INTERNATIONAL MONETARY FUND

IMF Country Report No. 16/263

SINGAPORE

2016 ARTICLE IV CONSULTATION—PRESS RELEASE; STAFF REPORT; AND STATEMENT BY THE EXECUTIVE DIRECTOR FOR SINGAPORE

July 2016

Under Article IV of the IMF's Articles of Agreement, the IMF holds bilateral discussions with members, usually every year. In the context of the 2016 Article IV consultation with Singapore, the following documents have been released and are included in this package:

- A **Press Release** summarizing the views of the Executive Board as expressed during its July 25, 2016 consideration of the staff report that concluded the Article IV consultation with Singapore.
- The **Staff Report** prepared by a staff team of the IMF for the Executive Board's consideration on July 25, 2016, following discussions that ended on May 10, 2016, with the officials of Singapore on economic developments and policies. Based on information available at the time of these discussions, the staff report was completed on July 8, 2016.
- An **Informational Annex** prepared by the IMF staff.
- A **Statement by the Executive Director** for Singapore.

The document listed below have been or will be separately released.

Selected Issues

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INTERNATIONAL MONETARY FUND

COMMUNICATIONS DEPARTMENT

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FOR IMMEDIATE
RELEASE July 29, 2016

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700 19th Street, NW
Washington, D. C. 20431 USA

IMF Executive Board Concludes 2016 Article IV Consultation with Singapore

On July 25, 2016, the Executive Board of the International Monetary Fund (IMF) concluded the Article IV consultation[1] with Singapore.

Singapore's economy continues to perform well despite being impacted by a combination of cyclical and structural factors, originating both at home and abroad. Growth moderated from 3.3 percent in 2014 to 2 percent in 2015, and it was 2.2 percent in the first half of 2016. Unemployment has remained low, but net employment generation slowed rapidly in 2015 and headline inflation has stayed below zero since late 2014. In response, macroeconomic policies have become more accommodative, spearheaded by monetary policy easing and an expansionary budget. Financial sector and macroprudential policies have ensured financial stability. On the external front, lower global energy prices contributed to a higher current account surplus in 2015, though the surplus declined in the first quarter of 2016.

Growth is projected to moderate slightly to 1.7 percent in 2016, as the full impact of the global shocks experienced in 2015 is felt, and is expected to recover to 2.2 percent in 2017. Economic activity will be supported by accommodative policies, along with low energy prices and the ongoing global recovery. However, near-term risks are skewed to the downside, including from slow global and regional growth and spillovers from renewed global financial volatility. Headline and core inflation are benign, expected to -0.3 and 0.8 percent in 2016, respectively, before rising to 1.1 and 1.4 percent in 2017 on gradually recovering energy and commodity prices. The current account surplus is expected to moderate over the medium term amid rapid population aging and reforms to boost domestic demand, including through better health care, pensions, and other social insurance arrangements.

Structural policies continue to focus on moving toward an innovation-based economy that relies less on labor and more on productivity growth, especially in the nontraded sector. Policies focus

[1] Under Article IV of the IMF's Articles of Agreement, the IMF holds bilateral discussions with members, usually every year. A staff team visits the country, collects economic and financial information, and discusses with officials the country's economic developments and policies. On return to headquarters, the staff prepares a report, which forms the basis for discussion by the Executive Board.

on targeted support to businesses to promote automation, innovation, and internationalization. The government is also raising investment in infrastructure and other long-term capital projects and rolling out policies to improve access to education and health care, particularly for the elderly.

Executive Board Assessment[2]

Executive Directors observed that Singapore's highly open economy enjoys strong fundamentals and continues to perform well, and commended the authorities for their skillful management. Directors noted that Singapore's strong external position and ample fiscal space allows the authorities to adjust policy settings in response to slower growth and external risks stemming from protracted lower growth in advanced and emerging economies and global financial market volatility.

Directors considered the authorities' expansionary fiscal policy stance and further easing of monetary policy in April as appropriate, in view of the weaker-than-expected inflation and growth developments. They agreed that the current accommodative fiscal stance is providing welcome support to activity and applauded the authorities' willingness to act quickly in response to evolving conditions. However, a number of Directors saw scope for additional fiscal stimulus to boost domestic demand, close the output gap, and provide insurance against elevated downside risks to growth. In this context, a number of Directors underscored that the current fiscal rule has served the country well for many years, while a number of others saw merit in considering aligning it to the business cycle. Turning to monetary policy, Directors considered that current policy settings are appropriate. They agreed that clear monetary communications are desirable, particularly to avoid short-run instability. While some Directors considered that more frequent elaboration of inflation prospects would be beneficial, a number of other Directors recognized merits in the authorities' current approach, which has served the country well and should be retained.

Directors observed that Singapore is at the mid-point of a decade long restructuring to a knowledge-based economy. They welcomed the authorities' more targeted approach to supporting automation, innovation and productivity, while expanding social insurance and safety nets. Directors urged the authorities to increase spending on research and development (R&D), promote private sector R&D, and support new, creative firms. They looked forward to the unveiling of initiatives by the Committee on the Future Economy.

Directors observed that Singapore's financial cycle has turned and that credit growth to residents has moderated. They noted that macro prudential policies in place made a decisive contribution to containing household indebtedness and should be retained. Directors considered that high

[2] At the conclusion of the discussion, the Managing Director, as Chairman of the Board, summarizes the views of Executive Directors, and this summary is transmitted to the country's authorities. An explanation of any qualifiers used in summings up can be found here: http://www.imf.org/external/np/sec/misc/qualifiers.htm.

levels of corporate debt warrant caution and close monitoring, although risks are mitigated by companies' high debt-servicing capacity.

Directors recognized Singapore's high regulatory and supervisory standards in the financial sector. They noted that banks have remained profitable with low non-performing loans and large capital and liquidity cushions as they adjust to changes in the direction of capital flows and lower oil prices. Directors welcomed that the regulation and supervision of banks is being further enhanced, and emphasized the need for banks to remain vigilant. They noted the authorities' continued efforts to align the AML/CFT framework with international standards, and welcomed recent steps to strengthen its enforcement.

Directors noted the finding that Singapore's external position is substantially stronger than consistent with macroeconomic fundamentals and desirable policies, while acknowledging that considerable uncertainty surrounds the assessment. The current account surplus increased further in 2015, as buoyant consumption only partly offset the narrowing of the oil trade deficit. Fiscal expansion should help reduce the external imbalance in the near term. Rapid population aging and policies to boost domestic demand and enhance inclusion, including better health care, pensions, and other social insurance arrangements, should over time lead to a significant reduction in Singapore's external imbalance.

Singapore: Selected Economic and Financial Indicators, 2012–17

					Projections	
	2012	2013	2014	2015	2016	2017
Growth (percentage change)						
Real GDP	3.7	4.7	3.3	2.0	1.7	2.2
Total domestic demand	6.8	4.3	0.2	0.5	4.1	3.2
Consumption	2.4	4.7	1.7	4.9	4.1	3.3
Private consumption	3.5	3.1	2.2	4.5	3.5	3.6
Gross capital formation	13.9	3.7	-2.0	-6.2	4.2	3.2
Saving and investment (percent of GDP)						
Gross national saving	47.9	48.2	46.4	46.1	46.6	46.3
Gross domestic investment	29.8	30.3	28.9	26.3	26.4	26.6
Inflation and unemployment (period average, percent)						
CPI inflation	4.6	2.4	1.0	-0.5	-0.3	1.1
Core CPI inflation	2.5	1.7	1.9	0.5	0.8	1.4
Unemployment rate	2.0	1.9	2.0	1.9	2.0	2.0
Central government budget (percent of GDP) 1/						
Revenue	22.6	21.9	21.6	21.6	21.9	21.4
Expenditure	13.7	14.8	15.7	18.8	20.6	20.5
Overall balance	8.9	7.1	5.9	2.7	1.3	0.9
Primary balance 2/	1.5	0.3	-0.3	-3.0	-4.2	-4.4
Money and credit (end of period, percentage change)						
Broad money (M2)	6.8	7.9	7.6	4.0	1.5	...
Credit to private sector	11.3	15.5	7.2	2.8	4.5	...
Three-month S$ SIBOR rate (percent)	0.4	0.4	0.5	1.2	...	...
Balance of payments (US$ billions)						
Current account balance	52.3	53.8	53.5	57.9	58.3	58.8
In percent of GDP	18.1	17.9	17.5	19.8	20.2	19.7
Goods balance	70.4	75.6	79.6	82.5	80.6	82.6
Exports, f.o.b.	437.4	437.4	437.8	377.0	356.4	385.6
Imports, f.o.b.	-367.1	-361.7	-358.2	-294.5	-275.7	-303.0
Financial account balance	23.1	37.3	46.2	56.0	51.3	49.5
Overall balance	26.1	18.2	6.8	1.1	7.1	9.2
Gross official reserves (US$ billions)	259.3	273.1	256.9	247.7	254.8	264.1
In months of imports 3/	6.1	6.4	7.0	7.1	6.8	6.6
Singapore dollar/U.S. dollar exchange rate (period average)	1.25	1.25	1.27	1.37	...	...
Nominal effective exchange rate (percentage change) 4/	2.4	2.6	0.9	-0.3	...	...
Real effective exchange rate (percentage change) 4/	4.7	2.7	-0.3	-2.0	...	...

Sources: Data provided by the Singapore authorities; and IMF staff estimates and projections.

1/ On a calendar year basis.

2/ Overall balance excluding investment income, capital revenue, and interest payments.

3/ In months of following year's imports of goods and services.

4/ Increase is an appreciation.

INTERNATIONAL MONETARY FUND

SINGAPORE

STAFF REPORT FOR THE 2016 ARTICLE IV CONSULTATION

July 8, 2016

KEY ISSUES

Outlook and Risks. Singapore's economy continues to perform well, although growth has slowed reflecting a combination of structural and cyclical factors: population aging, restrictions on foreign worker inflows, and slow productivity growth, and a difficult external environment, including the trade growth deceleration and the negative impact on domestic manufacturing of lower oil prices. Disinflation in domestic goods and asset markets and deleveraging continue. Risks to the outlook are skewed to the downside, including from slow global and regional growth and spillovers from renewed global financial volatility. Domestic risks are rooted in still elevated household and corporate leverage and slower-than-expected gains in productivity during the transition to an innovation-based, labor-lean growth model.

Macroeconomic and Financial Policies. Policies have turned accommodative in recent years amid slower growth at home and a challenging environment abroad. Faced with undershooting of its medium-term inflation objective, the Monetary Authority of Singapore (MAS) eased monetary policy further in April. Following on the heels of an expansionary 2015 budget, the 2016 budget raises spending further. While fiscal and monetary policies are already providing support to activity, more fiscal stimulus than is envisaged by the authorities would be useful to close the output gap and help narrow Singapore's current account gap. In case of a sustained negative shock, fiscal policy should be the first line of the defense, with monetary policy playing a supporting role. Consideration should also be given to attune the fiscal rule to the business cycle. Macroprudential policies have succeeded in arresting the increase in household leverage. Corporate leverage has stabilized as the financial cycle has turned. The local banks boast stable and high capital and profitability ratios but have exposures to the oil and gas sector and to Greater China. They are restructuring some of their loans to the more affected oil services firms and credit risk on China loans is deemed manageable.

Restructuring and Innovation-Led Growth. Singapore is at the midpoint of an ambitious, decade-long transition to a labor-lean, innovation-based economy. The shift to targeted support to businesses while rolling out inclusive policies announced earlier is welcome. To accelerate efficiency gains from restructuring, Singapore should raise spending on Research and Development (R&D), promote private sector R&D, and provide support for new, creative firms. More accommodative macroeconomic policies should help raise the rate of innovation.

External Sector Assessment. Singapore's external position continues to be substantially stronger than consistent with macroeconomic fundamentals and desirable policies. Fiscal expansion should help narrow the substantial current account imbalance.

Approved By
Markus Rodlauer (APD) and Vitaliy Kramarenko (SPR)

This report was prepared by a staff team led by Alex Mourmouras and Gerard Almekinders. Discussions were held in Singapore during April 28–May 10, 2016. The mission comprised Alex Mourmouras (Head), Juan Manuel Jauregui, Souvik Gupta, Umang Rawat (all APD), Geoffrey Heenan (Resident Representative), and Dirk Muir (RES). Marzunisham Omar and Ian Chung (both OED) participated in the policy discussions. Simon Paroutzoglou and Justin Flinner (both APD) ably assisted in the research and preparation of this report.

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Abbreviations and Acronyms

ACU	Asian currency unit
AML/CFT	Anti-money laundering/countering the financing of terrorism
BBC	Band-basket crawl
BOP	Balance of payments
CA	Current account
CPF	Central Provident Fund
CPI	Consumer price index
DBU	Domestic banking unit
DMP	Diamond-Mortensen-Pissarides
DSA	Debt sustainability analysis
EBIT	Earnings before interest and tax
EU	European Union, the
FI	Fiscal impulse
FY	Fiscal year
FSAP	Financial Stability Assessment Program
GDP	Gross domestic product
GFC	Global financial crisis
GIC	Government of Singapore Investment Corporation
GMM	Generalized method of moments
HP filter	Hodrick-Prescott filter
ICR	Interest coverage ratio
IT	Inflation targeting
LCR	Liquidity coverage ratio
LTD	Loan-to-deposit
MAS	Monetary Authority of Singapore
MRT	Mass Rapid Transit
MVF	Multivariate filter
NAIRU	Nonaccelerating inflation rate of unemployment
NEER	Nominal effective exchange rate
NFC	Nonfinancial corporate
NPL	Nonperforming loan
O&G	Oil and gas
OECD	Organisation for Economic Co-operation and Development
PF	Production function
R&D	Research and development
REER	Real effective exchange rate
SME	Small and medium-sized enterprises
Temasek	Investment company owned by the government of Singapore
TDSR	Total debt service ratio
TFP	Total factor productivity
UK	United Kingdom, the
UN	United Nations, the
U.S.	United States, the
y/y	Year-on-year

BACKGROUND

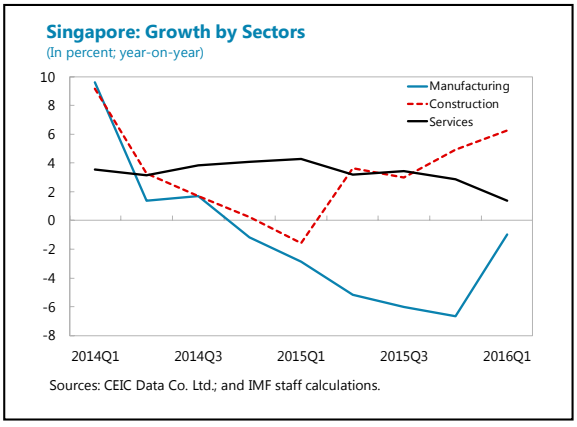
1. Robust Fundamentals. Singapore, a city state with a highly open economy, has a strong growth and development record based on sound macro- and micro-economic management, including a medium-term policy orientation and a top-ranked business climate. Despite its small size, the economy is diversified. Manufacturing, trade, logistics, and financial and other services all make important contributions to activity and exports. Singapore is a global financial center with large fiscal and financial buffers and a very strong external position. The 2013 FSAP found Singapore's regulation and supervision of the financial sector among the best globally.

2. Domestic Restructuring and Growth. The People's Action Party consolidated power in the 2015 election, ensuring continuity at the half-way point of the decade-long restructuring to a knowledge-based, labor-lean, and more inclusive economy. The restructuring is taking place amid a marked deceleration of actual and potential growth. At home, growth is constrained by an aging labor force and by tighter limits on foreign workers. Efficiency gains from restructuring have been slow to materialize reflecting transition costs. On the external front, Singapore is a net energy importer and thus benefits from lower energy prices. Nevertheless, the end of the commodities super cycle is negatively affecting its oil extraction-related industries and private investment and partly offsets the positive effects of lower energy prices on consumption. The SME sector is being challenged by higher labor costs, competition from neighbors, and the global trade slowdown. China's bumpy transition is also hurting (Figure 7, Appendix I). Direct and indirect effects of the United Kingdom's referendum on exit from the European Union (Brexit), through Singapore's real and financial linkages, are also important.

3. Past Fund Advice. Macroeconomic policies in 2015 were broadly in line with Fund advice. In response to a significant downward adjustment in Singapore's inflation outlook starting in late 2014, the MAS began an easing of monetary policy in January 2015. In addition, the 2015/16 budget raised spending with a view to strengthen Singapore's infrastructure and social insurance and safety nets and support medium-term productivity gains. The accommodative policy stance provided timely support to demand. The authorities have also made good progress implementing the 2013 FSAP recommendations. Consistent with staff advice, the authorities maintain macroprudential policies aimed at reducing risks from the property market.

RECENT ECONOMIC DEVELOPMENTS

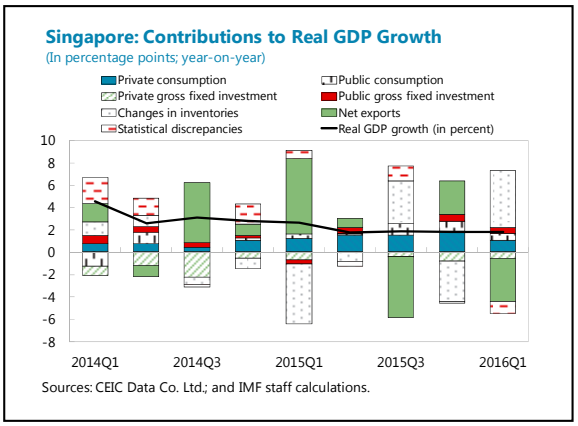
4. Growth Slowdown. Real GDP grew by 1.8 percent in the first quarter of 2016 (year-on-year), down from 2 percent in 2015 and 3.3 percent in 2014, resulting in a small negative output gap. The annual average growth rate in the six years (2010–15) since the Global Financial Crisis (GFC) was lower by nearly 1.5 percentage points relative to the six-year period preceding the crisis (2002–07).



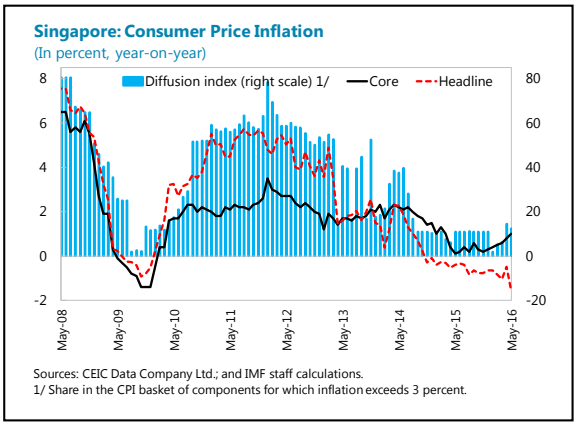
Globally, Singapore's growth slowdown has been more pronounced than the median for advanced economies.

- On the production side, the growth deceleration in 2015 was due to a 5 percent contraction in the manufacturing sector, on weakness in electronics and marine and offshore engineering. In the first quarter of 2016, the contraction in the manufacturing sector continued, albeit at a slower pace relative to 2015, while the construction sector expanded at a faster pace. The services sector, which accounts for about two-third of GDP, slowed further.

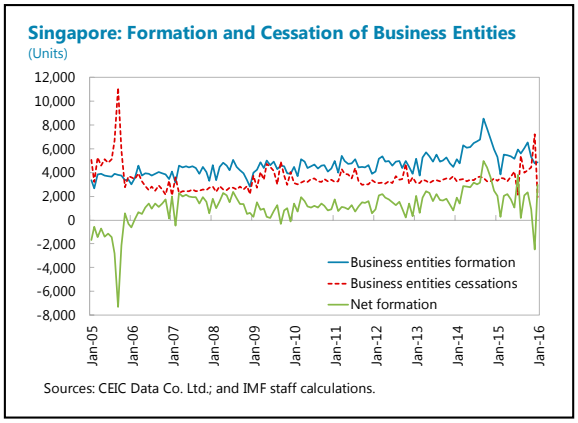
- On the expenditure side, in 2015, strong contributions came from both private and public consumption, in part owing to measures related to the celebration of the 50th anniversary of Singapore's independence, and from net exports. These were partly offset by the negative contributions to growth from private investment and declining inventories as the uncertain economic outlook continued to weigh on investor confidence. In the first quarter of 2016, growth was supported by consumption and inventory accumulation, while private investment remained a drag and net exports shrunk.

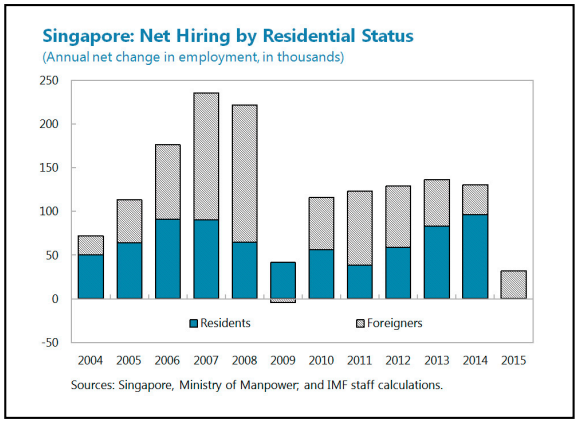


5. Disinflation. Meanwhile, inflation has also trended lower (Appendix II). Headline inflation has been negative since November 2014, while the MAS' core inflation has trended up since late 2015 and touched one percent in May 2016. Disinflation reflects the impact of lower energy, food and other commodity prices, lower premiums for car certificates of entitlement, and a softening in residential rental prices. Recent data indicate that inflation may be bottoming out, despite some volatility, along with international energy prices.



6. The Labor Market and Productivity. The labor market is softening. Real wages continued to rise in 2015, and the overall and resident unemployment rates remained broadly stable around 1.9 percent and 2.8 percent, respectively. However, net employment generation slowed down rapidly in 2015. Following sharp increases in 2013 and 2014, net employment gains for Singapore residents were negligible in 2015. The incidence of redundancy has also risen in recent quarters. On the supply side, the residents' labor force participation rate has reached a new high, supported largely by older workers. Post 2011, economy-wide labor productivity has been dragged down by the rising employment share of domestically-oriented sectors. Staff analysis finds evidence of growing skill mismatches which may have contributed to the slowdown in labor productivity (Appendix III). The pass-through of rising labor costs has been smaller than expected amid a negative output gap and uncertain outlook.





7. Balance of Payments (BOP)**.** The current account (CA) surplus reached 19.8 percent of GDP in 2015, up by 2.3 percentage points of GDP from 2014. The decline in global oil prices caused the oil trade deficit to narrow by 3.7 percentage points of GDP. The overall BOP retreated amid higher net financial account outflows, but remained narrowly in surplus in 2015. Nonoil domestic export volumes have remained weak through April 2016 and notwithstanding a further improvement in the terms of trade of about 4 percent (y/y), the CA surplus narrowed to 17.7 percent of GDP in 2016Q1, down by 3.7 percentage points of GDP compared to 2015Q1. Moreover, possibly reflecting the China-related turmoil in 2016Q1, portfolio flows turned negative by about 15 percent of GDP, the largest since the GFC. Deposit-taking corporations took US$25 billion out of Singapore during the quarter resulting in the overall BOP recording a deficit of more than US$6 billion.

8. Linkages with China and the United Kingdom. Singapore's gross trade in goods and services exceeded 300 percent of GDP in 2015, significantly higher than other advanced economies (excluding Hong Kong SAR and Luxembourg). Exposures to China are mainly through direct and indirect goods trade. Singapore ran a trade surplus with China in 2015. Services trade with China is much smaller. On the other hand, while services trade with the United Kingdom is of similar magnitude as with China (Singapore ran a surplus in 2014), goods trade with the United Kingdom is much smaller.[2] Further, in value added terms, Singapore has a stronger linkage with China than with the United Kingdom. Trade exposures to the EU (excluding the United Kingdom) are broadly comparable to that with China. In terms of financial exposures, Europe plays a bigger role than China in inward FDI, for example, with half of FDI from the United Kingdom going to the financial sector, one-fifth to the wholesale and retail trade sector, and another nearly one-fifth to the manufacturing sector. China accounted for nearly one-fifth of stock of Singapore's outward FDI, while both the United Kingdom and the EU (excluding the United Kingdom) individually accounted

[2] Some of the trade with the United Kingdom could represent indirect exposure to the EU, particularly in services trade.

for less than half of China's share. Staff analysis shows that a 1 percent one-off slowdown in China's GDP would impact Singapore's GDP by –0.1 to –0.5 percentage points in the first year, with the highest impact seen when financial volatility spikes. The direct impact of Brexit is expected to be limited. However, there could be large indirect effects, through exposure to the EU and global financial market volatility.[3]

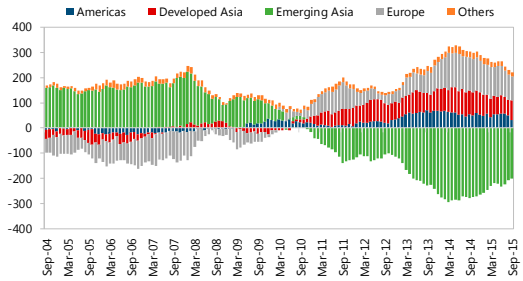
Text Table 1. Singapore: Exposure to Global Economics
(In percent of GDP; unless otherwise mentioned)

	World	China	United Kingdom	EU (excl. U.K.)
Merchandise exports (2015)	118	16	1	9
Domestic merchandise exports (2015)	58	7	1	5
Merchandise imports (2015)	101	14	2	11
Services exports (2014)	49	3	3	4
Services imports (2014)	51	3	2	6
Value added in foreign final demand (2011)	58	6	2	6
Inward FDI (stock; 2014)	264	4	16	46
Outward FDI (stock; 2014)	160	28	11	12

Sources: Singapore authorities; OECD *TiVA* database; CEIC Data Co. Ltd.; and IMF staff

9. Macro-Financial Developments. As an international financial center, Singapore intermediates credit globally. Prior to the GFC, banks in Singapore channeled savings from emerging Asia to Europe and developed Asia. Post crisis, the flows reversed and loans to China and elsewhere in emerging Asia expanded. The low post-GFC interest rate environment also triggered domestic credit and property booms in Singapore that resulted in higher household and corporate leverage. The Singapore dollar and the stock market came under pressure in 2015 and in early-2016 but have partly recovered. Financial markets have recovered from initial reactions to the Brexit referendum. In the week following the referendum, the Singapore dollar nominal effective exchange rate (NEER) was flat and the stock market was up by 1.7 percent.

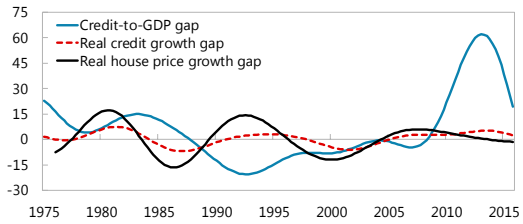
Singapore Banking System: Net Lending by Region
(In billions of Singapore dollars)



Source: Monetary Authority of Singapore

10. The Financial Cycle. The financial cycle has now turned and deleveraging has begun, particularly in bank lending to nonresidents, and overall growth of credit to nonbanks has become negative, a first since 2010 (Table 3). In the property market, macroprudential measures, such as the total debt service ratio (TDSR) framework and stamp duties, along with supply-side measures, have contributed to a welcome cooling of private residential property prices (as of 2016Q2, nearly 9½ percent below the 2013Q3 peak). On the commercial and industrial side, except for office space, prices have also declined from peaks, though at a slower pace between 2–5 percent across segments. Credit to resident nonbanks has

Singapore: Financial Cycles 1/
(In percentage points)

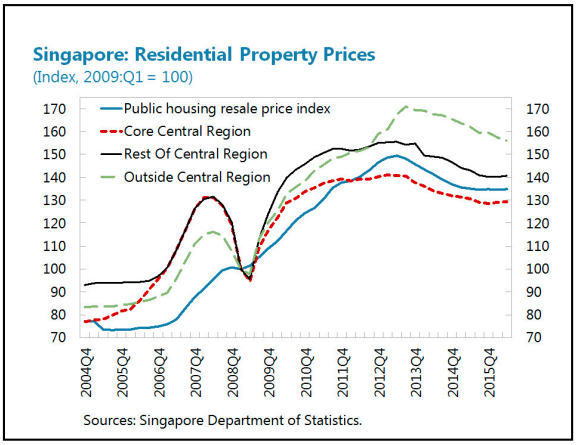


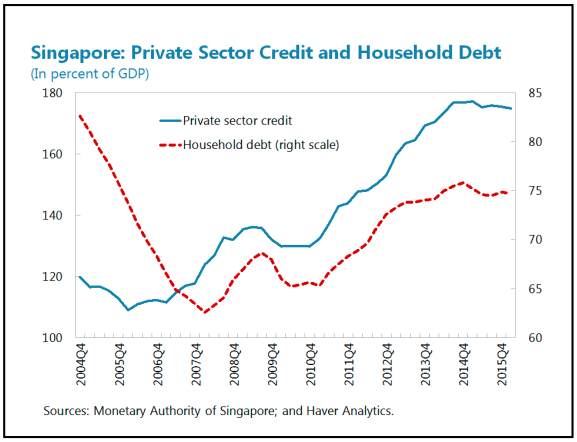
Sources: Singapore authorities; Bank for International Settlements (BIS); and IMF staff estimates.
1/ Financial cycles are measured by frequency-based (bandpass) filter capturing medium-term cycles. Credit-to-GDP gap estimates are based on data from the BIS on credit to private nonfinancial sector.

[3] See United Kingdom: Selected Issues, IMF Country Report No. 16/169.

remained positive and is projected to grow about 4.5 percent by end-2016, in line with medium-term nominal GDP growth.

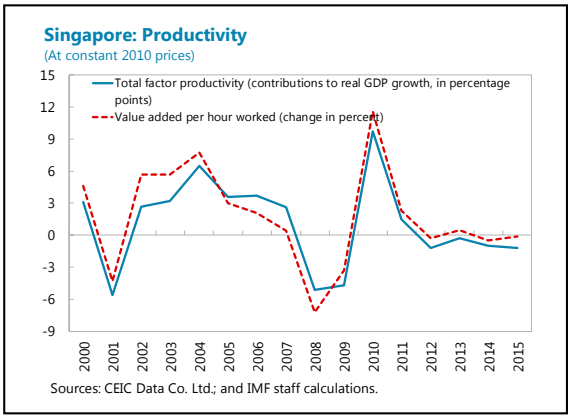
11. The Banks. The three local banks boast stable and high capital and profitability ratios. But they have come under increased market scrutiny following an uptick in still-low nonperforming loans (NPLs), given significant exposures to the oil and gas (O&G) sector (4–6 percent of total nonbank loans) along with other commodities finance, and loans to the Greater China region (12–34 percent of total loans). The banks are restructuring some of their O&G loans to the more affected oil services firms. Though domestic banks' exposure to Greater China declined slightly in 2015, it still remained sizable at close to 25 percent of total loans. Credit risk on Greater China loans is deemed manageable given exposures are primarily to the main state banks (as short-term, self-liquidating collateralized trade finance loans) and larger, more creditworthy borrowers.





OUTLOOK AND RISKS

12. Near-Term Outlook. Growth is projected to slow to 1.7 percent in 2016, with the output gap estimated at –0.6 percent, as the full impact of the slowdown in global trade and capital outflows experienced in recent quarters is felt and private investment is held back by the uncertain outlook. In surveys, companies report little appetite to hire and bank credit remains subdued. On the positive side, lower energy prices should support private consumption while external demand should gradually recover in the second half of 2016. Growth is projected to improve to 2.2 percent in 2017 on the back of recovering private investment. Staff's baseline incorporates the preliminary assessment of the fallout from the Brexit referendum. Headline and core inflation are benign, expected at –0.3 and 0.8 percent in 2016, respectively, before rising to 1.1 and 1.4 percent respectively in 2017 on gradually recovering energy and commodity prices.



13. Medium-Term Outlook. Growth is projected at 2.6 percent over 2018–21, as structural reforms help productivity recover to its long-term trend, large public investment projects related to infrastructure and age-related facilities continue, and private investment recovers further.[4] In addition to the recovery of overall capital formation, private consumption is also expected to be supported by an aging population. Singapore's potential growth has been slowing and is conservatively estimated in staff's baseline at about 2.5 percent over 2016–21 (Appendix IV). An aging population and tight controls on foreign workers will reduce labor force growth. In addition, uncertainties about global developments and the turning of the credit cycle are expected to dampen the recovery in private investment compared to earlier upswings. Other key factors are the gradual recovery in global growth, and the extent to which trade growth and productivity will rebound over the medium term.

14. Risks. Risks to growth are tilted to the downside (Appendix V). Weaker-than-expected global growth is the most important short-term external risk. This could manifest itself through a significant downshift in China and other large emerging economies as well as weak growth in key advanced economies, including as a result of the fallout from the Brexit referendum. Tighter or more volatile global financial conditions, including because of a possibly protracted period of uncertainty in financial markets related to Brexit, could lead to sharp asset price declines, a rise in credit spreads, and a surge in the U.S. dollar. Realization of these risks could disrupt a benign correction in property prices and orderly deleveraging in the household and corporate sectors. Continued delays in generating productivity gains and higher investment in the domestically-oriented sectors, as well as the prospect of persistent disinflationary pressures, represent additional domestic risks.

15. Authorities' Views. The authorities agreed that risks in the near term are related to the growth prospects in advanced economies and key emerging markets. Continued recovery in the United States, Europe, and Japan will provide support for the externally-oriented sectors in 2016. However, this uplift may be partially offset by other developments, including the slowdown in China and Brexit-related uncertainties, tighter financial conditions, and potential capital reversals associated with the normalization of U.S. interest rates, corporate realignments in the global information technology industry, and lingering weakness in the oil-related transport engineering sector. On Brexit, the authorities have indicated that they were well prepared for increased market volatility; markets have continued to function orderly; and they stand ready to provide additional liquidity. Meanwhile, domestic demand will be bolstered by consumption, both private and public, and by public investment in transport infrastructure. The authorities noted the dependence of Singapore's medium-term growth developments in China, through both direct and indirect links. They were confident that Singapore can manage the increased volatility associated with monetary policy normalization in the United States, given their ample policy buffers, including the flexibility accorded by the exchange rate system.

[4] The shift to a labor-lean growth model has raised wages relative to the cost of capital in Singapore. This is expected to raise firms' long-run desired capital stock and hence the rate of investment. See Dale W. Jorgenson, Capital Theory and Investment Behavior, American Economic Review 53 (2), 1963.

POLICY DISCUSSIONS

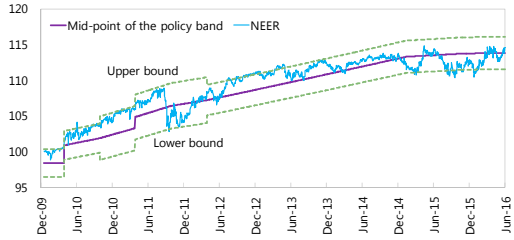
16. Overview. Over the past year, macroeconomic policies have become more accommodative amid larger-than-expected spillovers from China's rebalancing, the slowdown in global trade and growth, and lower-for-long energy prices. Monetary policy easing was accompanied by an expansionary budget in early-2016. Financial sector and macroprudential policies have ensured financial stability following a significant increase in leverage in recent years. Risks to the near-term outlook continue to be tilted to the downside and more fiscal stimulus would be useful to boost domestic demand. No further monetary policy action is expected in 2016 under staff's baseline, but the MAS should continue to remain vigilant to downside risks to inflation and growth. The authorities may also consider relaxation of selective macroprudential measures if signs of disorderly adjustments in the property market emerge. Meanwhile, structural reforms should focus on supporting medium-term growth through more targeted policies to boost productivity, innovation and inclusion.

A. Monetary Policy

17. Overview. The primary objective of monetary policy in Singapore as enshrined in the MAS Act is to maintain price stability that is conducive to sustainable economic growth. Reflecting the relative preeminence of the exchange rate as a nominal anchor in the context of Singapore's small and open economy, the MAS operates a basket, band, crawl (BBC) framework since 1981 in which the trade-weighted nominal effective exchange rate (NEER), is the policy instrument. Although the parameters of the system are not disclosed, the width of the band is currently estimated at 2 percent. The position of the band is adjusted to ensure that the NEER is consistent with the development of prices in the year ahead, taking into account the effect of output growth on prices. A long-run real appreciation of the effective exchange rate is built in, sustained by continual increases in productivity and competitiveness and high national savings. Lowering the rate of appreciation in Singapore's framework has the equivalent effects on inflation as monetary easing in countries using an interest rate instrument. Singapore, as a highly open economy, sees its export sector react strongly to a depreciation, which more than offset the short-term negative impact from higher interest rates resulting from the uncovered interest parity condition.[5]

Singapore: Nominal Effective Exchange Rate and Policy Band 1/

(Jan 1, 2010=100)



Sources: IMF, *Information Notice System*; and staff estimates.
1/ Mid-point, lower and upper bounds of the policy band are staff estimates.

18. Monetary Easing. In April 2016, the MAS unexpectedly reduced the slope of appreciation of the NEER slightly, from 0.25 percent to zero while maintaining the 2 percent band, as estimated by the staff. This move, which was prompted by the MAS' expectation of medium-term core inflation falling below 2 percent, is a continuation of an easing cycle that began in January 2015 and was

[5] For a detailed explanation of the monetary policy transmission mechanism see Appendix VI, part B. For more on the empirical evidence, see *Singapore: 2015 Article IV Consultation – Staff Report*, IMF Country Report No. 15/199, ¶15.

intended to achieve internal balance by helping to offset domestic weakness that was depressing prices.

19. Near-Term Policy. Going forward, staff sees no need for further easing in the near term. The April move is sufficient to achieve the MAS inflation objective: growth is below 2 percent, inflationary pressures are not present, and labor market pressures are receding, with unit labor costs rising by around 3 percent per annum and relative prices, including for oil, stabilizing globally. The current juncture is a result of a gradual softening of the economy and a slowdown in potential output growth. Inflation is on track to reach a stable medium-term level of under 2 percent by the end of 2017. To that end, a downward re-centering of the band will likely not be required in October.

20. Responding to Near-term Risks. Singapore's BBC monetary policy framework is well adapted to deal with exogenous shocks affecting the city state's highly open economy. In response to minor, temporary shocks, movements of the NEER within the band play an important shock absorbing role. Fiscal policy is the first line of defense in response to more sustained, substantial shocks given the large fiscal space and the need to rebalance the economy. Monetary policy can play a supportive role in this case: recalibration of the framework, via a re-centering and widening of the band, could help to smooth the transition. But, as noted, relying on expansionary monetary policy alone in the BBC framework would negatively affect interest-sensitive sectors and increase the already large current account surplus. Appendix VI and the accompanying Selected Issues Paper 16/264 titled "The Singapore Small Monetary Policy Model (SGPMOD)", provide a quantitative analysis of monetary policy reactions using a new, forward-looking monetary policy model for Singapore with global linkages, including responses to a large-scale downward revision in growth prospects originating from China, with renewed pressures on the renminbi possibly coupled with capital outflows from the region, and the possible effects of Brexit. The MAS could play a role in mitigating the negative effects on Singapore and smoothing any transition to a "new normal". In view of the skewing of risks on the downside, the MAS should remain vigilant and be prepared to continue its adjustments.

21. MAS Communication. The MAS provides a fair degree of detail in its published analysis and strong justifications at the time of its monetary policy actions. Nonetheless, as laid out in Box 1, staff sees scope to improve the communication of monetary policy. Actions that the MAS could take may be summarized as follows:

- **Clarify the Future Monetary Policy Path.** To further elucidate the conduct of monetary policy to the public, the MAS could contrast its past forecasts of the exchange rate path with actual outcomes and explain how any deviations affect the current monetary policy stance and the expected path of inflation.

- **Better Communicate Inflation Prospects.** The MAS could consider communicating its interpretation of inflation developments in the monthly press releases. Such information could help prime financial market participants for changes in monetary policy.

- **But Beware of Potential Short-Run Costs of Communication.** Staff recognizes that the introduction of such a change may cause some short-run instability, although this would dissipate in the long run given that the MAS already has a substantial degree of monetary

policy credibility, which would be buttressed by such improved communication. Providing a more explicit set of statements would serve to better guide market analysts in the current environment and prevent disruptive surprises to markets.

22. Authorities' Views. The authorities appreciated the staff's assessment of its monetary policy stance and recognized the need to stay vigilant. The MAS was of the view that inflation is on track to reach a stable medium-term level of slightly under 2 percent by the end of 2017. Moreover,

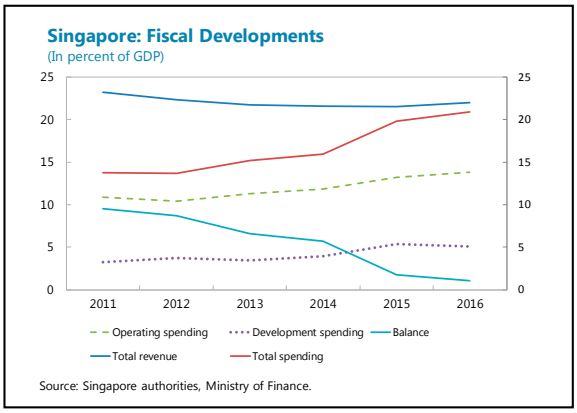
- **On the April Move.** The MAS indicated that the circumstances that led to the unexpected April 2016 move to a zero NEER slope were very different from two previous occasions—the high-tech bubble burst in 2001 and the GFC—when the move to a zero slope was large and sudden, in response to rapidly unfolding negative shocks. The MAS is of the view that the April move was part of a sequence of policy moves whose direction and magnitude was justified by data over the past 18 months. It was akin to moving the short-term interest rate to its neutral level in inflation-targeting regimes that use interest-rate reaction functions. The move was in direct response to internal balance considerations, with growth below 2 percent and inflationary pressures subdued. It was not meant to increase competitiveness by depreciating the real exchange rate in the absence of relative productivity gains.

- **On Communication.** The authorities were of the view that their approach, which has been gradually strengthened over time, is sufficient at this stage. Communicating monetary policy in a small open economy using an atypical, but sensible, NEER rule to pursue inflation targeting was exceedingly delicate. If the MAS were to provide forward guidance with monthly releases of inflation data, for example, markets would likely treat every statement by the MAS as a "mini monetary policy report", thus diluting the medium-term orientation of the MAS' policy objective. The authorities argued that while they needed to provide rational forecasts and a clear policy stance, this should not be dictated by a higher frequency of information releases. They were also concerned that there would be a shift of market focus to short-term movements in the macroeconomic data, resulting in a lack of understanding of underlying trends, which the MAS emphasizes in its policy formulation. Another negative effect of emphasizing the short-term outlook would be excessive volatility in the Singapore dollar. On balance, the authorities' assessment was that conducting monetary policy and providing its forecasts and basis for the policy stance twice a year contributed to medium-term objectives, even as they retained the flexibility to issue an "off-cycle" policy statement if conditions warranted it.

B. Fiscal Policy

23. Background. Singapore's fiscal policy is prudent and medium-term in orientation, enshrined in strong constitutional guarantees and striving to deliver efficient services to the public. The Constitution mandates a balanced budget over the term of each government and protects the use of "past reserves" by requiring enhanced political support to access them. Sustained over performance on this conservative fiscal rule has allowed the buildup of large fiscal reserves.

24. A Rising Government Size. Government spending as a share of GDP has risen steadily in recent years. In particular, the last two budgets made a concerted effort to reduce intra- and inter-generational inequality and invest in infrastructure and other long-term capital projects. The increase in operating and development spending effected over the past two years is large—nearly as big as the increase in spending in response to the GFC—and reflects several initiatives:



- A variety of means-tested, categorical programs aimed at improving access to healthcare, providing means-tested retirement support, and increasing the progressivity of the personal income tax.
- Policies to improve access to education and its quality and help raise labor productivity are also being pursued, notably through SkillsFuture, a program that covers on-the-job education and training expenses. Other programs aim to facilitate job transitions, by subsidizing wages and supporting training and job matching.
- Expenditure for economic development (transport, manpower, communications, trade and industry) is also up by 1.1 percentage points of GDP in the last two years. There has been a modest increase in targeted spending to help businesses raise productivity and innovation through tax rebates, selected deferrals of hikes in foreign worker levies, and financial support for working capital and employment.

The increase in the size of government will help meet the authorities' objectives of addressing healthcare and other aging needs, boosting productivity, and investing in infrastructure.

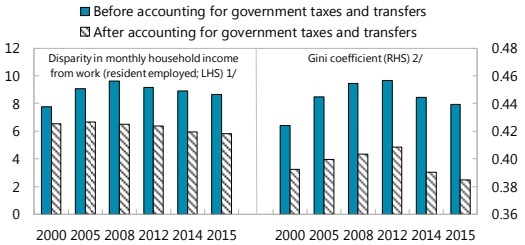
25. Enhancing Inclusion.

- Over the past decade, real household income from work rose across all income groups in Singapore (Figure 8). But income inequality also widened, particularly during the pre-GFC period and remained elevated for a few years after the GFC.[6] However, fiscal policies have helped soften some of this rise and the last two years witnessed some decline in inequality.

[6] For further discussions on income inequality and inclusion in Singapore, please see Jain-Chandra and others, 2016, "Sharing the Growth Dividend: Analysis of Inequality in Asia", IMF Working Paper No. WP/16/48; Ministry of Finance, 2015, "Income Growth, Inequality and Mobility Trends in Singapore", Occasional Paper (August 2015); Lien Centre for Social Innovation, 2015, *A Handbook on Inequality, Poverty and Unmet Social Needs in Singapore*, Social Insight Research Series (March 2015); and Tat, H.W. and R. Toh, 2014, "Growth with Equity in Singapore: Challenges and Prospects", International Labour Organization, Conditions of Work and Employment Series No. 48.

- Singapore has also registered improvements in wage equality between men and women for similar work (see the World Economic Forum's 2015 Global Gender Gap Report). There has also been a further increase in resident female labor force participation, particularly for those aged 25 years and older, aided in part by policies to supplement family care (e.g., child care, healthcare for elderly, certain levy concessions for foreign domestic workers etc.). However, overall female labor force participation remains below the average for advanced economies.

