8	52.7	48.6	-0.4	8.2	1.2				
Q2	3.0	5.8	7.7	9.6	3.9	16.6	-7.3	62.7	22.8	33.8	-11.4	15.5	-2.5				
Q3	7.6	13.1	7.3	18.2	16.9	13.4	11.2	36.9	1.7	23.4	-6.2	20.0	1.2				
Q4	10.4	10.9	5.1	16.4	3.4	-5.2	-17.7	38.5	-12.2	22.5	18.6	25.5	16.4				
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	-4.4	-14.1	-3.8	1.2	-12.7	-1.3	-31.5	-11.7	-2.2	-9.8	-29.5	8.6				
% 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
2017 Q1	99.5	105.1	100.8	91.4	101.8	102.6	98.5	100.3	101.1	109.1	100.2
Q2	99.4	105.3	101.6	90.2	102.0	103.3	98.6	100.4	101.3	109.4	100.5
Q3	99.4	105.5	100.3	90.0	102.6	103.9	98.2	100.6	101.4	110.4	100.4
Q4	99.6	105.9	100.9	89.1	102.5	104.1	99.4	100.8	102.4	110.4	99.9
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

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									

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	Maintenance & Repairs	Transport	Travel	Financial	Intellectual Property	Others		
	\$ Million													
2017	74,450	16.0	552,290	426,492	125,798	-12,245	7,557	-5,576	-6,698	26,637	-9,493	-24,673	-31,440	-7,663
2018	86,205	17.7	608,095	476,483	131,611	-3,966	8,236	-3,473	-6,497	27,780	-8,690	-21,323	-33,075	-8,365
2017 Q1	19,135	16.6	133,056	102,018	31,038	-2,930	1,719	-1,826	-1,098	6,312	-2,274	-5,763	-7,182	-1,792
Q2	18,717	16.6	134,601	102,983	31,618	-2,746	1,785	-1,250	-1,763	6,592	-2,283	-5,826	-8,157	-1,999
Q3	20,526	17.9	138,279	105,538	32,741	-2,790	1,878	-1,145	-1,119	6,774	-2,647	-6,531	-7,473	-1,952
Q4	16,072	13.1	146,353	115,953	30,401	-3,779	2,175	-1,354	-2,719	6,959	-2,289	-6,552	-8,629	-1,920
2018 Q1	19,842	16.6	139,872	109,439	30,433	-483	2,260	-701	-1,123	6,943	-2,153	-5,708	-8,168	-1,941
Q2	23,881	19.8	152,911	118,349	34,562	-967	2,008	-954	-1,771	7,081	-1,950	-5,382	-7,536	-2,177
Q3	24,686	20.3	158,513	124,286	34,226	-404	1,939	-818	-1,169	7,116	-2,139	-5,332	-7,028	-2,109
Q4	17,796	14.1	156,799	124,409	32,390	-2,113	2,030	-999	-2,435	6,640	-2,448	-4,901	-10,343	-2,138

Source: Singapore Department of Statistics

TABLE 10: BALANCE OF PAYMENTS – Capital & Financial Accounts

Period	Capital and Financial Account Balance					Net Errors & Omissions	Overall Balance	Official Foreign Reserves (End of Period)	\$ Million
	Total	Direct Investment	Portfolio Investment	Financial Derivatives	Other Investment				
2017	36,762	-70,586	46,297	11,325	49,726	154	37,841	373,994	
2018	67,793	-60,559	32,222	22,502	73,628	-1,487	16,925	392,096	
2017 Q1	2,910	-22,216	190	2,971	21,965	389	16,614	362,802	
Q2	13,399	-15,352	17,769	587	10,395	-874	4,443	366,634	
Q3	9,773	-15,731	11,378	-8,524	22,650	447	11,201	373,996	
Q4	10,681	-17,287	16,960	16,292	-5,284	192	5,584	373,994	
2018 Q1	12,658	-11,778	5,902	9,118	9,416	-352	6,833	376,529	
Q2	15,519	-14,728	7,419	7,205	15,622	-582	7,780	392,758	
Q3	18,305	-24,750	-6,237	1,735	47,558	-158	6,222	398,061	
Q4	21,311	-9,303	25,138	4,444	1,033	-394	-3,910	392,096	