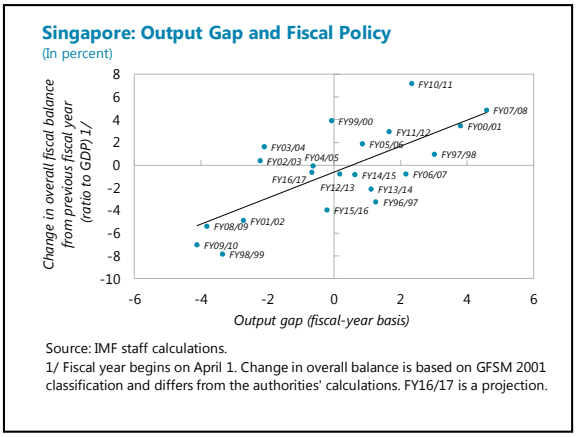
Singapore: Income Inequality



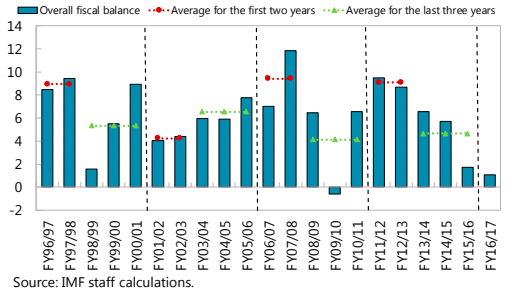
Sources: Singapore Statistics; CEIC Data Co. Ltd.; and IMF staff calculations.
1/ Ratio of monthly household income from work (including employer CPF contributions) per household member at 90th percentile to 10th percentile.
2/ Average of conventional Gini coefficient (including employer CPF contributions) and OECD measures of Gini coefficient that account for household size.

26. The 2016 Budget and Medium-Term Fiscal Policy. The increase in government spending is timely, as near-term risks to growth have risen, and also appropriate in view of Singapore's large saving-investment imbalance. Staff supports both the existing programs to reduce inequality and the new, more targeted initiatives to help businesses boost investment and encourage innovation. The boost to government spending in recent years is having a significant cumulative effect in supporting the economy at a time of weak external demand. But while the budget injected a substantial fiscal impulse, estimated by staff at 0.8 percent of GDP (Appendix VII), staff is of the view that more fiscal stimulus would be useful in order to boost domestic demand, close the output gap, and provide insurance against downside risks to growth. More expansionary fiscal policy would also help lower the large external current account imbalance. In light of recent increases in public investment and the adjustment costs in raising investment, the authorities should aim at closing the output gap of –0.6 percent gradually, over 3 years, by providing an additional annual impulse of 0.4 percentage points of GDP relative to the baseline scenario, and even more if growth surprises on the downside. The additional fiscal impulse could be aligned with measures that also promote the medium-term restructuring effort but in a setting that is more accommodative overall than envisaged by the authorities. Help could be provided to new and expanding businesses in dynamic sectors via further tax rebates and wage credits. More public infrastructure investment, including in health care and transport services, should also be considered as well as higher social spending.

28. The Fiscal Rule and Stabilization. The fiscal rule requiring a balanced budget over each term of government is simple to understand, builds a sense of accountability, and instills a commitment to long-term fiscal sustainability. The rule also provides limited flexibility for fiscal policy to contribute to macroeconomic stabilization. It contains an escape clause to deal with rare catastrophic events, such as the GFC, when a drawdown on past reserves is permitted upon request by the government and approval by the president. Barring such events, the rule restricts governments to balance the budget over their term. Like with other fiscal rules, it is important to be mindful of its limitations, including from a stabilization point of view. The requirement to balance the budget over the political cycle could give rise to a cautionary bias and make fiscal policy tighter than warranted by the business cycle during the early years of a government's term (see also Blöndal, 2006, "Budgeting in Singapore", *OECD Journal of Budgeting*). Singapore's fiscal policy is countercyclical overall. Nevertheless, the fiscal balance is larger during the first two years after elections. The exception is 2001 when fiscal policy responded to a recession caused by the bursting of the dotcom bubble.



Source: IMF staff calculations.
1/ Fiscal year begins on April 1. Change in overall balance is based on GFSM 2001 classification and differs from the authorities' calculations. FY16/17 is a projection.



Source: IMF staff calculations.
1/ Fiscal year begins on April 1. Overall balance is based on GFSM 2001 classification and differs from the authorities' calculations. FY16/17 is a projection.

29. Strengthening the Fiscal Rule. The recent amendment to the constitution to include up to half of the expected long-term real returns of Temasek in the revenue stream provides welcome scope for fiscal policy action if needed.[7] Consideration could be given to strengthen the fiscal rule by incorporating all of the government's investment income (to improve transparency) and by gearing it toward the business cycle, rather than the political cycle, in line with the best practice of basing fiscal policy on a structural budget balance rule (e.g., Chile). This change, which would require amending the constitution, would maintain Singapore's commitment to fiscal prudence and sustainability while providing the authorities more flexibility to conduct countercyclical fiscal policy. It would require the government to carefully monitor the level of potential output and the output gap. This seems well within the capabilities of Singapore's data collection and analysis framework.

30. Authorities' Views. The authorities are committed to fostering fiscal prudence, individual responsibility, and preparing society for future challenges while also promoting solidarity.

- **On the Size of Fiscal Stimulus.** In a changing environment with internal and external challenges, the increase in spending has two key drivers in the medium term; healthcare and

[7] Until 2016, up to half of the expected long-term real returns on fiscal reserves held and managed by the Government Investment Corporation (GIC) and the MAS, and up to half of the net investment income derived from Temasek, could be used by the budget.

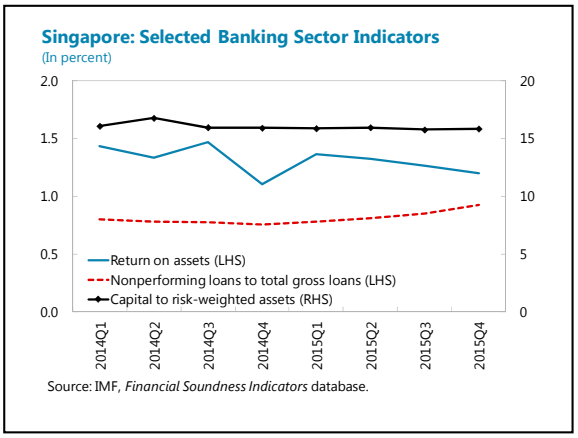
other aging-related spending, and investment in infrastructure. The current fiscal impulse strikes a balance between medium-term and short-term considerations. A small negative output gap in the short term has to be referenced against the global context. With many major economies operating below potential, it would be "heroic" for a small open economy like Singapore to overcome it entirely. In particular, it could risk creating distortions that disrupt the ongoing economic restructuring. Furthermore, the government has brought forward some multi-year infrastructure projects, such as the construction of MRT lines, although it remains mindful not to spend on infrastructure purely for the sake of providing short-term stimulus, without due consideration of the need for these lines, as well as the viability of maintaining and operating them in the future. If necessary, the government stands ready to act given the risks ahead. However, it is important that any further fiscal support is applied in a way that supports medium-term restructuring, and also after a careful diagnosis of the challenges to be addressed, that could be supply- or demand- driven, or due to credit conditions.

- **On the Fiscal Rule.** The authorities' fiscal rule is simple and easy to understand and communicate. It thus encourages accountability and instills commitment to long-term fiscal sustainability, and a culture of responsibility. The budget rule does not constrain the government from doing what it deems to be appropriate to manage the macroeconomic cycle. The use of past reserves is possible, upon approval by the President. They are also routinely used to fund land-related expenditure such as land reclamation and land acquisition costs related to projects like the Selective En-bloc Redevelopment Scheme. Moreover, returns from financial reserves can also be used to supplement the budget. Fiscal deficit spending is allowed in any given year and drawing on past reserves can also be effected to deal with crises even when there is no fiscal deficit. For instance, in 2009, the government drew on past reserves to deal with the GFC even though it had sufficient current reserves.

C. Financial Sector Issues

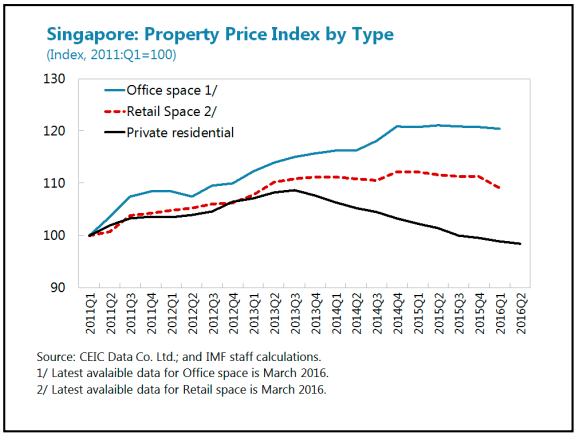
31. **De-Leveraging.** Overall credit growth has turned negative. While loans to residents have continued to grow at around 3 percent, nonresident loans have contracted. The moderation of credit growth during the past year has helped contain household and corporate indebtedness. It has been supported by the active use of macroprudential policies. More recently, the weakening of external demand for investment and trade credits also played a role. The slowdown in domestic nonbank loans has been broad based across most industries, except the construction sector. While the deleveraging cycle is positive for long-term financial stability, it is likely to hold back private investment. Staff's regression results suggest that a 1 percentage point change in real credit growth has on average been associated with a 0.6–0.9 percentage point change in real private fixed investment growth (Appendix IV).

32. Banking Sector Resilience. Banking sector profitability, though still healthy, has declined in recent quarters, as NPLs have ticked up. Banks remain well capitalized and loan loss provisioning for the entire banking system, at above 100 percent of unsecured NPLs, continue to be adequate. Local banks' asset quality remains healthier than that of the overall banking system (Appendix VIII). However, downside near-term risks persist due to exposure to Greater China and O&G, and also from the implications of the Brexit referendum. Banks with significant commodity-related exposures might see higher NPLs amid depressed commodity prices. However, it is unlikely to have a systemic impact as O&G exposures, at about 4–6 percent of total nonbank loans are well diversified and a large proportion of O&G firms are focused on integrated, downstream business and commodity trading which are more resilient to lower oil prices. Similarly, lending to China is concentrated among larger credit worthy borrowers. Banks should continue to monitor these risks closely and adjust provisioning as appropriate.



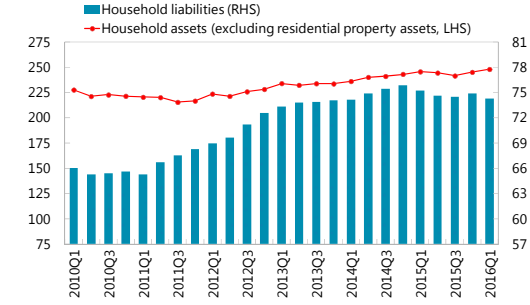
Source: IMF, *Financial Soundness Indicators* database.

33. Real Estate. Macroprudential policies have aided in the measured ongoing decline in residential real estate prices that are now broadly in line with the long-term trend. While transactions have moderated, projects with good location and pricing still enjoy favorable take up. Cooling measures have moderated resale activity and prices in the public housing sector, improving affordability. The large supply of new homes coming on stream could exert downward pressure on prices. Structural macroprudential measures should be maintained to prevent a buildup of excessive leverage that could lead to systemic risks. However, relaxation of cyclical measures could be considered once systemic risks dissipate or if uncertainties in the financial markets and headwinds in the external outlook cause sharper-than-warranted price corrections.



Source: CEIC Data Co. Ltd.; and IMF staff calculations.
1/ Latest avalaible data for Office space is March 2016.
2/ Latest avalaible data for Retail space is March 2016.

34. Household Leverage. Household balance sheets remain strong in aggregate: Singapore households are generally prudent, with household cash and deposits exceeding total household debt. In banks' outstanding housing loans portfolio, only about 5 to 10 percent of households have a debt service-to-income ratio exceeding 60 percent. But, although aggregate household indebtedness has moderated, risks from interest rate increases remain pertinent for selected households. Stress tests indicate that additional debt service burdens would generally be manageable even in a scenario of rapid interest rate increases above historical norms. In addition, banks' exposures to related risks appear limited given that (i) most properties are owner-occupied; (ii) tight loan-to-value limits require high down payments; and (iii) the share of borrowers in the lower TDSR band (i.e., less than 40 percent) has increased.[8] Preemptive prudential measures are helping discourage additional lending to over-indebted households. In this regard, staff welcomes the phasing in of a limit on unsecured credit to households from June 2015. Efforts aimed at assisting overextended households should continue, including through assistance with debt restructuring and financial education.



35. Corporate Leverage. Lending to corporates has started to moderate, leading to a decline in the corporate debt-to-GDP ratio. Nonfinancial corporate leverage in Singapore, as measured by the debt-to-equity ratio is one of the highest in the region and larger firms tend to rely more on debt rather than equity. However, firms hold ample cash balances and their net debt profile (debt net of cash and equivalents) remains relatively benign. Return on assets has weakened, most notably in trade-related sectors. Business cessations have increased in line with the general economic slowdown, and NPLs in the SME sector are on the rise. Nevertheless, most publicly-listed companies maintain high interest coverage ratios and appear able to withstand modest interest rate and earnings shocks. However, debt-at-risk could rise considerably in a downside tail-risk scenario (Appendix IX). Furthermore, staff welcomes the MAS' close monitoring of financial sector risks related to the corporate sector, including through stress tests of listed companies' balance sheets and surveys of banks' exposure to SMEs. The MAS has put in place regulatory safeguards to ensure banking system stability and remains watchful of corporate credit by conducting closer supervision of banks and ensuring underwriting standards are maintained. Continued monitoring of corporate debt developments is warranted amid weakened earnings and an uncertain outlook.

36. Regulation and Supervision. Singapore continues to maintain high regulatory and supervisory standards. Stringent minimum capital requirements, above the Basel III norms, have been applied since January 2013, two years ahead of the Basel timeline. Other components like the countercyclical and capital conservation buffers are being phased in as per Basel timelines starting from January 2016. The MAS will consult with the industry on their proposals for implementing the local net stable funding ratio requirement by the stipulated January 1, 2018, deadline. This would

[8] The Total Debt Service Ratio (TDSR) framework, introduced in 2013, limits the amount borrowers can spend on debt repayments to 60 percent of their gross monthly income and is applicable to loans for the purchase of all types of property, loans secured on property, and the re-financing of all such loans.

complement: (i) the phasing in since January 2015 of Basel III Liquidity Coverage Ratio (LCR) requirements for the three local banks, including reporting of LCRs for foreign currencies; and (ii) the application of LCRs, from 2016, to domestic systemically important foreign banks' operations in Singapore. Furthermore, public disclosure of LCRs intended to enhance market discipline and reduce uncertainty took effect on January 1, 2016. In the first quarter of 2016, the average Singapore dollar and all-currency liquidity ratios were above the regulatory minimum of 100 percent and 70 percent, respectively, for all three local banks. The Banking (Amendment) Bill, passed in February 2016, aims at enhancing prudential safeguards, corporate governance and risk management controls in the banking industry, including by requiring foreign banks deemed systemically important to subsidiarize their retail operations in Singapore

37. FSAP Recommendations. Important progress has been made in implementing the 2013 FSAP recommendations. In addition to the steps mentioned in the previous paragraph, the Singapore Exchange has enhanced its recovery plan. Staff welcomes the planned strengthening of the recovery and resolution framework and encourages further coordination with other jurisdictions to facilitate cross-border resolutions of global banks.

38. AML/CFT Framework. Staff acknowledges continued efforts to align the AML/CFT framework with international standards and effectively cooperate with foreign counterparts, particularly on tax matters. The recommendations of the 2016 AML/CFT evaluation by the Financial Action Task Force provide a good basis for further strengthening the effective implementation of the framework, including with regard to the transparency of companies and trusts and AML/CFT supervision. In this regard, staff notes the creation within the MAS of dedicated departments, to combat money laundering and strengthening enforcement, respectively, effective August 1, 2016. This would help streamline the existing responsibilities for relevant regulatory policies and monitor AML-related risks including via onsite supervision of financial institutions.

39. Authorities' Views. The authorities assessed that the financial system remains resilient to the turn in the financial cycle and can withstand risks on the horizon. In light of the downside risks, particularly from low commodity prices and spillovers from China, they emphasized their commitment to proactive financial sector surveillance and continued improvements in their supervision and regulation framework.

- **Banks.** The authorities acknowledged the recent rise in credit risks. However, they noted that the banking system remains well-capitalized with adequate provisions, holds liquid assets well above the LCR requirement, and is primarily funded by nonbank deposits. The near-term impact of the Brexit referendum on Singapore's banking system is assessed to be contained. Nevertheless, if needed, the MAS stands ready to provide adequate liquidity support to the banking system. The MAS' industry-wide stress tests show that the banking system remains resilient under various severe stress scenarios.

- **Households.** While household balance sheets remain healthy in aggregate, there are emerging pockets of risks. Macroprudential measures have slowed down the growth of household leverage and household balance sheets, on aggregate, remain firm. A significant rise in interest rates could cause vulnerabilities among pockets of overextended households but with little systemic implications. The MAS would continue to monitor households'

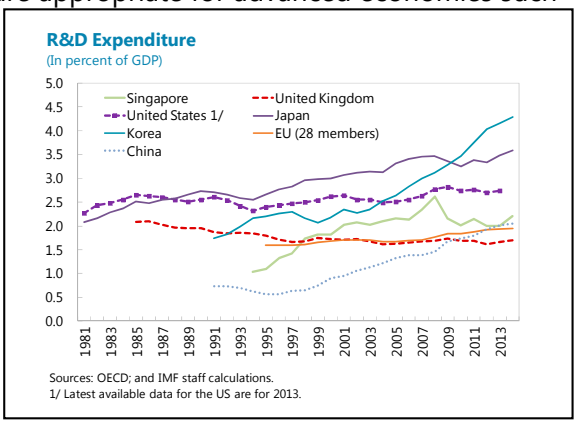
leverage and proactively encourage financial prudence, including through facilitating assistance measures and ongoing financial education.

- **Corporates.** Earnings have weakened amid an uncertain operating environment although corporate balance sheets have generally remained resilient, while leverage has started to stabilize. The MAS has included a countercyclical capital buffer in their macroprudential policy framework to curb excessive credit growth.

- **Macroprudential Policies.** Comprehensive macroprudential policies have aided a measured decline in property prices. Macroprudential policy measures in Singapore are targeted to specific risks and have both structural and cyclical components to ensure effectiveness and efficiency. The authorities remain vigilant for signs of renewed froth on the back of still-elevated prices in certain market segments. At the same time, uncertainties in financial markets and the external outlook could add to the risk of a sharper than warranted property market correction. They are committed to closely monitoring the property market for risks to financial stability and stand ready to recalibrate macroprudential policies when deemed appropriate.

D. Structural Policies

40. Innovation-Based Growth. The restructuring aims to spur knowledge-based growth, raise productivity, and turn Singapore into a global innovation hub. A high-level *Committee on the Future Economy* has been convened and will announce its priorities by end-2016. Policies that promote innovation, including higher levels of R&D spending, are appropriate for advanced economies such as Singapore that are at the knowledge frontier. Equally important are policies to promote human capital accumulation, especially lifelong learning that facilitates skill updating, lowers skill mismatches and helps reduce labor market frictions. Empirical evidence suggests that research intensity and human capital formation have both had a significant impact on raising living standards in Singapore over the years, though by somewhat less than in other advanced economies (Appendix IV).



41. R&D Spending. R&D spending is central to innovation-based growth and has risen in Singapore over the past two decades to about 2¼ percent of GDP in 2014.[9] As Singapore moves forward to reinvent itself, further nurturing the R&D ecosystem can be especially helpful in the discovery and launch of new goods and services, including in the financial sector (Appendix IX). Cross-country evidence suggests that in countries like Singapore that are close to the global technology frontier, increased competition, research-oriented education, and targeted support—particularly aimed at newer firms and not necessarily smaller firms—could help boost long-term

[9] According to OECD data for 2014, Singapore's R&D expenditure in percent of GDP was lower than in many advanced economies, but in per capita terms (at current purchasing power parity prices), it was higher than in all of these economies.

GDP. Staff welcomes the emphasis on productivity enhancement and the more targeted approach adopted in the last budget. The authorities should remain cognizant of the importance of social insurance and redistribution, over and above those needed for an aging society, to mitigate the risks from transitioning to innovation-based growth.[10]

42. Restructuring and the Stance of Macroeconomic Policies. An accommodative macroeconomic environment of low real interest rates and fiscal support for new, innovative firms can help speed up innovation and economic growth. However, care be must be taken not to disrupt the process of creative destruction through excessive or generalized support that could stand in the way of dissolution of nonviable firms. An additional, well-targeted boost to R&D spending in Singapore's public and private sectors, together with programs to reduce labor market frictions and improved skills matching, especially in the higher value-added jobs, will be important in the drive to an innovation-based growth model. Smoothing the business cycle could boost private investment in R&D and innovation, especially at firms/sectors that are highly reliant on financing that is external to the firm and/or on intangible capital (see IMF, Fiscal Monitor, Chapter 2, April 2016).

43. Authorities' Views. As Singapore restructures to a labor-lean economy, the authorities adopted a more targeted approach to incentives for productivity improvements aimed at businesses while maintaining existing social insurance and safety net programs for households. The authorities expect this approach to continue to facilitate the move towards technological upgrading, including through inducing firms to restructure. In pursuing this strategy, the authorities are also aware of the need to continue to promote supportive economic growth conditions.

[10] See, "Fiscal Policies for Innovation and Growth," IMF Fiscal Monitor Chapter 2, April 2016; and "Structural Reforms and Macroeconomic Performance: Initial Considerations for the Fund," Table 1, page 20, November, 2015. On the role of the state in providing social insurance, redistribution and strategic partnerships, in innovation-based economies, see Philippe Aghion, Unpublished lecture, Joint Vienna Institute, June 2012.

E. External Sector Assessment

44. Overall Assessment. Staff assesses Singapore's external position to be substantially stronger than consistent with medium-term fundamentals and desirable policies (Appendix X). Singapore's large current account surplus reflects a strong goods balance that is partly offset by remittance outflows and a negative income and services balance.

Text Table 2. Singapore: Comparing EBA CA Estimates

	ESR 2015 2015 A4	ESR 2016 2016 A4	Change
	(In percent of GDP)		
Year of assessment	2014	2015	
Cyclically-adjusted CA	19.6	22.0	2.4
CA norm	13.8	15.6	1.8
Total CA gap	5.8	6.4	0.6
Policy CA gap	1.2	0.75	-0.5
Residual CA gap	4.6	5.7	1.1
Residual with rounding	5	6	1.0
With ± 3 percent range	2–8	3–9	1.0

Source: IMF staff estimates.

45. Current Account. The CA surplus narrowed by 5.4 percentage points of GDP during 2004–14, alongside steady appreciation of the real effective exchange rate, but rose by 2.3 percentage points in 2015, reflecting a narrowing of the oil trade deficit by 3.7 percentage points of GDP and buoyant consumption. Staff judges, based on regression analysis, that the CA balance is substantially stronger, by 3–9 percent of GDP, than consistent with medium-term fundamentals and desirable policies. Singapore's status as a financial center and high corporate saving and foreign investment rates are contributing to Singapore's large CA balance. Other factors have to do with limited social safety nets and the mandatory, defined-contribution pension system whose assets are about 70 percent of GDP.

46. Prospects. Lower oil prices will further raise the CA surplus, to about 20 percent of GDP in 2016. Over the medium term, however, the CA is expected to decline as the population ages and public spending, including on social safety nets, rises. However, in staff's view, current policies may not be enough to moderate the CA surplus sufficiently and more action may be required — for example, fiscal policies to strengthen social insurance and social safety nets, including unemployment insurance — that would help reduce precautionary saving, boost private consumption, and reduce inequality. Over the long term, Singapore's elderly dependency ratio is expected to increase significantly by 30 percentage points in the next 20 years, and private saving is expected to decline by 15 percentage points of GDP (Box 2).

47. Net International Investment Position and International Reserves. The net international investment position stood at 210 percent of GDP in 2015, up by 13 percentage points of GDP from 2014, driven by capital outflows (Table 8). While Singapore's position as a financial center warrants high-reserve buffers, current official reserves at 87 percent of GDP —equivalent to 26 percent of short-term external debt, reflecting significant short-term external liabilities of its large international banking system— appear adequate, and there is no clear case for further reserve accumulation. Singapore also has other official liquid external assets. Potential vulnerabilities posed by cross-border deposit taking by foreign bank branches are mitigated by banks' large short-term external assets.

48. Authorities' Views. The authorities did not agree with the characterization of Singapore's external position as substantially stronger than warranted by medium-term fundamentals and desirable policies. They cautioned against a narrow view that does not fully capture Singapore's exceptional structural features. In particular, the large CA surplus reflects the country's position as a

global financial center, trading and production hub, and its city-state geography, with high corporate sector saving and investment abroad. Policies are appropriately formulated with a longer-term perspective in mind. In particular, the exchange rate is the monetary policy instrument and it is used to achieve internal balance objectives, which would be compromised if it were used to directly target the external balance. The external sector assessment should focus on longer-term considerations related to consumption smoothing over a life cycle and preserving intergenerational equity and sustainability, rather than near- or medium-term notions of equilibrium. The CA surplus is expected to decline over time as population aging takes hold, lowering the saving rate, and as the size of government spending rises. The authorities highlighted the spending already committed to the upgrading and extension of the country's transport system, and suggested that such large projects had to be properly planned to ensure effective implementation and sustainability.

STAFF APPRAISAL

49. **Outlook.** Singapore's economy continues to perform well, although growth has slowed, inflation is running below target, and downside risks dominate. Policies have been recalibrated in response to weaker-than-expected inflation and growth developments.

50. **Monetary Policy.** The slight reduction of the NEER slope to zero in April was an appropriate monetary policy response to inflation continuing to run below target. The move should be sufficient to restore internal balance, and a shift to a nominal depreciation is not currently envisaged. The MAS should remain vigilant and respond flexibly to evolving downside risks to inflation and real activity, including spillovers from possible renewed volatility in China's currency, financial markets, and Brexit, and also the effects on the domestic economy of higher U.S. interest rates and U.S. dollar appreciation. There is also scope for the MAS to improve monetary policy communication. Singapore's unique monetary policy framework notwithstanding, the MAS could elaborate more frequently its views of inflation developments as they relate to its medium-term price stability objective and do more to explain the reasons behind its policy moves.

51. **Fiscal Policy.** The continued implementation, as part of the 2016 budget, of long-term investment projects and social programs to reduce income inequality is appropriate. The construction of aging-related infrastructure, expansion of ports and other facilities, and the extension of the social safety net all provide near-term support to the economy while helping to prepare Singapore for aging, maintain its infrastructure edge, and make it a more inclusive society. Also appropriate are the budget's new measures to boost innovation and strengthen productivity, including financial support for the new economy and the provision of working capital for small and medium enterprises. But while fiscal policy is providing welcome support to activity, more fiscal stimulus than envisaged in the budget would be useful to boost domestic demand, close the output gap, and provide insurance against downside risks to growth. In this context, consideration should also be given to attune the fiscal rule to the business cycle rather than the political cycle and include all the government's investment income in the budget's revenue stream. Infrastructure spending could be accelerated; means-tested, categorical income transfers to families could be further expanded; and more could be done to help dynamic, innovative businesses, especially credit constrained ones. In case of a sustained negative shock, fiscal policy should be the first line of defense, with monetary policy playing a supporting role.

52. Financial Sector. Singapore's financial system has been resilient to the emerging market turbulence over the last year, including China- and the initial Brexit-related volatility, aided by large capital and liquidity cushions and by high standards of regulation and supervision. The banks are adjusting to the China slowdown and the end of the oil super cycle, remain profitable, and are reorienting their business models. They should also remain vigilant regarding Brexit-related uncertainties. Regulation and supervision of banks is being further enhanced. The financial sector's substantial exposure to China and liquidity management needs continued monitoring. The ongoing disinflation in real estate prices is welcome as it continues to be moderate and orderly and improves housing affordability. Macroprudential policies in place made a decisive contribution to containing household indebtedness and should be retained for prudential reasons. However, selective measures could be relaxed if signs of disorderly adjustment emerge or if systemic risk dissipates. Stress tests indicate that households would be resilient to a rapid increase in interest rates and most corporates would be able to handle a combined shock to interest rates (reflecting tighter financial conditions) and earnings (reflecting a weaker external environment). However, elevated household and corporate sector leverage warrants continued monitoring.

53. Restructuring. The adjustments to the authorities' approach to restructuring to a labor-lean economy are appropriate in view of the small tangible gains in productivity to date, especially in the domestically-oriented sectors. These adjustments could help generate sharper incentives for businesses and workers by adopting a more targeted approach to boosting automation and innovation while maintaining the expansion of social insurance and safety net arrangements. In staff's view, maintaining more accommodative macroeconomic policies would facilitate restructuring by reducing uncertainty and helping to boost private investment, including in R&D and innovation. A boost to R&D spending in the public and private sector accompanied by programs to reduce labor market frictions and improve skills matching, especially in the higher value-added jobs, will be important in the drive to an innovation-based growth model.

54. External Sector Assessment. Singapore's external position in 2015 continued to be substantially stronger than is consistent with macroeconomic fundamentals and desirable policies. As in previous years, considerable uncertainty surrounds the assessment, owing to Singapore's position as a global financial center and its fully-funded pension system, among other factors. Rapid population aging and reforms to boost domestic demand, including through better health, pension, and other social insurance arrangements, and public investment, should lead to a significant reduction in Singapore's external imbalances over time.

55. It is recommended that the next Article IV consultation be held on the standard 12-month cycle.

Box 1. Singapore—Transparency, Communication and the Conduct of Monetary Policy

Monetary Policy Framework in Singapore. Conceptually, the MAS' focus on internal balance makes it akin to an inflation-targeting (IT) central bank, and the principles governing transparency, accountability and communication relevant to IT central banks should apply. However, there are unique considerations that arise as they use an atypical policy instrument, the NEER. Foreign exchange markets are deeper, more liquid and consequently, often faster moving, than money markets in other IT countries.

Transparency and Communication. Central bank transparency is related to openness about policy objectives; data, models and forecasts; the way decisions are made and the policy implications of decisions; as well as openness about implementation. Transparency facilitates smoother market responses to policy decisions, by reducing the likelihood that policy decisions that come as a surprise, causing sharp movements in asset prices. (N. Dincer and B. Eichengreen, 2014, "Central Bank Transparency and Independence: Updates and New Measures," *International Journal of Central Banking*, March 2014, page 189–253) A first step is improved communication with the public. The MAS does provide a fair degree of detail in its published analysis and strong justifications at the time of its monetary policy actions. However, there is scope to improve the communication of monetary policy. In the context of the April decision, for example, it proved challenging to communicate that the reasons underlying the move to a zero slope were very different from those during the GFC.

Clarifying the Monetary Policy Path. The MAS could clarify its future monetary policy path. For example, the Monetary Policy Statement of October 2015 could have been used to present a high-level synthesis of the MAS' monetary policy direction, noting that if domestic and global conditions continued to evolve as anticipated, the monetary stance would remain unchanged in the near term. The semi-annual Macroeconomic Review contains forecasts for real GDP and inflation for the next two years – not point estimates, but ranges and an acknowledgement of where the outcome is likely to fall in that range. Ideally, a broader set of macroeconomic forecasts could be provided. Moreover, past forecasts could be contrasted with actual outcomes, explaining their effects on the current monetary policy stance and future expected path of inflation, to further elucidate the conduct of monetary policy to the public. Other central bank publications do this, including the Bank of Canada's Monetary Policy Review, the European Central Bank's Economic Bulletin, and the Czech National Bank's Inflation Report. A good deal of background material on Canada and the Czech Republic's experiences, in particular, can be found in Clinton and others, 2015, "Inflation-Forecast Targeting: Applying the Principle of Transparency," IMF Working Paper No. 15/132.

Communicating Inflation Prospects. The MAS could also consider communicating its interpretation of inflation developments in the monthly press releases. For example, in early-2016 such a statement could have been used to signal that inflation outcomes were somewhat weaker than expected. While the existing releases often reaffirm the MAS forecast range announced in the previous Monetary Policy Statement, they could provide more detail on how the current inflation outcomes compare with the MAS' earlier expectations. Such information could help prime market participants for changes in monetary policy.

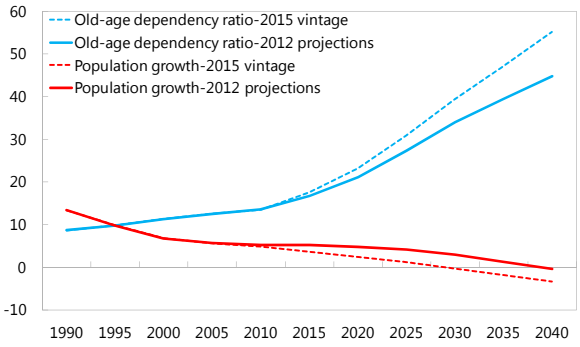
Potential Short-Run Costs of Communication. The introduction of such a change may cause some short-run instability, although this would dissipate in the long run, as can be seen from the experience of other open-economy inflation targeters such as the Czech Republic, New Zealand, or Canada. Moreover, the MAS already has a substantial degree of monetary policy credibility, which would be buttressed by such improved communication, thus allowing Singapore to avoid any sustained short-run volatility. There are also signs that market analysts already do a lot of short-term analysis based on the official data releases, examining their manner of wording and other hints of policy intentions. Providing a more explicit set of statements would serve to better guide them in the current environment, and prevent disruptive surprises to markets.

Box 2. Singapore—Aging, Savings and the Current Account Balance: Illustrative Projections

Rapid Aging. Rising life expectancy alongside persistent low fertility and a policy-induced slowing of immigration are contributing to rapid aging of Singapore's population:

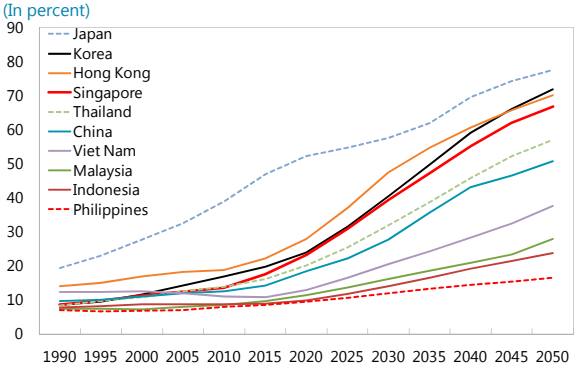
- Current United Nations projections indicate more rapid aging than thought earlier. Over the next 20 years, Singapore's old age dependency ratio is now expected to rise by 30 percentage points to 47 percent, the current level in Japan. This means that by 2035, for every one hundred persons between the ages of 20 and 64, there will be 47 persons of 65 years and older, up from 17 persons now. Hong Kong SAR and Korea are projected to age at about the same pace. The region's emerging market economies will age at a slower pace.
- The effects of Singapore's aging population are already clearly visible. Over the past three years, a key measure of government spending (operating and development spending) rose by 2.1 percent of GDP. A third of this increase was due to health spending, which rose by 73 percent over this period. Recently-introduced programs (e.g. Pioneer Generation Package, Silver Support) will further raise aging-related spending.

Singapore: Old-Age Dependency Ratio and Population Growth
(In percent)



Source: United Nations, World Population Prospects-2012 and 2015 Revisions.

Selected Asian countries: Old-Age Dependency Ratios
(In percent)



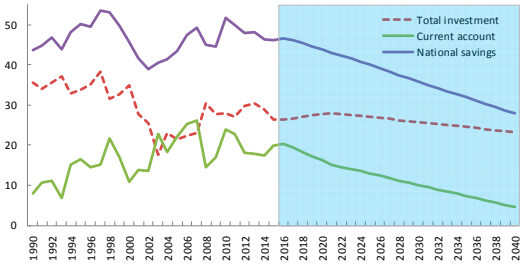
Source: United Nations, World Population Prospects-2015 Revisions.

Box 2. Singapore—Aging, Savings and the Current Account Balance: Illustrative Projections (concluded)

Implications for saving. According to the life cycle hypothesis, saving behavior is age dependent, with people saving during their working years and running down their savings during retirement. Accordingly, aging can be expected to reduce Singapore's high saving rate and the current account:

- Based on panel regression results, the November 2008 Regional Economic Outlook for Asia and the Pacific projected that, because Singapore's aging is outpacing that of its trading partners, its current account balance would decline by about 6 percent of GDP over a 30-year horizon.
- A 1997 survey paper concluded that a one percentage point change in the elderly dependency ratio is typically found to result in approximately a one half of one percentage point change in the private saving rate.[1] Accordingly, the UN's latest projections for the elderly dependency ratio, together with an assumed modest decline in the investment to GDP ratio—reflecting the projected shrinkage of the working age population which will make capital relatively more abundant and hence, other things equal, depress returns on capital—would lead to a narrowing of Singapore's current account surplus by about 15 percent of GDP over the next two decades.

Singapore: Illustrative Scenario for Savings and Investment
(In percent of GDP)



Sources: Department of Statistics; and IMF staff calculations.

- The overall effect of aging on the current account also depends on the response of government saving and investment. If government saving declines owing to higher spending on the elderly, the decline in private saving in Singapore and hence the current account could be larger than indicated in the chart. Given Singapore's large fiscal buffers, the private sector would be unlikely to raise its own savings in response to a reduction in government savings.

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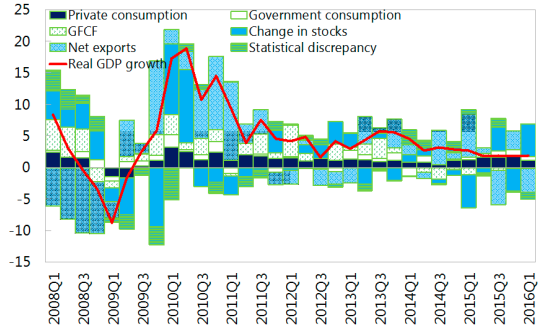
[1] See IMF Working Paper No. WP/97/136.

Figure 1. Singapore—Real Sector Developments

Growth amounted to 1.8 percent (y/y) in recent quarters, supported by private and government consumption.

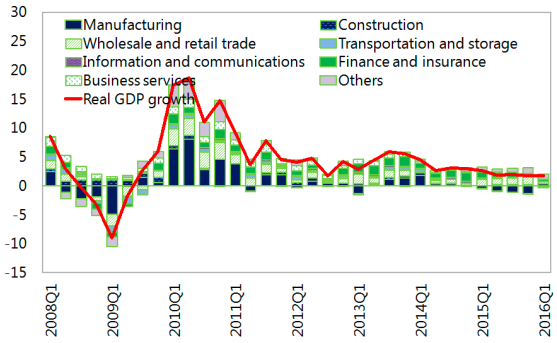
Contribution to Real GDP Growth by Expenditure
(In percent, year-on-year)



Sources: CEIC Data Company Ltd.; and IMF staff calculations.

The manufacturing sector contracted in 2015. Bright spots were wholesale and retail trade and finance and insurance

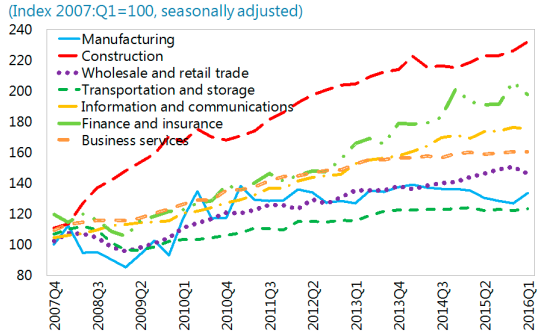
Contribution to Real GDP Growth by Industry
(In percent, year-on-year)



Sources: CEIC Data Company Ltd.; and IMF staff calculations.

The construction sector, which experienced the highest cumulative growth since 2007, also expanded in 2015.

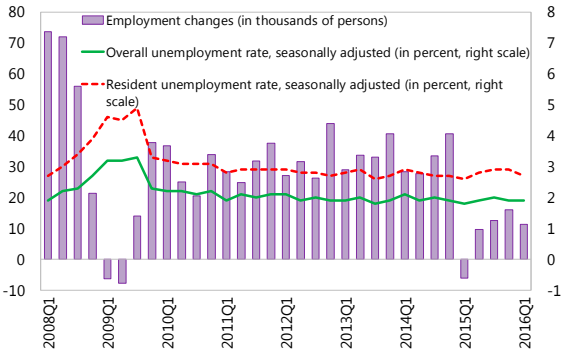
Real GDP by Industry
(Index 2007:Q1=100, seasonally adjusted)



Sources: CEIC Data Company Ltd.; and IMF staff calculations.

The overall unemployment rate remains low (1.9 percent); the rate for residents averaged 2.8 percent in 2015.

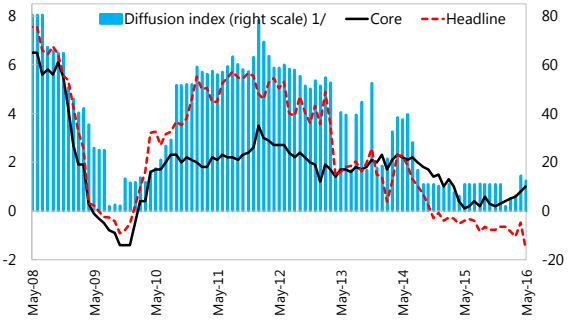
Singapore: Employment and Unemployment



Sources: CEIC Data Co. Ltd.; and IMF staff calculations.

Headline inflation remains negative. Core inflation seems to have bottomed out.

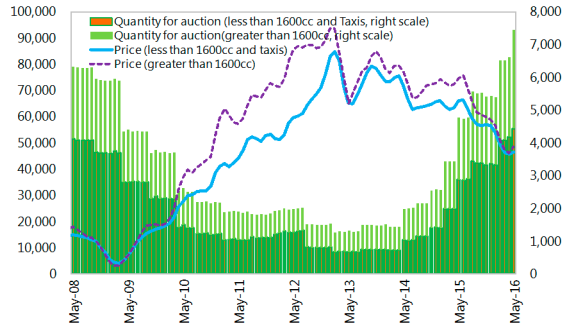
Singapore: Consumer Price Inflation
(In percent, year-on-year)



Sources: CEIC Data Company Ltd.; and IMF staff calculations.
1/ Share in the CPI basket of components for which inflation exceeds 3 percent.

Declining prices of car ownership certificates have contributed to downward pressure on headline inflation.

Car Certificates of Ownership, Price and Quantity
(In Singapore dollars; Units, RHS)

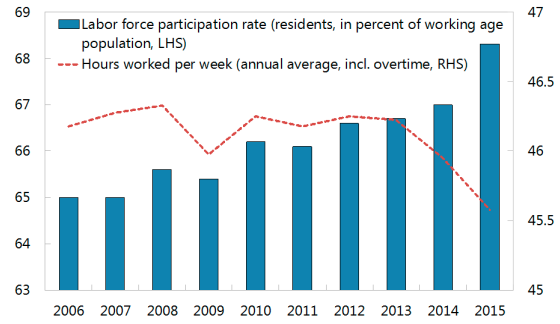


Source: CEIC Data Company Ltd.

Figure 2. Singapore—Labor Market Developments

The residents' labor force participation rate reached a new high in 2015, but total hours worked per week fell.

Labor Force Participation Rate and Hours Worked

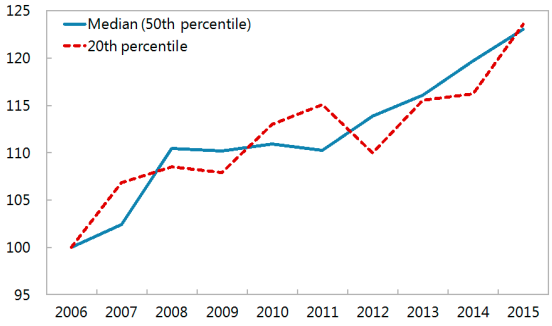


Sources: CEIC Data Co. Ltd.; and IMF staff calculations.

...and real income continued to rise.

Gross Real Income from Work for Citizens

(Index, 2006=100; excluding employer's contribution to CPF; employed full-time)

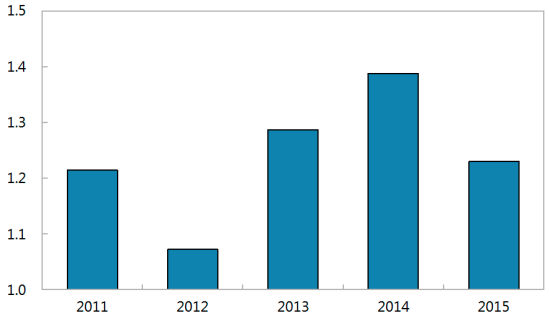


Sources: Singapore, Ministry of Manpower; and IMF staff calculations.

...fewer vacancies were available per unemployed worker;

Job Vacancy to Unemployed Persons Ratio

(Annual average)



Sources: Singapore, Ministry of Manpower; and IMF staff calculations.

The unemployment rate was little changed in 2015...

Unemployment Rate: Total and Residents

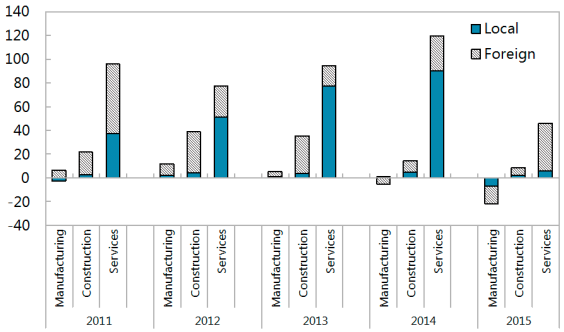
(In percent; annual average)

Sources: Singapore, Ministry of Manpower; and IMF staff calculations.

But indicators point to a slowdown in growth of labor demand and resident employment, particularly in services;

Change in Employment by Sector and by Residency

(In thousands)

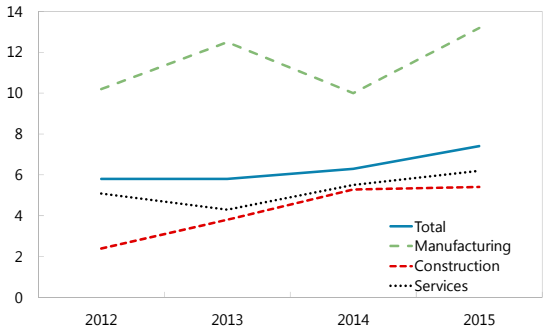


Sources: Singapore, Ministry of Manpower; and IMF staff calculations.

...and a higher proportion of workers were made redundant, particularly in manufacturing.

Incidence of Redundancy by Sector

(Per 1,000 workers)

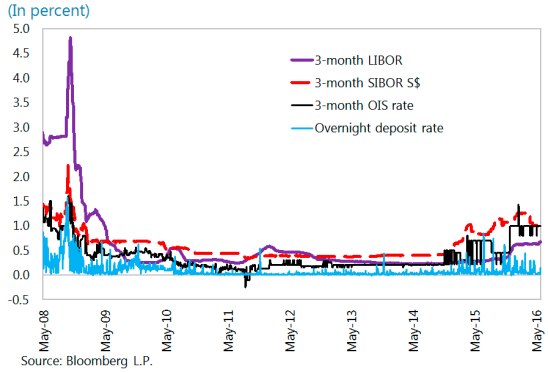


Source: Singapore, Ministry of Manpower.

Figure 3. Singapore—Monetary and Financial Sector Developments

Short-term interest rates are at 1 percent.

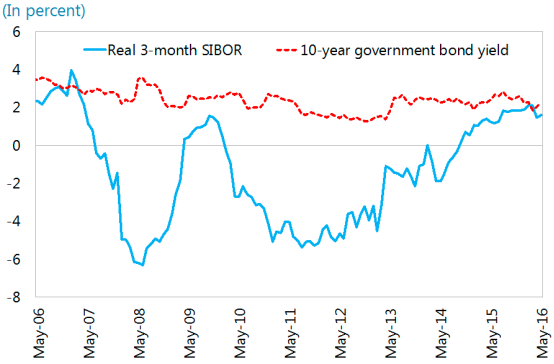
Interest Rates
(In percent)



Source: Bloomberg L.P.

Real short-term rates are near a 9-year high.

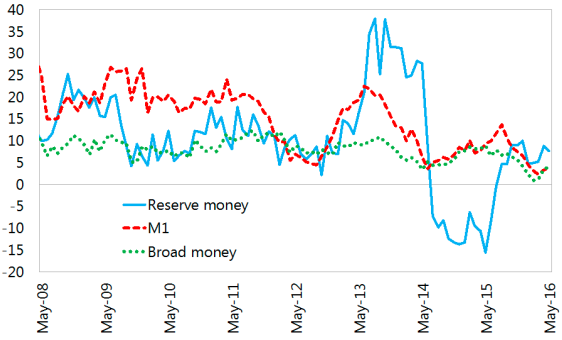
Singapore: Real Interest Rate and Nominal Government Bond Yield
(In percent)



Sources: Bloomberg LP; and CEIC Data Company Ltd; and IMF staff calculations.

Broad money growth slowed to 3.4 percent (y/y) in April 2016.

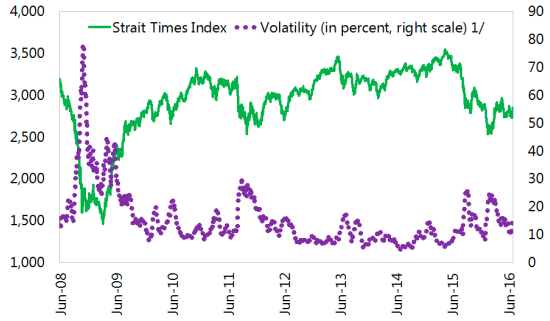
Singapore: Monetary Aggregates
(Year-on-year percent change)



Sources: CEIC Data Company Ltd; and IMF staff calculations.

Stocks have been making up some of the losses sustained since mid-2015 amid continued elevated volatility.

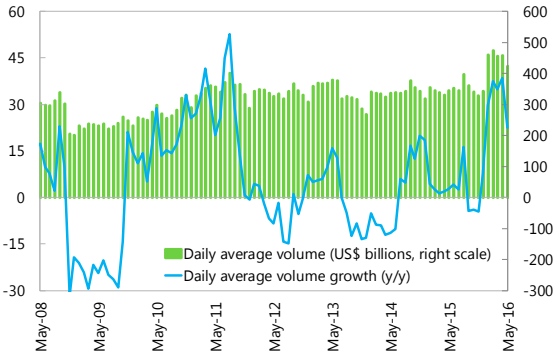
Stock Market Index with Volatility



Source: Bloomberg L.P.
1/ Standard deviation of 1 year moving average of daily equity price change in log levels.

FX turnover has picked up, following a slowdown in the last four months of 2015.

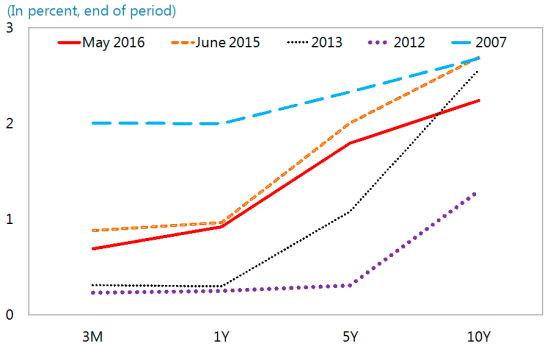
Singapore: Foreign Exchange Market Turnover



Source: CEIC Data Co. Ltd.

The yield curve has shifted downward compared to a year ago and remains below pre-crisis levels.

Government Bond Yields
(In percent, end of period)

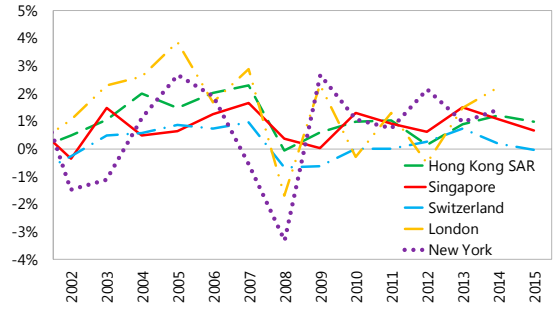


Source: Bloomberg L.P.

Figure 3. Singapore—Monetary and Financial Sector Developments (Concluded)

The financial services sector has on average contributed about ½ percentage points to total growth during 2001-15.

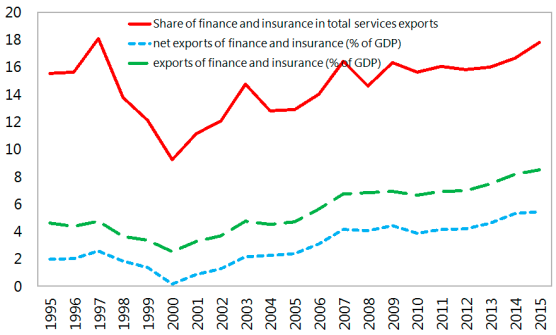
Contribution of Financial Services Sector to Growth 1/
(In percentage points)



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.
1/ Latest available data for London and New York are until 2014.

Financial services exports have reached about 8½ percent of GDP in 2015.

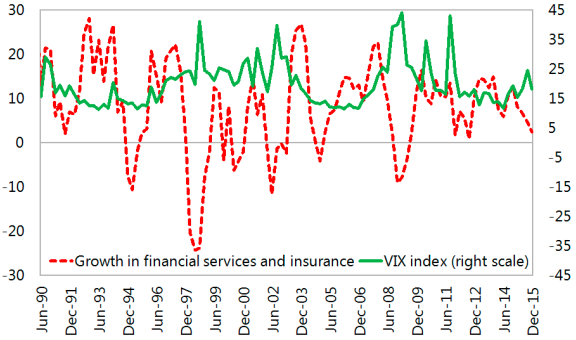
Singapore: Finance and Insurance Services Exports
(In percent)



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

Financial services activity in Singapore slows down during periods of heightened global risk sentiment.

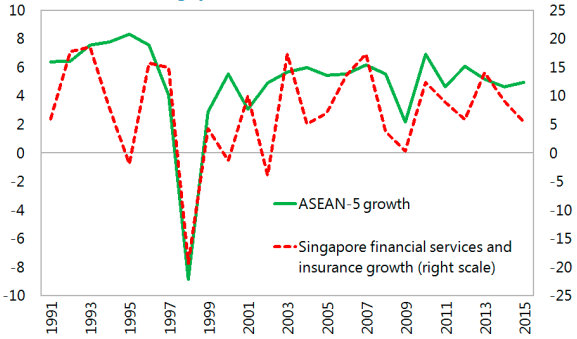
Growth in Financial Services Sector and the VIX Index
(In percent)



Sources: Bloomberg L.P.; CEIC Data Co., Ltd.; and IMF staff calculations.

Financial services activity in Singapore has been highly correlated with economic activity in ASEAN-5 countries.

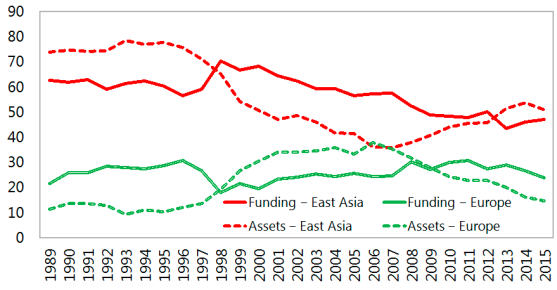
Growth in ASEAN-5 and Financial Services and Insurance Value-Added in Singapore



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

Cross-border banking activity in Singapore is dominated by East-Asian and European regions.

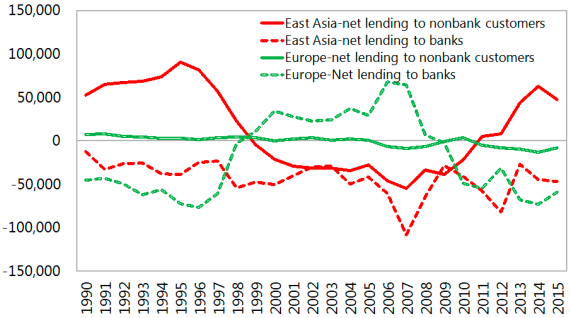
Share of East Asia and Europe in Asian Dollar Market, 1989–2015
(In percent of total cross-border funding and assets 1/)



Sources: Monetary Authority of Singapore.; and IMF staff calculations.
1/ Cross-border funding/assets include nonbank deposits/loans to nonbank customers and amounts due to/from banks.

Since the crisis, net lending to nonbank customers in East Asia and bank funding from Europe turned positive.

Asian Dollar Market: Composition of Lending/Funding Positions For East Asia and Europe
(In millions of U.S. dollar)

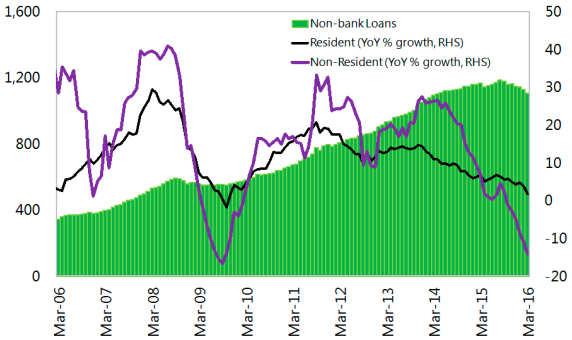


Sources: Monetary Authority of Singapore; and IMF staff calculations.

Figure 4. Singapore—Banking Sector Developments

Growth in nonbank loans to residents has slowed to under 2 percent (y/y) while credit to nonresidents continues to contract.

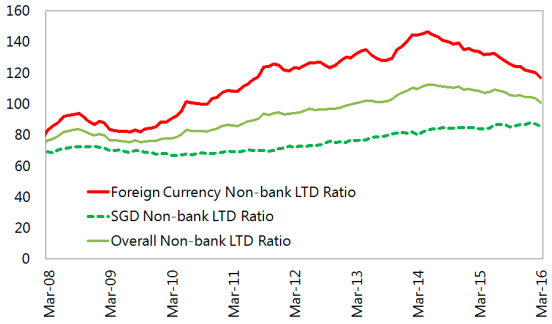
Banking Sector: Combined Assets
(In billions of Singapore dollars; year-over-year percent)



Source: CEIC Data Co. Ltd.; and IMF staff calculations.

Foreign currency loan to deposit ratio have been on a declining trend over the past two years.

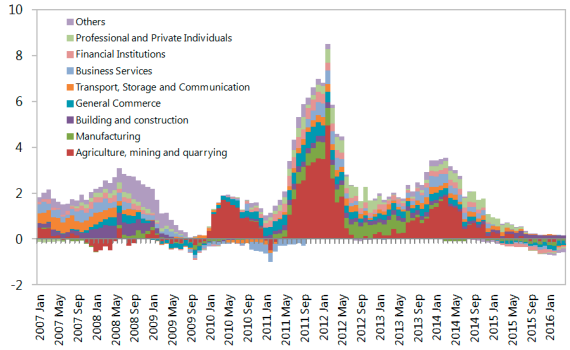
Banking Sector: Loan to Deposit Ratio
(In percent)



Source: CEIC Data Co. Ltd.

Slowdown in domestic nonbank loan growth has been broad based across sectors.

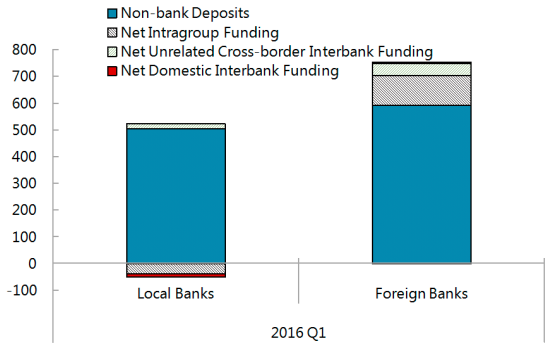
Domestic Bank Loans to Non-Bank Customers by Sector
(In percent, year-on-year)



Sources: Monetary Authority of Singapore; and IMF staff calculations.

Nonbank deposits mostly fund both local and foreign banks. Intragroup funding remains important for foreign banks.

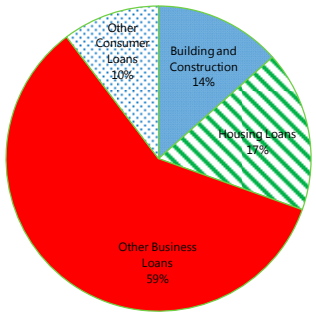
Funding Structure of the Banking System
(In billions of Singapore dollars)



Sources: Singapore authorities

Housing loans and loans to the building and construction sectors account for about 30 percent of total nonbank loans.

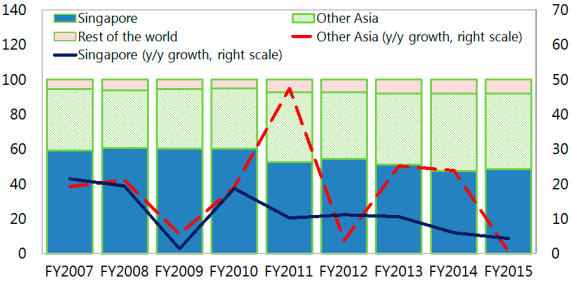
Banking Sectors' Nonbank Loans by Sector, March 2016
(In percent of total)



Sources: CEIC Data Co. Ltd.; and IMF staff calculations.

The big 3 domestic banks now have about 45 percent of their loan portfolio in other Asia (excluding Singapore).

Big 3 Singapore Incorporated Banks: Geographic Distribution of Customer Loans 1/
(In percent)

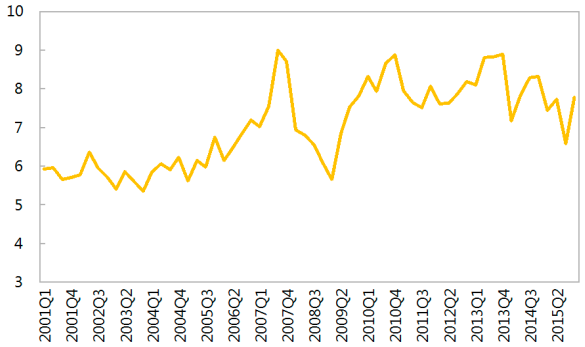


Sources: Banks' financial reports and annual reports; and IMF staff estimates.
1/ Classification varies by bank. OCBC, location of credit risk; DBS, location of borrower incorporation; and UOB, booking location.

Figure 5. Singapore—Housing Market Developments

Singapore's housing market is cooling. The house price-to-income ratio is trending downwards.

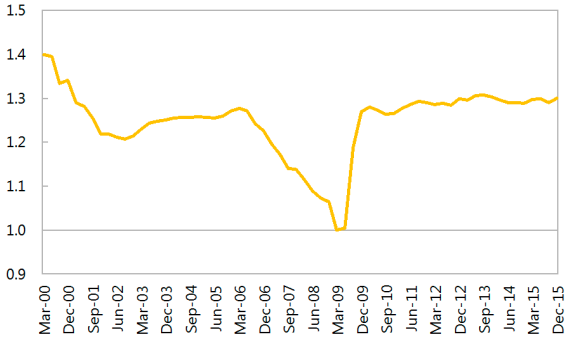
Non-landed Private House Price to Income Ratio
(Price per sq. ft./annual household income at the 71st-80th percentile)



Sources: Singapore, Department of Statistics; CEIC Data Co. Ltd.; and IMF staff calculations.

The house price-to-rent ratio has remained broadly stable in the last few quarters.

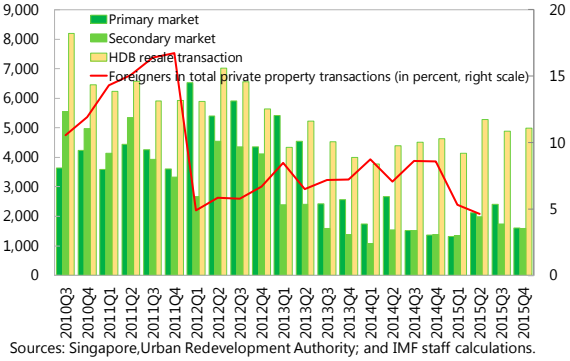
House Price to Rent Ratio
(Index; 2009Q1=100)



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

Housing transactions in the public market segments are holding up. The private market remains subdued.

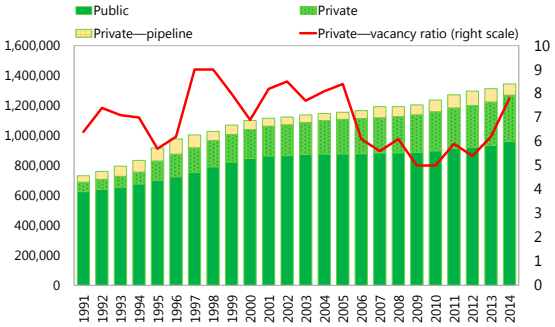
Private and Public Residential Transaction
(In units)



Sources: Singapore,Urban Redevelopment Authority; and IMF staff calculations.

The vacancy ratio (for private residential sector), has reverted to the historical average on easing supply constraints.

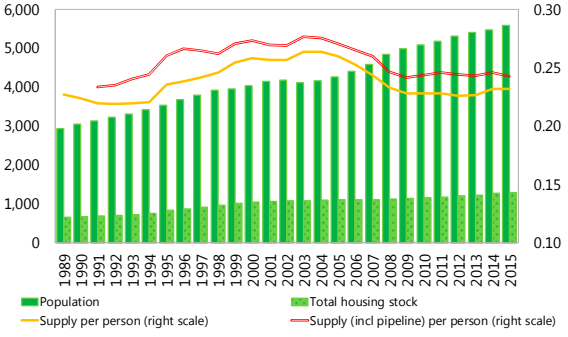
Singapore: Housing Stock
(Units, in percent)



Source: CEIC Data Co., Ltd.

Supply bottlenecks owing to rapid population growth with limited new housing supply...

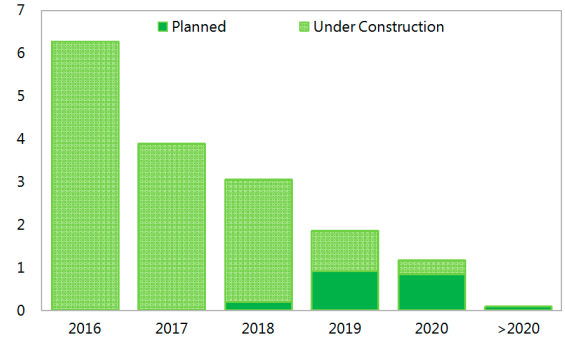
Housing Supply and Population
(In thousands, left scale; and ratio, right scale)



Sources: CEIC Data Co., Ltd.; and IMF staff calculations.

...look set to ease as a pipeline of housing supply is expected to come on the market in the coming years.

Upcoming Private Residential Supply Pipeline at end of 2015:Q4
(In percent of existing private housing stock)

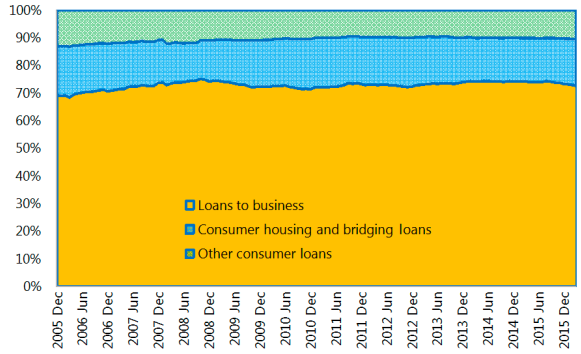


Source: Singapore, Urban Redevelopment Authority (URA).

Figure 5. Singapore—Housing Market Developments (Concluded)

Banks' exposure to private housing loans has remained stable.

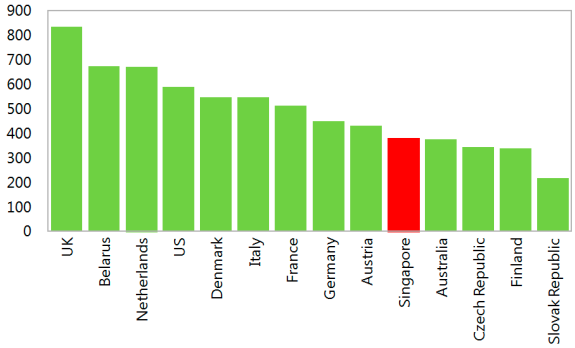
Housing Loans as a Share of Total Loans
(In percent)



Sources: Monetary Authority of Singapore; and IMF staff calculations.

Households have strong balance sheets in aggregate.

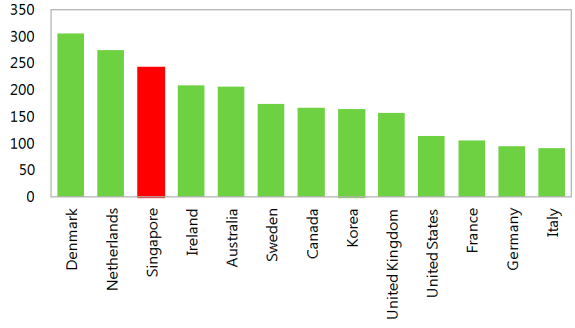
Household Net Wealth, 2014
(In percent of GDP)



Sources: OECD, and Singapore authorities.

Households are highly indebted, partly reflecting a high rate of home ownership compared to other countries.

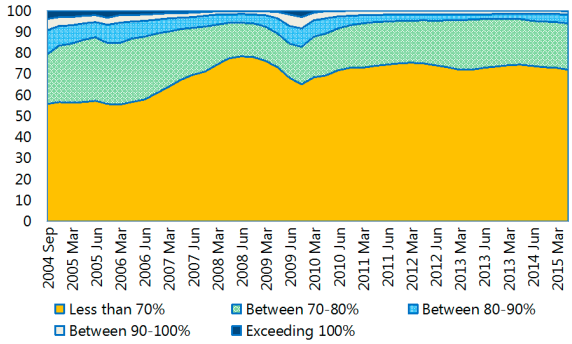
Household Debt, 2014
(In percent of disposable income)



Sources: OECD; Singapore Department of Statistics; and IMF staff calculations.

and macroprudential policies helped improve their credit risk profile and limited banks' exposure to overextended households.

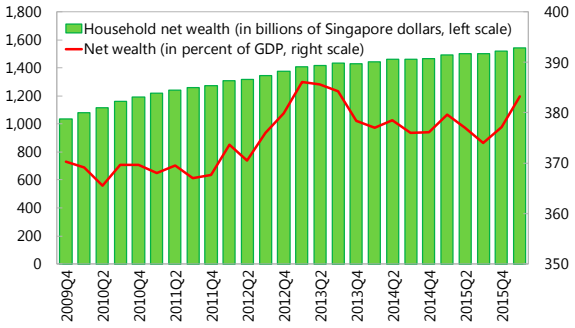
Outstanding Housing Loans by LTV Ratios
(In percent)



Source: Monetary Authority of Singapore.

Household net wealth increased at a faster pace between 2009 and 2013, helped in part by house price appreciation.

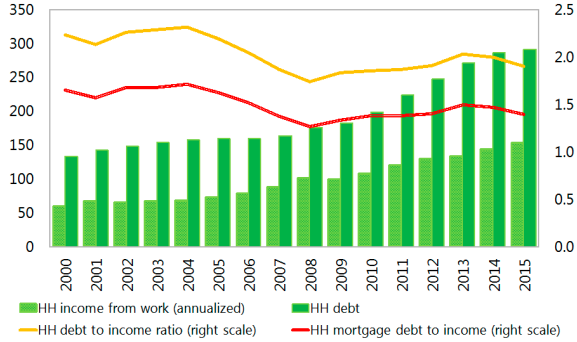
Household Net Wealth
(In billions of Singapore dollars, left scale; and in percent, right scale)



Sources: Singapore, Department of Statistics; and IMF staff calculations.

Household indebtedness improved recently. Also, liquid assets (cash and deposit) exceed total liabilities.

Household Debt and Income
(In billions of Singapore dollars, left scale)

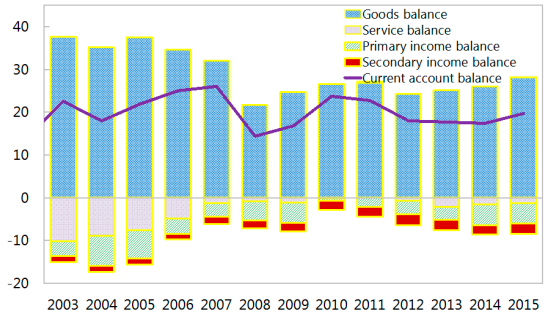


Sources: Singapore Department of Statistics; and IMF staff calculations.

Figure 6. Singapore—External Sector

The current account surplus has averaged about 20 percent of GDP over the past decade.

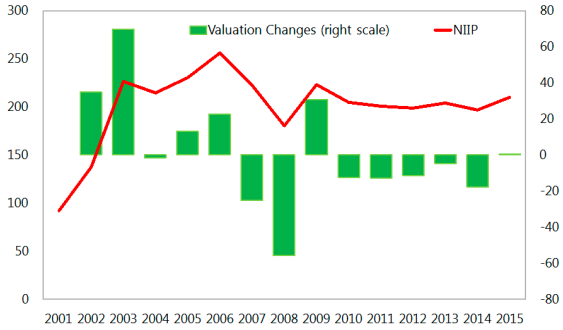
Current Account Balance
(In percent of GDP)



Source: Haver Analytics.

Negative valuation changes have kept Singapore's NIIP position at about 200 percent of GDP over the past years.

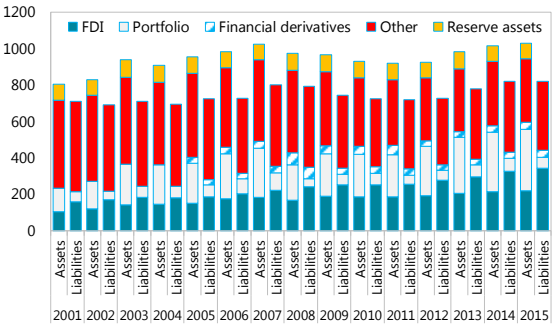
NIIP Position and Valuation Changes
(In percent of GDP)



Sources: Singapore, Department of Statistics; CEIC Data Co., Ltd.; and IMF staff calculations.

Singapore has a net asset position in portfolio assets and a net liability position in FDI holdings.

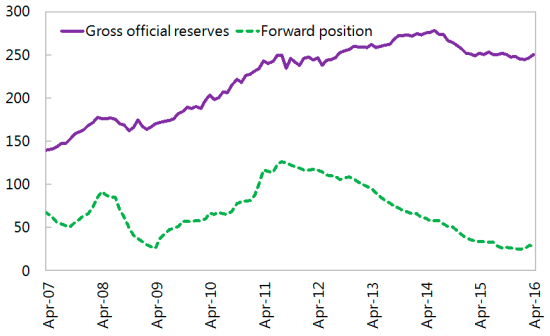
International Investment Position
(In percent of GDP)



Sources: Singapore, Department of Statistics; CEIC Data Co. Ltd.; and IMF staff calculations.

Gross official reserves have been hovering around US$250 billion. The forward position has been declining.

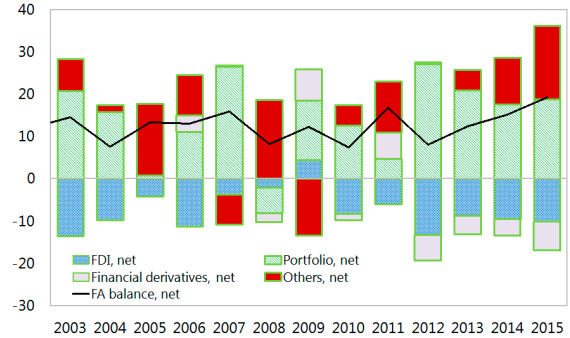
Singapore: Gross Official Reserves and Forward Position
(In billions of U.S. dollars)



Sources: CEIC Data Co. Ltd; and IMF, *International Financial Statistics* database.

The financial account is characterized by net FDI inflows and net portfolio outflows.

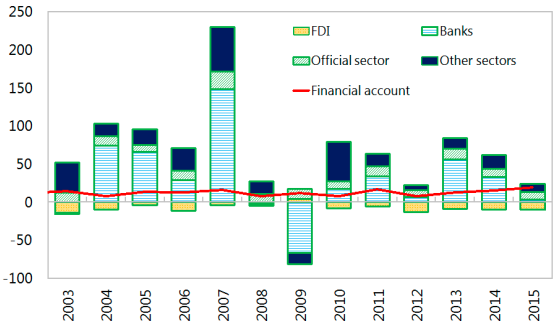
Financial Account Balance by Type of Investment
(In percent of GDP)



Source: CEIC Data Co. Ltd.; and IMF Staff calculations.

Official and bank outflows accounted for most of outflows in 2015.

Financial Account by Sector: Net
(In percent of GDP)

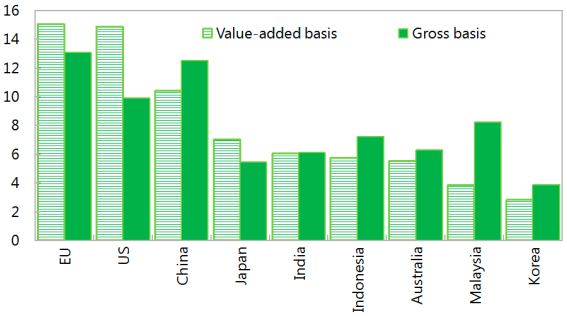


Source: CEIC Data Co. Ltd.; and IMF staff calculations.

Figure 7. Singapore—Spillovers

Singapore depends mainly on foreign final demand from the European Union and United States., while China, Japan, Indonesia and India are important partners in the region.

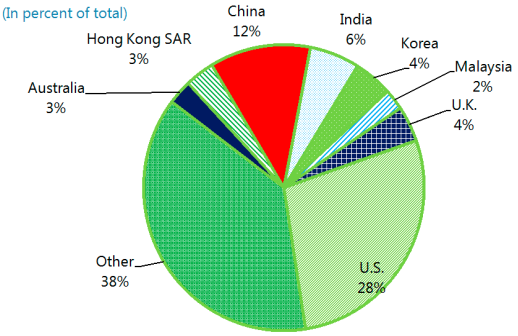
Singapore: Value Added in Foreign Final Demand versus Gross Exports
(In percent of total, 2011)



Source: *OECD-WTO Trade in Value Added* database.

Singapore has large portfolio assets, which would make its external balance sheet vulnerable to shocks in the U.S and several regional economies such as China and India.

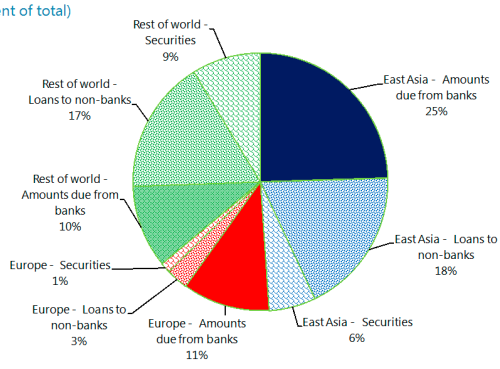
Composition of Singapore's Portfolio Investment Assets June 2015
(In percent of total)



Sources: IMF, *Coordinated Portfolio Investment Survey*.

East Asia is the largest user of funds and likely to receive outward spillovers from Singapore, in the event of a banking sector stress in Singapore.

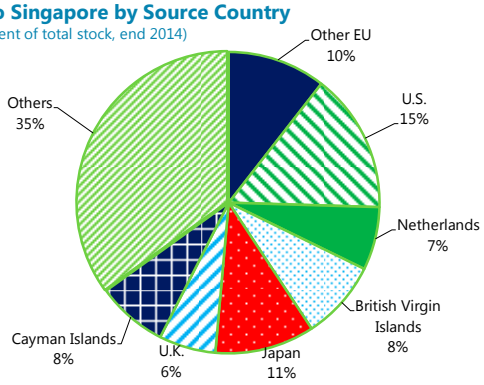
ACU Use of Funds by Region, April 2016
(In perent of total)



Source: Monetary Authority of Singapore, *Monthly Statistical Bulletin.*

Inward FDI are also dominated by the European Union and the United States. and are mainly concentrated in the finance and insurance sector.

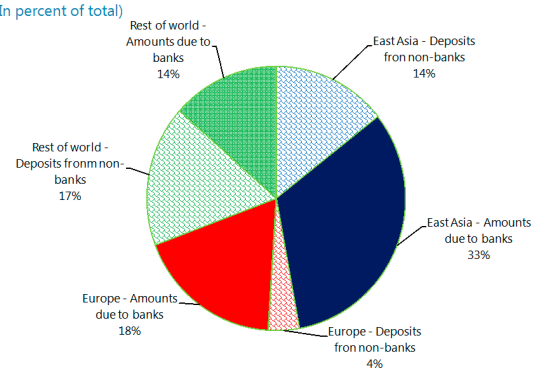
FDI to Singapore by Source Country
(In percent of total stock, end 2014)



Sources: Singapore, Department of Statistics; and IMF staff caclulations.

Major sources of funding for Singapore's financial center include East Asian and European banks, followed by deposits from East Asian nonbanks.

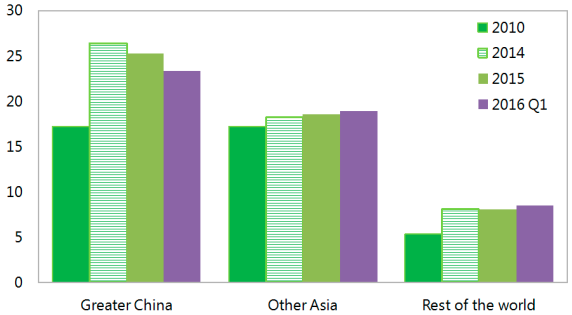
ACU Funding Sources by Region, April 2016
(In percent of total)



Source: Monetary Authority of Singapore, *Monthly Statistical Bulletin*.

Cross-border exposures of domestic banks in Greater China and other Asian economies increased, leading to higher spillovers from the region.

Cross-Border Exposures of Domestic Banks 1/
(In percent of total loans)

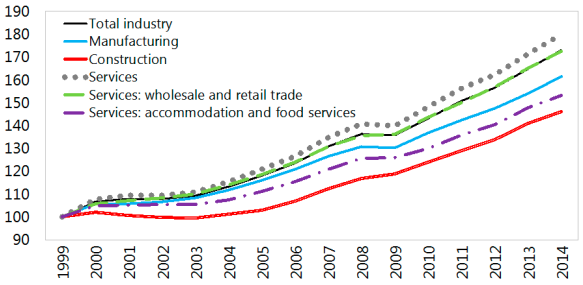


Sources: Banks' financial reports and annual reports; and IMF staff estimates.
1/ Classification varies by bank. OCBC, location of credit risk; DBS, location of borrower incorporation; and UOB, booking location.

Figure 8. Singapore—Social and Equality Indicators

Industry-wide wage increased by 3.5 percent in 2015.

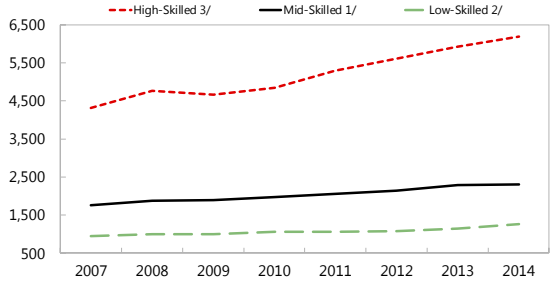
Nominal Wages by Industry 1/
(Index 1999=100; excluding employers' contributions to CPF)



Source: Haver Analytics; and IMF staff calculations.
1/ Based on wage changes granted by private sector establishments (with at least 10 employees) to full-time resident employees with continuous employment of at least a year. Wages are inclusive of bonuses.

Wages of low-skilled workers grew at a faster pace in recent years.

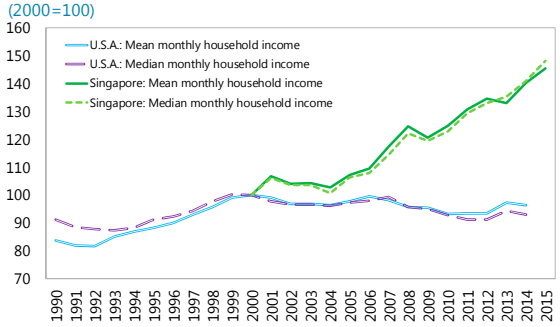
Weighted Gross Monthly Median Wages 4/
(In Singapore Dollars)



Sources: Singapore Ministry of Manpower; and IMF staff calcualtions.
1/ Mid-skilled comprises clerical supprot workers, Sales & service workers, craftsmen, plant & machine operators & assemblers.
2/ Low-skilled comprises cleaners, labourers and related workers.
3/ High-skilled comprises managers & administrators, working prioprietors, professionals, and technicians.
4/ 2014 data is as of June.

Median household income from work increased by 5 percent in real terms 2015.

United States and Singapore: Mean and Median Household Income 1/
(2000=100)



Sources: *Key Household Income Trend 2015*; U.S. Census Bureau; and Fund staff calculations.
1/ 2013 data for U.S. is not available.

While largely stagnant during 2000–06, real incomes of lower income groups have recently increased considerably.

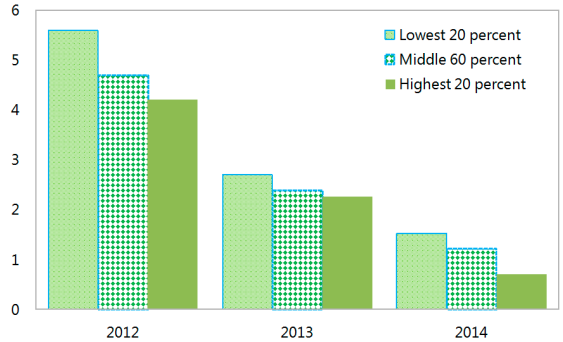
Average Monthly Real Household Income by Decile 1/

			Cumulative Change (in percent)		
Decile	2000	2015	2000–2015	2000–2006	2006–2015
Total	1,735	2,726	57.1	17.6	33.6
1st-10th	315	383	21.6	-6.6	30.2
11th-20th	537	736	37.1	1.1	35.6
21st-30th	720	1,088	51.1	9.2	38.4
31st-40th	911	1,397	53.4	10.6	38.7
41st-50th	1,119	1,711	52.9	12.0	36.6
51st-60th	1,366	2,092	53.2	13.4	35.1
61st-70th	1,669	2,565	53.7	14.8	33.9
71st-80th	2,093	3,218	53.7	17.2	31.2
81st-90th	2,821	4,642	64.6	25.1	31.6
91st-100th	5,801	10,251	76.7	31.1	34.8
Memo:					
Top dec/bottom dec	18.4	26.8			

1/ Income from work per household member in employed households. Household income from work includes employer CPF contributions. Deflated by CPI for the respective income group (lowest 20 percent, middle 60 percent, top 20 percent).

Lower rate of inflation has helped everybody, but the bottom 20 percent gained the most.

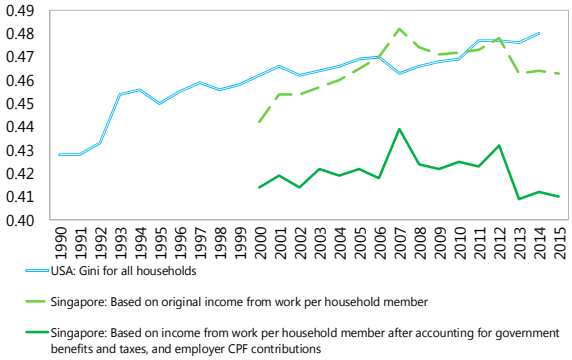
Inflation by Income Group
(Year-on-year percent change)



Source: Singapore, Department of Statistics; and IMF staff calculations.

Government policies (taxes and benefit payments) are also contributing to a reduction in inequality

United States and Singapore: Gini 1/

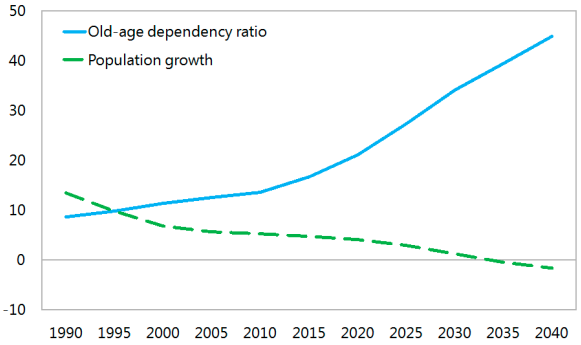


Sources: *Key Household Income Trends 2015*; and U.S. Census Bureau.
1/ 2014 Data for United States is not available.

Figure 9. Singapore—Demographic Transition

Old-age dependency is projected to increase significantly in the medium to long term.

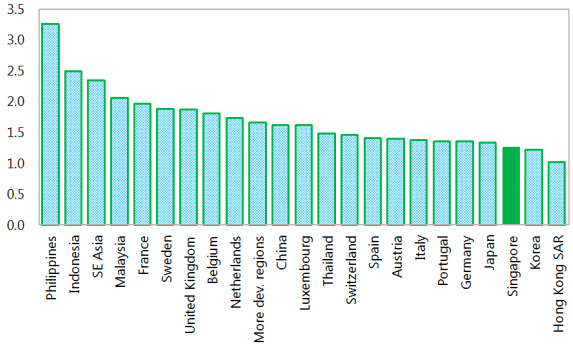
Old-Age Dependency Ratio and Population Growth
(In percent)



Source: United Nations, World Population Prospects-2012 Revisions.

The average number of children per woman is among the lowest in the world.

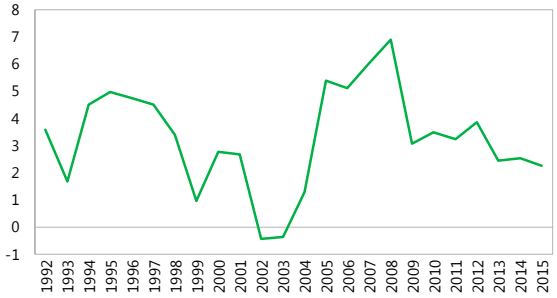
Total Fertility, 2005–2010
(Children per woman)



Source: United Nations, World Population Prospects-2012 Revisions.

Labor force growth has declined in recent years, after a period of very strong growth during 2005–2009…

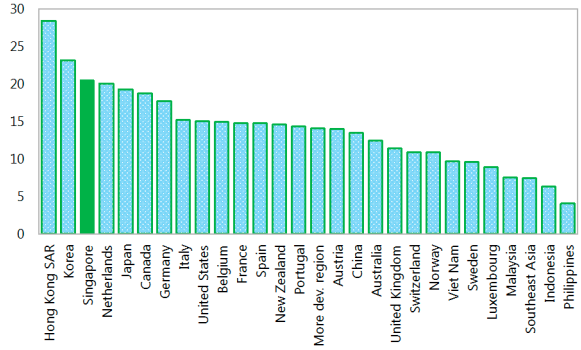
Labor Force Growth Rate
(Year-on-year percent change)



Sources: Singapore Authorities; and IMF staff calculations.
Note: Observations for 1995, 2000, and 2005 were obtained by interpolating the annual time series.

Singapore's aging speeds is among the highest in the region and in advanced economies.

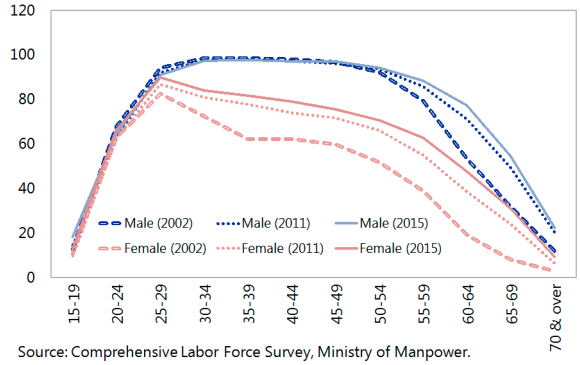
Aging Speed Comparison: Change Between 2010 and 2030
(In percent)



Source: United Nations, World Population Prospects-2012 Revisions.