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
2017 Q1	1.3978	1.7452	1.4923	139.60	1.2470	0.3158	0.1799	4.5998	0.1248	1.0683
Q2	1.3773	1.7930	1.5758	143.97	1.2316	0.3207	0.1764	4.5337	0.1204	1.0603
Q3	1.3584	1.8224	1.6007	139.88	1.2062	0.3213	0.1739	4.4713	0.1186	1.0662
Q4	1.3366	1.7987	1.5962	136.56	1.1851	0.3290	0.1709	4.5033	0.1251	1.0416
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

Source: Monetary Authority of Singapore

TABLE 12: SINGAPORE DOLLAR NOMINAL EFFECTIVE EXCHANGE RATE INDEX

Index (2–6 Oct 2017 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
2017 Oct 6	100.00	2018 Jan 5	100.52	2018 Apr 6	100.22	2018 Jul 6	100.08	2018 Oct 5	100.84	2019 Jan 4	101.42
13	100.07		12	100.29	12	100.31	13	100.42	12	100.74	11
20	100.14		19	100.20	20	100.35	20	100.47	19	100.94	18
27	100.04		26	100.25	27	100.15	27	100.68	26	101.12	25
Nov 3	100.21	Feb 2	100.00	May 4	100.23	Aug 3	100.74	Nov 2	101.11	Feb 1	101.55
10	100.17		9	99.58	11	100.04	10	100.77	9	101.20	8
17	100.18		15	99.77	18	100.16	17	100.75	16	101.12	15
24	100.24		23	99.82	25	100.26	24	100.78	23	101.26	22
Dec 1	100.30	Mar 2	99.84	Jun 1	100.43	31	100.76	30	101.27	Mar 1	101.67
8	100.26		9	100.01	8	100.56	Sep 7	100.53	Dec 7	101.34	8
15	100.23		16	100.28	14	100.67	14	100.64	14	101.36	15
22	100.31		23	100.15	22	99.96	21	100.82	21	101.37	22
29	100.39		29	100.29	29	99.91	28	101.10	28	101.22	29
											Apr 5
											101.74

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	0.416	0.319	0.363	0.366	0.425	0.480	0.524	0.438	-0.214	-0.945	-1.167	-0.586	
2012	0.138	0.592	0.688	0.631	0.326	0.113	0.277	0.457	0.699	0.379	0.302	0.207	
2013	0.003	-0.087	-0.188	0.082	-0.052	-0.034	-0.075	0.093	0.411	0.438	0.545	0.220	
2014	-0.053	-0.132	-0.243	0.141	0.135	0.359	0.192	0.094	0.037	0.002	-0.027	0.023	
2015	0.010	-0.070	-0.127	0.347	0.686	0.734	0.163	-0.201	-0.116	0.004	0.261	0.247	
2016	-0.069	-0.003	0.179	0.416	0.172	0.225	0.288	0.276	-0.214	-0.494	-0.398	-0.242	
2017	0.063	0.177	0.337	0.313	0.091	-0.088	0.069	0.164	0.187	0.009	0.101	0.126	
2018	0.100	-0.147	0.043	0.132	0.272	0.041	0.066	0.238	0.255	0.209	0.186	0.217	
2019	0.271	0.164	0.136										

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	5.33	1.89	2.81	0.16	0.45
2017 Q1	174.0	573.0	584.7	64.6	8.9	7.5	7.2	4.9	5.28	0.95	1.15	0.16	0.33
	Q2	178.2	573.7	585.4	64.5	10.8	7.3	7.0	5.28	1.00	1.30	0.16	0.33
	Q3	182.0	577.9	589.9	66.4	9.2	5.4	5.3	5.28	1.12	1.33	0.16	0.33
	Q4	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 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
	Q2	186.1	588.6	601.4	70.2	4.4	2.6	2.7	5.33	1.52	2.34	0.16	0.37
	Q3	184.3	597.7	610.3	69.7	1.2	3.4	3.5	5.33	1.64	2.40	0.16	0.40
	Q4	184.5	602.4	615.0	71.8	0.4	3.9	3.9	5.33	1.89	2.81	0.16	0.45

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								
		Total	Income Tax	Assets Taxes	Stamp Duty												
\$ 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