Labor force participation rates have been rising for both male and female workers, but there is scope to further raise participation rates for women.

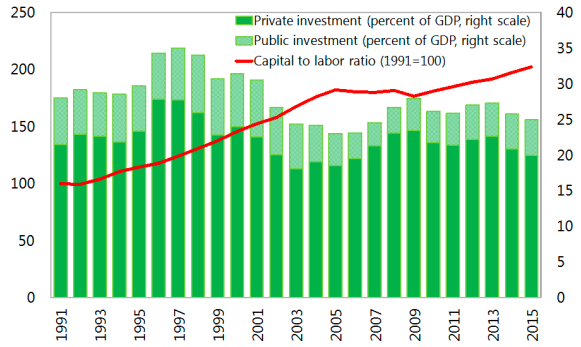
Resident Labor Force Participation Rate by Gender and Age
(In percent)



Source: Comprehensive Labor Force Survey, Ministry of Manpower.

…contributing to a gradual increase in the capital to labor ratio.

Capital to Labor Ratio and Investment



Sources: Singapore, Department of Statistics; CEIC Data Co. Ltd.; and Haver Analytics.

Table 1. Singapore—Selected Economic and Financial Indicators, 2012–17

Nominal GDP (2015): US$293 billion
Main exports (percent of total domestic exports): Electronic products (21%); chemical products (20%)
GDP per capita (2015): US$52,888
Population (June 2015): 5.54 million
Unemployment rate (2015): 1.9 percent

					Projections	
	2012	2013	2014	2015	2016	2017
Growth (percentage change)						
Real GDP	3.7	4.7	3.3	2.0	1.7	2.2
Total domestic demand	6.8	4.3	0.2	0.5	4.1	3.2
Consumption	2.4	4.7	1.7	4.9	4.1	3.3
Private consumption	3.5	3.1	2.2	4.5	3.5	3.6
Gross capital formation	13.9	3.7	-2.0	-6.2	4.2	3.2
Saving and investment (percent of GDP)						
Gross national saving	47.9	48.2	46.4	46.1	46.6	46.3
Gross domestic investment	29.8	30.3	28.9	26.3	26.4	26.6
Inflation and unemployment (period average, percent)						
CPI inflation	4.6	2.4	1.0	-0.5	-0.3	1.1
Core CPI inflation	2.5	1.7	1.9	0.5	0.8	1.4
Unemployment rate	2.0	1.9	2.0	1.9	2.0	2.0
Central government budget (percent of GDP) 1/						
Revenue	22.6	21.9	21.6	21.6	21.9	21.4
Expenditure	13.7	14.8	15.7	18.8	20.6	20.5
Overall balance	8.9	7.1	5.9	2.7	1.3	0.9
Primary balance 2/	1.5	0.3	-0.3	-3.0	-4.2	-4.4
Money and credit (end of period, percentage change)						
Broad money (M2)	6.8	7.9	7.6	4.0	1.5	...
Credit to private sector	11.3	15.5	7.2	2.8	4.5	...
Three-month S$ SIBOR rate (percent)	0.4	0.4	0.5	1.2	...	...
Balance of payments (US$ billions)						
Current account balance	52.3	53.8	53.5	57.9	58.3	58.8
In percent of GDP	18.1	17.9	17.5	19.8	20.2	19.7
Goods balance	70.4	75.6	79.6	82.5	80.6	82.6
Exports, f.o.b.	437.4	437.4	437.8	377.0	356.4	385.6
Imports, f.o.b.	-367.1	-361.7	-358.2	-294.5	-275.7	-303.0
Financial account balance	23.1	37.3	46.2	56.0	51.3	49.5
Overall balance	26.1	18.2	6.8	1.1	7.1	9.2
Gross official reserves (US$ billions)	259.3	273.1	256.9	247.7	254.8	264.1
In months of imports 3/	6.1	6.4	7.0	7.1	6.8	6.6
Singapore dollar/U.S. dollar exchange rate (period average)	1.25	1.25	1.27	1.37	...	...
Nominal effective exchange rate (percentage change) 4/	2.4	2.6	0.9	-0.3	...	...
Real effective exchange rate (percentage change) 4/	4.7	2.7	-0.3	-2.0	...	...

Sources: Data provided by the Singapore authorities; and IMF staff estimates and projections.

1/ On a calendar year basis.
2/ Overall balance excluding investment income, capital revenue, and interest payments.
3/ In months of following year's imports of goods and services.
4/ Increase is an appreciation.

Table 2. Singapore—Balance of Payments, 2012–17 1/
(In billions of U.S. dollars)

	2012	2013	2014	2015	Projections 2016	2017
Current account balance	52.3	53.8	53.5	57.9	58.3	58.8
Goods balance	70.4	75.6	79.6	82.5	80.6	82.6
Exports, f.o.b.	437.4	437.4	437.8	377.0	356.4	385.6
Imports, f.o.b.	-367.1	-361.7	-358.2	-294.5	-275.7	-303.0
Services balance	-2.0	-6.2	-4.7	-3.9	-3.4	-4.3
Exports	127.8	140.3	150.8	139.6	138.2	143.9
Imports	-129.8	-146.5	-155.5	-143.5	-141.6	-148.1
Primary income balance	-9.2	-9.1	-15.1	-13.8	-12.0	-12.4
Receipts	64.5	66.9	63.3	58.8	59.6	61.9
Payments	-73.7	-76.0	-78.5	-72.6	-71.6	-74.3
Secondary income balance	-6.8	-6.5	-6.2	-6.9	-6.9	-7.2
Capital and financial account balance	23.1	37.3	46.2	56.0	51.3	49.5
Capital account (net)	0.0	0.0	0.0	0.0	0.0	0.0
Financial account (net)	23.1	37.3	46.2	56.0	51.3	49.5
Direct investment	-38.8	-26.5	-29.4	-29.8	-30.3	-31.8
Assets	18.3	39.6	39.1	35.5	37.8	41.6
Liabilities	57.1	66.1	68.5	65.3	68.0	73.4
Portfolio investment	78.2	62.5	53.4	54.8	51.2	50.5
Assets	83.3	61.1	56.5	47.9	48.3	50.1
Liabilities	5.1	-1.4	3.2	-6.9	-2.8	-0.4
Other investment and financial derivatives	-16.3	1.3	22.2	31.0	30.4	30.8
Net errors and omissions	-3.2	1.7	-0.5	-0.8	0.0	0.0
Overall balance	26.1	18.2	6.8	1.1	7.1	9.2
Memorandum items:						
Current account as percent of GDP	18.1	17.9	17.5	19.8	20.2	19.7
Goods balance as percent of GDP	24.3	25.2	26.0	28.2	27.9	27.7
Re-exports as percent of GDP	62.3	63.7	63.1	60.3	...	...
Net international investment position						
In billions of U.S. dollars	586.8	605.0	577.6	597.0	...	...
In percent of GDP	198.4	203.7	196.6	209.7	...	...

Sources: Monetary Authority of Singapore, *Economic Survey of Singapore* ; and IMF staff estimates and projections.

1/ Data for the current account balance, the capital and financial account balance, and net errors and omissions are converted to U.S. dollars from the official presentation in Singapore dollars using period-average exchange rates. The official presentation has adopted the sign convention for assets and liabilities in line with BPM6 manual.

Table 3. Singapore—Monetary Survey, 2012–16 1/

	2012	2013	2014	2015	2016	
					May	Dec. Proj.
	(In billions of Singapore dollars, end of period)					
Net foreign assets	407	434	458	502	485	515
Monetary authorities	315	341	344	353	346	360
Banks	92	93	115	149	139	155
Domestic credit	660	745	800	823	835	858
Claims on resident private sector	554	640	686	706	720	738
Claims on central government	105	105	113	117	115	120
Other items (net)	-445	-509	-536	-573	-553	-610
M2	622	671	722	752	767	763
M1	213	241	262	279	279	288
Quasi-money	410	430	461	472	488	475
	(Annual percentage change)					
Domestic credit	10.6	13.0	7.3	2.9	3.5	4.3
Claims on private sector	11.3	15.5	7.2	2.8	4.5	4.5
M2	6.8	7.9	7.6	4.0	4.1	1.5
	(Contribution to M2 growth, in percent)					
Net foreign assets	4.4	4.4	3.6	6.0	4.4	1.8
Domestic credit (net)	10.9	13.8	8.1	3.2	3.9	4.7
Claims on private sector	9.7	13.8	6.9	2.7	4.2	4.2
Claims on central government (net)	1.2	0.0	1.2	0.5	-0.4	0.4
Other items (net)	-8.5	-10.3	-4.0	-5.2	-4.1	-4.9
Memorandum items:						
Total loans to nonbanks (in billions of Singapore dollars) 2/	907	1,081	1,180	1,177	1,156	1,157
Total loans to nonbanks (annual percentage change)	9.7	19.2	9.2	-0.3	-2.3	-1.7
Claims on resident private sector (3mma/3mma, saar)	...	...	...	0.8	1.0	...

Sources: IMF, *International Financial Statistics* ; and CEIC Data Co. Ltd.

1/ Based on domestic banking units (DBUs) and Asian currency units (ACUs).
2/ Total loans of DBUs and ACUs to both residents and nonresidents.

Table 4. Singapore—Indicators of Vulnerability, 2012–16

	2012	2013	2014	2015	2016 Latest
Financial sector indicators					
Broad money (M2, percent change, y/y)	6.8	7.9	7.6	4.0	4.1
Private sector credit (percent change, y/y)	11.3	15.5	7.2	2.8	4.5
Credit to the property sector (percent change, y/y) 1/	16.3	11.8	9.0	8.2	8.2
Share of property sector credit in total nonbank credit (percent) 1/	47.0	44.9	46.3	50.7	51.8
Credit rating of local banks (S&P) 2/	AA-	AA-	AA-	AA-	...
Three-month S$ SIBOR (percent, end-year) 5/	0.4	0.4	0.5	1.2	1.0
NPL ratio (local banks, percent) 3/ 4/	1.2	1.0	0.9	1.0	...
Capital adequacy ratio of local banks (percent) 4/	18.1	16.4	15.9	15.8	...
Asset market indicators					
Stock prices (percent change, y/y) 5/	19.7	0.0	6.2	-14.3	-14.4
P/E ratio 5/	13.4	13.1	12.6	12.8	13.9
Stock prices of the finance sector (percent change, y/y) 5/	36.8	-1.1	10.3	-12.8	-15.8
Real estate prices (percent change, y/y) 5/					
Private residential	2.3	3.2	-2.9	-3.9	-2.9
Office space	3.8	4.9	3.2	2.5	-0.3
Industrial space	28.3	10.5	2.5	-0.6	-4.8
External indicators					
Current account balance (US$ billion)	52.3	53.8	53.5	57.9	12.7
In percent of GDP	18.1	17.9	17.5	19.8	17.7
Gross official reserves (US$ billion) 5/	259.3	273.1	256.9	247.7	247.1
In months of next year's imports of goods and services	6.1	6.4	7.0	7.1	6.9
Real effective exchange rate (end of period, 2010=100) 6/	113.8	114.0	112.3	110.0	110.0

Sources: Data provided by the Singapore authorities; and IMF, *Information Notice System* .

1/ For domestic banking units (DBU).
2/ Ratings of the three major local banks.
3/ In percent of global nonbank loans.
4/ Data for 2015 are as of September.
5/ Data for 2016 are as of May, excpet for stock prices (June), real estate prices (June for private residential prices and March for office space and industrial space prices), and current account balance (2016Q1).
6/ Staff estimates.

Table 5. Singapore—Summary of Government Operations and Stock Positions, 2011/12–2016/17 1/

	2011/12	2012/13	2013/14	2014/15	2015/16		2016/17	
					Budget	Prel.	Budget 10/	Proj.
I. Statement of government operations								
				(In billions of Singapore dollars)				
Revenue	81.3	81.4	82.3	84.9	86.8	86.7	90.9	90.3
Taxes	46.1	50.1	51.1	54.1	55.7	55.1	59.2	58.7
Other revenue 2/	35.2	31.2	31.2	30.8	31.1	31.6	31.8	31.6
Of which : interest income	1.7	1.7	1.9	2.6	2.9	3.8	3.9	3.9
Expenditure	51.0	52.7	57.0	63.3	77.5	76.4	80.4	80.0
Expense	38.1	37.9	42.7	46.5	54.4	53.3	57.1	56.7
Compensation of employees	5.7	6.2	6.8	7.4	8.1	8.1	8.7	8.7
Use of goods and services	14.3	14.6	15.2	16.1	17.8	17.7	18.7	18.7
Expense not elsewhere classified	18.1	17.0	20.7	23.0	28.6	27.5	29.7	29.3
Grants, subventions & capital injections to organisations	6.7	6.7	7.1	7.9	9.4	9.6	11.4	11.3
Transfers	11.3	10.3	13.6	15.1	19.1	17.9	18.3	18.1
Net acquisition of nonfinancial assets	12.9	14.9	14.3	16.8	23.2	23.2	23.3	23.4
Development expenditure	11.4	13.5	13.0	15.3	20.9	21.6	20.9	20.9
Land-related expenditure	1.5	1.3	1.3	1.4	2.2	1.6	2.4	2.4
Gross operating balance	43.3	43.5	39.6	38.4	32.5	33.5	33.8	33.6
Net lending/borrowing	30.3	28.6	25.3	21.6	9.3	10.3	10.5	10.3
Net acquisition of financial assets	...	...	...	...	...	...	...	...
Net incurrence of liabilities	...	...	...	...	...	...	...	...
				(In percent of GDP)				
Revenue	23.2	22.4	21.7	21.6	21.6	21.5	22.0	22.0
Taxes	13.2	13.8	13.5	13.8	13.8	13.7	14.3	14.3
Other revenue 2/	10.1	8.6	8.2	7.8	7.7	7.9	7.7	7.7
Expenditure	13.7	13.7	15.2	15.9	20.3	19.8	21.0	20.9
Expense	10.9	10.4	11.3	11.8	13.5	13.2	13.9	13.8
Net acquisition of nonfinancial assets	3.7	4.1	3.8	4.3	5.8	5.8	5.7	5.7
Gross operating balance	12.4	12.0	10.4	9.8	8.1	8.3	8.1	8.2
Net lending/borrowing	9.5	8.7	6.6	5.7	1.3	1.7	1.0	1.1
Memorandum items:								
Primary balance 3/	0.0	0.8	0.0	-0.6	-3.3	-3.1	-2.9	-2.9
Cyclically adjusted primary balance	-0.2	0.7	-0.1	-0.7	-3.3	-3.0	-3.2	-3.2
Expenditures on social development 4/	6.2	6.0	6.4	6.9	7.9	7.9	8.7	8.7
Land sales revenue	5.5	5.0	4.6	3.8	3.5	3.0	2.5	2.5
Spending from Endowment and Trust Funds (9)	0.7	0.8	1.0	1.0	1.2	1.2	1.3	1.3
Fiscal impulse 5/	-1.9	-1.5	1.3	-0.1	3.2	3.0	0.8	0.8
Authorities' budgetary accounts 6/								
Operating revenue (1)	14.6	15.3	15.1	15.5	16.0	15.9	16.7	...
Total expenditure (2)	13.3	13.5	13.6	14.4	16.9	17.0	17.9	...
Primary fiscal balance (3)=(1)-(2)	1.3	1.9	1.4	1.1	-1.0	-1.1	-1.2	...
Special transfers (excl. transfers to endowment funds) (4)	0.8	0.4	0.8	1.0	1.4	1.1	0.7	...
Basic balance (5)=(3)-(4)	0.5	1.5	0.6	0.1	-2.4	-2.2	-1.9	...
Transfers to Endowment and Trust Funds (6)	1.6	2.0	1.5	2.2	1.5	1.5	0.9	...
Net investment returns contribution (7)	2.3	2.2	2.2	2.2	2.2	2.5	3.6	...
Overall balance (8)=(5)-(6)+(7)	1.1	1.6	1.3	0.1	-1.7	-1.2	0.8	...
II. Stock positions	2011	2012	2013	2014	2015			
				(In billions of Singapore dollars, unless otherwise indicated)				
Gross financial assets 7/	...	...	817	834	878			
Gross debt 9/	354	385	390	387	421			
Gross debt (in percent of GDP) 8/	102	107	104	100	105			
Memorandum items:								
Government deposits at the Monetary Authority of Singapore 8/	124	147	163	114	115			
Temasek asset holdings 8/ 9/	193	198	215	223	266			

Sources: Data provided by the Ministry of Finance; and IMF staff estimates and projections.

1/ The fiscal year runs from April 1 through March 31. The presentation of the table is based on GFSM 2001.
2/ Includes revenue from land sales and investment income.
3/ Overall balance excluding investment income, capital revenue, and interest payments.
4/ Includes development and operating expenditure on education, health, national development, environment and water resources, culture, community and youth, social and family development, communications and information, and manpower (financial security). Includes spending on social development purposes from endowment and trust funds set up by the government.
5/ The fiscal impulse is the change in the cyclically adjusted operational balance, excluding top ups to endowments and trust funds.
6/ The authorities' budgetary accounts are based on Singapore's Constitutional rules governing the protection of Past Reserves. It includes the net investment returns contribution, which reflects the amount of investment returns that is taken into the Budget. It excludes receipts such as proceeds from land sales and the remaining part of investment income that accrues to Past Reserves and cannot be used to fund government expenditures without the approval of the President. While such receipts are not reflected in the Overall Balance, the information is presented annually to Parliament and included in Budget documents.
7/ Gross asset stock figures are as at the end of March for each year as reported in the "Statement of Assets and Liabilities" in the budget document.
8/ Gross debt stock figures are as at the end of the calendar year. Government debt is issued to develop domestic capital markets and to provide an investment vehicle for the mandatory saving scheme.
9/ The government of Singapore is the sole equity shareholder of Temasek.
10/ The IMF staff projection for GDP is used to calculate the numbers for the 2016/17 budget in the authorities' budgetary accounts in percent of GDP.

Table 6. Singapore—Medium-Term Scenario, 2012–2021

					Projections					
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Real growth (percent change)										
GDP	3.7	4.7	3.3	2.0	1.7	2.2	2.5	2.6	2.6	2.6
Total domestic demand	6.8	4.3	0.2	0.5	4.1	3.2	3.6	3.7	3.6	3.6
(Contribution to GDP growth, in percent)	4.8	3.1	0.1	0.4	2.9	2.3	2.6	2.7	2.7	2.7
Final domestic demand	4.6	5.1	0.0	2.7	2.3	3.0	3.6	3.9	3.8	3.8
Consumption	2.4	4.7	1.7	4.9	4.1	3.3	3.4	3.7	3.7	3.7
Private	3.5	3.1	2.2	4.5	3.5	3.6	3.8	4.1	4.1	4.1
Public	-1.9	11.1	-0.1	6.6	6.4	2.2	2.0	2.2	2.3	2.4
Gross capital formation	13.9	3.7	-2.0	-6.2	4.2	3.2	4.0	3.8	3.6	3.5
Private	13.3	4.8	-4.7	-7.3	2.1	2.9	4.0	3.8	3.6	3.6
Public	16.7	-1.6	11.0	-1.6	12.5	4.4	4.0	3.8	3.5	3.2
Gross fixed investment	8.3	5.7	-2.6	-1.0	-0.8	2.5	3.9	4.2	3.9	3.8
Change in inventories 1/	1.7	-0.4	0.1	-1.5	1.3	0.2	0.1	0.0	0.0	0.0
Net exports /1	-1.5	1.9	1.8	1.3	-1.1	-0.1	-0.1	-0.1	-0.1	-0.1
Saving and investment (percent of GDP)										
Gross national savings	47.9	48.2	46.4	46.1	46.6	46.3	45.7	45.0	44.4	43.6
Government 2/	12.9	10.9	10.1	8.1	7.0	6.7	6.9	7.2	7.4	7.6
Private and other	35.0	37.3	36.3	38.0	39.6	39.5	38.7	37.9	37.0	36.0
Gross capital formation	29.8	30.3	28.9	26.3	26.4	26.6	27.1	27.5	27.9	28.2
Government 3/	4.6	4.5	5.0	5.0	5.7	5.8	5.9	6.0	6.0	6.1
Private and other	25.2	25.9	24.0	21.3	20.7	20.8	21.2	21.5	21.8	22.1
Inflation and unemployment (period average, percent)										
CPI inflation	4.6	2.4	1.0	-0.5	-0.3	1.1	1.8	1.9	1.9	1.9
Core CPI inflation	2.5	1.7	1.9	0.5	0.8	1.4	1.9	1.9	1.9	1.9
Unemployment rate	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0
Output gap	0.6	1.0	0.7	-0.1	-0.6	-0.6	-0.4	-0.3	-0.1	0.0
Central government (percent of GDP) 4/										
Revenue	22.6	21.9	21.6	21.6	21.9	21.4	21.5	21.7	22.0	22.2
Expenditure	13.7	14.8	15.7	18.8	20.6	20.5	20.4	20.5	20.6	20.7
Overall balance	8.9	7.1	5.9	2.7	1.3	0.9	1.1	1.2	1.3	1.5
Primary balance 5/	1.5	0.3	-0.3	-3.0	-4.2	-4.4	-4.4	-4.4	-4.4	-4.5
Merchandise trade (percent change)										
Export volume	0.4	2.6	3.6	2.3	0.1	3.7	3.9	3.9	4.2	4.5
Import volume	1.1	0.6	3.2	3.2	0.5	3.9	4.4	4.6	4.9	5.2
Terms of trade	-0.9	0.0	0.7	5.7	1.3	-1.4	-0.3	-0.1	-0.2	-0.2
Balance of payments 6/ (percent of GDP)										
Current account balance	18.1	17.9	17.5	19.8	20.2	19.7	18.6	17.5	16.5	15.4
Balance on goods and services	23.6	23.1	24.4	26.9	26.7	26.3	25.1	24.1	23.1	21.9
Balance on primary and secondary income	-5.5	-5.2	-7.0	-7.1	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5
Gross official reserves (US$ billions)	259	273	257	248	255	264	275	288	301	314
In months of imports 7/	6.1	6.4	7.0	7.1	6.8	6.6	6.6	6.5	6.4	6.3

Sources: Data provided by the Singapore authorities; and IMF staff estimates and projections.

1/ Contribution to GDP growth.
2/ Based on fiscal accounts data.
3/ Based on national accounts data.
4/ On a calendar year basis.
5/ Overall balance excluding investment income, capital revenue, and interest payments.
6/ The authorities recently migrated to the *Balance of Payments Manual 6* (BPM6), which resulted in some BOP data revisions.
7/ In months of next year's imports of goods and services.

Table 7. Singapore—Financial Soundness Indicators—Local Banking Sector, 2012–15 1/

	2012	2013	2014		2015
			Sep.	Dec.	Sep.
			(In percent)		
Capital adequacy ratio					
Regulatory capital to risk-weighted assets	18.1	16.4	16.0	15.9	15.8
Regulatory tier I capital to risk-weighted assets	14.9	13.8	13.5	13.6	13.6
Shareholders' equity to assets	9.2	8.4	8.5	8.6	8.8
Asset quality					
NPLs to nonbank loans	1.2	1.0	0.9	0.9	1.0
Total provisions to NPLs	128.3	135.4	148.6	152.5	138.9
Specific provisions to NPLs	41.8	34.8	32.4	32.6	28.5
Loan concentrations (in percent of total loans)					
Bank loans	12.7	15.5	14.4	14.0	12.9
Nonbank loans	87.3	84.5	85.6	86.0	87.1
Of which :					
Manufacturing loans	7.9	7.9	8.0	7.9	7.5
Building and construction loans	12.6	12.8	12.9	14.9	16.4
Housing loans	22.0	19.8	20.4	20.2	20.7
Loans to professionals and private individuals	8.8	8.4	8.8	9.0	9.1
Loans to nonbank financial institutions	10.7	8.8	9.0	7.2	7.0
Profitability					
After tax return on assets	1.1	1.0	1.0	0.9	1.0
After tax return on equity	12.0	11.5	12.4	10.3	11.3
Net interest margin	1.8	1.7	1.7	1.7	1.7
Non-interest income to total income	43.6	39.5	42.2	33.9	36.7
Liquidity 2/					
Liquid DBU assets to total DBU assets	9.7	9.3	9.2		
Liquid DBU assets to total DBU liabilities	10.5	10.0	9.9		

Source: Monetary Authority of Singapore.

1/ The data is for local banks' consolidated operations. Local banks refer to the three local banking groups.
2/ Liquidity data reflect all commercial banks operating in Singapore, including branches and subsidiaries.

Table 8. Singapore—International Investment Position, 2012–15

	2012	2013	2014	2015
	(In billions of Singapore Dollars)			
External assets	3352	3695	3952	4150
Direct investment	694	775	828	884
Portfolio investment	984	1157	1274	1360
Equity securities	524	595	642	685
Debt securities	460	562	633	675
Other investment and financial derivatives	1358	1418	1509	1556
Reserve assets	317	345	340	351
External liabilities	2635	2929	3189	3306
Direct investment	1003	1120	1272	1383
Portfolio investment	202	247	273	242
Equity securities	175	207	226	199
Debt securities	27	41	46	43
Other investment and financial derivatives	1430	1562	1644	1681
Net international investment position	717	766	763	844
	(In percent of GDP)			
External assets	927	983	1018	1031
Direct investment	192	206	213	220
Portfolio investment	272	308	328	338
Equity securities	145	158	165	170
Debt securities	127	150	163	168
Other investment and financial derivatives	376	377	389	387
Reserve assets	88	92	88	87
External liabilities	729	780	821	822
Direct investment	278	298	328	344
Portfolio investment	56	66	70	60
Equity securities	48	55	58	50
Debt securities	8	11	12	11
Other investment and financial derivatives	396	416	423	418
Net international investment position	198	204	197	210

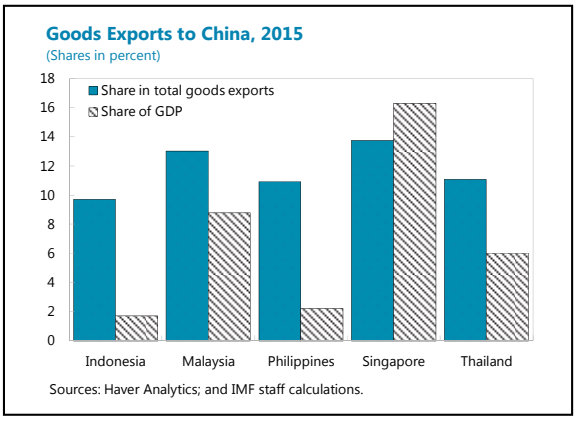
Source: Singapore, Department of Statistics.

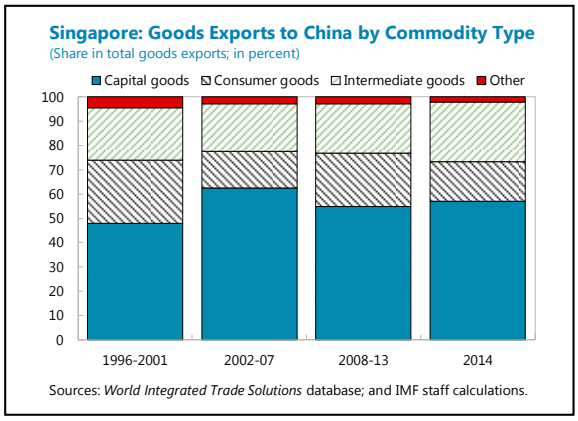
Appendix I. Linkages with China[1]

Singapore is exposed to China through direct and indirect trade and financial links. The bumpy rebalancing of China's growth model, including repercussions in global financial markets, will have important implications for Singapore.

A. Trade Links

Trade Exposure. China is Singapore's single largest destination for goods exports. In 2015, exports to China were nearly equal to the combined exports to the European Union and the United States. Singapore's exports to China expanded at a compound annual growth rate of about 15 percent over the past two decades, much faster than its total goods exports. As a result, the share of exports going to China has approximately quintupled. Among the ASEAN-5 countries, Singapore is the most exposed to China through goods trade. Goods exports to China amounted to 16.3 percent of GDP in 2015, much higher than Malaysia (8.8 percent), the second most exposed ASEAN-5 country. In terms of Singapore's gross exports, China accounted for a share of about 14 percent (up from the 2011–14 average of 11.5 percent). Capital goods account for about three-fifth of exports to China, while intermediate goods represent another one quarter of the share. This commodity composition makes Singapore vulnerable to a slowdown in investment demand as China rebalances. In 2014, China accounted for nearly 6 percent of Singapore's services exports.

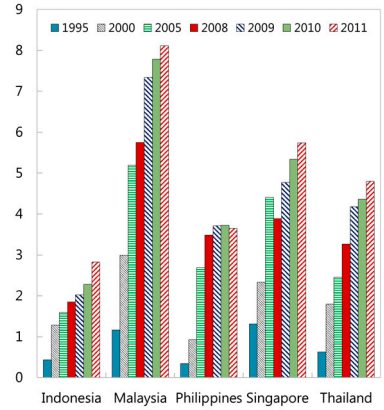




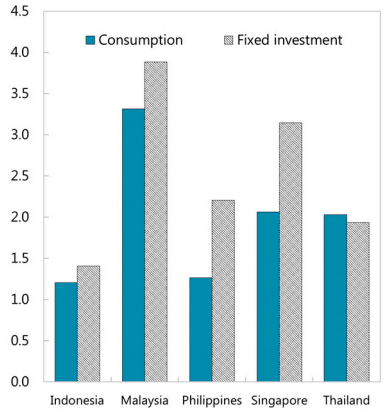
Trade in value-added terms. In value-added terms, Singapore's exposure is second highest among the ASEAN-5 countries, after Malaysia. Over the years, Singapore's shares in value-added in China's final domestic demand and exports have increased, making it more vulnerable to developments in China.

[1] Prepared by Souvik Gupta and Umang Rawat (APD).

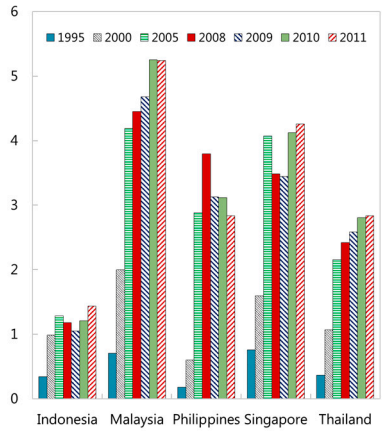
Appendix Figure I.1. ASEAN-5: Trade in Value-Added with China



Sources: OECD, TiVA database; and IMF staff calculations.



Sources: OECD, TiVA database; and IMF staff calculations.



Sources: OECD, TiVA database; and IMF staff calculations.

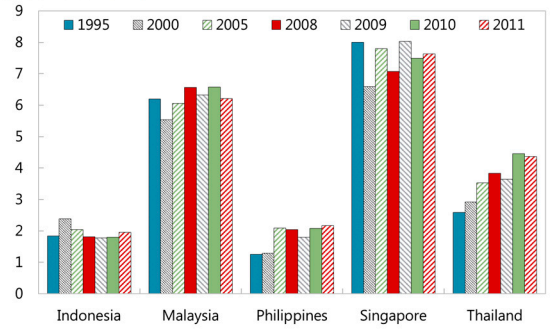
Goods Exports. Goods exports to China went down by 7.4 percent (in U.S. dollar terms) in 2015, driven by a sharp reduction in domestic exports to China (down by 17.3 percent). Re-exports to China were up by 2.4 percent. However, exports to other parts of the world, excluding the United States, were down by nearly thrice as much (exports to the U.S. were flat).[2] The large fall in domestic exports to China was driven by chemicals and manufactured goods. Volume of domestic exports to China was also down in 2015, first time since the Great Financial Crisis (GFC).

Services Exports. Services exports to China are small, but growing. In 2014, they accounted for a share of about 6.8 percent of the total (or, nearly 3 percent of GDP). These exports to China were nearly as big as those to Japan, but about one-third to one-half of those exports to Europe or North America, respectively.

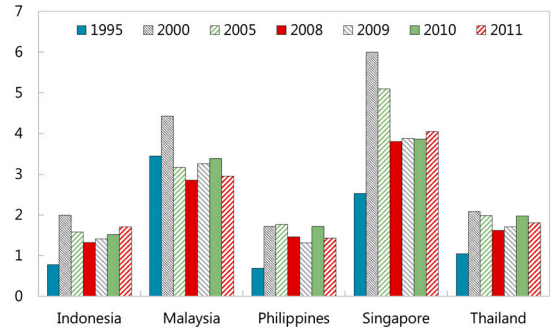
Indirect Trade Links. Indirect trade link with China, particularly through the other countries in the region, is also important given that Singapore has the highest exposure to value-added embedded in other ASEAN-5 domestic demand and exports. In gross value terms, the ASEAN-4 economies together with Japan and Korea accounted for nearly 34 percent of Singapore's total goods exports in 2015. Any impact of a shock originating from China on these countries will also have implications for Singapore. Services exports to the ASEAN-4 countries and Korea were about twice as high as those to China in 2014.

[2] Total goods exports were down by 14.5 percent in 2015. In Singapore dollar terms, total good exports were down by about 7 percent, but those to China were up by 0.5 percent.

Appendix Figure I.2. Trade in Value-Added Among ASEAN-5



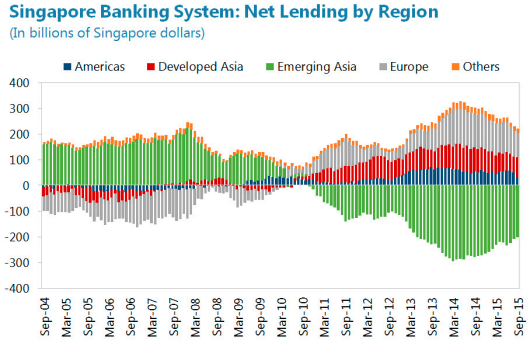
Sources: OECD, TiVA database; and IMF staff calculations.



Sources: OECD, TiVA database; and IMF staff calculations.

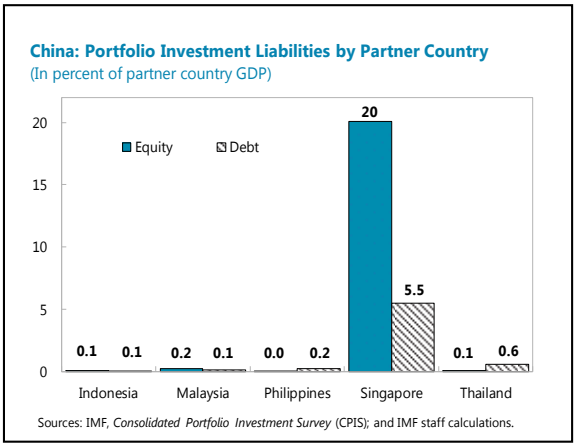
B. Financial Linkages

Background. As an international financial center, Singapore intermediates credit globally. Prior to the GFC, banks in Singapore channeled surplus savings from emerging Asia to Europe. Post crisis, the flows reversed and net lending to nonbank customers in emerging Asia and bank funding from rest of the world turned positive. Credit growth was strong during 2009–2014, driven primarily by demand from China and other emerging Asia.

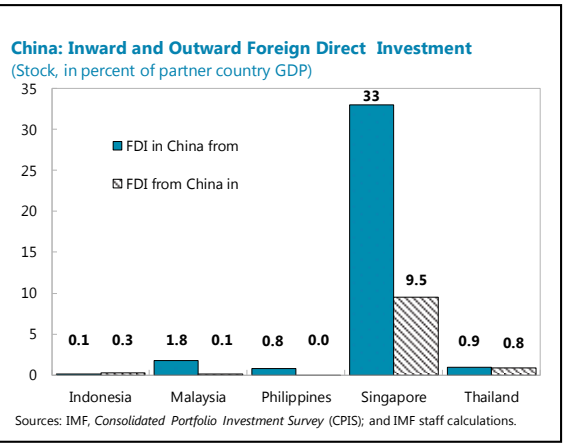


Source: Monetary Authority of Singapore

Direct Financial Exposure. Singapore's financial linkages to China are large in absolute terms and when compared to those of other ASEAN countries. The stock of China's FDI from Singapore is over 30 percent of Singapore's GDP while Singapore's portfolio investment in China is about 27 percent of Singapore's GDP. This is not surprising in view of Singapore's position as a large international financial center, although a material fraction of the investment in China via Singapore may originate in other countries.

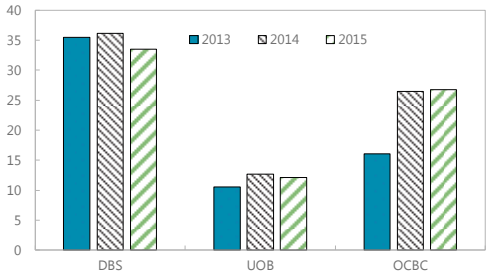


Sources: IMF, *Consolidated Portfolio Investment Survey* (CPIS); and IMF staff calculations.



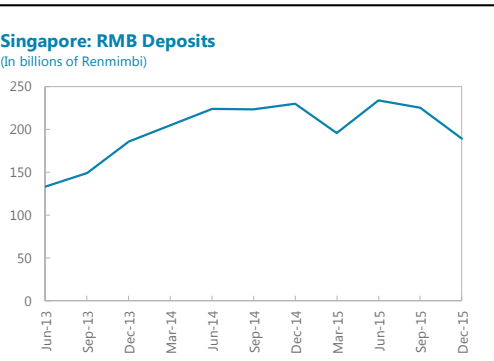
Sources: IMF, *Consolidated Portfolio Investment Survey* (CPIS); and IMF staff calculations.

Banking Sector Exposure. The three big banks in Singapore—DBS, OCBC, and UOB—have significant lending exposure to the greater China region. Problem loans (as a proportion of gross loans) arising from greater China have risen mildly in 2015. Credit risk from mainland China is mitigated as exposure is predominantly trade finance related—short-term loans, which are traditionally safer and mostly backed by letters of credit from systemically important Chinese banks. However, substantial exposure to Hong Kong SAR and other Asian economies including Malaysia and Indonesia, which are also closely tied to China would require careful monitoring of banks' balance sheets. On March 31, 2016, Moody's changed the outlooks on the three big banks from stable to negative due to increasingly challenging domestic and external operating environment for banks.



Sources: DBS, UOB and OCBC financial and annual reports; and IMF staff calculations.

Carry Trade. The development of the offshore RMB market (CNH) facilitated a very profitable interest rate arbitrage from its inception in 2010, wherein investors borrowed short term from overseas banks at relatively low interest rates and then invested in high-yielding Chinese assets amid expectations of a renminbi appreciation. There are three main channels through which the RMB carry trade built up – trade over/under invoicing, black market channels, and especially, copper-backed commodity financing.[3] Depreciation of the RMB has led to unwinding of carry trade as evidenced by large capital outflows in China and fall in trade finance activities. The falling demand for RMB in offshore markets, including Singapore, is evidenced by continued shrinkage of offshore renminbi deposits.

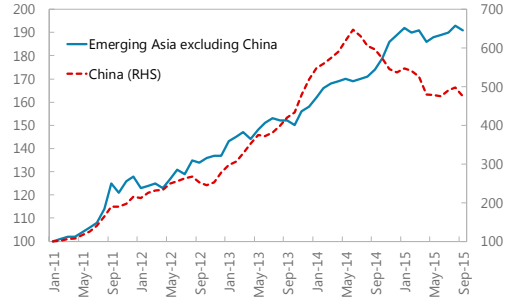


Source: Monetary Authority of Singapore

Turning Point. More recently, the credit cycle has begun to turn, led by a decline in nonbank loans to China. Nonbank loans to China started falling in mid-2014, also accompanied by a contraction in trade bills due to a slowdown in the Chinese economy as well as a moderation in trade flows. The share of trade bills in nonbank loans fell from a peak of 15 percent in June 2014 to 8 percent in February 2016. Cross-border exposure of domestic banks in Greater China region, which increased from 2010 to 2014 and fell slightly in 2015, is still sizable at close to 25 percent.

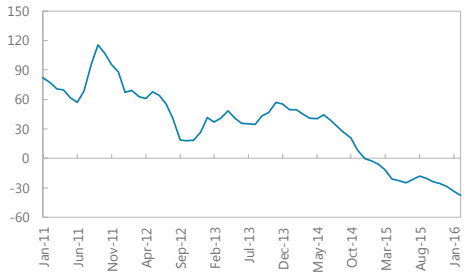
[3] See Xiao and Balding, "Carry Trade Dynamics Under Capital Controls: The Case of China," June 27, 2015.

Singapore: Non-bank Loans to China and Emerging Asia
(Index: Jan 2011 = 100)



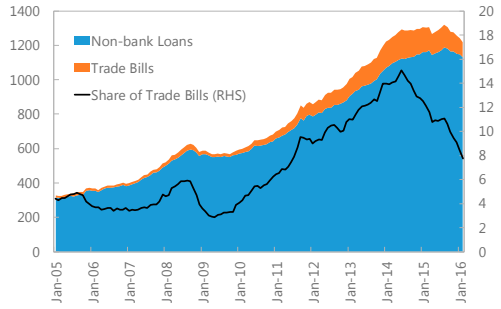
Sources: Monetary Authority of Singapore.

Singapore: Banking System's Total Trade Bills Growth 1/
(YoY percent growth)



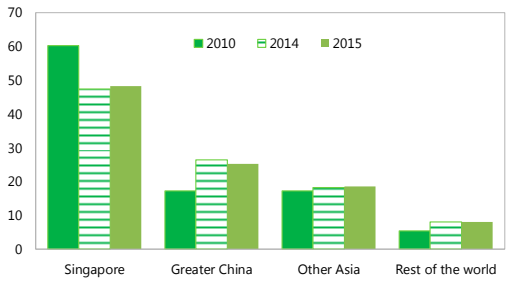
Sources: Monetary Authority of Singapore; and IMF staff calculations.
1/ Bills discounted are used as proxy for trade finance. Includes bills financing by domestic banks and external bills discounted or purchased by foreign banks.

Singapore: Share of Trade Bills
(In billions of Singapore dollars)



Sources: Monetary Authority of Singapore; and IMF staff calculations.

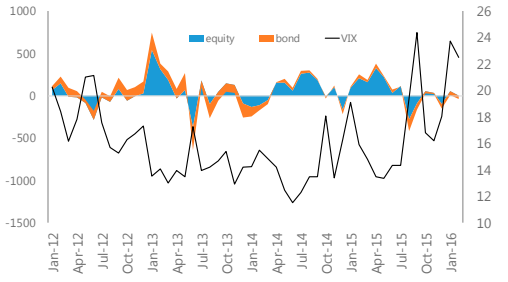
Singapore: Cross-Border Exposures of Domestic Banks 1/
(In percent)



Sources: Banks' financial reports and annual reports; and IMF staff calculations.
1/ Classification varies by bank. OCBC, location of credit risk; DBS, location of borrower incorporation; and UOB, booking location.

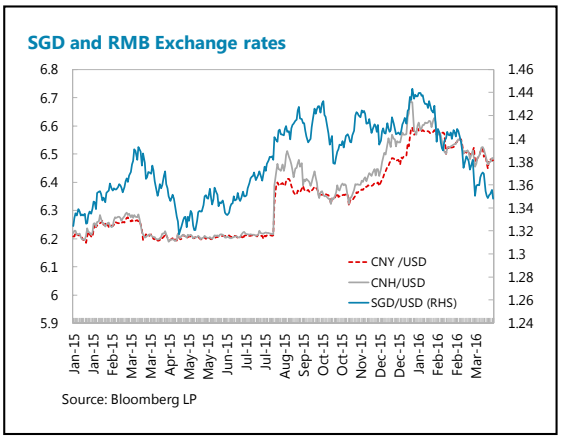
Indirect Financial Exposure. Developments in China also affect financial conditions in Singapore indirectly, via their impact on regional and global financial conditions. RMB depreciation and uncertainty about the underlying strength of the Chinese economy led to spikes in the VIX in August 2015 and in January 2016 and capital outflows (mostly equity) from Singapore were sizable. Continued uncertainty about the Chinese economy and policymaking could also adversely affect global investors' outlook about Asia, which would especially impact financial centers like Singapore and Hong Kong SAR.

Singapore: Portfolio Fund Flows
(In millions of US dollars, sum of last four weeks)



Source: EPFR Global Country Flows

Exchange Rate Co-Movement. Singapore dollar and the Chinese renminbi have commoved against the U.S. dollar since the latter's step devaluation in August 2015, when Singapore dollar slid to a five-year low. Singapore's currency is highly responsive to changes in renminbi as its exporters have a high degree of exposure to China. Furthermore, it closely tracks renminbi as the latter is believed to be included in the undisclosed currency basket used by the MAS to manage monetary policy. The Singapore dollar could continue to come under pressure if renminbi depreciation pressure continues and its depreciation against the U.S. dollar would also put upward pressure on Sibor interest rates to keep pace against exodus of funds.



C. China Spillovers

Recent staff analyses (Dizioli and others, forthcoming, and Cashin and others, 2016) show that a 1 percent one-off slowdown in China's GDP would have varying impact on the ASEAN-5 economies, given their trade exposure. This impact is amplified if combined with a China-induced spike in global financial volatility. The impact on Singapore's GDP in the first year after of the shock is estimated at –0.1 to –0.5 percentage points, with the highest impact seen when financial volatility spikes. These estimates also incorporate the positive spillover from a China slowdown, viz. lower global commodity prices, which would help Singapore as the country is a net importer of commodities.

References

Dizioli, A.; J. Guajardo; V. Klyuev; R. Mano; and M. Raissi, 2016 (forthcoming), "Spillovers from China's Growth Slowdown and Rebalancing to the ASEAN-5 Economies", IMF Working Paper.

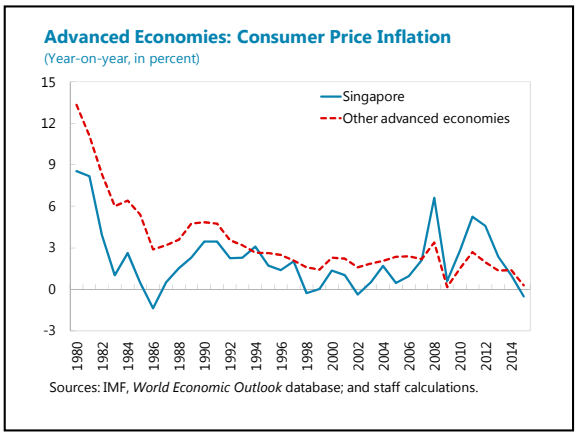
Cashin, P.; K. Mohaddes; and M. Raissi, 2016, "China's Slowdown and Global Financial Market Volatility: Is World Growth Losing Out?" IMF Working Paper No. 16/63.

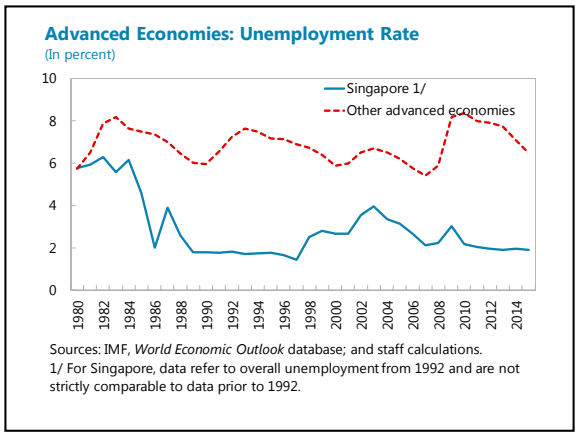
Xiao and Balding, 2015, "Carry Trade Dynamics Under Capital Controls: The Case of China", accessed through http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2623794 (June 27, 2015).

Appendix II. Inflation and Unemployment Trends[1]

Inflation in Singapore has remained on a downward trend since late 2011, declining from a peak of about 5.5 percent to –0.8 percent in the first quarter of 2016, and remained below zero since 2014Q4. Unemployment, on the other hand, was stable around 2 percent during this time. This study finds that in Singapore while the conventional inflation-unemployment trade-off holds over the past two decades, it has weakened in recent years. On the other hand, inflation expectations are better anchored. Finally, the marginal impact from import prices on headline inflation does not appear to have increased in recent years.

Headline inflation in Singapore has largely remained below that in other advanced economies over the past three and a half decades. Like in other advanced economies, Singapore has experienced a trend disinflation since 2011 and the headline inflation has remained below zero since late 2014. However, the slowdown in inflation in Singapore has happened at a much faster pace, declining from a peak of about 5.5 percent in late 2011 to –0.8 percent in the first quarter of 2016. Historically, Singapore also experienced a much lower overall unemployment rate, particularly since the 1990s, reflecting in part a lower structural unemployment rate.





What is remarkable is that despite a trend decline in inflation for over four years now, unemployment rate has remained broadly stable around 2 percent. Does it mean that the traditional Phillips curve relation has weakened in recent years? IMF (2013) and Blanchard and others (2015), for example, have looked into this issue in the context of other advanced economies. Both these studies document a flattening of the Phillips curve since the 1970s, with most of this flattening happening before the 1990s against a rapid decline in inflation. Moreover, these studies find that inflation expectations are much better anchored now than in the past helping ensure the stability of inflation witnessed over the last three decades (the Great Moderation).

In this study, we use the New Keynesian Phillips curve framework described in the above studies to explore how the Phillips curve relationship has evolved over time in Singapore along with the evolution of importance of inflation expectations in explaining headline inflation. The framework

[1] Prepared by Souvik Gupta (APD).

also allows for global shocks through relative import price deflator to influence the inflation process, an important factor in the context of a small and highly open economy like Singapore.

We first estimate a long-run relationship, whereby inflation (π_t) is determined by inflation expectations (π_t^e) and cyclical unemployment ($u_t - u_t^*$), where u_t^* is structural unemployment.

$$\pi_t = \alpha\pi_t^e - \delta(u_t - u_t^*) + \psi_t \qquad (1)$$

Applying the generalized method of moments (GMM) estimation technique, with lagged explanatory variables as instruments, on data since the mid-1990s, we find that the negative relationship between inflation and cyclical unemployment holds. However, the estimates vary depending on the measure of cyclical unemployment.[2] Inflation expectations are found to be significant in two of the models.

Appendix Table II.1. Singapore—Long-Term Phillips Curve Relation 1/

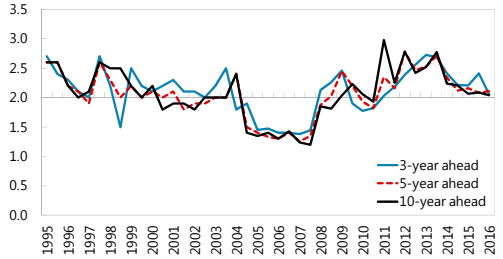
Dependent variable: actual inflation	Measure of cyclical unemployment based on:			
	1987Q1–2016Q1 average unemployment rate	Hodrick-Prescott (HP) trend unemployment rate	NAIRU following Blagrave and others (2015)	NAIRU following a modified version of Ali (2015)
Long-term inflation expectation	0.70	0.52	0.16	0.12
	(0.00)	*(0.00)*	*(0.23)*	*(0.27)*
Cyclical unemployment	0.58	1.87	1.46	1.79
	(0.04)	*(0.00)*	*(0.0)*	*(0.00)*

Source: IMF staff estimates.
1/ Reports the absolute coefficient for cyclical unemployment. Numbers in parentheses are the p-values based on robust standard errors (a p-value less than 0.05 implies that the coefficient is statistically significant at 5 percent level).

In Singapore, inflation expectations have largely been stable over the last two decades, hovering predominantly between 1.5 percent and 2.5 percent range. The near-term inflation expectation has also been in line with the survey of professional forecasts conducted by the Monetary Authority of Singapore (MAS).

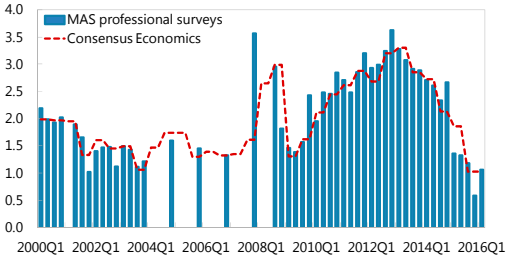
[2] We used the average of the 6–10 year-ahead consumer price inflation forecasts from the Consensus Economics as long-term inflation expectation. For the cyclical unemployment, we used four different measures of long-term or structural unemployment: average unemployment rate over 1987Q1–2016Q1; a Hodrick-Prescott (HP) measure of trend unemployment rate; and two measures of nonaccelerating inflation rate of unemployment (NAIRU) derived from a multivariate Kalman filter (MVF) framework developed by Blagrave and others (2015) and a modified version of Ali (2015) to account for changes in labor force participation (see Appendix IV for details on these MVF models).

Singapore: Inflation Expectations 1/
(Year-on-year, in percent; based on headline consumer price index)



Source: Consensus Economics, Inc.
1/ Refers to inflation expectations for 3,5, and 10 calendar years ahead. Based on semi-annual surveys (April and October).

Singapore: 1-Year Ahead Inflation Expectations 1/
(Year-on-year, in percent; based on headline consumer price index)



Sources: Monetary Authority of Singapore; and Consensus Economics, Inc.
1/ Refers to inflation expectations for the following calendar year. Historical data not available for all the quarters for MAS professional surveys.

Stability of inflation expectations could be a testament to the credibility of the MAS' monetary policy framework, prudent fiscal policy decisions, a pragmatic approach toward macroeconomic management, and strong institutions in Singapore. Following Gillitzer and Simon (2015), we statistically assess the stability of inflation expectations to surprises in actual inflation. We regress the change in successive semi-annual Consensus Economics surveys of inflation forecasts at various horizons on the change in actual inflation during the interim period between the relevant surveys.

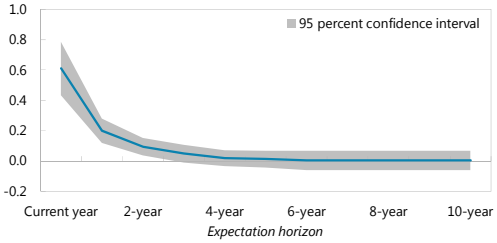
$$\pi^{e}_{t+h} - \pi^{e}_{t-6+h} = \mu_h + \omega_h(\pi_t - \pi_{t-6}) + \varepsilon_{t+h} \qquad (2)$$

Where, *h* refers to different forecasts horizons.

If expectations are well anchored, surprises in actual inflation in the interim period between the two surveys should not impact the medium- to long-term expectations. Near-term expectations, however, may change reflecting unexpected transitory shocks to actual inflation.

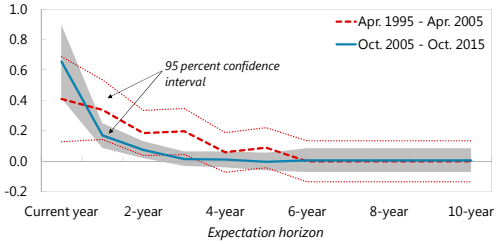
Our analysis finds that since the mid-1990s, when the Consensus Economics' long-term forecast became available, surprises in actual inflation have had significant positive impact on inflation expectations up to 2-year ahead (marginally significant impact on the 3-year-ahead expectations), with insignificant impact beyond the 3-year horizon. Thus, inflation expectations have been well anchored in the longer term. Further, a breakdown of the estimation period into two decades reveals that expectations have become better anchored over the last decade. During this period, inflation surprises have had a larger impact on the current-year inflation forecasts, but the impact on the future years have been relatively muted, particularly over the medium term.

Singapore: Response of Inflation Expectations to Changes in Actual Inflation 1/
(Response to 1 percentage point change in actual inflation since the last survey)



Sources: Consensus Economics, Inc.; CEIC Data Co. Ltd.; and IMF staff estimates.
1/ Based on semi-annual survey (April and October) of inflation expectations since 1995 by Consensus Economics, Inc.

Singapore: Response of Inflation Expectations to Changes in Actual Inflation 1/
(Response to 1 percentage point change in actual inflation since the last survey)



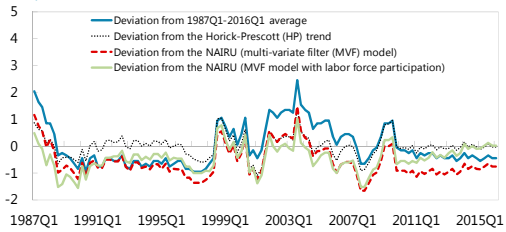
Sources: Consensus Economics, Inc.; CEIC Data Co. Ltd.; and IMF staff estimates.
1/ Based on semi-annual survey (April and October) of inflation expectations since 1995 by Consensus Economics, Inc.

Having studied the long-run Phillips curve relationship, next we checked whether this relationship has changed over time (the short-run dynamics). To formally test for the short-run dynamics we use the following error-correction model.

$$\pi_t = (1-\theta_t)\pi_{t-1} + \theta_t\pi_t^e - \rho_t(u_t - u_t^*) + \gamma_t\pi_t^m + \varphi_t\left(\pi_t - \hat{\alpha}\pi_t^e + \hat{\delta}(u_t - u_t^*)\right) + \xi_t \qquad (3)$$

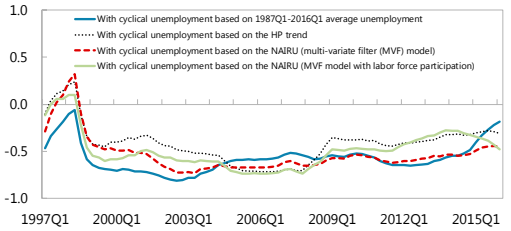
In which, π_t^e is the long-term inflation expectation, expressed as the average of the 6–10 year-ahead Consensus Economics inflation forecasts and the parameter θ will capture the impact of these expectations; the parameter ρ will capture the short-term responses of inflation to cyclical unemployment, while φ will capture the adjustments in short-term deviation from the long-term relationship estimated in (3) above. Following IMF (2013), import price inflation is also included to capture the influence of global commodity prices on domestic inflation, an important channel for short-term inflation in Singapore. It is estimated as the year-on-year change in import prices relative to the GDP deflator and its impact on current inflation will be captured by the parameter γ. We allowed the parameters to vary over time by using a rolling ten-year window and used the GMM methodology with robust standard errors for parameter estimations and lagged cyclical unemployment and import prices as instruments.

Singapore: Alternative Measures of Cyclical Unemployment 1/
(In percent)



Sources: CEIC Data Co. Ltd.; and IMF staff estimates.
1/ See Blagrave and others (2015), IMF Working Paper No. WP/15/79, for details on the MVF model and estimation of the Nonaccelerating Inflation Rate of Unemployment (NAIRU).

Singapore: Correlation between Inflation and Alternative Measures of Cyclical Unemployment 1/
(Rolling 10-year window)

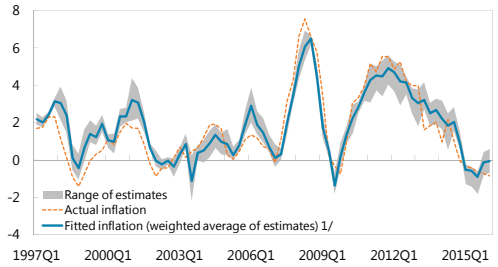


Sources: CEIC Data Co. Ltd.; and IMF staff estimates.
1/ See Blagrave and others (2015), IMF Working Paper No. WP/15/79, for details on the MVF model and estimation of the Nonaccelerating Inflation Rate of Unemployment (NAIRU).

- First, the results are sensitive to the measure of cyclical unemployment used. As discussed above, we estimated four different measures of cyclical unemployment. While these measures broadly agree over much of the history since the late-1980s, in recent years two of the measures indicate virtually no cyclical unemployment.
- Second, as mentioned above, while the long-term Phillips curve relationship holds, also seen in the negative 10-year rolling simple correlation, this correlation has weakened somewhat in recent years for three of the cyclical measures of unemployment. A further analysis shows that while the volatility of headline inflation has remained more or less similar since the GFC (standard deviation of 2.4 percent over 2011Q1–2016Q1, compared to 2.7 percent over 2007Q1–2010Q4), that of unemployment has significantly dropped (standard deviation dropping from 0.5 percent to 0.1 percent over the same period). One possible explanation could be the supply-driven external shocks, for example, in global energy prices, has led to higher variability in inflation, while domestic demand conditions were conducive enough to maintaining a relatively stable level of unemployment rate.

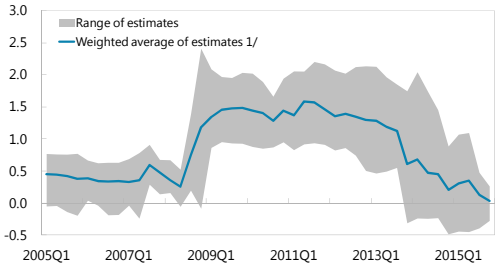
- Regression estimates based on the four different measures of cyclical unemployment explain the actual inflation process fairly well, though they differ in their extent of in-sample forecast accuracy. The regression that uses the 1987Q1–2016Q1 average unemployment rate as the measure of long-term unemployment yields the best fit against actual inflation, followed by the one that uses the HP trend of unemployment for measuring u_t^*. Of the two regressions that used the NAIRU estimates from the multi-variate Kalman filter, the one without modifications for labor force participation yielded a relatively better fit. In the following, we present a weighted average of the outcomes from these four regressions, with higher weights attached to the regression with better fit (adjusted R-squared) in terms of explaining actual inflation.

Singapore: Actual and Fitted Inflation
(Estimates from GMM regressions)



Source: IMF staff estimates.
1/ Weights are based on adjusted R-squared of the modified New Keynesian Phillips Curve in explaining actual inflation.

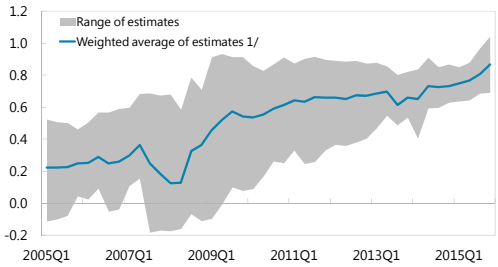
Singapore: Slope of the Phillips Curve
(Estimates from 10-year rolling GMM regressions; absolute value of the estimates)



Source: IMF staff estimates.
1/ Weights are based on adjusted R-squared of the modified New Keynesian Phillips Curve in explaining actual inflation.

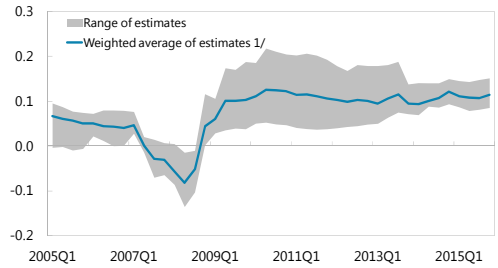
- As indicated in the simple correlation analysis above, the responsiveness of inflation to cyclical unemployment has been declining in recent years. While the relationship strengthened around the GFC, it has been weakening since 2011 and more rapidly so over the last three years. The large variability of the alternative estimates indicates a combination of uncertainty from the GFC period (in a ten-year rolling window, the GFC still impacts the parameter estimates for recent years) and also uncertainty surrounding the measurement of structural unemployment in recent years as Singapore is undergoing an economic transformation.
- Moreover, the relevance of past inflation in explaining current inflation has weakened and that of inflation expectations has strengthened steadily over the last one decade, except during the GFC. Also noteworthy is that the alternative

Singapore: Anchoring of Long-term Inflation Expectations
(Estimates from 10-year rolling GMM regressions)



Source: IMF staff estimates.
1/ Weights are based on adjusted R-squared of the modified New Keynesian Phillips Curve in explaining actual inflation.

Singapore: Importance of Import Price Inflation
(Estimates from 10-year rolling GMM regressions)



Source: IMF staff estimates.
1/ Weights are based on adjusted R-squared of the modified New Keynesian Phillips Curve in explaining actual inflation.

parameter estimates are now more tightly bound compared to the earlier years.

- Finally, while the impact of import price inflation is higher in the post GFC period, there does not appear to be any particular strengthening of this impact in recent years. However, given the magnitude of the change in global commodity prices in the last two years, the total impact has been potentially bigger. Once again, we find that the alternative parameter estimates are more closely bound in recent years.

To conclude, the inflation-unemployment trade off held in Singapore over a longer period. But in the short run, this relationship appears to have weakened in recent years. However, inflation expectations are better anchored relative to the past. The Singaporean authorities must be commended for the credibility of their macroeconomic policies which could have contributed to the improvement in anchoring inflation expectation. Finally, despite increased volatility in the global commodity prices, the marginal impact of import price inflation on the headline inflation does not appear to have increased in recent years, but its total impact is potentially larger given the large declines in commodity prices since late 2014.

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Appendix III. Labor Market Dynamics[1]

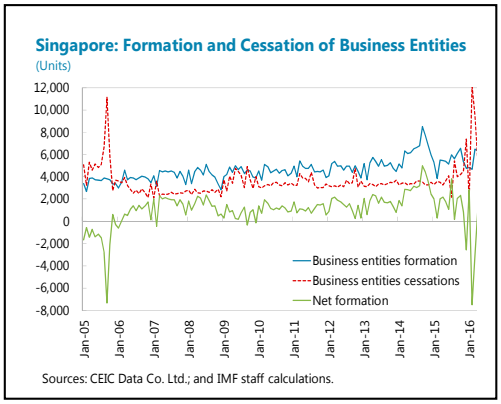
Summary. This Appendix reviews basic facts of Singapore's labor market, focusing on the evolution of labor market frictions as estimated from a Diamond-Mortensen-Pissarides (DMP) matching function. We find that tightness in Singapore's labor market has eased in recent quarters: though the unemployment rate has remained broadly stable amid a rising resident labor force participation rate, vacancies have declined and redundancies have risen. While job matching efficiency in Singapore has been comparable with the US, it has been declining in recent years, reflecting growing skill mismatches or changes in search and recruitment efforts. Labor market policies should actively continue to aim at improving skill matches and reverse the decline in matching efficiency.

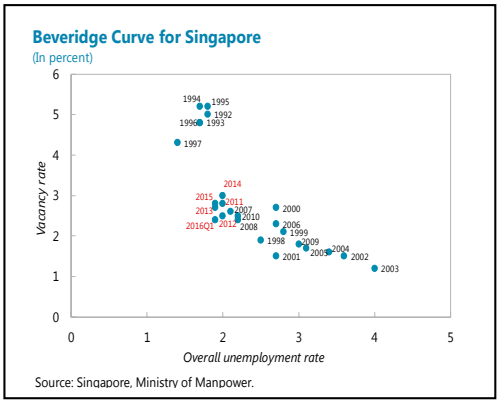
Restructuring and Labor Markets. The ongoing restructuring of Singapore's economy to a labor-lean, innovation-based growth model relies on the introduction of more binding restrictions on inflows of foreign workers (33.7 percent of total employment excluding foreign domestic workers in end-2015) and the provision of incentives to Singaporean workers and firms. The system of incentives developed since 2011 encourages Singaporean workers and firms to work, learn and innovate. It also discourages hiring of foreign workers, including through foreign worker levies and sectoral quotas.

Labor Market Developments. The restructuring has resulted in a tighter labor market, although the tightness has eased in recent quarters.

- As the labor force aged and restrictions on inflows of foreign workers came into force starting in 2011, labor markets tightened and residents' labor force participation rate rose to a record level. Increased participation by persons aged 50 years and above, which comprised a third of the labor force in 2015, accounted for about 90 percent of the change in the resident labor force participation since mid-2011. Female participation has also gone up across all age groups. Many of the new entrants were recruited in part-time and/or low-skilled jobs, resulting in a tepid change in labor productivity in recent years.
- In recent quarters the labor market has become less tight, reflecting the turn of the financial cycle at home and a difficult external environment. The ratio of job vacancies to unemployed workers has declined from a peak of 1.42 in 2014Q2 to about unity in 2016Q1. The rate of firm creation has declined and that of firm cessation has picked up. Redundancies in the labor force have gone up to the post Global Financial Crisis (GFC) highs, led by the manufacturing and services sectors. The recruitment rate has failed to keep pace with the vacancy rate since late 2013, indicating a combination of skill mismatches and rising unit business cost. Job vacancy rates have slowed down amid a deceleration in the formation of businesses and a rise in their cessation. The Beveridge curve had shifted upward during 2011–15.

[1] Prepared by Souvik Gupta (APD).





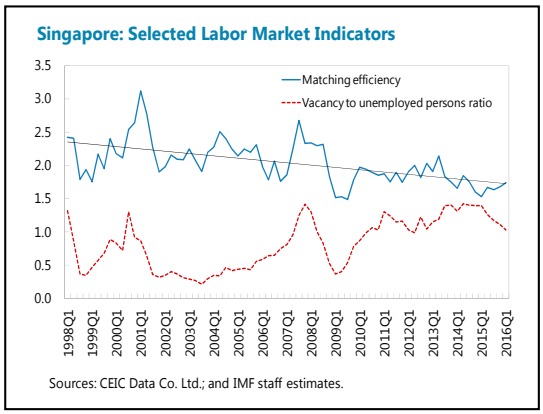
Labor Market Matching. As Singapore's economy becomes more innovation-based, the Schumpeterian mechanism of creative destruction is expected to lead to more rapid creation of new goods and services, firms, and jobs in rising sectors. But this process is expected to be disruptive as workers producing older varieties or vintages get displaced. Operationally, the ease with which workers are matched to vacancies is measured using the methods of DMP. They incorporate labor market frictions by assuming that workers who lose their job must spend some time as unemployed. They are matched to jobs randomly, according to a matching function that relates the number of successful labor market matches to vacancies posted by firms. Formally, when there are *u*L* number of unemployed workers and *v*L* vacancies, where *u* is the unemployment rate and *v* is the vacancy rate, there are *m*L* labor market matches. We assume the standard Cobb-Douglas, constant returns to scale matching function,

$$m = m_0 u^{\gamma} v^{1-\gamma}$$

where m_0 is Singapore's matching efficiency and γ is the probability of finding a job. From this, the relationship between the hiring rate m/u and labor market tightness (v/u) is:

$$\frac{m}{u} = m_0 \left(\frac{v}{u}\right)^{1-\gamma}$$

Estimates for Singapore. In the case of Singapore, γ is estimated at about 0.52, comparable to the U.S., though slightly smaller, and higher than other OECD countries.[2] In 2015, the median duration of unemployment in Singapore was 8 weeks, resident workers made redundant had a 54 percent chance of getting reemployed after three months. Matching efficiency, as measured by m_0, has declined over time (chart). If the model had been estimated until the mid-2000s, m_0 would have been 0.63, which was higher



[2] See Hall, R.E. and S. Schulhofer-Wohl, 2015, "Measuring Job-Finding Rates and Matching Efficiency with Heterogeneous Jobseekers", Hoover Institution, Economics Working Paper No. 15103 (January 2015), Table 1.

than in the U.S.[3] Matching efficiency has improved only recently, but these rates are still below the pre-GFC average, similar to the U.S. experience and likely indicating a higher skill mismatch or a change in search and recruitment efforts.[4]

[3] See Hobijn, B and A. Sahin, 2009, "Job-Finding and Separation Rates in the OECD", Economics Letters 104(3), (September 2009).

[4] 3 See Gregory, V,; C. Patterson, A. Sahin, and G. Topa, 2014,"Why Is the Job-Finding Rate Still Low", http://libertystreeteconomics.newyorkfed.org/2014/02/why-is-the-job-finding-rate-still-low.html#.Vv1SsE0UWdJ (February 2014).

Appendix IV. Potential Growth and Productivity[1]

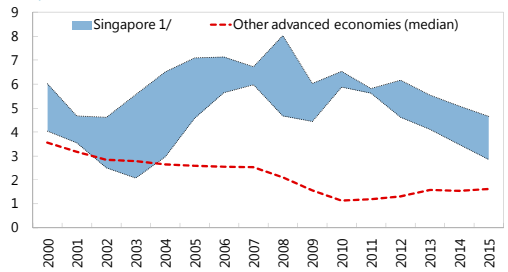
Singapore's growth rate has slowed down in recent years, driven by both cyclical and structural factors. While an aging population and tight immigration policies have led to a slower labor force expansion, despite a record high labor participation rate, a decline in private investment has contributed to a slower capital formation. Productivity has not helped either. Against this backdrop, potential growth has slowed rapidly in recent years. Looking forward, potential output is expected to grow at about 2.5–3 percent rate over the medium term, with productivity improvement backed by human capital formation, R&D, and innovation-based output.

A. Potential Growth

Singapore's potential growth has been slowing. While potential growth has been trending down since early 2000s in most advanced economies (see IMF, 2015a; and OECD, 2016), Singapore has experienced a steady decline in potential growth since the Global Financial Crisis (GFC).

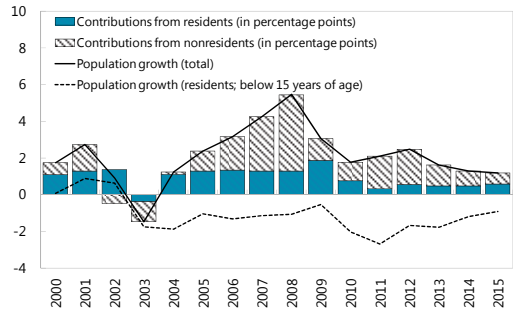
- Staff estimates that potential growth slowed to 2.75–4.5 percent range in 2015, compared with 4.5–5.5 percent seen in the recent past (see technical details below about the alternative methodologies used).
- Singapore's population is aging and restrictions on foreign worker inflows have limited total labor force growth. Growth in working-age population (aged 15–64 years) has dropped from above 5 percent in 2007 to 1.4 percent in 2015. Similarly, growth in nonresident labor force has fallen from an average of 6 percent over 2010–12 to 3 percent over 2013–15.
- In addition, uncertainties about global and regional developments, including in China, are impacting investments in physical capital, particularly in the private sector. For the economy as a whole, net capital formation slowed from a compound

Advanced Economies: Potential Growth
(In percent)



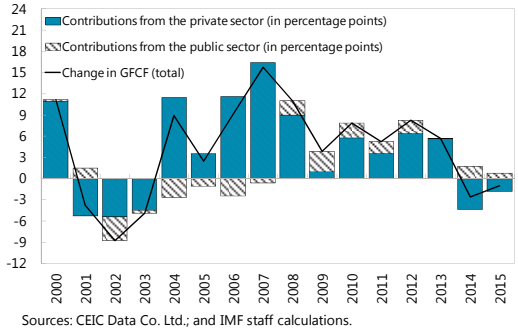
Sources: IMF, *World Economic Outlook* database; and staff estimates.
1/ Range of staff estimates based on several statistical filters (see technical details).

Singapore: Population Growth
(In percent)



Sources: CEIC Data Co. Ltd.; and IMF staff calculations.

Singapore: Gross Fixed Capital Formation (GFCF)
(Annual change, in percent; at constant 2010 prices)

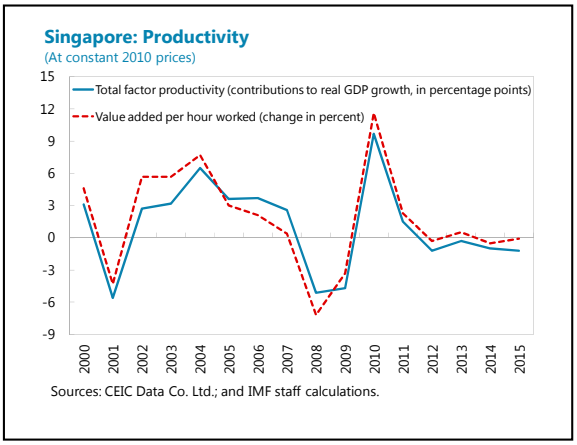


Sources: CEIC Data Co. Ltd.; and IMF staff calculations.

[1] Prepared by Souvik Gupta (APD).

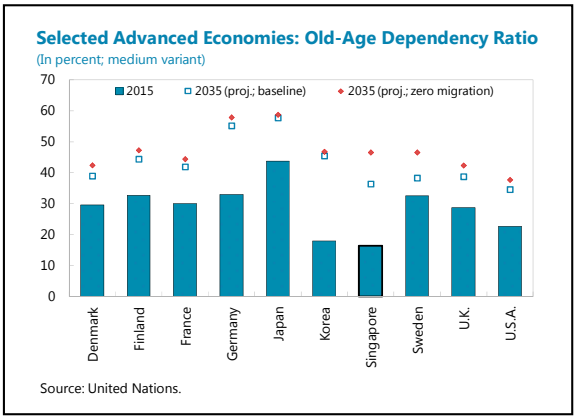
growth rate of 5.5 percent over 2010–12 to 4.5 percent over 2013–15.

- And, somewhat worryingly, though not unique to Singapore, productivity growth has slowed down considerably post GFC, driven by a weaker manufacturing sector and higher labor participation in less-productive, domestically-oriented sectors. Official statistics show that the total factor productivity (TFP) contributed negatively to real GDP growth in every year since 2012 (longest streak of negative contributions, though cumulatively it is smaller than negative contributions witnessed during the past recessions).

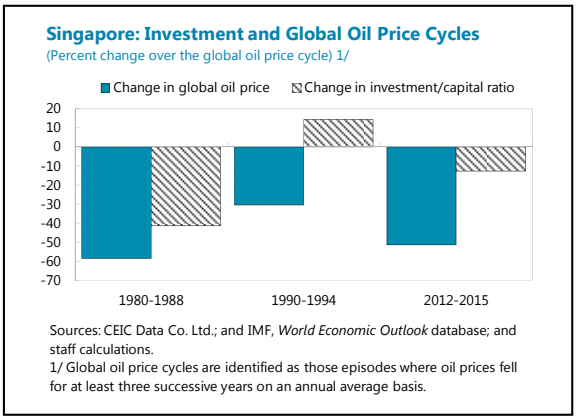


Over the medium term, staff estimates potential growth to further decelerate to 2.5–3 percent range (see tables below).[2]

- Resident labor force participation reached an all-time high in 2015, but was aided by older age workers, who likely joined in low-productivity jobs. Given the negative growth in population aged below 15 years, a fast pace of aging, and an already high labor force participation rate, resident labor force growth is forecast to about halve over the medium term, compared to 2009–15 (i.e., annual average addition of about 20,000 workers, in line with official forecast, compared to 46,000 over 2009–15).

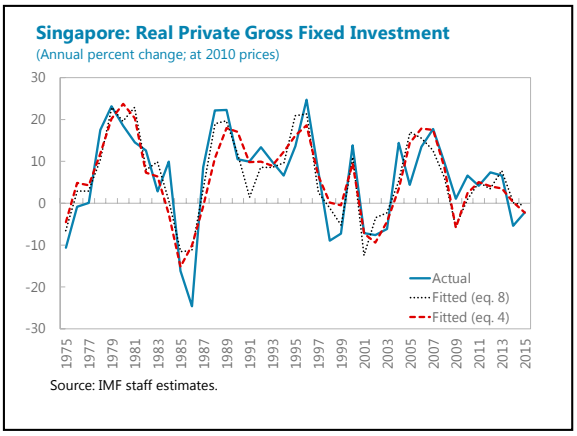


- The authorities are expected to continue with the tight policies on foreign labor participation. Staff assumes that average net addition to nonresident workforce will also halve over the medium term, compared to 2013–15.
- With capacity utilization presumably low in the manufacturing sector, given recent global developments, and the commodity price cycle lasting longer than expected a



[2] Staff's baseline macro-framework is anchored on the conservative estimates of potential growth.

year ago, staff expects the pace of capital formation to further slow down over the medium term. Further, staff analysis finds that turning of the financial cycle could have material impact on private investment. Using annual data from 1975, staff's regression estimates show that 1 percentage point slowdown in real credit growth could lower private real fixed investment by 0.6–0.9 percentage points. The estimated impact is fairly robust across different specifications (see table below).



The results also show that growth in labor force positively impacts private fixed investment, while a lower share of the manufacturing sector and counter-cyclical fiscal policies (public fixed investment is weakly correlated with output gap in the sample) drag private investment down.

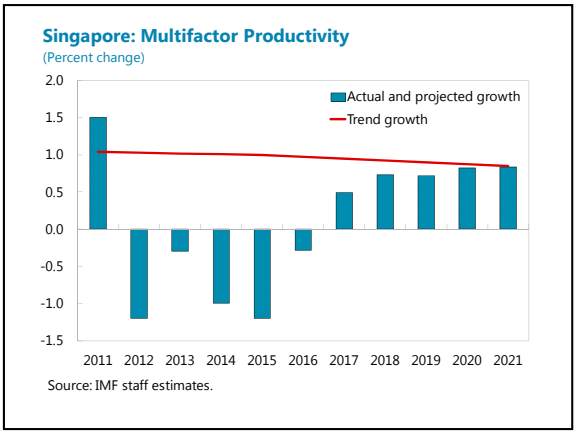
Appendix Table IV.1. Singapore—Explaining Private Fixed Investment

	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5	Eq. 6	Eq. 7	Eq. 8
Constant	–41.0*	–41.7*	–41.1*	–27.9**	–33.9*	–31.8^	–24.9**	–25.5**
Lagged private fixed investment	0.1							
Growth of labor force	1.4*	1.4*	1.2**	0.7#	1.2**	1.1**	1.4*	1.4*
Real credit growth	0.8**	0.9*	0.7**	0.6*	0.8*	0.8**	0.9*	0.9*
Share of the manufacturing sector	1.6*	1.6*	1.6*	1.2**	1.3**	1.2**	0.9**	0.9**
1-year ahead output gap			0.8**	1.1*	0.7**	0.7	0.9*	0.9*
World output gap				3.0*				
World output gap (1-year ahead)					2.0**	0.5	0.4	
Global financial volatility (VIX)						0.0		
Real public fixed investment							–0.3*	–0.3*
Number of observations	41	41	41	41	41	26	41	41
Adjusted R-squared	0.52	0.53	0.58	0.66	0.61	0.56	0.70	0.70
Durbin-Watson statistics	1.79	1.74	1.80	2.08	1.91	2.30	2.23	2.25

Source: IMF staff estimates.

Note: *,**,^, and # indicate statistical significance at 1,5, 10, and 15 percent levels respectively.

- Finally, with respect to TFP, given the recent dynamics and slower-than-envisaged response to the authorities' incentives, staff assumes productivity to improve at a pace slower than its trend growth in the near term and will move closer to its trend growth later in the medium term.
- Put all together, contributions from all the factors of production, with the exception of human capital formation, are expected to pull the potential growth down over the medium term.



Appendix Table IV.2. Singapore – Estimates of and Contributions to Potential Growth

The Simple Production Function Approach

	Estimated potential growth (In percent)	Contributions (In percentage points)		
		Capital formation	Labor force	Total factor productivity
1993–2002	6.5	4.0	1.3	1.2
2003–2012	5.2	2.5	1.6	1.1
2013–2015	4.6	2.6	1.1	1.0
2016–2021 (proj.)	2.5	1.2	0.6	0.7

The Augmented Production Function Approach

	Estimated potential growth (In percent)	Contributions (In percentage points)				
		Capital formation	Resident labor force	Human capital formation	Nonresident labor force	Total factor productivity
1993–2002	6.5	4.0	0.6	0.4	0.8	0.7
2003–2012	5.3	2.5	0.7	0.5	0.9	0.6
2013–2015	5.1	2.6	0.5	0.8	0.6	0.6
2016–2021 (proj.)	3.1	1.2	0.3	0.8	0.3	0.6

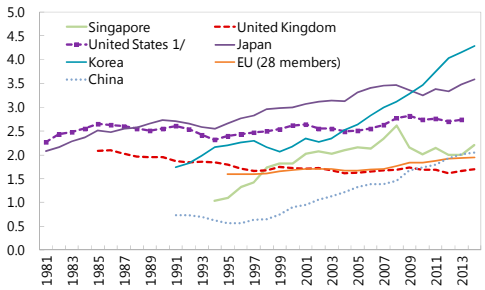
Source: IMF staff estimates.

Against this backdrop of slower growth in physical inputs, productivity enhancement will be vital for Singapore's growth over the medium term. The authorities have announced multi-year plans to raise R&D; help workers enhance their skills; and provide incentives to firms to promote investment in automation and robotics. A high level committee, Committee on the Future Economy, is expected to unveil plans by end-2016 on Singapore's future economic strategies.

B. R&D and Innovation-Based Growth

Emphasis on R&D and on labor market reforms (especially lowering labor market frictions) is appropriate for advanced economies as they strive to raise productivity growth (See Table 1 in IMF, 2015b). Innovations (new ideas or blueprints that result in the creation of new goods or processes and raise the productivity of labor and capital) are the ultimate drivers of total factor productivity (Romer, 1990). Innovations are non-rival and only partly excludable, giving rise to increasing returns. Empirically, R&D giving rise to innovations is the mechanism that "explains" the large residual in growth accounting exercises (see Jones 2015). Importantly, innovations are driven by the total *global* effort into R&D at the global level, which depends on the number of researchers in the world. On this view, total research effort is the sum of R&D of large, systemically important countries. For example, Jones (2015) uses the G-5 (the U.S., Germany, Japan, France and the U.K.). The prospect of China, India and other large developing countries contributing growing numbers of researchers could, in principle, raise global TFP, which has become anemic of late.

R&D Expenditure
(In percent of GDP)

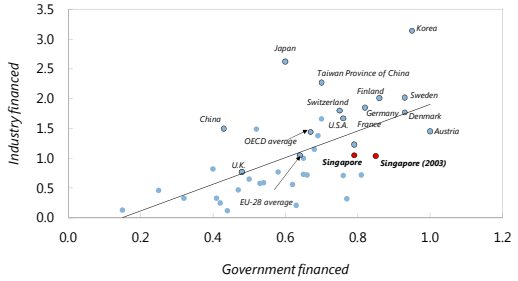


Sources: OECD; and IMF staff calculations.
1/ Latest available data for the US are for 2013.

R&D in Singapore

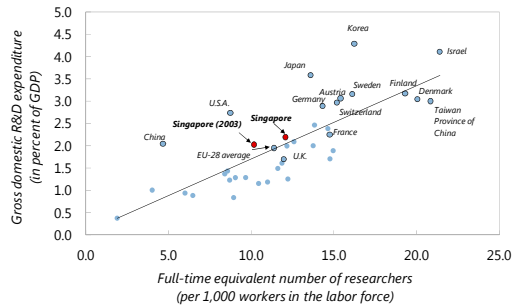
In Singapore, R&D spending in relation to GDP had been rising from low levels prior to the GFC but has leveled off in recent years. Latest cross-country data as of 2014 show that R&D share of output in Singapore is lower than in the G-5 and in Korea and has not changed much from its 2003 level. However, when expressed in per capita terms (at current purchasing power parity prices), Singapore's R&D expenditure is higher than these economies.

R&D Expenditure: OECD Countries and Selected Other Countries
(In percent of GDP; 2013 or latest available data)



Sources: OECD.Stat; and IMF staff calculations.

R&D: Expenditure and Number of Researchers
(2014 or latest available data)



Sources: OECD.Stat; and IMF staff calculations.

Research conducted in the private sector account for 60 percent of the total spending (data as of 2014). However, compared to the G-5 countries and Korea, industry-financed R&D expenditure appears to be low per unit of government-financed expenditure. In terms of sectoral allocations, engineering and technology has a 59 percent share, followed by biomedical research (19 percent) and research in other natural sciences (13 percent).

Total manpower associated with R&D (viz. researchers, technicians, and support staff) grew at a

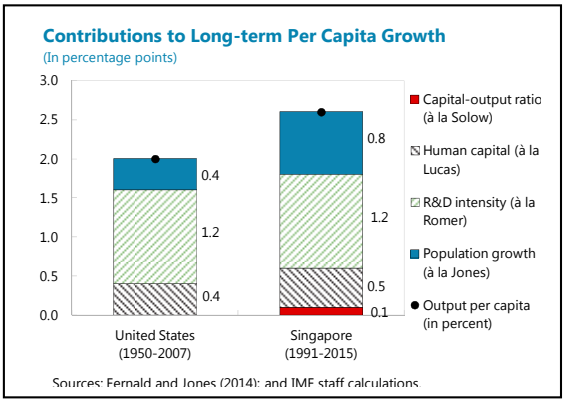
compound annual growth rate of 4.4 percent during 2004–14, faster than growth in overall labor force (4.2 percent during 2004–14). Total expenditure on R&D and researcher intensity, measured by full-time equivalent as percentage of total labor force, could be further improved.

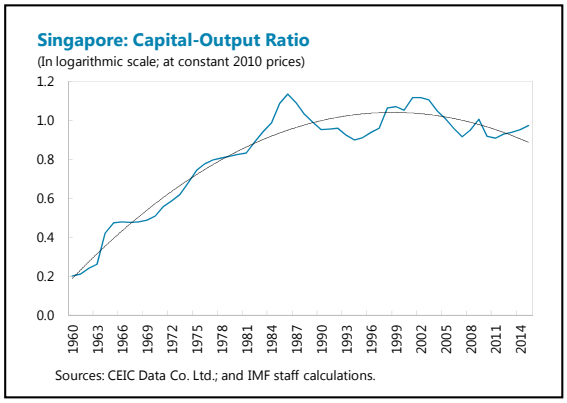
Empirical work suggests that R&D spending investment in Singapore has had a significant effect on total factor productivity and growth, although by less than in other advanced economies.[3] As Singapore's effort in this area become more pronounced, the productivity of its R&D effort could rise. The experience of Korea demonstrates that concentrated national efforts in R&D coupled with the imposition of hard budget constraints and global market orientation of firms can help create "global stars," companies that innovate and that help raise productivity and growth.

C. An Alternative Growth Accounting Based on Innovation

Following Jones (2002) and Fernald and Jones (2014), we also conduct an alternative growth accounting exercise that uses investment in R&D spending to estimate growth in total factor productivity. While following Jones, who focused on the R&D in the G-5 countries (France, Germany, Japan, the U.K., and the U.S.), we also add Korea and Singapore. Due to lack of a longer time series on labor force data, the analysis is only conducted starting in 1991. There were a few updates to the G-5 data for R&D, particularly the number of researchers in the U.S. were revised down in the OECD data. We have also included overtime hours in the total hours.

The results for Singapore accord qualitatively with those of Jones. The contribution of R&D to growth is large, almost 50 percent of growth in per capita output. The contribution of population growth has been significant as well, about 30 percent. Human capital has added 20 percent while a decline in the capital/output ratio since the Asian Financial Crisis has led to an insignificant contribution to growth from physical capital formation.





[3] The long-term elasticity of output with respect to R&D spending in Singapore is about 8.14 percent, which is comparable to estimates of R&D rates return for emerging and advanced countries taken together but lower than rates of return in advanced OECD countries (See Ping Ho and Wong, 2009).

D. Technical Details on Estimation of Potential Growth

Hodrick-Prescott (HP) Filter

A standard HP filter is applied to quarterly data since 1975. To account for the well-known end-of-period estimation problems associated with the HP filter, staff's forecasts of real GDP growth over 2016Q1–2017Q4 are incorporated.

Augmented HP Filter

The HP filter is augmented to incorporate financial cycle information and the Kalman filter is used to derive new estimates of potential output, following Borio and others (2013). The motivation is to incorporate information about financial cycle that contributes to the economic sustainability (potential output). The experience of the Global Financial Crisis of 2008–09, for example, demonstrates that output may be on an unsustainable path even if inflation remains low and stable: inflation is not a sufficient statistic that captures imbalances, particularly financial imbalances.

The HP filter can be written in state-space form as:

$$\Delta y_t^* = \Delta y_{t-1}^* + \varepsilon_{0,t} \quad (1)$$

$$y_t = y_t^* + \varepsilon_{1,t} \quad (2)$$

where y_t= log real GDP and $\varepsilon_{i,t}$ for i = 0,1 is a normally and independently distributed error with mean zero and variance σ_i^2.

We now include lags of output gap itself and real credit growth, Δcr_t and real property price growth, $\Delta PropPrice_t$.

$$y_t - y_t^* = \beta(y_{t-1} - y_{t-1}^*) + \gamma_1 \Delta cr_{t-k_{cr}} + \gamma_2 \Delta \text{PropPrice}_{t-kpp} + \varepsilon_{2,t} \quad (3)$$

where k_{cr} is a lag of credit growth and k_{pp}, of property price, chosen to maximize statistical fit. $\varepsilon_{2,t}$ is a normally and independently distributed error with mean zero and variance σ_2^2. All variables are mean-adjusted.

For estimation of (3), we use the Kalman Filter. To preserve the same duration of the business cycle as implied by the standard HP filter (i.e., $\lambda_1 = \frac{\sigma_1^2}{\sigma_0^2}$ = 1600 for quarterly data), set the signal-to-noise ratio $\lambda_2 = \frac{\sigma_2^2}{\sigma_0^2}$ such that:

$$\frac{\text{var}(y_t - y_{(2),t}^*)}{\text{var}(\Delta^2 y_{(2),t}^*)} = \frac{\text{var}(y_t - y_{(3),t}^*)}{\text{var}(\Delta^2 y_{(3),t}^*)}$$

where $y_{(2),t}^*$ and $y_{(3),t}^*$ are the potential output series from equations (2) and (3), respectively.

Multivariate Filter (MVF) Approach

The MVF approach used is an extension of Blagrave and others (2015) to account for the effect of ageing on labor force participation.

Model:

The output gap is defined as the deviation of real GDP (Y, in log terms) from its potential level, $\bar{Y}$,

$$y = Y - \bar{Y} \quad (4)$$

The stochastic process for output (real GDP) comprises of three equations, and subject to three types of shocks: shocks to the level of potential output, shock to potential growth rate, and a demand-side shock. The first shock will cause output to be at permanently different level than its initial steady-state path, while the second shock to make it deviate from the stead-state path temporarily. The demand-side shock will make output deviate from its potential temporarily. First, the level of potential output follows an autoregressive process and evolves according to potential growth and a level-shock term:

$$\bar{Y}_t = \bar{Y}_{t-1} + G_t + \varepsilon_t^{\bar{Y}} \quad (5)$$

Potential growth itself is also subject to shocks, following which it adjusts to its steady-state rate:

$$G_t = \theta G_{SS} + (1-\theta)\bar{G}_{t-1} + \varepsilon_t^{G} \quad (6)$$

Finally, the output gap slowly closes over time and is also subject to demand shocks:

$$y_t = \phi y_{t-1} + \varepsilon_t^{y} \quad (7)$$

In order to identify the above three shocks, a Phillips curve relation is added.

$$\pi_t = \lambda \pi_{t+1} + (1-\lambda)\pi_{t-1} + \beta y_t + \varepsilon_t^{\pi} \quad (8)$$

Finally, equations describing the unemployment process, including an Okun's relation, labor force participation are added to provide further identifying information.

The unemployment gap is defined as the difference from the NAIRU ($\bar{U}$). It is related to the output gap through an Okun's law equation and it affects the labor force participation (LFP) gap.

$$u_t = \bar{U}_t - U_t \quad (9)$$

$$LFP\_GAP_t = LFP_t - \bar{LFP}_t \quad (10)$$

$$u_t = \tau_1 u_{t-1} + \tau_2 y_t + \varepsilon_t^{u} \quad (11)$$

$$LFP\_GAP_t = \upsilon_1 LFP\_GAP_{t-1} + \upsilon_2 u_t + \varepsilon_t^{LFP\_GAP} \quad (12)$$

The NAIRU converges to an exogenous stead-state level, evolves according to a time-varying trend, and can experience shocks.

$$\bar{U}_t = \tau_4 \bar{U}_{SS} + (1-\tau_4)\bar{U}_{t-1} + \bar{UG}_t + \varepsilon_t^{\bar{U}} \quad (13)$$

$$\bar{UG}_t = \tau_3 \bar{UG}_{t-1} + \varepsilon_t^{\bar{UG}} \quad (14)$$

Similarly, the potential labor force participation converges to its steady-state, absent any shock.

$$\bar{LFP}_t = \vartheta_3 \bar{LFP}_{SS} + (1-\upsilon_3)\bar{LFP}_{t-1} + \varepsilon_t^{\bar{LFP}} \quad (15)$$

Finally, data from Consensus forecasts are used to capture rational expectations, which are exposed to shocks in the short term, but fulfilled in the long term.

Actual and model-consistent growth expectations:

$$g_{t+j}^E = g_{t+j} + \varepsilon_{t+j}^{g^E} \quad , j = 0,1,\ldots,5 \quad (16)$$

Actual and model-consistent inflation expectations:

$$\pi_{t+j}^E = \pi_{t+j} + \varepsilon_{t+j}^{\pi^E} \quad , j = 0,1,\ldots,5 \quad (17)$$

Annual data (1971–2015) on real GDP growth, inflation, unemployment rate, and labor force participation are used. We apply the Bayesian estimation technique (Kalman filter) to estimate the parameters.

Production Function (PF) Approaches

We apply two production function approaches. In both the approaches contributions from the resident and nonresident labor forces are separately estimated. In the augmented PF approach, contribution from the resident labor force is augmented by human capital formation.

The general PF with human capital formation is given below.

$$Y_t = A_t K_t^{\alpha} H_t^{\beta(1-\alpha)} LNR_t^{(1-\beta)(1-\alpha)} \quad (18)$$

$$H_t = h_t LRES_t \quad (19)$$

$$h_t = \exp(\varphi S_t) \quad (20)$$

Where, the nonstandard expressions are:

H_t : human capital in year t

ϕ : return on education (assumed 7 percent following the economic literature)

S_t : years in schooling, as obtained from the Barro-Lee database

LNR_t : Nonresident labor employment

$LRES_t$: Resident labor employment

α : share of capital

β : share of resident labor in the total labor force

Annual data are used. Due to lack of sufficient time series on resident and nonresident labor force, data from 1991 are used.

An Alternative Growth Accounting Based on Innovation

Following Jones (2002) and Fernald and Jones (2015), we also conduct an alternative growth accounting exercise that uses investment in R&D spending to estimate growth in total factor productivity.

In the growth accounting exercise, Jones uses the following Cobb-Douglas production function with human capital formation:

$$Y_t = A_t^{\sigma} K_t^{\alpha} H_{Yt}^{(1-\alpha)} \quad (21)$$

where H_{Yt} is expressed similarly to equations 19 and 20 above, but using the total number of labor employed.

The process of new ideas is given by the following equations:

$$\dot{A}_t = \delta H_{At}^{\lambda} A_t^{\varphi} \quad , A_0 > 0 \quad (22)$$

$$H_{At} = \sum_{i=1}^{M} h_{it}^{\theta} L_{Ait} \quad (23)$$

where H_A is effective world research effort expressed as a weighted sum of the number of researchers (L_A) in each economy. As discussed above, Jones focused on the G-5 economies as the representation for worldwide research activity and we extended this set of countries by including Korea and Singapore.

Finally, using a resource constraint on the total labor supply in the representative economy, Jones derives output per worker (y_t) as the following:

$$y_t = \left(\frac{K_t}{Y_t}\right)^{\frac{\alpha}{1-\alpha}} l_{Yt} h_t A_t^{\frac{\sigma}{1-\alpha}} \quad (24)$$

where l_Y is the fraction of the labor force that works to produce ideas (research intensity).

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Appendix V. Risk Assessment Matrix 1/

Source of Risk	Likelihood and Transmission	Expected Impact of Risk	Recommended Policy Response
Sharper-than-expected global growth slowdown	**Significant China slowdown: Medium to Low** **Significant slowdown in other large EMs and frontier economies: Medium** **Structurally weak growth in key advanced and emerging economies, including as a result of Brexit: Medium** *Direct and intraregional trade linkages.* A significant slowdown in China would have both direct and indirect effects on Singapore's exports, on the back of increasing direct trade links between China and the region. China is also the second largest source of tourists for Singapore. Domestic demand would also be hit through worsening investment sentiment. Singapore's high degree of openness and position as a financial center and a trading hub would imply large spillovers from advanced or emerging economies' lower growth. High household leverage and potential asset price corrections could exacerbate a slowdown in economic activity, with potential spillovers to banks. *Financial linkages*. Although most of the domestic banks' lending to China is assessed to be high quality, total exposures remain high. Widespread corporate defaults could lead to rising NPLs. More broadly, given Singapore's role as a financial center, financial stress in China could lead to a decline in investor sentiment, pullback of funding and market volatility. Potential inward spillovers from banks in advanced markets with significant presence in Singapore's domestic market.	**Medium to High**	Provide temporary and targeted fiscal support and loosen monetary policy to offset headwinds from a potential slowdown. Continue to monitor banks' exposures to China and the rest of the region. Use prudential policies and bank supervision to ensure risks are managed well. Continue to ensure that stress tests are up to date in an evolving environment with changing risks. Should domestic demand weaken substantially, use temporary and targeted fiscal stimulus, loosen monetary policy and recalibrate macroprudential as necessary while maintaining financial stability.
Tighter or more volatile global financial conditions	**Sharp asset price decline and decompression of credit spreads: Medium** **Surge in the US dollar: High** *Corrections in asset prices and in exchange rates* due to sustained capital flow reversals and *higher-than-expected increases in interest rates* could affect growth prospects through wealth effects and deteriorate banks' capital, especially in light of the elevated levels of household and corporate debt and prevalence of variable interest rates. *A decline in financial sector activity*—an important driver of the economy and very sensitive to the global risk sentiment—could slow growth. *Liquidity risks* owing to sudden retrenchment of interbank—including intragroup—funding of offshore banks and funding pressures due to foreign currency liabilities of domestic banks. Dollar denominated loans off shore could see an increase in arrears.	**Medium**	Ensure financial institutions maintain prudent risk management practices and have adequate liquidity and capital buffers. Maintain close links with home country supervisors. Recalibrate macroprudential policies to mitigate financial sector stress. In an extreme event, the strong official reserve position could provide an additional cushion. Swap lines with other central banks could complement this.
Persistently lower energy prices	**High** Singapore's marine engineering sector manufactures and exports equipment and services for offshore exploration and production to oil companies worldwide. Banks also lend to the oil sector. The negative impact is mitigated by Singapore's oil refineries and other downstream operations that face lower costs of inputs	**Medium to Low**	Provide temporary and targeted fiscal support to business in the sector.
Disorderly or excessive correction in property prices	**Medium to Low** *Decline in collateral values and wealth effects* could trigger a fall in economic activity and bank lending with further adverse feedback effects on household indebtedness and property prices	**Medium**	Adjust macroprudential policies while safeguarding financial stability. Use targeted fiscal transfers to households whose debt servicing capacity is adversely affected.
Low growth in productivity and investment	**Medium** *Sharp increase in unit labor costs and loss of competitiveness.* A more limited access to foreign workers may reduce competitiveness and profitability and provide disincentives to invest in some sectors. *Higher than expected transitional costs* such as high frictional unemployment or higher than expected hallowing out in some sectors can have long-term effects on growth.	**Medium**	Adjust foreign worker policies to relax tightness in labor markets. Provide targeted and temporary fiscal stimulus and loosen monetary policy.
Retreat from globalization and international cooperation. **Delays in the implementation of AML standards and associated reputational risks**	**Medium to Low** *Decline in cross-border banking activity*. Aggravating challenges, uncertainty about regulatory reform and uneven progress across major jurisdictions could lead to regulatory arbitrage, financial fragmentation, weakening of global financial safety net, and a decline in cross-border banking activity. **Medium** *Reputational risks*. If risks related to opaque ownership structures in the wealth management sector are not adequately addressed, any change in perceptions about Singapore's good reputation could have adverse effects on the viability of the industry.	**Medium**	Continue to maintain regulatory standards and risk management practices consistent with international regulatory norms. Continue to maintain collaboration with financial sector supervisors in other major jurisdictions. Fully implement international AML standards. Ensure service providers report suspicious transactions, and close accounts where supporting evidence of beneficial ownership is incomplete.

1/ The Risk Assessment Matrix (RAM) shows events that could materially alter the baseline path (the scenario most likely to materialize in the view of IMF staff). The relative likelihood is the staff's subjective assessment of the risks surrounding the baseline ("low" is meant to indicate a probability below 10 percent, "medium" a probability between 10 and 30 percent, and "high" a probability between 30 and 50 percent). The RAM reflects staff views on the source of risks and overall level of concern as of the time of discussions with the authorities. Mutually nonexclusive risks may interact and materialize jointly.

Appendix VI. SGPMOD: A Small Monetary Policy Model [1]

This appendix summarizes some of the key results of the Selected Issues paper which introduces a new small calibrated model of the Singapore economy, the Singapore Global Policy MODel (SGPMOD)[2]. While, in reality, Singapore has multiple policy options to react to shocks, SGPMOD is used to illustrate the positive role the Monetary Authority of Singapore (MAS) can play in offsetting negative effects from downside risks, such as a downward revision to China's future growth path, and the effects of Brexit on Singapore. We show, unsurprisingly, that monetary policy is expansionary. In the case of China, as expected, the MAS cannot prevent the long-term fall in output; it can only mitigate the short-term effects. In the case of Brexit, the MAS can play a strong role in combatting its negative effects after the initial impact.

A. The Structure of SGPMOD

The Singapore Global Policy MODel (SGPMOD) is a quarterly, multi-region model, including both China and the United States, and a small reduced-form block for the other regions. It tracks all the components of the nominal effective exchange rate (NEER), although its interest rates come from the uncovered interest parity (UIP) condition vis-à-vis only the U.S., reflecting Singapore's role as a global financial center linked to the United States. Based on calibration from other, larger structural models at the IMF, SGPMOD attempts to link shocks to trends in the long term and the movements in gap variables in the short term. It has been designed with the sole purpose of examining the conduct of monetary policy in Singapore by the Monetary Authority of Singapore (MAS).

The MAS uses an inflation-targeting (IT) regime, pursuing a target NEER. This is officially known as the Basket-Band-Crawl framework, or BBC (see MAS, 2001 and Khor and others, 2004). The MAS usually announces twice a year (in April and in October) about its intentions for the target nominal effective exchange rate. It communicates in general terms about the three components:

- ***Basket*** = the composition of currencies used in the target NEER defended by the MAS to guide monetary policy. The basket is composed of the currencies of its major trading partners, weighted by their share in trade – in particular, Malaysia, Indonesia, China, the U.S., and the euro area, along with other countries, including most south-east Asian countries.
- ***Band*** = the permitted percentage variation around the MAS' target NEER.
- ***Crawl*** = the permitted quarterly change in the MAS' target NEER. It is usually a rate of appreciation, although sometimes it is set at zero.

Parrado (2004), McCallum (2006), and MAS (2016a) provide ample evidence that the MAS determines the target NEER by pursuing some form of price stability, implying the existence of a MAS core inflation target. It also most likely has weight on the output gap, which, besides smoothing the path of real GDP, can also serve as another indicator of future inflation.

[1] Prepared by Dirk Muir (RES).

[2] SGPMOD is a member of a suite of similarly developed models for roughly 24 other countries by the International Monetary Fund, and shares the theoretical underpinnings of Carabenciov and others (2013).

The Singapore Block: A NEER-Based Model for an IT Regime

The Singapore block of SGPMOD is a canonical gap model, focused on four standard building blocks:

- **The I-S curve** links the output gap (real GDP minus the level of potential output) with the domestic interest rate gap, the real effective exchange rate (REER) gap (directly affected by the MAS) and the output gap of the rest of the world.
- **The Phillips curve** links MAS core CPI inflation with expected and lagged inflation, the REER gap, and the output gap. The MAS' definition of core inflation excludes from headline inflation the costs of accommodation and private road transport, but includes food prices and non-road-transport energy costs.
- **The UIP condition** clears financial markets, by linking the domestic short-term interest rate with the U.S. short-term interest rate, accounting for expected future movement in the exchange rate (influenced by the MAS) and any country risk premium.
- **The monetary policy rule** is for an IT regime, constructed as a NEER reaction function, explored in the next subsection.

The Monetary Policy Reaction Function

The MAS does not explicitly state its monetary policy rule, but econometric work provides us a guide. Following in the footsteps of Parrado (2004) and McCallum (2006), its composition is similar to a standard interest rate reaction function, with the deviation of core inflation from its target level, and the output gap.

$$\Delta NEER_t^{POL} = g_1 \Delta NEER_{t-1}^{POL} + (1-g_1)[\Delta \overline{NEER}_t + g_2(\pi_{t+3}^e - \pi_t^{TAR}) + g_3 y_t + g_4\left(RS_t^{US} - RS_t^{US,neut}\right)] + \Delta NEER_t^{shk}$$

where $\Delta NEER^{POL}$ is the annualized quarter-on-quarter change in the MAS' target NEER at time "t"; $\Delta \overline{NEER}$ is the annualized quarter-on-quarter change in the trend NEER; $\pi_{t+3}^e - \pi^{TAR}$ is the three-quarter-ahead expected MAS core inflation deviation from its target; y_t is the output gap, and $RS_t^{US} - RS_t^{US,neut}$ is the nominal short-term U.S. interest rate gap.

Estimates of the Policy Rule

The NEER reaction function is an extension of that estimated by Sheridan and Nadeem (2013) and Arbatli (2015), based on data from 1991 to 2015. It includes a shadow measure of the U.S. Fed Funds rate (Wu and Xia, 2015). Singapore cannot actually set its own interest rates, as it is a small economy with an entirely open capital account that cannot influence the interest rate implied by the UIP condition. All else equal, a move in the U.S. interest rate moves the Singapore rate, which imparts extra volatility to the domestic economy. By including the U.S. interest rate in its determination of the target NEER, the MAS tries to spread the nominal-side adjustment into the NEER as well as the Singaporean interest rates, somewhat reducing volatility in Singapore's economy.

Appendix Table VI.1: Singapore —Estimates of the SGPMOD's NEER Reaction Function

Variables	*Coefficients*
Lagged change in NEER	0.624***
Expected Inflation	1.202***
Output Gap	0.178***
U.S. Fed Funds Rate	0.115*
Observations	96
R-Squared	0.7058

Source: IMF staff estimates
Notes: *** significant at .01 level; **significant at .05 level; *significant at .10 level.
Estimation method: GMM regression, with four lags of output gap and inflation used as instruments

Rest of the World

The remainder of the SGPMOD consists of the U.S., China, and the other rest of the world, plus commodities (oil and food). The U.S. and China have full blocks, similar to Singapore, derived from the IMF's Global Projection Model (GPM) framework (Blagrave and others, 2013). Commodities (food and oil) are based on random walk stochastic processes for prices. For the other countries there are random walk stochastic process for their real bilateral US$ exchange rate and output gaps. There are some extra links for emerging Asia, accounting from direct impacts from China. These are important links to capture, since emerging Asia is Singapore's largest trading partner. As with Singapore, the blocks for the U.S. and China are both variants of the canonical gap model. They each have their own monetary policy frameworks.

Monetary Policy in the United States and China

The U.S. follows an IT regime, so it has an inflation-forecast-based interest rate reaction function, using core CPI inflation.

China's monetary policy regime is more complex. It is a dual instrument, dual target system. The framework uses two reaction functions, one that defines the nominal policy bilateral US$ exchange rate (where the nominal bilateral US$ exchange rate is chosen by targeting China's output gap, and using an explicit nominal bilateral US$ exchange rate target), while the other defines the short-term policy interest rate (with the same specification as the U.S. interest rate reaction function). The actual outcomes for the bilateral US$ exchange rate and the short-term interest rate turn out to be linear combinations of their reaction functions, and their outcomes under the UIP condition.

U.S. and China's Spillovers to Singapore

The primary direct impacts from the U.S. on Singapore are through the output gap (captured by the equation's two proxies for trade – the change in the REER, and the rest-of-the-world output gap) and inflation (its impact from the REER, which is a proxy for imported goods prices). Another impact is from the UIP condition, which states that the domestic Singapore short-term interest rates move one for one with that of the U.S., all else being equal. This motivates the choice of the MAS to allow for the small impact of the short-term U.S. interest rate gap when determining the target NEER. Finally, the U.S. has an indirect impact on Singapore because of its direct impacts on China's interest rates and output gap.

China's has the same direct impacts on Singapore through the output gap and inflation as the U.S. Its indirect impacts on Singapore come through its effects on the U.S. via its output gap and its direct impact on emerging Asia, captured by linking China's output gap with theirs.

B. The Monetary Policy Transmission Mechanism in SGPMOD

This section considers a negative shock to domestic demand in Singapore, via the output gap, in order to understand the transmission of monetary policy to the Singaporean economy. In doing so, we consider the MAS' NEER reaction function, and contrast it with a standard interest rate reaction function.

The General Behavior of the Mechanism

Regardless of the form of the policy rule, because the MAS follows an IT regime, a decrease in domestic demand generates the same behavior:

- The output gap enters excess supply, which leads to disinflation, eliciting a monetary policy response;
- Monetary policy takes an expansionary stance, which encourages aggregate demand, putting upward pressure on the output gap;
- As the output gap becomes more positive, inflationary pressures increase, and inflation begins to return to its target level;
- As the inflation gap closes, the MAS withdraws its stimulus; and
- Finally, inflation returns to target and the output gap closes.

However, there are distinctions between the actual behavior of monetary policy, and whether the MAS implements its IT regime using an interest rate reaction function, or a NEER reaction function. The detailed explanation below focuses on the mechanics under the NEER reaction function, and contrasts it to the use of an interest rate reaction function, in Figure VI.1.

The Monetary Policy Transmission Mechanism on Impact

On the impact of such a shock, the MAS depreciates the NEER immediately. Because inflation is sticky, the REER will also depreciate on impact. This leads to higher net trade – exports rise as their goods cost less abroad, while imports fall as their cost to Singaporeans rise, especially since exchange rate pass-through is relatively fast in an open economy such as Singapore. Higher trade means that the output gap will begin to close, and the excess demand will decrease. Both this, and

the depreciated REER, adds inflationary pressures to the economy, and MAS core inflation begins to rise.

The MAS' depreciation of the NEER also works through the UIP condition. The nominal bilateral US$ exchange rate depreciates in line with NEER, and Singapore's short-term interest rate increases relative to that of the U.S.:

$$\uparrow RS_t = RS_t^{US} + PREM_t - \downarrow \Delta S_{t+1} \Rightarrow \uparrow RR_t$$

Since inflation is somewhat sticky, the real interest rate, *RR*, will also increase. The increase in the real interest rate works against the depreciation of the REER in the determination of Singapore's output gap. Therefore, without a complete understanding of the weights of those variables in the behavior of the output gap, the effects of monetary policy may be ambiguous on impact.

In a country using an interest rate reaction function instead, the nominal short-term interest rate would fall as policy interest rate is lowered, as would the real, while the exchange rate would depreciate, meaning that the two instruments would both work in the same direction. Therefore, since Singapore uses a NEER reaction function where the two instruments (the NEER and the short-term interest rate) work at cross purposes, it experiences more volatility than a country under an interest rate reaction function, even if both countries are IT regimes.

The Monetary Policy Transmission Mechanism in the Medium- to Long-Term

After the first year, the temporary nature of the shock dictates that the REER return to its long-term equilibrium, and starts to appreciate, as will Singapore's real bilateral US$ exchange rate. As the real bilateral US$ exchange rate appreciates, so will the nominal, despite rising inflation, because inflation is still rising more slowly than the rate of appreciation, because of price stickiness. By uncovered interest parity, Singapore's short-term interest rate falls relative to that of the United States:

$$\downarrow RS_t = RS_t^{US} + PREM_t - \uparrow \Delta S_{t+1} \Rightarrow \downarrow RR_t$$

Monetary policy is now stimulative. Although the change in the NEER (and therefore the US$ bilateral rate) is removing the stimulus from the economy, the real interest rate is working to reintroduce it. The real interest rate offsets the MAS' stimulus in the short term, but it slows its withdrawal in the medium term.

Choosing the Reaction Function

The apparent superiority of the interest rate reaction function in delivering lower volatility and faster adjustment in SGPMOD is very unlikely to hold, in practice. An interest rate reaction function for Singapore is a poor choice. As a small, very open economy, with an entirely open capital account, and a strong role as a regional financial center, Singaporean interest rates are mostly influenced through its financial markets, which can best be proxied in SGPMOD by the UIP condition.

C. Downside Risks to Singapore

As the current economic environment unfolds, there are a number of risks to the Singapore economy, which at this juncture, are skewed to the downside. They are basically complex combinations of the model properties presented above, with differing time horizons and variable magnitudes. While we can often untangle the sources of the shocks, it is difficult to determine how they interact with one another in the Singaporean economy, without the use of a tool such as SGPMOD. We consider three scenarios – a sudden downward revision in expected potential output growth in China; another version of the China scenario, but leading to additional turmoil in other emerging markets; and the effects of Brexit, stemming from disruption to world financial markets and reduced growth prospects in the United Kingdom and the European Union.

We assume that the risk starts to unfold in 2016Q2 (2016Q3 in the case of the Brexit scenario). The outcomes are presented relative to a baseline forecast to the end of 2018Q4. We recognize that the MAS may not be able to offset the effects exclusively. For example, fiscal policy and other structural policy can also play a role. However, we are only interested here in examining the role monetary policy can play in modifying the short-term dynamics of the economy. We consider two cases to describe the new target NEER relative to its baseline path: first, there are ongoing policy adjustments to the target NEER; second; the MAS stays with the baseline target NEER path. In second case, movements in the short-term interest rate match that of the U.S. because of its determination by the UIP condition.

Lower Expected Potential Output Growth in China

Consider a scenario where China's potential output growth is revised down, permanently, by one percent (quarter-on-quarter, at annual rates). The reported results, as found in Figure VI.2, are the outcome on the economy, versus the expected path of real GDP in China under the baseline. We also assume that the fall in potential output growth leads to a decline in expected stock of wealth for households, which translates into an additional fall in China's output gap of roughly 0.25 percentage points. Moreover, there is constant upward pressure on China's inflation, because of the higher costs associated with the realization that potential output is not expanding as fast as originally expected.

The outcomes in China are, of course, significant for Singapore (Figure VI.3), just not with direct impacts, but indirect as well, primarily through Emerging Asia. As Emerging Asia experience a decline in its output (primarily from strong trade links with China), they reduce their imports from Singapore, which manifests itself as a lower Singaporean output gap.

There are also the direct impacts from China. First, the Singaporean output declines along with import demand from China. Moreover, since China is weakening, the renminbi depreciates against all currencies, pushing up, in the short term, Singapore's NEER. Because prices are sticky, the REER appreciates as well. Of course, the lower output gap and REER appreciation are disinflationary.

At this point, we should draw attention to the types of spillovers from China—they lead to neither a permanent decline in Singapore or emerging Asia potential growth, nor a crisis of confidence in the ASEAN economies (with its attendant threat of capital flight). We will consider such extra effects on top of this "calmer" China scenario in the following scenario.

In this scenario, the MAS can definitely play a key role. Many of the short-term impacts are similar to those of the negative domestic demand shock. Monetary policy can smooth the transition to a lower long-term level of real GDP, but it cannot prevent it, as this scenario presents a permanent contraction in China's share in the global economy.

We can see the utility of the MAS' new target NEER path by comparing it with the case where the MAS simply follows its baseline. We see that, in the medium term, the NEER is too appreciated, and interest rates are too high, leading to notable negative consequences. The output decline is much larger, driven by the output gap in the near term, not potential output, thereby illustrating the importance of monetary policy, which can only act on the demand side of the economy. Inflation also turns out to be much weaker.

Lower Expected Potential Output Growth in China with Emerging Market Turmoil

Now, reconsider the previous scenario about China's potential output growth rate. Since China is a key player in the global economy, it is not unlikely that there may be further effects based on investors' confidence in the economies most strongly linked to China, such as emerging Asia, and Singapore itself. Therefore, relative to the previous, "calmer" China scenario, this scenario amplifies its negative impacts with two additional assumptions about the riskiness of emerging Asian assets. First, there is a 1 percentage point increase in Singapore country risk premium in 2016, which declines to zero by 2017q3. Second, there is additional country risk in emerging Asia, leading to additional depreciation in their real exchange rate gap vis-à-vis the U.S.

Therefore, in Figure VI.4, Singapore experiences additional negative impacts from the further falls in emerging Asia's output gap, and its real exchange rate gap. The additional increase in the Singaporean risk premium leads to a higher domestic short-term interest rate on impact, through the UIP condition. Passing through to the real short-term interest rate, it causes an even larger decline in real GDP, which in turn means inflation falls further than the "calmer" China scenario, in the short term. However, there is higher inflation in the medium term, and therefore greater relative cyclicality in Singaporean inflation.

Since future inflation is higher than in the "calmer" China scenario, the MAS does not need to move the target NEER as much – inflation stabilization is more important than output stabilization in its policy reaction function. In this case, the MAS is struggling to react properly, because of changes in the fundamentals of the exchange and interest rates outside of the MAS' control. First, the trade weights of Singapore's trading partners permanently diverge from the composition in the official NEER basket, as Emerging Asia shrinks in size relative to everyone else. Second, the UIP condition is broken by the country risk premium shock, which means that the MAS' policy actions are no longer the sole determinant of the short-term interest rate vis-à-vis that of the U.S.

Overall, Singapore is worse off in the short term when there is the additional emerging markets turmoil. Although it is clear that the MAS, even with the limitations it faces in using its NEER reaction function, is able to improve the outcomes relative to holding steady in its policy decisions over 2016 to 2018.

The Effects of Brexit with Near-Term Global Turmoil

The June 23, 2016, referendum in the UK on EU membership resulted in a majority that favored the UK leaving the EU. Brexit has a broad array of implications on the future relationships between the UK and the EU, both of a long-term and a short-term nature. Given their sizes in the global economy, the effects in those countries will be felt worldwide, and are being examined. We quantify the effects of Brexit on Singapore based on a scenario similar to that used to develop the IMF's July WEO Update, starting in 2016Q3 (not 2016Q2, as in the previous scenarios). The scenario is concentrated in 2016 and 2017, as negotiations between the UK and the EU could potentially last more than a year. The scenarios considered here are illustrative only and do not suggest the eventual outcome of the negotiations.

We represent Brexit using a number of components focusing primarily in the UK and the EU, with additional effects added for the rest of the world. There is a medium-term contraction of trade between the UK and the EU, as the free trade links are reduced towards the standards under the World Trade Organization. This leads to wider output gaps in the near term. Considerable uncertainty on the part of consumers and firms worsen this. By the end-2018, the EU output gap is 0.4 percent, and that of the UK translates into 0.45 percent for the remaining countries block (Figure VI.5).

The UK and EU financial sectors also see tighter lending conditions, which increase in magnitude through 2017. The UK sector tightens more, as its role in mainland Europe is reduced because of exiting the EU. The peak effects are in 2017, as it takes time for markets to understand and react to the changes implied by Brexit. This is included in the EU and UK output gaps, and also weakens their bilateral US$ exchange rate gaps.

There are direct trade spillovers on China from lower foreign demand and their real GDP falls by 0.1 percent as end-2017, while U.S. real GDP troughs around 0.25 percent at end-2016. Therefore U.S. monetary policy is looser, and its short-term interest rate falls by about 1.1 percent by the start of 2018 relative to the baseline to combat the resulting disinflationary pressures from the direct negative spillovers from Europe and the safe-haven flows that appreciate the currency. The other regions see more negative impacts on their output gaps, falling at a steady pace, reaching –0.4 percent by end-2018.

All the exchange rates realign across the world. Naturally, the regions at the epicenter (EU and UK) depreciate. The US dollar and the Japanese yen both appreciate, as they are safe haven currencies. Note that this will be especially stimulative, all else being equal, for Singapore, adding to depreciation pressures on the Singapore dollar. China and the rest of emerging Asia depreciate, complicating the behavior of the Singapore dollar, and increasing upward pressure on the Singapore NEER.

We first consider the case where the MAS does not move the target NEER away from its baseline case. We can better discern the effects of the foreign shocks buffeting Singapore, without the mitigating impact of monetary policy (the red lines in Figure VI.6). Given the generally negative impact of the spillovers and financial market effects, the NEER is depreciating in Singapore until the end of 2018, by almost one percent.

Real GDP contracts by more than 0.4 percent, led by reduced demand for Singapore's exports by emerging Asia, China, and the U.S. (in that order) until the end of 2018. The path of Singapore's

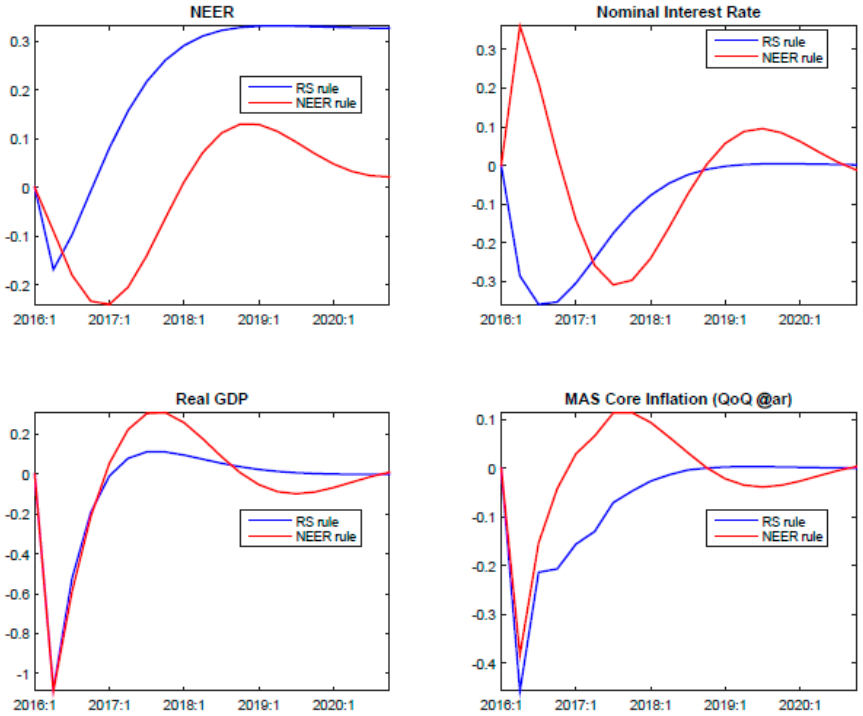
NEER generally works against this, driven by financial markets. Singapore's bilateral exchange rates against the U.S. dollar and the Japanese yen account for most the movement, with only a mild depreciation against emerging Asia. This is a by-product of the "safe-haven" financial flows to the U.S. plus Japan, to a lesser degree. Because the UIP condition drives the domestic financial market, the short-term domestic interest rate rises in 2016, and as U.S. monetary policy loosens in 2017, it retreats. The broad-based lower foreign demand and generally positive real interest rate is disinflationary, despite the depreciation of the NEER.

As with other regions, we assume an additional increase in country risk – another reflection of safe haven effects on financial markets. There is an additional increase in Singapore's country risk premium in the second half of 2016 of roughly 25 basis points that unwinds over the course of 2017. Therefore, the negative interest rate effect is such that real GDP is 0.1 percentage points lower than it would be otherwise.

The baseline policy case demonstrates the need for the MAS to act. As expected, they ease the target NEER. In the short term, benefits from the depreciation of around 0.2 percent by end-2016 is offset by the almost 0.9 percent increase in the short-term real interest rate. However, the MAS continues to loosen over 2017 and into 2018, which markets anticipate, and the trough of real GDP is less long lived in the baseline policy case—ending in 2017Q1 at 0.4 percent and quickly rising above zero by mid-2018, instead of lingering below 0.2 until end-2018. The generalized depreciation against the U.S. dollar across Singapore's major trading partners forces the MAS to rely on its bilateral U.S.$ exchange rate to achieve the target NEER. Therefore, the short-term interest rate is about 50 basis points higher than under the baseline policy case. However, by mid-2017 the NEER effect predominates over that of interest rates, with inflation recovering, as is real GDP. And because households and firms are forward-looking, inflation never falls as far as under the baseline case, reaching a trough of only –0.2 percent instead of –0.5 percent, in anticipation of the MAS' defense of its inflation objective.

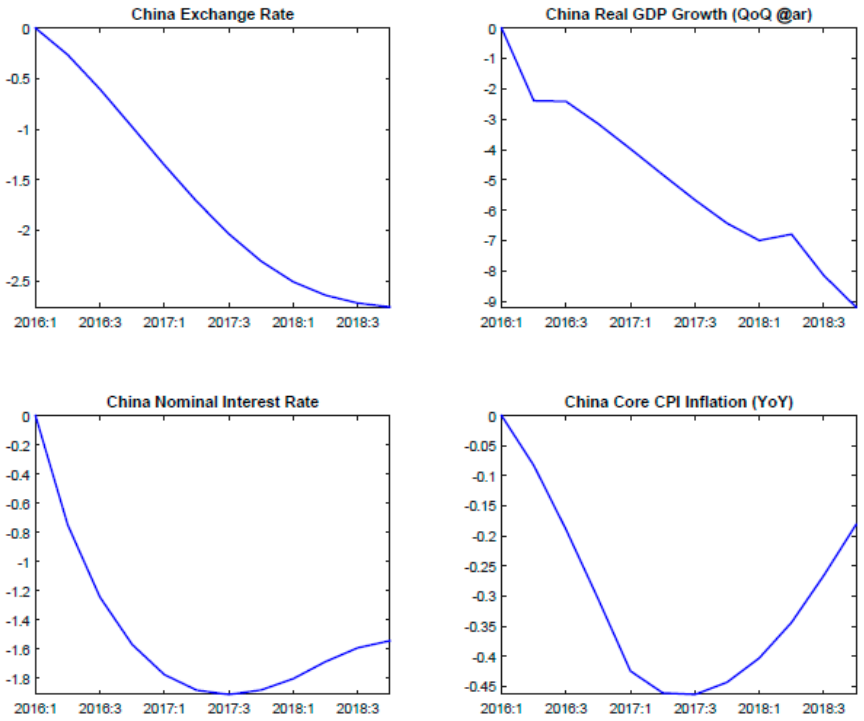
In conclusion, monetary policy can do little to prevent the trough in real GDP in late 2016, but it can definitely contribute to a speedier recovery. In the near term, there is general global turbulence in exchange rate markets, exacerbating the negative effects from Singapore's transmission mechanism and its reliance on the UIP condition. Furthermore, there may be considerable short-term uncertainty from the hard-to-quantify safe-haven effects, which are very important for a financial center such as Singapore. Here, we have taken a relatively benign view. There could be further unexpected volatility, not explored here, starting in late 2017 or 2018, when the exit negotiations for the UK will presumably be much more advanced.

Appendix Figure VI.1. A Decrease in Domestic Demand in Singapore
(Percent or percentage point deviation from baseline)



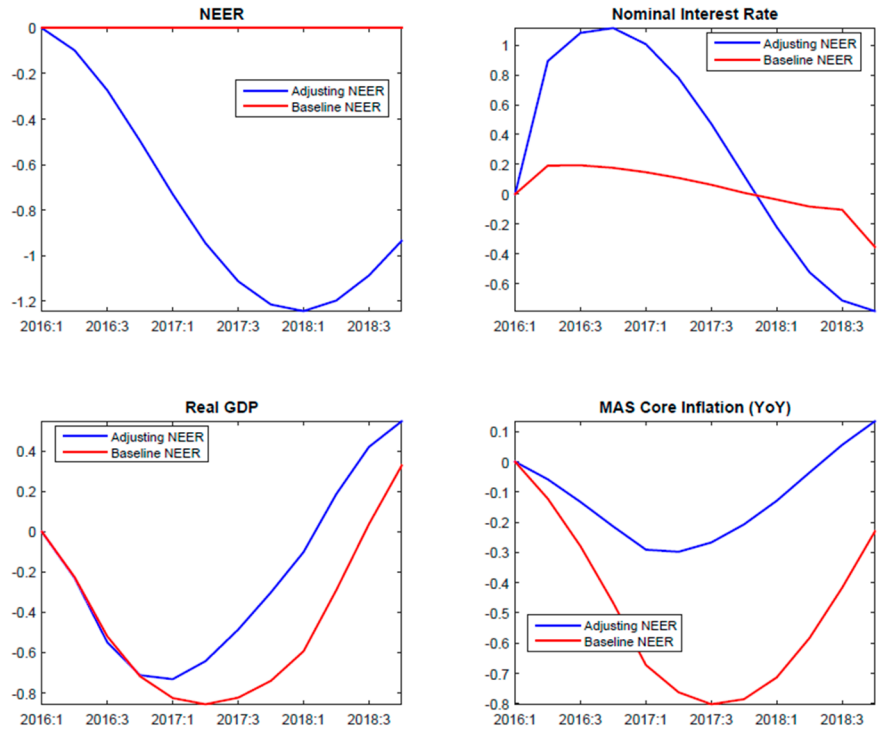
Source: IMF staff calculations.

Appendix Figure VI.2. Lower Potential Growth in China—China
(Percent or percentage point deviation from baseline)



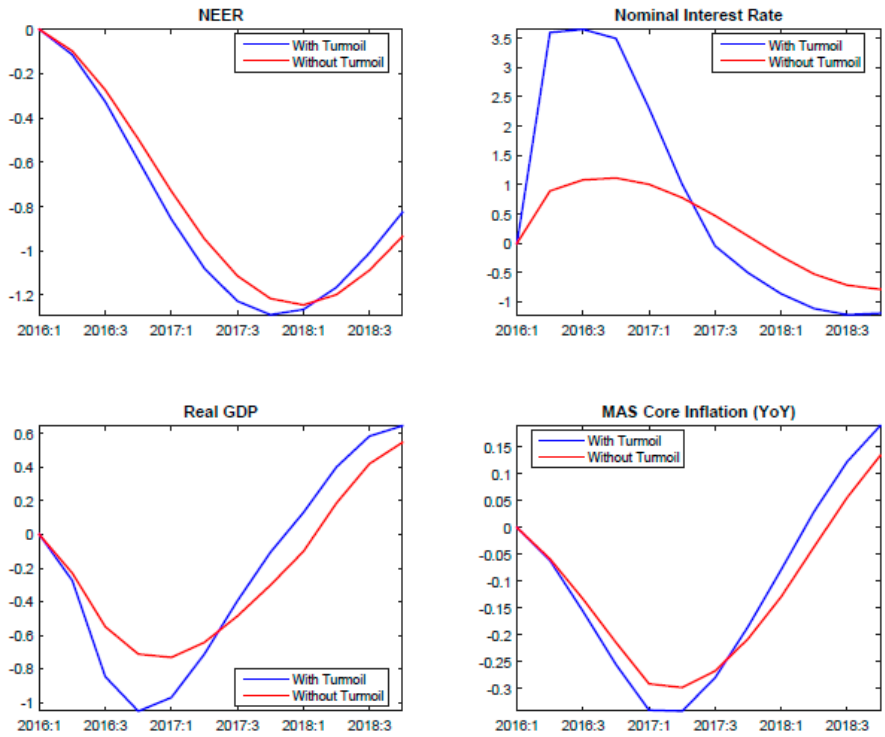
Source: IMF staff calculations.

Appendix Figure VI.3. Lower Potential Growth in China—Singapore
(Percent or percentage point deviation from baseline)



Source: IMF staff calculations.

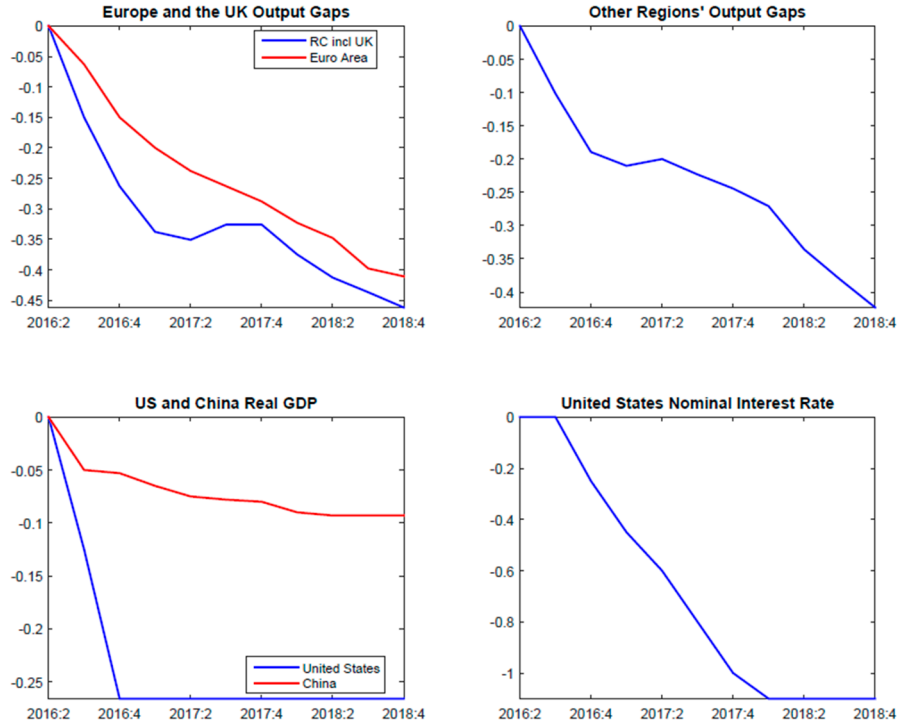
Appendix Figure VI.4. Lower Potential Growth in China Leading to Emerging Market Turmoil—Singapore
(Percent or percentage point deviation from baseline)



Source: IMF staff calculations.

Appendix Figure VI.5. Effects of Brexit Including Near-term Global Turmoil—Rest of the World

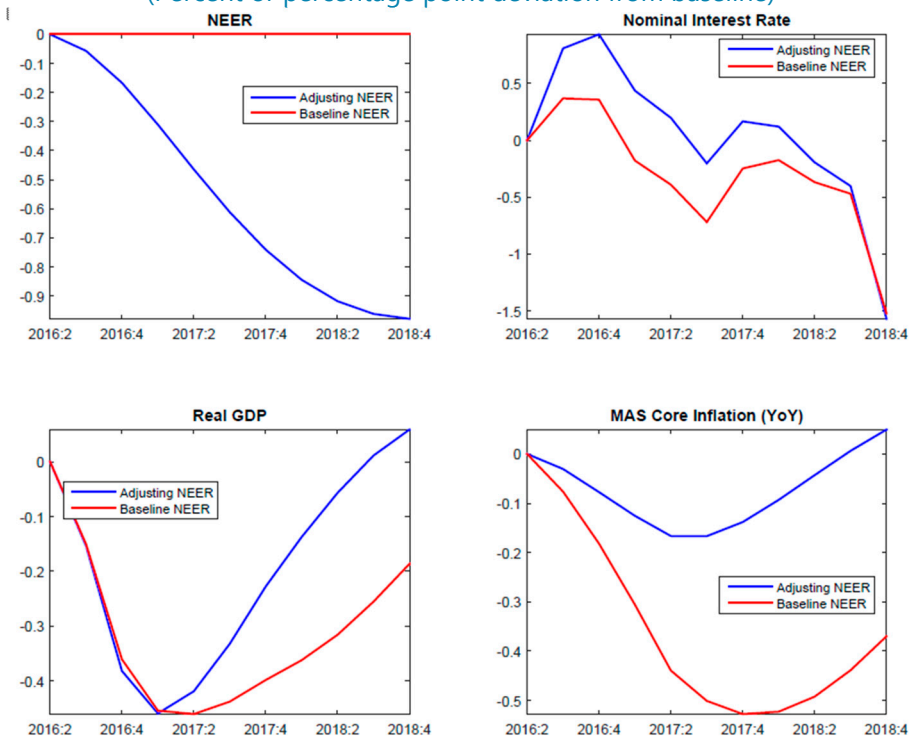
(Percent or percentage point deviation from baseline)



Source: IMF staff calculations.

Appendix Figure VI.6. Effects of Brexit Including Near-term Global Turmoil—Singapore

(Percent or percentage point deviation from baseline)



Source: IMF staff calculations.

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Appendix VII. Measuring the Fiscal Impulse[1]

Introduction. The stance of fiscal policy as measured by the fiscal impulse (FI) is central to the policy discussion in this year's Article IV consultation. Assessment of the fiscal impulse is complicated by the presence of four pillars in Singapore's public finances (the budgetary sector; CPF; government investment agencies; and various special funds not consolidated into the budget)[2], and the presence of large accumulated reserves, which have reduced fiscal transparency and resulted in the use of unique budget concepts (See IMF Country Report 15/299, paragraph 35).

Overview. This appendix presents staff's FI methodology and preliminary estimates. Staff uses a multiplier of 0.5 in line with the FAD Guidance Note. Also, this appendix explains the construction of table 5 of the Staff Report (table of fiscal operations) following the Government Finance Statistics Manual of 2001 (GFSM 2001) using official statistics. As usual, to facilitate comparison, the fiscal table also reports the figures following the methodology and presentation used by the authorities in the budget.

Fiscal Impulse. The authorities' methodology is summarized in Table VII.1.

Appendix Table VII.1. Singapore—The Authorities' Fiscal Impulse Methodology.

Revenue
- Includes:
  - Operating Revenue
- Excludes:
  - Investment Income
  - Government land sales: volatile item that may not reflect fiscal impulse

Expenditure
- Include:
  - Operating Expenditure
  - Development Expenditure
  - Other Expenditure

    Includes
    - Special transfers
    - Spending from endowment and trust funds
    - Investment expenses and agency fees on land sales
    - Land related expenditure (e.g. land reclamation)

    Excludes
    - Top-ups to endowment and trust funds

Source: IMF staff estimates.

[1] Prepared by Juan Jauregui (APD).

[2] This, along with the constitutional fiscal rule, the role of the President of the Republic as fiscal guardian, and other features of Singapore's system of public finances are described in more detail in Jón R. Blöndal, 2006, "Budgeting in Singapore," OECD Journal on Budgeting 6(1), 45–86.

Staff Adjustments. Staff's starting point is the methodology used by the authorities. On the revenue side this is modified by adjusting for the effects of the business cycle on revenues. On the expenditure side, staff makes adjustments to adhere to GFSM2001. Staff then computes the ***modified cyclically adjusted balance*** as adjusted revenue minus expenditure excluding top ups; the FI is defined as the change in the modified cyclically adjusted balance.

Operationalizing the FI measure. Staff starts with Table 04, *Government Revenue 2016*, and Table 05, *Government Expenditure 2016*. Operating revenue is as defined by the authorities in Table 04 but excluding investment and interest income and the MAS contribution, account L00, and capital receipts, account M00. To arrive at cyclically adjusted revenue, staff's estimate of the output gap and a unitary elasticity are used. For total expenditure, staff starts with "total outlays" from Table 05 and subtracts "transfers from the consolidated revenue account" and "loans" (account 5600), which are treated as financing items in GFSM2001.[3] This means that staff also includes "land related expenditure", "expenses on land sales" and "expenses on investment" in total expenditure.

Staff Estimates of FI. Table VII.2 presents staff's estimated FI for the last two fiscal years. The attachment contains a longer time series of the FI using this methodology.

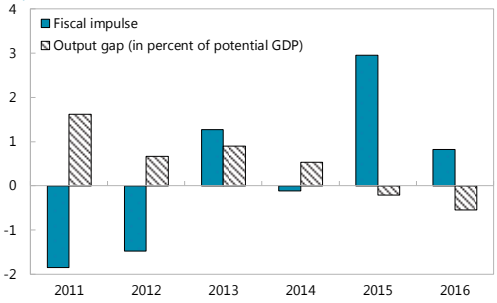
Appendix Table VII.2. Singapore—Fiscal Impulse

Staff Methodology	2014	2015B	2015	2016B
(in SGD billion)				
Operating revenue	60.8	64.3	64.2	66.9
Output Gap, FY (in percent of potential GDP)	0.5	(0.2)	(0.2)	(0.5)
Potential GDP	391.2	403.4	403.4	412.9
Revenue at Potential GDP	60.5	64.4	64.3	67.3
Operating expenditure	46.5	54.4	53.3	57.1
Net acquisition of nonfinancial assets	16.8	23.2	23.2	23.3
Cyclically adjusted operational balance	(2.8)	(13.1)	(12.1)	(13.1)
Top ups to endowment and trust funds	8.5	6.0	6.0	3.6
Modified Cyclically adj. balance	5.8	(7.1)	(6.1)	(9.5)
Fiscal impulse (change in modified cyclically adjusted balance)	(0.5)	12.9	11.9	3.4
Fiscal Impulse (in percent of potential GDP)	**(0.1)**	**3.2**	**3.0**	**0.8**

Source: IMF staff estimates.

[3] Following the authorities' treatment, we exclude transfers from the consolidated revenue account from the FI calculation.

Comparison of FI 2016 estimates. The FI for FY 2016/17 computed by staff is about 0.8 percent of GDP, some 0.3 percentage points less than the authorities' 1.1 percent of GDP. Most of the difference comes from the revenue side, with the cyclical adjustment contributing about a third and the rest possibly from different assumptions about nominal GDP (Table VII.3).



Appendix Table VII.3. Singapore— Fiscal Impulse: Comparison of Staff's and Authorities' Estimates, FY2016

	FY 2015	FY 2016	Impulse FY 2016
(in percent of GDP)		Authorities	
Revenues	16.2	16.6	(0.4)
Operating and development expenditure	16.2	18.1	1.9
Other expenditures	3.3	3.0	(0.3)
Total			1.1
		Staff	
Revenue at Potential GDP	15.6	16.3	(0.7)
Operating expenditure	12.9	13.8	0.9
Net acquisition of nonfinancial assets	5.6	5.7	0.0
Top ups to endowment and trust funds	1.5	0.9	0.6
Potential GDP (SGD billion)		412.9	
Total			0.8
		Unadjusted revenue	
Revenue	15.5	16.2	(0.7)
Operating expenditure	12.9	13.8	0.9
Net acquisition of nonfinancial assets	5.6	5.7	0.0
Top ups to endowment and trust funds	1.5	0.9	0.6
Potential GDP (SGD billion)		412.9	
-	-	-	
Total			0.9

Source: IMF staff estimates.

Comparison of FI 2015 estimates. Note that staff's methodology produces a very large fiscal impulse of 3 percent of GDP in FY2015. Consequently, the FI for CY2016 ends up at 1.4 percent, significantly larger than the 0.8 percentage points estimated by the authorities. For FY2015, the difference of 1.2 percentage points with respect to the authorities' impulse of 1.8 percent of GDP comes from a larger increase in expenditure, as recorded by staff. There is some offsetting impact in revenue, as staff measures a larger negative impulse, that is mostly explained by the cyclical adjustment.

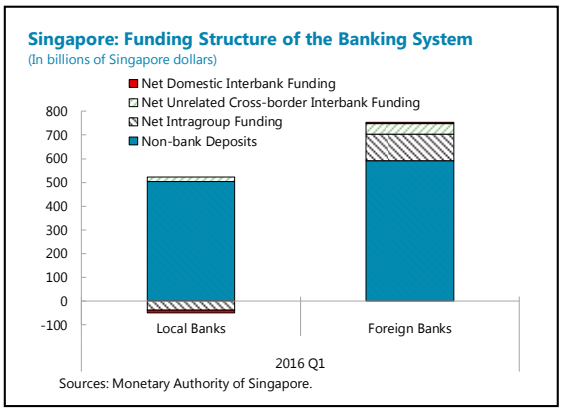
Appendix Table VII.4. Singapore—Fiscal Impulse: Comparison of Staff's and Authorities' Estimates, FY2015

	FY 2014	FY 2015	Impulse FY 2015
(in percent of GDP)		Authorities	
Revenues	15.5	16.6	(0.7)
Operating and development expenditure	14.4	18.1	1.8
Other expenditures	2.6	3.0	0.7
Total			1.8
		Staff	
Revenue at Potential GDP	15.5	16.4	(1.0)
Operating expenditure	11.9	13.6	1.7
Net acquisition of nonfinancial assets	4.3	5.9	1.6
Top ups to endowment and trust funds	2.2	1.5	0.6
Potential GDP (SGD billion)		403.4	
Total			3.0
		Unadjusted revenue	
Revenue	15.6	16.4	(0.8)
Operating expenditure	11.9	13.6	1.7
Net acquisition of nonfinancial assets	4.3	5.9	1.6
Top ups to endowment and trust funds	2.2	1.5	0.6
Potential GDP (SGD billion)		403.4	
-			
Total			3.2

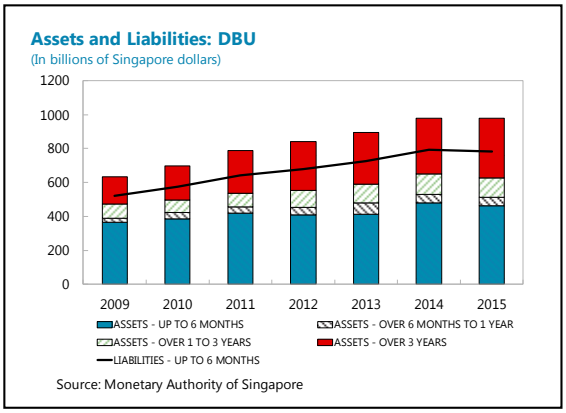
Source: IMF staff estimates.

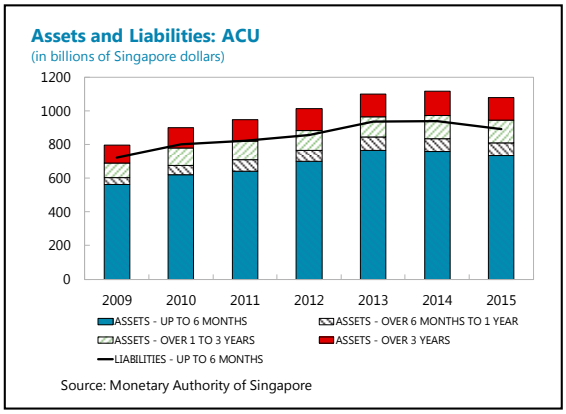
Appendix VIII. Assessing Banking Sector Resilience[1]

Background. The funding structure of banks in Singapore, predominantly reliant on nonbank deposits, is resilient. In March 2016, deposits of nonbank customers accounted for most of the funding of local banks and more than 75 percent of foreign banks' funding. However, foreign banks still continue to rely on wholesale funding, which can often be in foreign currencies. Since the domestic wholesale-banking market is relatively shallow, most of the wholesale funding is international. This puts Singapore in an elevated vulnerability to negative external events. Banks should therefore engage more actively in interest-rate risk management and foreign currency funding management. The MAS' analysis suggests that bulk of interbank funding is intragroup (parent bank lending to its branches/subsidiaries) which has been relatively stable and increases during crisis episodes. However, rising interconnectedness could increase contagion risk and propagate systemic shocks within a banking group.



Maturity Mismatches. The high proportion of long-term assets (> 6 months) funded by short-term liabilities (< 6 months) in the domestic banking units (DBUs) can expose banking sector to interest rate and (re)funding risk. While both assets and liabilities of the Asian currency units (ACUs) are predominantly short term (under 6 months), there is maturity mismatch on the DBUs' balance sheets. However, banks remain resilient given their low leverage and large capital buffers.



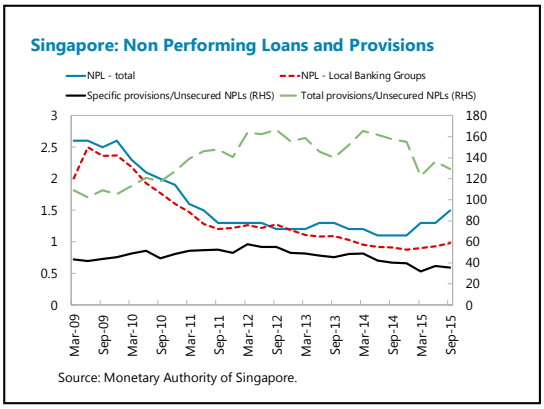


Loan Concentration. High concentration of loans in certain sectors and regions can lead to elevated risks. More than 50 percent of total DBU loans consist of housing loans and loans to the building and construction sectors. Furthermore, the big three domestic banks have more than

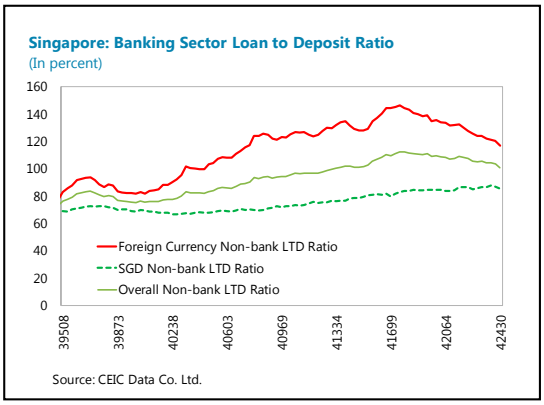
[1] Prepared by Umang Rawat (APD).

90 percent of their business in Singapore and rest of Asia making them vulnerable to growth cycle in Asia. A slowdown in China and its spillovers to rest of Asia can reduce profitability of these banks.

Nonperforming Loans. Nonperforming loans (NPLs) in the three big banks have increased due to losses associated with trade and commodities sector. Overall banking sectors' nonperforming loans have increased to 1.5 percent in 2015Q3, from 1.1 percent a year ago. Total and specific provisions for NPLs have reduced significantly due to rising defaults. Nonperforming loans in the three big domestic banks also increased to 1 percent (S$6.9 billion) from 0.9 percent (S$6.1 billion) over the same period. In the three big banks, NPLs have increased from S$6.1 billion in end 2014 to S$7.5 billion in end-2015 (an increase of 23 percent in the past one year).



Foreign currency mismatch. While foreign currency mismatch risks remain due to volatility and weakening of emerging Asia currencies, banking sectors' foreign currency loan-to-deposit (LTD) ratios have been on a downward trend down (foreign currency LTD ratio at 117 percent in Feb 2016). Local banks are better placed in dealing with foreign currency risks where Singapore dollar, U.S. dollar and all currency LTD ratios are under 100 percent.



Assessment. Preliminary analysis based on a broad-based measure of bank soundness suggests that domestic banks are more robust than some of the foreign banks. A bank health index based on capital adequacy, asset quality, earnings, liquidity and leverage show that despite fall in profitability recently, domestic banks are healthier as compared to some of the foreign banks operating in Singapore[2]. This is, however, only a relative assessment of banks overall health. More thorough stress tests would be required to assess vulnerabilities of individual banks and of the overall sector. Staff encourages the MAS to continue and enhance vigilant monitoring of branches and subsidiaries of foreign banks.

[2] A Bank Health Assessment Tool is used to compare the relative ranking of banks in Singapore. The largest foreign banks operating as 'full banks' in Singapore are included in the sample.

Appendix Table VIII.1. Singapore—Bank Health Index

Bank Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Oversea-Chinese Banking Corp Ltd	1.0	2.0	1.2	0.7	1.9	1.2	1.6	3.0	3.0	1.6	3.8	1.4	1.3	1.5
United Overseas Bank Ltd	1.8	2.9	1.0	1.0	2.2	1.0	0.0	1.9	2.8	1.3	1.8	1.2	1.6	0.5
Bangkok Bank PCL	..	..	-1.2	2.6	2.3	1.4	1.1	1.5	2.5	2.5	1.6	2.9	3.6	3.5
Bank of America Corp	2.6	1.7	1.1	..	0.5	-1.9	-2.3	-0.2	-0.9	-1.1	-1.0	-0.5	-0.1	0.1
Bank of China Ltd	..	..	..	..	..	0.1	0.2	-0.6	0.1	0.0	0.3	-0.2	0.7	..
Bank of East Asia Ltd/The	..	..	..	..	2.9	0.2	-1.6	-0.3	0.2	-0.5	0.9	1.3	1.1	1.6
Bank of India	..	-2.0	-1.8	-2.6	..	-0.6	0.2	-2.2	-2.5	-2.7	-3.4	-4.7	-6.0	..
Bank of Tokyo-Mitsubishi UFJ Ltd/The	..	..	..	..	-3.3	-3.9	-4.9	-2.6	-2.5	-3.1	-2.6	-2.8	-2.0	..
Credit Agricole Corporate & Investment Bank	..	..	..	..	..	-1.2	..	..	..	..	..	..	..	..
HSBC Holdings PLC	-0.3	-0.4	-0.1	-0.3	-0.7	-1.0	-3.0	-2.1	-2.1	..	-2.4	-1.6	-1.4	-0.6
Hong Leong Bank Bhd	3.9	5.5	2.4	1.5	1.2	1.4	3.0	3.1	-2.4	0.0	0.4	0.8	1.3	..
Indian Bank	..	..	..	..	..	..	..	..	..	1.6	..	..	-2.2	..
Indian Overseas Bank	-2.7	-1.5	-0.5	0.0	..	-0.8	-0.9	-3.2	-2.8	-3.4	-5.6	-6.7	-9.0	..
JPMorgan Chase & Co	0.9	1.9	-0.8	-0.7	0.3	0.0	-0.5	1.3	1.6	1.3	1.1	0.1	0.9	2.1
Bank Mandiri Persero Tbk PT	3.1	..	6.1	-1.4	2.2	3.5	1.5	2.4	3.3	6.0	6.2	6.2	6.4	6.7

Source: Bloomberg, and IMF staff calculations.
Note: Indicators in the top 90th percentile of soundness denoted in green, those in the bottom 10th percentile denoted in red and the rest in between shown in various shades of yellow.

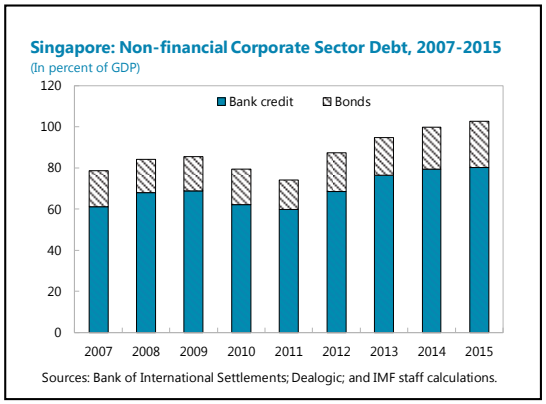
U.S. Monetary Policy Normalization. Tighter liquidity and normalization of U.S. monetary policy may retreat some of the bank funding from outside Asia (predominantly Europe and the U.S.). Post the global financial crisis, a global search for yield and stronger growth prospects in emerging Asia led to an inflow of bank funding from rest of the world to emerging Asia. With the markets heavily reliant on foreign interbank funding, tightening of liquidity conditions could lead to a continued reduction in inflow of funds to Singapore, creating liquidity gaps given growth expectations. Steps should be taken to further develop and enhance the management of domestic wholesale funding market.

MAS Monitoring. The MAS is closely monitoring the financial system including through an annual industry-wide stress test as part of its financial stability mandate. The stress test conducted by the MAS assumes realization of some of the risks under the G-RAM framework including significant weakening of external economic environment, prolonged slowdown in China and aggressive monetary policy tightening by the U.S. Federal Reserve. Their results indicate that even though asset quality would deteriorate under the stress scenario, banks would remain solvent, with their capital adequacy ratios remaining above regulatory requirements. Furthermore, banking system is also resilient to failure in their top Asian bank interbank counterparties amid challenges in the region, reflecting the shock-absorbing capacity of the interbank market.

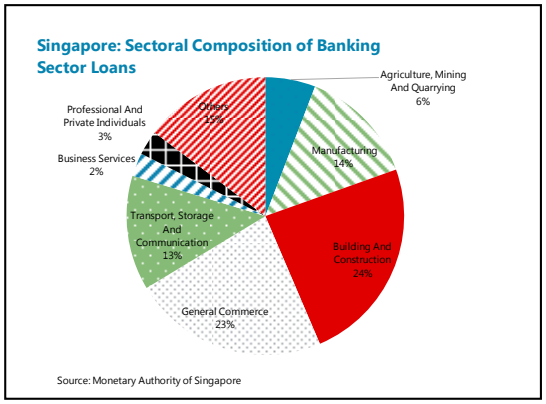
Appendix IX. Nonfinancial Corporate Sector Debt[1]

Nonfinancial corporate (NFC) debt in Singapore, which has risen since the global financial crisis, has started to stabilize. However, amid an uncertain operating environment, including slowdown in China and end of the commodity super cycle, corporate earnings have weakened. This appendix provides an overview of securities issuance and loans in the NFC sector in Singapore and finds that: (i) NFC sector relies heavily on banking sector loans, which are well diversified; (ii) a large proportion of NFC security issuance is denominated in foreign currency subjecting them to currency risks; and (iii) a significant proportion of debt securities, much higher than other advanced economies, are set to mature in the near term exposing firms to refinancing and interest rate risk. We further analyze firm level data and find that: (i) leverage in Singapore NFC is one of the highest in the region, with larger firms relying more heavily on debt rather than equity; (ii) the distribution of leverage has remained broadly stable, and after firms' cash and short-term investments are taken into account, remains fairly benign and (iii) while debt-at-risk rose between 2012–14, most listed firms will be able to service their debt in response to earnings and interest rate shock, although debt-at-risk can rise substantially in tail-risk scenarios.

Debt. Nonfinancial corporate sector debt increased from under 80 percent of GDP in 2007 to 103 percent in 2015. Bank loans, which includes domestic bank credit and cross-border credit from nonresident banks, continues to be the dominant source of financing for the NFCs[2]. Bond financing has, however, been on a rise, increasing to 23 percent of GDP in 2015.



Banking Sector Loans. Nonfinancial corporates rely heavily on bank loans. In March 2016, loans to NFCs were 77 percent of banks' total nonbank loans and advances and was well diversified[3]. Loans to the commodities-related sectors (agriculture, mining and quarrying) constituted 6 percent of loans to NFCs; building, construction and general commerce dominate, accounted for about 47 percent, while manufacturing; and transport, storage and communications were 14 and 13 percent respectively. While overall banking sector NPL ratios remain low, the NPL ratio for the manufacturing sector has increased against a backdrop of softening global demand.



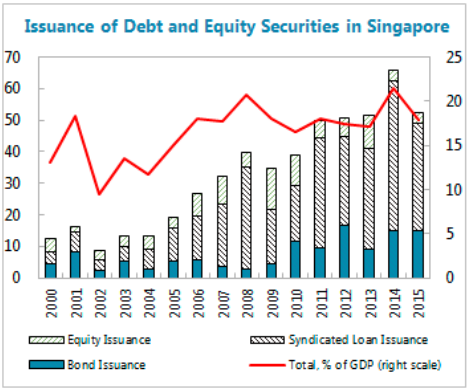
[1] Prepared by Umang Rawat (APD).

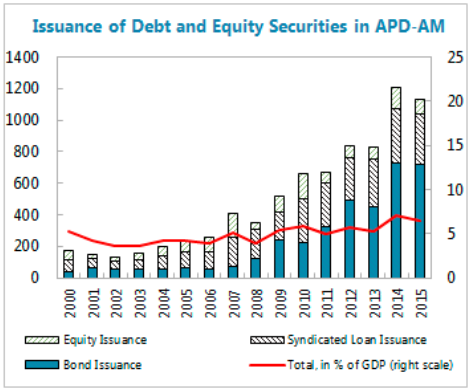
[2] The locational banking statistics, published by the Bank for International Settlements (BIS), computes credit based on residency principle. Therefore, bank credit to nonfinancial corporations here accounts for corporations registered in Singapore. While the measure includes credit from both domestic and nonresident banks, it does not include credit from other (nonbank) financial institutions.

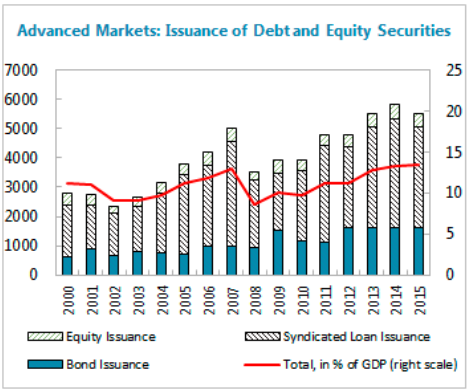
[3] This includes total nonbank loans extended by the banking sector to nonfinancial corporations, irrespective of whether they are registered in Singapore or abroad. Sectoral breakdown of loans to corporations registered in Singapore is not available however, we do not expect the decomposition to differ substantially.

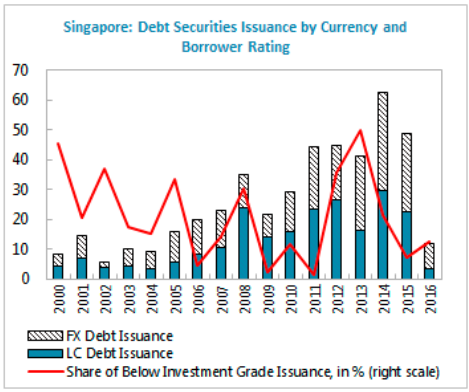
Appendix Figure IX.1. Securities Issuance: Nonfinancial Corporate Sector

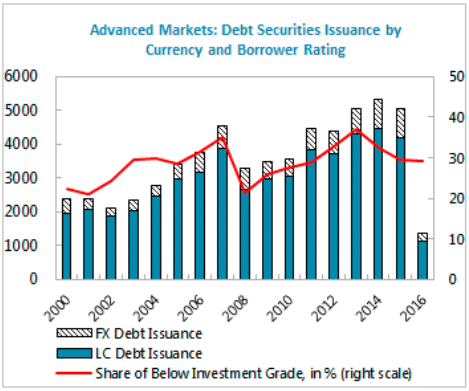
(In billions of U.S. Dollars unless otherwise stated)

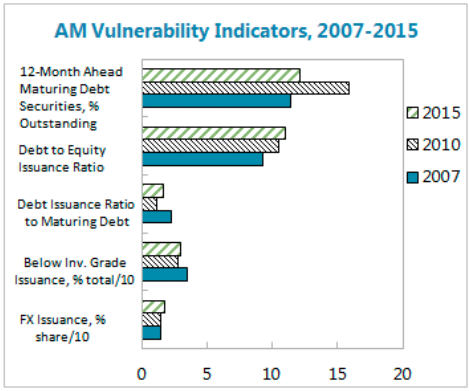


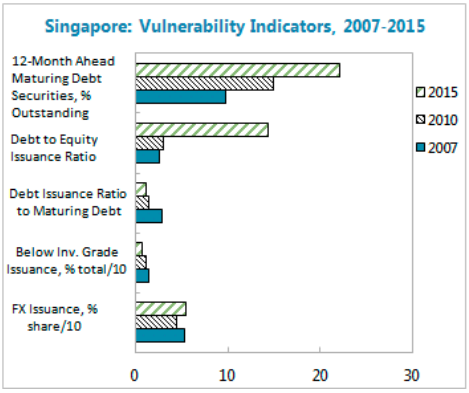


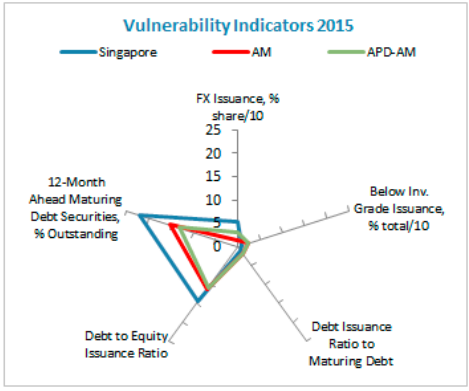












Sources: Dealogic; IMF staff calculations.

Securities Issuance. Figure IX.1 compares securities issuances in Singapore to international NFC issuance in advanced markets. Bond issuance in Singapore has increased from a low base reaching about 5 percent of GDP, comparable to the entire group of advanced markets. This is in contrast to other advanced markets in the Asia-Pacific region, where bond issuance dominates relative to equity and syndicated loan issuance. Furthermore, unlike other advanced markets where local currency issuance constitutes above 80 percent of total issuances, foreign currency debt issuances in Singapore are more than 50 percent of total issuances. This may subject NFCs to currency risks, particularly in the current uncertain and volatile environment. 12-month ahead maturing debt securities are at about 23 percent of outstanding securities, nearly double than in other advanced markets, and poses highest risk for NFCs currently. As the U.S. monetary policy starts tightening, this may increase the debt burden of NFCs in Singapore.

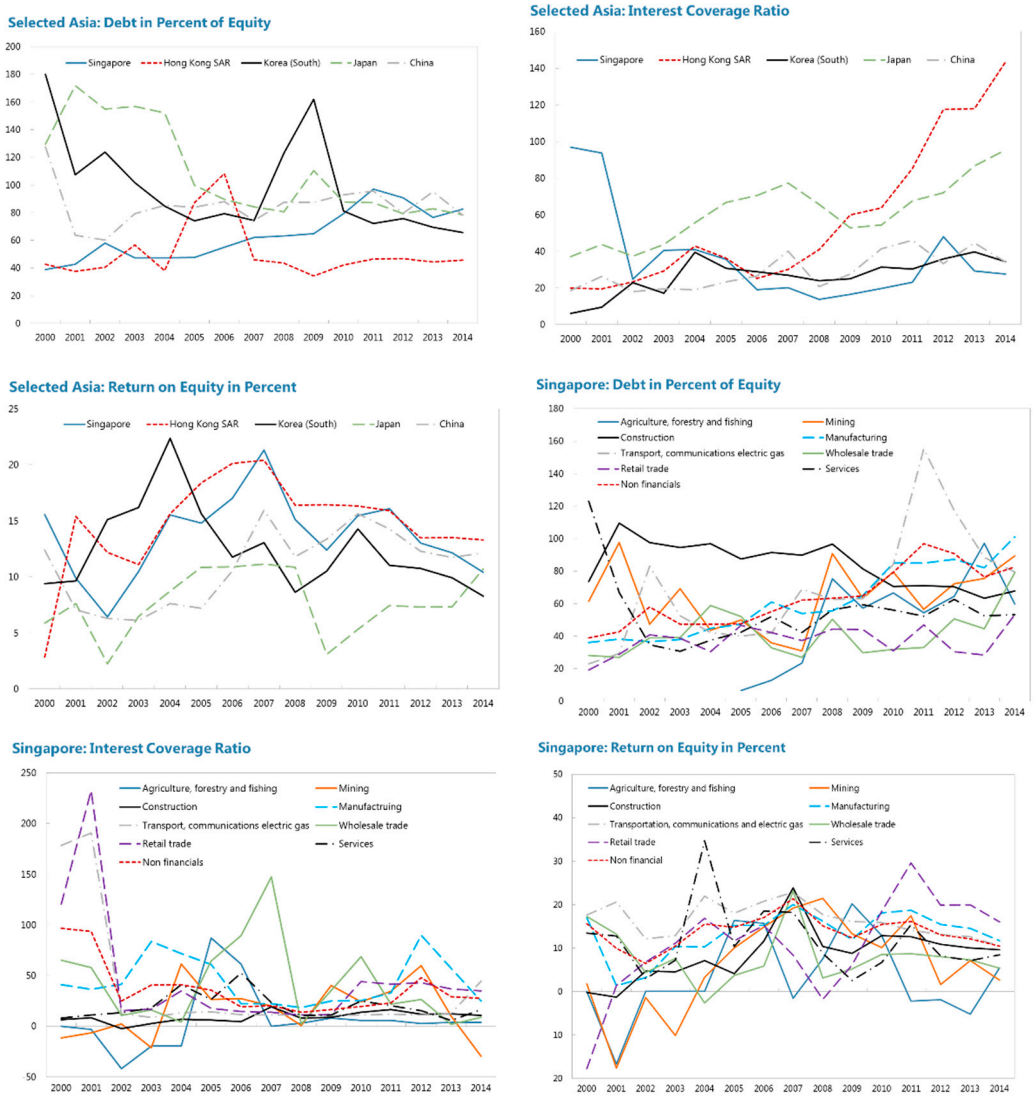
Vulnerability Indicators

Firm-level balance sheet indicators point to some areas of vulnerability. Balance sheet ratios and income statements provide valuable insight into the health of the NFC sector. We use the IMF's Corporate Vulnerability Utility (CVU) (Brooks and Ueda, 2011), which is based on publicly traded firms listed in Thomson Reuters Worldscope database to assess NFC sector health and vulnerabilities in Singapore. Figure IX.2 compares balance sheet indicators of NFC in Singapore to selected Asian economies as well as sectoral analysis of key balance sheet concepts namely, leverage, liquidity and profitability.

Leverage has risen. Corporate sector indebtedness and leverage have risen since the global financial crisis but has started to stabilize, however earnings have weakened amid an uncertain operating environment.

- *Leverage*. The market-capitalization weighted debt-to-equity ratio in Singapore of about 80 percent is one of the highest in the region, much more than in Hong Kong SAR and Korea. However, leverage has started to fall at the turn of the credit cycle. In particular, growth in bank lending to corporates has slowed from a peak of 29 percent year-on-year in September 2011 to under 5 percent in 2015Q4.
- *Liquidity*. Liquidity is assessed through interest coverage ratio (ICR) that measures corporates' capacity to pay interest on outstanding debt. The market-capitalization weighted ICR in Singapore is the lowest in the region, substantially lower than Hong Kong SAR and Japan but more comparable to Korea and China. However, in absolute terms, the ICR, even though declining, has remained healthy at above 25 as of end-2014.
- *Profitability*. Overall corporate profitability has deteriorated due to adverse domestic and external environment. The market-capitalization weighted return on equity (ROE) has continued to decline approaching levels last seen in early-2000s after the bursting of the dotcom bubble. With the exception of Japan, other economies in Asia are experiencing a similar decline in profitability.

Appendix Figure IX.2. Singapore: Vulnerability Indicators



Sources: Worldscope; and IMF, *Corporate Vulnerability Utility* database.

Sectoral View. We further take a closer look at balance sheet indicators on a sectoral level in Singapore.

- The market-capitalization weighted debt-to-equity ratio has been on a rising trend since the global financial crisis (GFC). Leverage in the transport, communications, and electric gas sector peaked in 2011, followed by deleveraging in recent years. Between 2013 and 2014, uptick in leverage was predominantly seen in trade (wholesale and retail), manufacturing, and mining sectors. These sectors have been directly hit by end of the commodity super cycle and softening of global demand. Therefore, leverage is expected to fall going forward.
- The market-capitalization weighted ICRs in manufacturing and mining industries have seen biggest decline in recent years against a backdrop of falling commodity prices and slowdown in global trade. The ICRs in mining industry became negative in 2014. While the

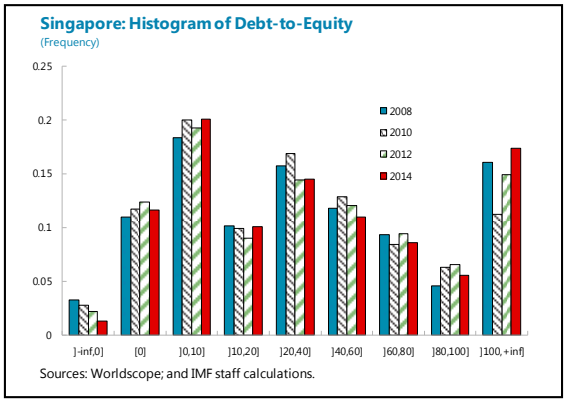
ICR in the manufacturing sector was still healthy in 2014, it would further decline if interest rates were to rise or the earnings outlook were to deteriorate.

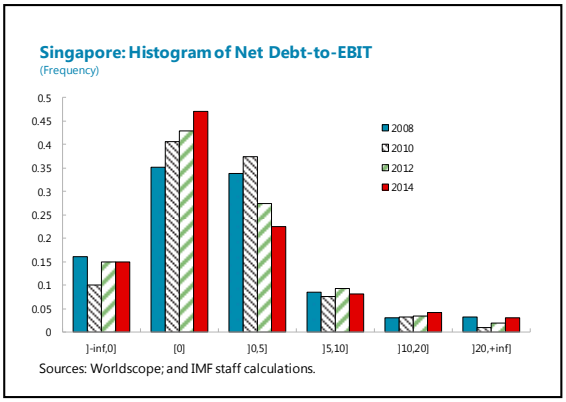
- There has been a broad-based decline in ROE in most sectors in Singapore. Prospects in retail trade, which saw tremendous growth in profitability after the GFC, have fallen significantly. In trade-related sectors, notably manufacturing, ROEs have also dipped in light of slow global growth.

Assessment of NFC Balance Sheet: Stress Test

In the previous section, we assessed the balance sheet in the NFC sector by using the market-capitalization weighted leverage, returns and the ICR. In this section, we focus on debt-at-risk as the key indicator measuring total indebtedness of firms with relatively low debt servicing capacity, with debt servicing capacity measured by the ICR. The IMF's Corporate Stress-testing Exercise considers debt to be at risk when the ICR is below 1.5.

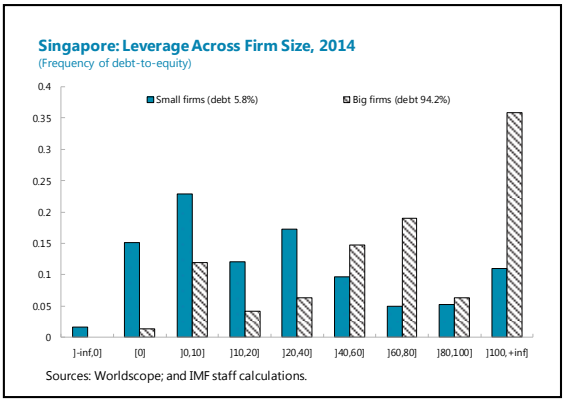
Cross-Firm Distribution of Leverage. In addition to evaluating debt-at-risk, here we also focus on changes in the cross-firm distribution of leverage through time, which is preferable to looking only at changes in averages. There are signs of increase in leverage overtime. As discussed earlier, the debt-to-equity ratio in Singapore is high with majority of firms having debt-to-equity ratio greater than 20. Furthermore, very high levels of leverage (debt-to-equity of above 100) has become more common since 2010. However, net debt-to-earnings before interest and taxes (EBIT) is more reasonable suggesting ample cash reserves and short-term investments for NFCs in Singapore[4].

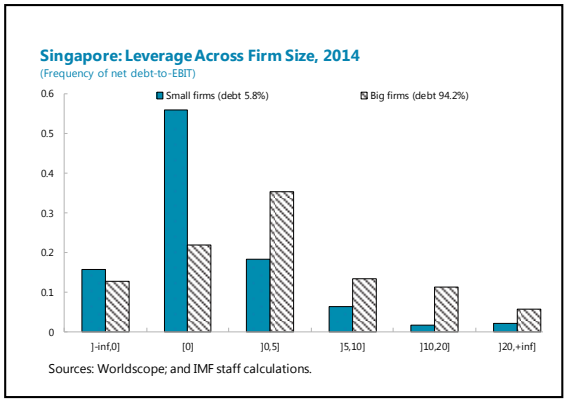




Larger firms, with better access to credit markets, are more leveraged than smaller firms. We define 'large firms' as those in the top 25th percentile of total assets and the remainder as 'small firms'. Small firms in Singapore tend to have lower leverage, with more than 50 percent of them having a debt-to-equity ratio of less than 20. Furthermore, all firms with negative equity are small firms, which have very low debt levels and are not systemically important. Similarly, negative EBIT is more common among smaller firms. Big firms, where most of NFC debt is concentrated, tend to have a higher leverage and thus need to be regularly monitored as they can have systemic implications.

[4] Net debt is defined as total debt minus cash and equivalents (short term liquid investments).





Approach. In order to quantify corporate sector vulnerabilities, we explore the sensitivity of debt-at-risk to earning and interest rate shocks. The ICR measures the debt capacity for a firm such that firms with an ICR below 1.5 are classified as distressed and called "firms-at-risk". Debt-at-risk is then defined as the share of total corporate debt associated with firms at risk. We explore how the share of debt-at-risk changes when firms are subject to interest rate or profit shocks. Firm-level data are used to explore the impact of shocks to interest rates and profits. The sample consists of publicly-listed NFCs as included in the Thomson Reuters Worldscope database for the period 2007–2014.[5]

Interest rate shock. In scenario 1, interest costs are expected to increase by 25 percent. In scenarios 2 and 3, downside tail-risk is considered whereby interest rates are assumed to increase by 200 and 300 basis points respectively. The baseline interest rate is defined as interest expense relative to total debt in the current year. We then apply a tail-risk interest rate shock to the baseline rate. Hence, interest expenses in the shock scenario 2 and 3 are computed as:

$$interest\ expense_{shock,t} = \frac{i_{rate,t} + X}{100} * debt_t \qquad X \in (2,3)$$

Profit shock. We shock operating income (EBIT) by assuming a 25 percent decline:

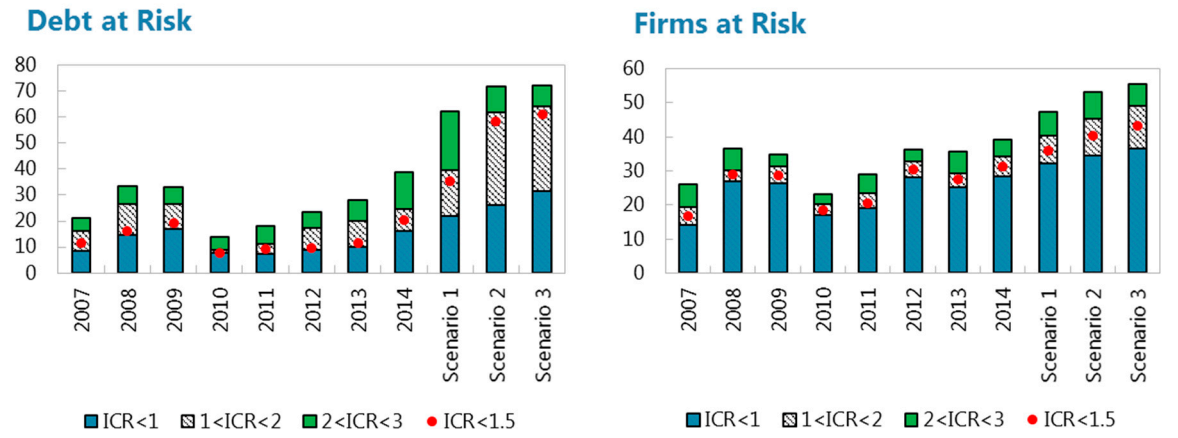
$$EBIT_{shock,t} = EBIT_t * (1 - 0.25)$$

Therefore, ICR in the shock scenario can be written as:

$$ICR_{shock,t} = \frac{EBIT_{shock,t}}{interest\ expense_{shock,t}}$$

[5] The number of active listed firms in the sample over 2007–14 ranges from 558 to 612.

Appendix Figure IX.3. Singapore: Stress Scenarios



Sources: WorldScope; and IMF staff calculations.

Results. Figure IX.3 shows that debt-at-risk and firm-at-risk have risen in recent years. In response to a stress scenario of a 25 percent increase in interest costs and a 25 percent decline in EBIT, firms-at-risk would increase from 31 to 36 percent of all corporates, and their share of debt-at-risk would increase from 20 to 35 percent. However, taking cash reserves into account, the total debt-at-risk would fall to 27 percent and most listed firms would still be able to service their debts. Debt-at-risk and firms-at-risk rise substantially in the face of tail-risk shocks, increasing from 20 percent, affecting 31 percent of firms, to 61 percent of total debt and 43 percent of firms in the most extreme scenario.

Appendix X. Developments in FinTech[1]

The Future Economy. Growth through factor accumulation has reached its limits in Singapore given physical limitations, an aging population, and limits to immigration. Moreover, as in other advanced economies, prospects for private investment remain clouded: the recovery from the global financial crisis (GFC) has been slow, shallow and uneven (the "new mediocre"). Global manufacturing overcapacity and the drag from the end of the global commodity super cycle add to business uncertainty. Investment may also be held down by the generally capital-saving nature of recent technological changes: new information technologies utilize the internet and hand-held devices to cut time and costs and enable better matching of ultimate sellers with ultimate buyers, including through e-commerce, ride and apartment sharing, peer-to-peer lending and other emerging financial technologies. These technologies, FinTech among them, require investments in internet-based information technology platforms but either reduce the usefulness of existing "bricks and mortar" capital (e.g., retail space in malls) or raise its capacity utilization (cars, apartments). Either way, they tend to reduce the need for new private investment in traditional capital assets.

Opportunities for Singapore. While potentially disruptive, these new technologies also hold special promise for Singapore, given the important role of the financial sector in the economy (Figure 3), the scarcity of land and space in the city state, a high level of human capital and financialization, and the premium placed on entrepreneurship and innovation. The authorities are focusing their efforts to turn Singapore into a global innovation hub. Several schemes have been introduced to foster innovation, including through incentives to businesses to automate, innovate, and internationalize, and a high-level *Committee on the Future Economy* has been convened and will announce its priorities by end-2016. The government is also providing extensive support of investments in human capital, most notably through *SkillsFuture*, a program that covers educational expenses in support of on-the-job education and training.

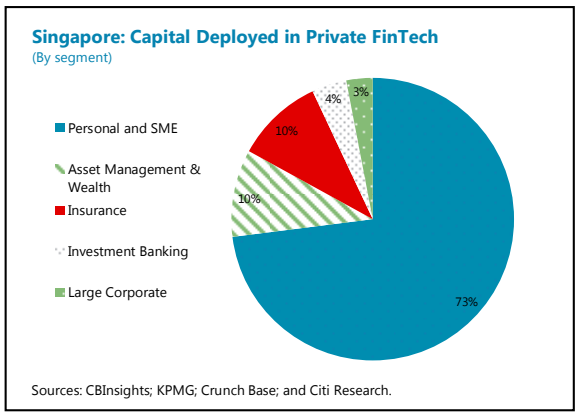
Financial Technology, also known as FinTech, refers to new solutions, which demonstrate an incremental or radical and disruptive innovation in development of applications, processes, products or business models in the financial services industry. Since 2010, more than US$50 billion has been invested in almost 2,500 companies worldwide as FinTech innovations redefine the way in which we store, save, borrow, invest, move, spend and protect money.

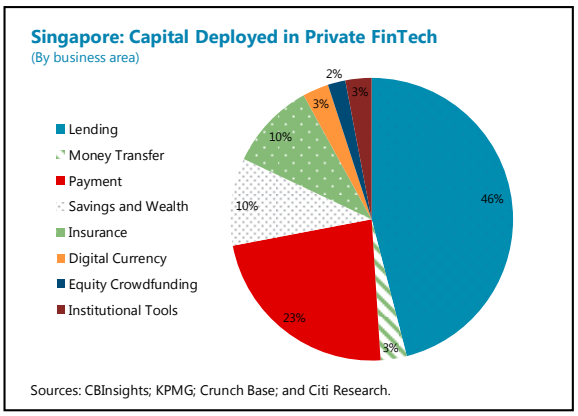
Scope. FinTech encompasses a wide array of business processes including payments, investments, lending, insurance, wealth management, digital currency and big-data analytics. This takes the form of Business-to-Consumer (B2C), Business-to-Business (B2B), or Consumer-to-Consumer (C2C) interaction. Citi (2016)[2] finds that B2C dominates with over 70 percent of the FinTech investments to date in the personal/SME business segments. Mobility of technology (e.g., smartphones), ideas (e.g., through online platforms) and payments has revolutionized information and content delivery wherein B2C FinTech solutions can win new clients by providing better and more efficient services.

[1] Prepared by Umang Rawat (APD).

[2] "Digital disruption – How FinTech is forcing banking to a tipping point", Citi GPS, March 2016.

B2B solutions on the other hand require corporate clients' greater product/service customization and due diligence, all of which increase switching costs.

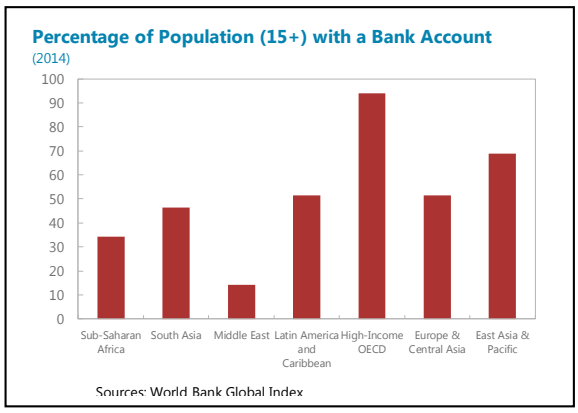


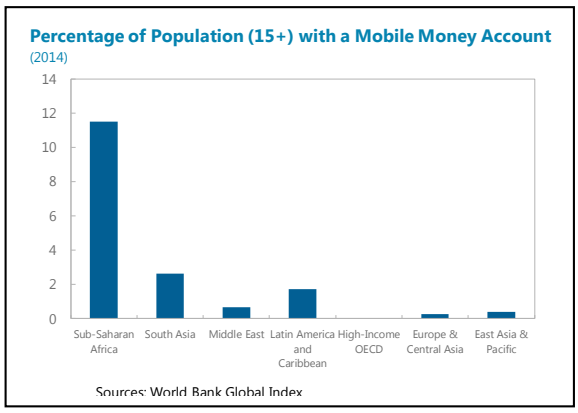


Disruptive Potential. By business area, payments and peer-to-peer (P2P) lending is most active. Less capital-intensive activities – such as online payment – are more likely to be disrupted by FinTech. However, only companies that are innovative (rather than just providing cheaper services) are likely to have a sustainable competitive advantage. As the FinTech space is maturing, innovators are seeking to disrupt and enhance elements along the financial services value chain. Insurance, for example, is rapidly growing with investment into firms with InsurTech propositions more than tripling from 2014 to 2015 (Accenture, 2016).[3] Another area is personal finance management, where companies like Wealthfront have propelled algorithmic asset management and thus reduced the need for face-to-face wealth advisors. Other new initiatives include Crowdfunding, which allows people to raise funds via the internet. A particularly promising area of FinTech is big data and data collection involving monumental changes in analytics, data storage, data-driven-marketing and cloud computing. Finally, digital currencies, like Bitcoins, have attracted much interest and the technology behind it—block chain or the distributed ledger system—can be used elsewhere to maintain a decentralized record.

Financial Inclusion. FinTech, via limited build-up costs and fast and efficient processing and delivery of service, can achieve financial inclusion by expanding services to underserved regions. According to World Bank Global Findex (2014), there are 2 billion unbanked or underbanked people in the world, mainly, but not solely, in developing countries in Africa and Asia. FinTech solutions such as mobile money (i.e., monetary transaction executed with a mobile phone), even though in its nascent stage, is gaining traction in Sub-Saharan Africa and South Asia where consumers have lower access to traditional bank channels than high-income countries. Furthermore, FinTech solutions, for example, P2P lending, are also supporting demand of credit constrained SMEs. Due to lower operating costs, they are able to offer credit at lower rates of interest.

[3] FinTech and the evolving landscape: landing points for the industry (Accenture, 2016).





Growing Investment in FinTech. The U.S., China, the U.K. and Sweden lead private investment in Global FinTech companies. Asia-Pacific is catching up, with Fintech investment in the region more than quadrupling in 2015 to US$4.3 billion, making it the second biggest region for FinTech after North America. In the region, China has the lion's share of investment, accounting for 45 percent in 2015. India makes up 38 percent and is growing fast. Three locations, working to create clusters of start-up activity, are especially relevant in connection with FinTech. The first, New York City,[4] kicked-off the trend in 2010 by focusing on financial services as an opportunity for local start-ups. London followed suit in 2013 by launching numerous interconnected initiatives aimed at creating a FinTech ecosystem supported by the U.K. government.[5] Finally, Singapore, which started more recently in 2015, has seen a very ambitious support from the government, with the MAS setting up the FinTech and Innovation Group and a venture fund to support start-ups.[6]

Prospects for Singaporean FinTech. As one of the gateways of the Asian financial market, Singapore represents an attractive spot in the region for growth of FinTech. The Asia-Pacific region has tremendous untapped potential in finance with a very significant underserved market. The MAS aims at developing a parsimonious ecosystem bringing together key players – the technology players, finance players, start-ups, and both global and local Singapore players as well as covering broad range of segments – credit, savings, investing, payments, insurance, big data, block chains and distributed ledgers etc. The MAS envisions developing a smart financial center through initiatives such as a Financial Sector Technology and Innovation (FSTI) scheme to provide financial support (S$225 million over 5 years), aiding the development of efficient digital payment systems, an interactive technology-enabled regulatory reporting system (RegTech), supporting a FinTech ecosystem and building skills and competencies in technology through the financial sector's *SkillsFuture* drive.[7]

[4] "The FinTech Innovation Lab", Partnerships for New York City http://pfnyc.org/our-investments/partnership-fund-programs/.
[5] "Fintech: The UK's Unique Environment for Growth", UK Trade & Investment, 2014.
[6] "MAS Sets Up New Fin Tech & Innovation Group", Media Releases, July 2015.
[7] "A Smart Financial Centre" – Keynote Address by Mr. Ravi Menon, Managing Director, Monetary Authority of Singapore, at Global Technology Law Conference 2015.

Singapore		Overall Assessment
Foreign asset and liability position and trajectory	**Background**. The net international investment position (NIIP) stood at 210 percent of GDP at the end of 2015, about 13 percent higher than in 2014, driven by outflows in 2015. It stands at the level of 2010, but is significantly lower than the pre-GFC peak of 256 percent of GDP in 2006. Current account and growth projections imply that the NIIP to GDP ratio is likely to rise substantially over the medium term. 1/ **Assessment**. The external balance sheet is not a major source of risk. Potential vulnerabilities posed by the large gross non-FDI liabilities (438 percent of GDP at the end of 2015)—predominantly cross-border deposit taking by foreign bank branches—are mitigated by banks' large short-term external assets and the authorities' close monitoring of banks' liquidity risk profiles. Singapore also has large official reserves and other official liquid assets. 2/	**Overall Assessment**: *The external position in 2015 was substantially stronger than what is consistent with medium-term fundamentals and desirable policies.* Developments in 2015; including the decline in the energy prices and lower regional trade had an important impact on the current account. The assessment for 2015 and the size of the imbalance are subject to a wide range of uncertainty reflecting Singapore's very open economy and position as a global trading and financial center. Since end 2015 the NEER has remained broadly unchanged, and thus assessment of the external position is unlikely to have changed. **Potential policy responses**: Consistent with the authorities' current policies, increased public spending, a stronger social safety net, a more-even distribution of consumption across generations, helped by an expected slower absorption of foreign workers would contribute to moderate the current account over the medium term. Fiscal policy in recent years has already made progress in this direction as social spending has increased.
Current account	**Background**. The large current account (CA) surplus of 19.8 percent of GDP in 2015, up by 2.3 percent of GDP relative to 2014, reflects a strong goods balance that is somewhat offset by remittance outflows and a negative income balance. 3/ The recent oil price decline caused the oil trade deficit to narrow by 3.7 percentage points of GDP, to 1.7 percent of GDP in 2015. 4/ Amid a regional trade slowdown, weaker external demand and buoyant private and public consumption partially offset the resulting CA improvement. The recent easing of monetary policy through a slightly lower trend appreciation of the nominal effective exchange rate (NEER) band is likely to have had a limited positive effect on the current account.5/ Structural factors and policies that boost the saving rate such as financial center status, limited social safety nets, high income inequality and the rapid pace of aging combined with a defined-contribution pension scheme are the main drivers of Singapore's strong external position. Fiscal policy in recent years has increased social spending which should contribute to a lower CA surplus. **Assessment**. Singapore is a small, very open economy that has a large positive NIIP, very high per capita income and is aging at a very high speed. Such non-standard factors make a quantitative assessment of its CA subject to a wide range of uncertainty. Considering a range of estimates (based on EBA and other models) staff assesses the 2015 CA as substantially stronger than the level consistent with medium-term fundamentals and desirable policies, by 3 to 9 percent of GDP. 6/	
Real exchange rate	**Background**. The average real effective exchange rate (REER) has depreciated by 2 percent between in 2015 with respect to 2014. This modest depreciation followed a secular appreciation of the exchange rate which amounted to 29 percent appreciation in REER terms between 2004 and 2013. Since end 2015 the NEER has depreciated by 2 percent. **Assessment**. While non-standard factors make a quantitative assessment difficult, staff assesses that the real exchange rate is around 6 to 18 percent weaker than warranted by medium-term fundamentals and desirable policies. This estimate is drawn from the CA assessment and relies on a semi-elasticity of the CA with respect to the REER of about 0.5, consistent with Singapore's high level of openness. This assessment is subject to a wide range of uncertainty reflecting the uncertainty in the underlying CA assessment and the semi-elasticity of the CA with respect to the REER.	
Capital and financial accounts: flows and policy measures	**Background**. Singapore has a fully open capital account. The financial account deficit tends to co-move with the global financial cycle. It reflects in part reinvestment abroad of income from the foreign assets of the official sector. Financial flows also encompass sizable net inward FDI and smaller but more volatile net bank-related flows. 7/ Inflows on account of "Other Investment, liabilities," which averaged US$50 billion per annum during the first five years after the global financial crisis turned negative in 2015 (–US$4 billion). In all, reflecting international investors' reassessment of risk across regions and asset classes and the resulting unwinding of carry trades, the capital and financial accounts in 2015 recorded the largest net outflow in at least 30 years, both in absolute terms and relative to Singapore's GDP. As a trade and financial center in Asia, negative sentiment in emerging and low income countries in the region can affect Singapore significantly **Assessment**. The financial account is likely to remain in deficit as long as the trade surplus is likely to remain large.	
FX intervention and reserves level	**Background**. With the NEER as the intermediate monetary policy target, intervention is undertaken to achieve inflation and output targets. Singapore's official reserves declined by 9 percent (25 billion USD) in 2014 and 2015, reflecting also valuation changes. As a financial center, prudential motives call for a large NIIP buffer, also in the form of reserves. **Assessment**. At end 2015, official reserves covered about 26 percent of non FDI short-term external debt. However, reserves are far in excess of thresholds for other adequacy metrics. 8/ While non-standard factors warrant generous reserve buffers, current levels appear adequate and there is no case for further accumulation for precautionary purposes.	

Technical Background Notes	1/ Valuation changes have been an important driver of changes in the NIIP, given the large gross assets and liabilities. 2/ Singapore's official reserves amounted to about 87 percent of GDP in 2015. 3/ Singapore has a negative income balance despite its large and positive NIIP position. This reflects the lower rate of return earned on its foreign assets relative to the return paid on its foreign liabilities. The lower return on foreign assets may reflect the fact that the composition of Singapore's assets is tilted toward safer assets which yield lower returns. 4/ Singapore is a net oil importer, with a net oil trade deficit of 1.7 percent of GDP in 2015. The oil trade deficit would be smaller if one takes into account the high imported petroleum product content in Singapore's exports of petrochemicals and other oil intensive products and services like water transportation. In addition, Singapore has some sectors that are closely linked to investment in the oil sectors such as production of oil rigs. The decline in investment in the oil sector is expected to reduce Singapore's exports of these products, in particular if the oil price decline is sustained. 5/ The monetary policy easing in 2015 involved two slight declines in the trend appreciation of the NEER band from an estimated 2 percent to less than 1 percent per annum, and was motivated by the deceleration of inflation amid a closing output gap and weak external demand. 6/ Non-standard factors make quantitative assessment of Singapore's external position difficult and subject to significant uncertainty. Singapore is not in the sample used to estimate the EBA models because it is an outlier along several dimensions (e.g. the NFA position, per capita income, fiscal balance and the aging speed) and nonlinearities in their impacts on the CA would not be captured in the EBA framework. That said, the EBA CA framework, appropriately adjusted for the special characteristics of Singapore, can still be informative. Applying the EBA coefficients to Singapore suggests that the CA surplus is mainly explained by the high level of productivity, the large fiscal surplus, a dummy regressor for status as a financial center, and its large NFA position. The EBA-estimated CA gap is about 6.4 percent of GDP (relative to a cyclically-adjusted level of the CA of about 22 percent of GDP in 2015 and a norm of 15.6). Of that, about 0.75 percentage points of GDP is identified as policy gaps (driven by the fiscal balance and public spending on health care) and the remaining 5.7 percentage points of GDP are the residual. However, that estimated CA surplus norm could be overstated, in particular if the high NFA level is interpreted as a byproduct of past excessive surpluses. The CA gap increased by 1 percentage point with respect to last year's assessment. The norm increased by 3 percentage points driven mostly by the contribution of terms of trade (1.5 percentage points) and domestic credit (0.6). The EBA-Lite model gives a very similar assessment. 7/ The latter is the result of considerably larger gross inflows and outflows. 8/ The reserves-to-GDP ratio is also larger than in most other financial centers, but this may reflect in part that most other financial centers are located in reserve-currency countries or currency unions.

Appendix XII. Public Debt Sustainability Analysis

Background. The debt sustainability analysis (DSA) framework for market access countries is used to assess Singapore's debt sustainability and other risks related to its funding and debt structure.

Macro-Fiscal Assumptions. Growth is projected at 1.7 percent in 2016, recovering to 2.2 percent in 2017. Growth is projected at 2.6 percent in the medium term. In staff's baseline projections, central government surplus decreases from 2.7 percent of GDP in 2015 to 1.5 percent in 2021. The projected fiscal path is consistent with the authorities' targets and is supported by policy reforms announced in recent budgets.

Data Coverage. Consistent with the data on government debt reported by the authorities, the fiscal assumptions in this DSA are based on the general government debt.

Choice of Framework. Singapore's high level of government assets calls for using the basic framework. Government's gross debt increased sharply in 2009, by about 10 percent of GDP, reflecting sizable discretionary fiscal stimulus, declining real and nominal growth and a large fall in world trade. Although growth rebounded sharply and the overall fiscal balance recovered, the debt to GDP ratio remained broadly stable. Staff projections have debt falling, reaching pre-global financial crisis levels by 2021.

Debt is Projected to Fall. Under the baseline, the debt-to-GDP ratio is projected to decrease to below 90 percent by 2021. Gross financing needs (GFN) are expected to remain at about 10 percent in the medium term.

A high level of financial assets mitigates the risks associated with public debt. The gross government debt is high at about 100 percent of GDP, but it includes about 65 percent of GDP of debt to the Central Provident Fund (CPF), a defined contribution fully funded pension scheme that requires Singaporeans to contribute to individual accounts. CPF invests mostly in public bonds, 95 percent, and the government invests the proceeds through Temasek and the Government Investment Corporation (GIC). Most of the investments are held abroad. Although GIC does not report assets, Temasek has assets of about 70 percent of GDP. Gross financial assets of the government are about 200 percent of GDP.

Singapore Public Sector Debt Sustainability Analysis (DSA) - Baseline Scenario

(in percent of GDP unless otherwise indicated)

Debt, Economic and Market Indicators [1/]

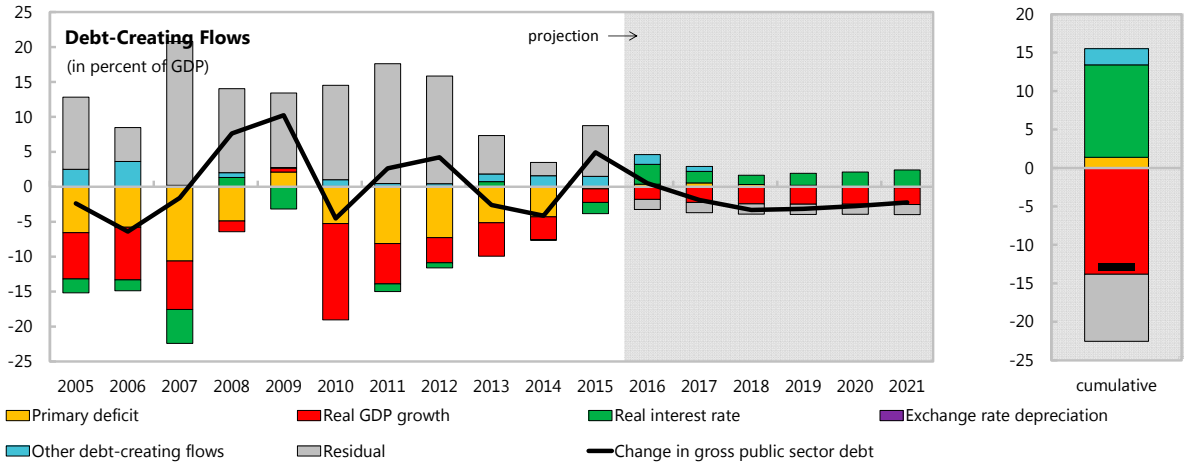
	Actual			Projections					
	2005-2013 [2/]	2014	2015	2016	2017	2018	2019	2020	2021
Nominal gross public debt	97.7	99.8	104.7	100.7	98.8	95.5	92.3	89.6	87.3
Public gross financing needs	-7.2	-5.8	-1.7	6.1	10.5	10.2	9.9	9.8	9.8
Real GDP growth (in percent)	6.3	3.3	2.0	1.7	2.2	2.5	2.6	2.6	2.6
Inflation (GDP deflator, in percent)	1.4	0.0	1.6	-0.3	0.4	1.3	1.3	1.3	1.3
Nominal GDP growth (in percent)	7.8	3.3	3.7	1.4	2.7	3.8	3.9	3.9	3.9
Effective interest rate (in percent) [4/]	0.0	0.0	0.0	3.1	3.4	3.9	4.4	4.9	5.4

As of March 23, 2016

Sovereign Spreads		
EMBIG (bp) 3/		31
5Y CDS (bp)		N/A
Ratings	Foreign	Local
Moody's	Aaa	Aaa
S&Ps	AAA	AAA
Fitch	AAA	AAA

Contribution to Changes in Public Debt

	Actual			Projections							
	2005-2013	2014	2015	2016	2017	2018	2019	2020	2021	cumulative	debt-stabilizing primary balance [9/]
Change in gross public sector debt	0.8	-4.1	4.9	0.5	-1.9	-3.3	-3.2	-2.8	-2.2	-12.9	
Identified debt-creating flows	-11.4	-6.0	-2.3	2.0	-0.4	-1.9	-1.7	-1.3	-0.8	-4.1	
Primary deficit	-5.7	-4.3	-0.3	0.4	0.5	0.3	0.2	0.1	-0.1	1.4	0.0
Primary (noninterest) revenue and grants	20.3	20.4	20.1	20.7	20.0	20.3	20.5	20.8	21.1	123.3	
Primary (noninterest) expenditure	14.6	16.1	19.8	21.0	20.6	20.6	20.8	20.8	20.9	124.7	
Automatic debt dynamics [5/]	-6.8	-3.3	-3.5	1.1	-0.6	-1.1	-0.8	-0.4	0.0	-1.8	
Interest rate/growth differential [6/]	-6.8	-3.3	-3.5	1.1	-0.6	-1.1	-0.8	-0.4	0.0	-1.8	
Of which: real interest rate	-1.3	0.0	-1.6	2.9	1.7	1.3	1.7	2.1	2.4	12.0	
Of which: real GDP growth	-5.6	-3.3	-1.9	-1.8	-2.2	-2.4	-2.5	-2.5	-2.4	-13.8	
Exchange rate depreciation [7/]	0.0	0.0	0.0	...	...	...	...	...	...	...	
Other identified debt-creating flows	1.1	1.6	1.5	1.4	0.7	0.0	0.0	0.0	0.0	2.1	
Net privatization proceeds (negative)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Contingent liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Other change in financial assets	1.1	1.6	1.5	1.4	0.7	0.0	0.0	0.0	0.0	2.1	
Residual, including asset changes [8/]	12.2	1.9	7.3	-1.4	-1.5	-1.5	-1.4	-1.4	-1.4	-8.7	



Source: IMF staff.

1/ Public sector is defined as central government.

2/ Based on available data.

3/ Long-term bond spread over U.S. bonds.

4/ Defined as interest payments divided by debt stock (excluding guarantees) at the end of previous year.

5/ Derived as [(r - π(1+g) - g + ae(1+r)]/(1+g+π+gπ)) times previous period debt ratio, with r = interest rate; π = growth rate of GDP deflator; g = real GDP growth rate; a = share of foreign-currency denominated debt; and e = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).

6/ The real interest rate contribution is derived from the numerator in footnote 5 as r - π (1+g) and the real growth contribution as -g.

7/ The exchange rate contribution is derived from the numerator in footnote 5 as ae(1+r).

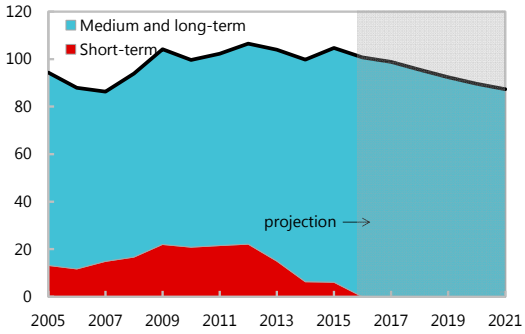
8/ Includes asset changes and interest revenues (if any). For projections, includes exchange rate changes during the projection period.

9/ Assumes that key variables (real GDP growth, real interest rate, and other identified debt-creating flows) remain at the level of the last projection year.

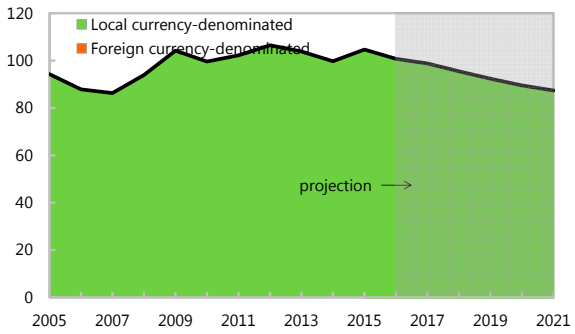
Singapore Public DSA - Composition of Public Debt and Alternative Scenarios

Composition of Public Debt

By Maturity
(in percent of GDP)



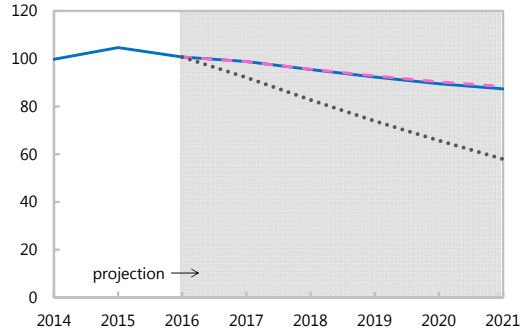
By Currency
(in percent of GDP)



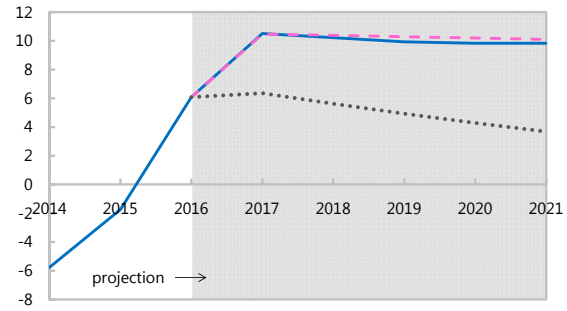
Alternative Scenarios

Baseline — Historical — Constant Primary Balance

Gross Nominal Public Debt
(in percent of GDP)



Public Gross Financing Needs
(in percent of GDP)



Underlying Assumptions

(in percent)

Baseline Scenario	2016	2017	2018	2019	2020	2021
Real GDP growth	1.7	2.2	2.5	2.6	2.6	2.6
Inflation	-0.3	0.4	1.3	1.3	1.3	1.3
Primary Balance	-0.4	-0.5	-0.3	-0.2	-0.1	0.1
Effective interest rate	3.1	3.4	3.9	4.4	4.9	5.4
Constant Primary Balance Scenario						
Real GDP growth	1.7	2.2	2.5	2.6	2.6	2.6
Inflation	-0.3	0.4	1.3	1.3	1.3	1.3
Primary Balance	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
Effective interest rate	3.1	3.4	3.9	4.4	4.9	5.4

Historical Scenario	2016	2017	2018	2019	2020	2021
Real GDP growth	1.7	5.4	5.4	5.4	5.4	5.4
Inflation	-0.3	0.4	1.3	1.3	1.3	1.3
Primary Balance	-0.4	5.0	5.0	5.0	5.0	5.0
Effective interest rate	3.1	3.4	3.6	3.9	4.1	4.4

Source: IMF staff.

INTERNATIONAL MONETARY FUND

SINGAPORE

STAFF REPORT FOR THE 2016 ARTICLE IV CONSULTATION—INFORMATIONAL ANNEX

July 8, 2016

Prepared By Asia and Pacific Department

CONTENTS

FUND RELATIONS

(As of May 31, 2016)

Membership Status: Joined August 3, 1966; Article VIII

General Resources Account

	SDR Millions	Percent of Quota
Quota	3,891.90	100.00
Fund holdings of currency (exchange rate)	3,261.61	83.80
Reserve tranche position	630.66	16.20
Lending to the Fund:		
New Arrangements to Borrow	117.79	

SDR Department

	SDR Millions	Percent of Allocation
Net cumulative allocation	744.21	100.00
Holdings	744.34	100.02

Outstanding Purchases and Loans: None.

Financial Arrangements: None.

Projected Payments to the Fund: None.

Exchange Arrangement

Singapore's de facto exchange rate arrangement is classified as "stabilized." The de jure exchange rate arrangement is "other managed." The Monetary Authority of Singapore (MAS) monitors its value against an undisclosed basket of currencies and intervenes in the market to maintain this value within an undisclosed target band. The U.S. dollar is the intervention currency. Singapore has accepted the obligations of Article VIII, Sections 2, 3, and 4 and maintains an exchange rate system free of restrictions on the making of payments and transfers for current international transactions, except for restrictions maintained solely for the preservation of national or international security, which have been notified to the Fund in accordance with the procedures set forth in Executive Board decision 144-(52/51). Singapore maintains restrictions on Singapore dollar credit facilities to, and bond and equity issuance by, nonresident financial institutions. Singapore-dollar proceeds obtained by nonresident financial entities (such as banks, merchant banks, finance companies, and hedge funds) from loans exceeding S$5 million, or any amount for equity listings or bond issuance to finance activities outside Singapore must be swapped or converted into foreign currency upon draw-down. Financial institutions are prohibited from extending Singapore-dollar credit facilities in

excess of S$5 million to nonresident financial entities if there is reason to believe that the Singapore-dollar proceeds may be used for Singapore-dollar currency speculation. In a bid to contain a real estate price bubble, Singapore imposed additional stamp duties on purchases by foreigners and corporate entities of residential properties in Singapore.

Article IV Consultation

Singapore is on the 12-month consultation cycle. The 2015 Article IV consultation discussions were held during April 29–May 12, 2015; the Executive Board concluded the consultation on July 15, 2015 (IMF Country Report No. 15/199).

FSAP Participation

The FSAP Update involved two missions: May 15−22, 2013 and July 25–August 7, 2013. The findings were presented in the Financial System Sustainability Assessment (IMF Country Report No. 13/325).

Technical Assistance: None.

Resident Representative: Mr. Geoffrey Heenan has been posted in Singapore since January 2014.

STATISTICAL ISSUES

Assessment of Data Adequacy for Surveillance
General: Data provision is broadly adequate for surveillance. While the authorities have continued to expand the range of publicly available data, dissemination of more disaggregated data would enhance the basis for macroeconomic policy analysis, particularly in the external, monetary and fiscal areas.
National accounts: The Singapore Department of Statistics (DOS) has made improvements in data sources and methodology. The reconciliation of various national accounts estimates was conducted in 2014, resulting in lower statistical discrepancies. DOS has completed the rebasing of Singapore's national accounts to reference year 2010. **Price statistics**: DOS has completed the rebasing of the Consumer Price Index (CPI) to base year 2014. The CPI is rebased once every five years to reflect the latest consumption pattern and composition of goods and services consumed by resident households.
Government finance statistics: Information on government assets held abroad is neither published nor provided to the Fund. The government publishes annually partial information on the interest and dividends on these assets. Debt service payments on domestic debt made from the extra budgetary Government Securities Fund are published on an annual basis. Data on the financial position of the consolidated public sector are not published.
Monetary statistics: The Monetary Authority of Singapore has not submitted the standardized report forms (SRFs) for monetary statistics introduced in October 2004. The SRFs provide for accounting data to be broken down by instrument, sector, and currency.
Balance of payments: In February 2012, the DOS concluded the migration of the balance of payments accounts to the 6th edition of the *Balance of Payments and International Investment Position Manual (BPM6*). The main changes relative to the 5th edition include: reclassification of repairs on goods and processing fees to services (from goods); reclassification of merchanting to goods (from services); and treating banks' Asian Currency Units (ACUs) as residents (previously they were regarded as nonresidents, and hence their transactions were excluded from the balance of payments). Data on Singapore's international investment position (IIP) is not provided on a disaggregated sectoral basis as suggested by the BPM6. The authorities have completed revising the IIP data to include all foreign assets held by Singapore's Government Investment Corporation. The associated flows were already included in the balance of payments data.

Data Standards and Quality	
Singapore provides data on a timely basis and meets all the SDDS specifications. These include the coverage, periodicity, and timeliness of the data; and the dissemination of advance release calendars; quarterly certification of the metadata posted on the Fund's Dissemination Standards Bulletin Board; and provision of information to allow users to assess data quality.	No data ROSC is available.

Singapore—Table of Common Indicators Required for Surveillance

(As of June 17, 2016)

	Date of Latest Observation	Date Received	Frequency of Data[1]	Frequency of Reporting[1]	Frequency of Publication[1]
Exchange rates	6/17/16	6/17/16	D	D	D
International reserve assets and reserve liabilities of the Monetary Authorities[2]	4/2016	5/2016	M	M	M
Reserve/base money	4/2016	5/2016	M	M	M
Broad money	4/2016	5/2016	M	M	M
Central bank balance sheet	5/2016	6/2016	M	M	M
Consolidated balance sheet of the banking system	4/2016	5/2016	M	M	M
Interest rates[3]	6/17/16	6/17/16	D	D	D
Consumer price index	4/2016	5/2016	M	M	M
Revenue, expenditure, balance and composition of financing[4]—general government[5]	3/2015	3/2016	A	A	A
Revenue, expenditure, balance and composition of financing[4]—central government	3/2016	5/2016	M	M	M
Stocks of central government and central government-guaranteed debt[6]	2015:Q1	5/2016	Q	Q	Q
External current account balance	2016:Q1	5/2016	Q	Q	Q
Exports and imports of goods and services	5/2016	6/2016	M	M	M
GDP/GNP	2016:Q1	5/2016	Q	Q	Q
Gross external debt[7]	2015:Q4	3/2016	Q	Q	Q
Net international investment position	2015:Q4	3/2016	Q	Q	Q

[1] Daily (D); weekly (W); monthly (M); quarterly (Q); annually (A); irregular (I); and not available (NA).
[2] Includes reserve assets pledged or otherwise encumbered as well as net derivative positions.
[3] Both market-based and officially determined, including discount rates, money market rates, rates on treasury bills, notes, and bonds.
[4] Foreign, domestic bank, and domestic nonbank financing.
[5] The general government consists of the central government (budgetary funds, extra budgetary funds, and social security funds) and state and local governments.
[6] Including currency and maturity composition.
[7] Official external debt is zero.

Statement by Marzunisham Omar, Executive Director for Singapore
and Ian Chung, Advisor to the Executive Director
July 25, 2016

1 Introduction

1.1 The Singapore authorities would like to thank the IMF team for a constructive 2016 Article IV Consultation.

2 Recent Economic Developments and Outlook

2.1 The pace of expansion in the global economy has remained subdued, with some unevenness and hesitancy in growth across regions. Against this external backdrop, the Singapore economy has proceeded along a modest growth path, expanding on average by 2.2% year-on-year in H1 2016. On a quarter-on-quarter seasonally adjusted annualised (SAAR) basis, GDP growth averaged 0.5% over the first two quarters of the year, down from the 4.3% in the last two quarters of 2015. This downshift in momentum mainly reflected an easing of activity within financial services and the wholesale trade sector alongside a general slowdown in regional trade flows. Nonetheless, the drag was partly offset by some pickup in the manufacturing sector, underpinned by tentative recoveries in the pharmaceuticals and electronics segments.

2.2 In the coming quarters, global growth is likely to remain lacklustre, given heightened macroeconomic uncertainty in Europe after Brexit and subdued trade in the Asian region. This will weigh on the performance of the trade-related industries as well as the sentiment-sensitive segments within the financial services sector. Nevertheless, the domestic-oriented sectors should stay resilient, with support from healthcare and education spending, as well as public infrastructure construction. At this stage, the Singapore economy should continue to expand at a modest pace for the rest of the year, with GDP growth projected to come in at 1–3% for the whole of 2016.

2.3 Underlying inflation has begun to pick up gradually, due to a smaller decline in the prices of oil-related items, as well as the dissipation of disinflationary impulses from budgetary and other one-off measures. MAS Core Inflation, which excludes the cost of private road transport and accommodation, troughed at 0.2% y-o-y in Q4 2015 and has since risen to 1% in Q2 2016. Notwithstanding the rise in core inflation, CPI-All Items inflation fell to −0.9% in Q2 compared to −0.7% in Q4 2015, largely reflecting steeper year-on-year declines in the cost of private road transport due to a higher base in the same period last year.

2.4 External and domestic price pressures are expected to be benign, reflecting weak global demand and reduced tightness in the domestic labour market. While MAS Core Inflation is projected to continue on a moderate uptrend for the rest of 2016, this will mostly be on account of base effects arising from budget-related subsidies and sharp reductions in the price of oil-related items last year, rather than the outcome of demand-induced price

pressures. For 2016, MAS Core Inflation is projected to average around 1%. Meanwhile, CPI-All Items inflation has likely troughed in Q2, and is expected to rise in the coming months. For the year as a whole, it is forecast to come in at -1.0–0.0%.

3 Macroeconomic Policy Mix

3.1 Against this challenging cyclical backdrop and ongoing structural changes, an optimal and sustainable macropolicy response is called for. Accordingly, Singapore's approach has been to rely on a complementary mix of macroeconomic instruments as well as structural reform measures that are consistent with cyclical developments, and which facilitate the longer-term restructuring of the economy. In this regard, an over-reliance on any one policy instrument is avoided.

Monetary Policy

3.2 Singapore's monetary policy had been eased in a calibrated manner since January 2015, in line with the changing macroeconomic environment. In April 2016, MAS set the S$NEER policy band to a zero percent rate of appreciation. This was not a policy to depreciate the domestic currency, but only to remove the modest and gradual appreciation path of the S$NEER policy band. The latest monetary policy move took into account the assessment that Singapore's GDP growth would be more modest than previously envisaged, and hence MAS Core Inflation would pick up more gradually over the course of 2016 than earlier anticipated, and likely keep to just below two percent on average over the medium term.

3.3 The sequence of measured monetary policy shifts over the past 18 months has been validated by growing evidence of benign underlying inflation pressures for longer. Cumulatively, these policy calibrations are attuned to internal balance considerations, and will help to keep the level of real GDP close to its potential in 2016–17 and ensure price stability over the medium term. Although the shock result of the UK referendum has imparted greater uncertainty to the global economy, Singapore's growth and inflation outlook still fall within expectations at this juncture. MAS' current policy stance thus remains appropriate, as acknowledged by Staff, and the exchange rate policy framework is sufficiently flexible to accommodate heightened financial market volatility arising from Brexit.

3.4 MAS appreciates the importance of timely and clear communication on monetary policy. MAS will continue to communicate the implications of shocks for inflation and the policy stance through *Monetary Policy Statements*, the *Macroeconomic Review,* and other timely pronouncements, as needed. The frequency of shocks in the post-GFC years has certainly increased, and a judicious approach towards policy formulation and communication is necessary. It is neither feasible nor optimal to pre-emptively shape market expectations in the face of every shock or to over-commit to a pre-set future path of inflation and monetary policy. Indeed, Singapore's experience has been that inflation can be volatile from month to month, due to various temporary factors. MAS has and will continue to enhance its monetary policy

transparency initiatives over time, including in terms of the information it provides on the evolving path of key macroeconomic variables. Nonetheless, a robust communication approach will need to take into account the particular characteristics of our policy framework.

Fiscal Policy

3.5 Budget 2016 was expansionary, providing a fiscal impulse of slightly over one percent of GDP for the current financial year. This is in addition to the impulse that will be carried over from the past three years' Budget measures, including cost-saving measures for firms and transfers to households, which provide support to overall economic activity. Similarly, Budget 2016 provided targeted near-term relief to households and small and medium enterprises (SMEs) facing pressures from the economic downturn and restructuring. At the same time, it built on the longer-term themes of the previous Budgets to restructure the economy in line with Singapore's evolving comparative advantage and to foster a more caring and inclusive society.

3.6 For households, relief was provided in the form of one-off GST vouchers and Service and Conservancy Charges (S&CC) rebates. Recognising the impact of external economic weakness and restructuring on businesses and workers, the Budget introduced a suite of measures aimed at relieving the cash flow of SMEs. For instance, the corporate income tax rebate was raised from 30% of tax payable to 50%, for Years of Assessment (YA) 2016 and 2017, capped at $20,000 per YA. The scheduled hike in the foreign worker levy for the Marine and Process sectors was also deferred by another year in view of the challenges facing the oil-and-gas sector. To mitigate credit constraints amid the turning of the credit cycle, the new SME Working Capital Loan was introduced to ensure that viable SMEs have continued access to funding.

3.7 The pre-committed fiscal impulse proposed in the Staff Report assumes a static output gap projection, which does not appear to fully recognise the rapidly evolving external and domestic economic conditions, as well as cost developments. Rather than follow a pre-committed fiscal (impulse) rule, the government takes an approach that is contingent on developments as they evolve, providing appropriate support as specific points of vulnerability emerge. The government is keenly aware of the downside risks to growth and stands ready to inject further fiscal support as necessary. Singapore has the means to implement targeted budget measures with minimal lag. For instance, in view of the negative impact of the downturn in oil and commodity markets on the marine and offshore sector, the authorities were able to provide swift support to the sector by deferring levy increases for work permit holders. Instead of broadly aiming to boost the economy with a fixed amount of stimulus, the government is more concerned about designing a package that is well-suited to evolving economic circumstances. With respect to Staff's suggestion to generate more healthcare and transport infrastructure investments for short-term stimulus, the authorities note that such investments have already been stepped up, and that any decision to invest should be anchored to the need and viability of maintaining and operating these infrastructures in the future.

3.8 Singapore's fiscal rules effectively require the budget to be balanced over a term of government. It has the merit of introducing fiscal discipline to the decisions of each term of Government. Such rules do not imply that the medium-term budget stance is by design out of sync with business cycles, or that the rules constrain the government from acting counter-cyclically. It has been clearly demonstrated during the Global Financial Crisis that the government was able to respond swiftly when the need arose.

3.9 Overall, the expansionary fiscal policy stance this year, together with the more accommodative monetary policy setting, constitute a complementary macroeconomic mix to ensure medium-term price stability and sustainable growth.

4 Addressing Medium-term Challenges

4.1 Since 2010, Budget measures have kept in step with the different phases of economic restructuring. The latest set of measures in Budget 2016 built on these early efforts, underscoring the labour and land resource constraints confronting business, despite the cyclical downturn. It also marked a significant milestone in Singapore's restructuring journey, as the focus shifted from dealing with economy-wide challenges, towards taking a sector-based approach to build up firms' capabilities to leverage on new growth opportunities. The $4.5 billion Industry Transformation Programme (ITP), in particular, was designed to help firms and industries to move into the next phase of restructuring. ITP encompassed many different schemes to raise both human and intellectual capital. For instance, the Automation Support Package and the National Robotics Programme will help companies scale up automation and support the development and deployment of robots. Various financing and tax incentives under the ITP will also encourage SMEs to increase scale through mergers and acquisitions, and to internationalise.

4.2 The Committee on the Future Economy (CFE) was set up in October 2015 to develop economic strategies that will position Singapore well for growth in the future. It will build on and update the Report of the Economic Strategies Committee of 2010, taking into account the new challenges and opportunities facing Singapore amid rapid changes in the global environment, and slower labour force growth. The CFE will address areas crucial to Singapore's economic development, including identifying and designing growth strategies for priority clusters, recommending strategies to create and re-design jobs, and equipping Singaporeans with the skillsets needed for the future.

4.3 Under the Research, Innovation and Enterprise plan over 2016 to 2020 (RIE2020), Singapore will set aside $19 billion to support research, innovation and enterprise activities to take the country to the next stage of development. This is an 18% increase in budget as compared to RIE2015, the preceding 5-year plan. 45% of the RIE2020 budget will be committed to support four strategic domains where Singapore has competitive advantages and/or important national needs. These are Advanced Manufacturing and Engineering (AME), Health and Biomedical Sciences (HBMS), Urban Solutions and Sustainability (USS), and Services and Digital Economy (SDE). The four domains will be supported by cross-cutting

efforts to ensure excellent science, a strong pipeline of skilled power, translation of research into products and services, and nurturing of high-tech start-ups.

5 Financial Sector Developments

5.1 The authorities welcome the Staff's acknowledgement of Singapore's high regulatory and supervisory standards. Despite a recent rise in credit risks, Singapore's banking system remains well capitalized with adequate provisions. Macro-prudential policies have contributed to a modest correction in property prices and signs of a soft landing. While household and corporate leverage rose in the post-GFC period, the recent moderation of credit growth—aided in part by macroprudential measures—has helped contain household and corporate indebtedness. Household and corporate balance sheets remain resilient and stress tests indicate debt servicing remains manageable in the event of adverse shocks. The authorities will continue to monitor developments in credit and asset markets, and adjust macro-prudential tools to maintain financial stability.

6 Final Remarks

6.1 The external economic environment is fraught with uncertainty and downside risks as also recognised in the IMF's July 2016 WEO Update. The authorities will continue to carefully monitor developments and their impact on the Singapore economy. In the event of a negative shock, the authorities have the wherewithal to respond in a timely and appropriate manner to provide the necessary support to the economy and ensure macroeconomic and financial stability.

6.2 The Singapore authorities are pleased to inform the Board that they are agreeable to the publication of the Staff Report associated with the 2016 Article IV Consultation and will be releasing the Buff Statement at the same time.