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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>3MMA</td>
<td>three-month moving average</td>
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<tr>
<td>ACU</td>
<td>Asian Currency Unit</td>
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<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
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<td>BOJ</td>
<td>Bank of Japan</td>
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<tr>
<td>CLMV</td>
<td>Cambodia, Lao PDR, Myanmar and Vietnam</td>
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<td>COE</td>
<td>Certificate of Entitlement</td>
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<tr>
<td>CPF</td>
<td>Central Provident Fund</td>
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<td>CPI</td>
<td>consumer price index</td>
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<tr>
<td>DBU</td>
<td>Domestic Banking Unit</td>
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<td>ECB</td>
<td>European Central Bank</td>
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<td>EIA</td>
<td>Energy Information Administration</td>
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<td>EPG</td>
<td>Economic Policy Group</td>
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<tr>
<td>FAI</td>
<td>fixed asset investment</td>
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<td>FDI</td>
<td>foreign direct investment</td>
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<td>Fi</td>
<td>Fiscal Impulse</td>
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<td>GFC</td>
<td>Global Financial Crisis</td>
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<tr>
<td>GF CF</td>
<td>gross fixed capital formation</td>
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<td>GST</td>
<td>Goods and Services Tax</td>
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<td>GVC</td>
<td>Global Value Chain</td>
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<td>HS</td>
<td>Harmonised System</td>
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<td>IMF</td>
<td>International Monetary Fund</td>
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<tr>
<td>ISM</td>
<td>Institute of Supply Management</td>
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<tr>
<td>ICT</td>
<td>information and communications technology</td>
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<tr>
<td>LIBOR</td>
<td>London interbank offered rate</td>
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<td>MMS</td>
<td>Monetary Model of Singapore</td>
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<tr>
<td>m-o-m</td>
<td>month-on-month</td>
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<tr>
<td>NEA</td>
<td>Northeast Asian economies</td>
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<tr>
<td>NEER</td>
<td>nominal effective exchange rate</td>
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<tr>
<td>NODX</td>
<td>non-oil domestic exports</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Develop</td>
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<td>OPEC</td>
<td>Organisation of the Petroleum Exporting Countries</td>
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<td>PBOC</td>
<td>People’s Bank of China</td>
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<tr>
<td>PCE</td>
<td>personal consumption expenditures</td>
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<td>PGP</td>
<td>Pioneer Generation Package</td>
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<td>PMI</td>
<td>Purchasing Managers’ Index</td>
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<tr>
<td>q-o-q</td>
<td>quarter-on-quarter</td>
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<tr>
<td>R&amp;D</td>
<td>research and development</td>
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<tr>
<td>REER</td>
<td>real effective exchange rate</td>
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<tr>
<td>SA</td>
<td>seasonally adjusted</td>
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<tr>
<td>SAAR</td>
<td>seasonally adjusted annualised rate</td>
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<tr>
<td>SIBOR</td>
<td>Singapore interbank offered rate</td>
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<tr>
<td>SME</td>
<td>small and medium enterprise</td>
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<tr>
<td>TFP</td>
<td>total factor productivity</td>
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<tr>
<td>ULC</td>
<td>unit labour cost</td>
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<tr>
<td>y-o-y</td>
<td>year-on-year</td>
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Preface

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

The Review was edited by Associate Professor Peter Wilson, and continues to feature our collaborations with academics. We are pleased to have Dr Donald Kohn of the Brookings Institution write Special Feature B in this issue, titled “Monetary and Macroprudential Policies: Their Roles in Promoting Sustained Growth”. We are also grateful to Associate Professor Anthony Tay of the SMU School of Economics for contributing Special Feature C, which provides a survey of density forecasting in macroeconomics. Finally, our appreciation goes to Elif Arbatli and Gee Hee Hong from the IMF, who prepared Box B on the role of global value chains and economic complexity in determining Singapore’s export elasticities.

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

The Review can be accessed in PDF format on the MAS website: http://www.mas.gov.sg/Monetary-Policy-and-Economics/Monetary-Policy/Macroeconomic-Review.

Hard copies of the Review may also be purchased at major bookstores, ordered online (http://www.marketasiabooks.com), or on an annual subscription basis (details can be found on the last page).
14 October 2015

Monetary Policy Statement

INTRODUCTION

1. In April 2015, MAS maintained the modest and gradual appreciation path of the Singapore dollar nominal effective exchange rate (S$NEER) policy band, with no change to its slope, width and the level at which it was centred. This policy stance, which has been in place since January 2015, was assessed to be appropriate in view of the moderate growth and inflation prospects.

2. Following the Monetary Policy Statement (MPS) in April, the S$NEER appreciated amid a broad-based retraction in US$ strength. Since July, however, the S$NEER has weakened and largely fluctuated in the lower half of the policy band. This reflected renewed expectations of US monetary policy tightening and a rise in global risk aversion, mainly stemming from fears of a more significant downturn in China and other emerging market economies. The three-month S$ SIBOR fell from 1.01% as at end-March 2015 to 0.82% by the end of June, before rising to 1.14% as at end-September 2015.

OUTLOOK

3. The Singapore economy is projected to expand at a modest pace for the rest of 2015 and in 2016, with the uplift from the firmer US economy tempered by weaker growth prospects in the region. MAS Core Inflation will stay subdued in 2015, but should pick up gradually over 2016, largely due to the dissipation of the disinflationary effects of lower oil prices, and budgetary and other one-off measures.
**Growth**

4. According to the *Advance Estimates* released by the Ministry of Trade and Industry today, the Singapore economy registered marginal growth of 0.1% on a quarter-on-quarter seasonally adjusted annualised basis in Q3 2015, following the 2.5% contraction in Q2. The manufacturing sector continued to decline, reflecting persistent weakness in the electronics, precision engineering, and transport engineering clusters. Growth in financial services was weaker amid the slowdown in lending to the region. In comparison, segments of the wholesale trade and transportation sectors were boosted by an upturn in oil-related activities in early Q3. The domestic-oriented sectors saw further steady growth during the quarter, partly supported by increases in public residential construction.

5. The overall outlook for the global economy has softened compared to the review in April. While the US economy is likely to expand at a stronger pace on robust private consumption, its import demand has been weak. In the Eurozone and Japan, the pickup in economic activity is envisaged to be gradual. China’s growth momentum is easing on a sharp deceleration in investment growth. Taken together, these factors will weigh on the region’s commodity producers and trade-dependent economies. As a consequence, the growth outlook for Asia ex-Japan as a whole has dimmed.

6. The subdued global growth will exert a drag on the external-oriented sectors in Singapore in the quarters ahead. Within manufacturing, the transport engineering cluster will continue to be hampered by a cutback in oil exploration activities. The weakness in IT production and its supporting industries will also persist due to sluggish final demand and ongoing reconfigurations in the electronics cluster. In comparison, the domestic-oriented sectors should expand at a moderate pace, underpinned by sustained demand for healthcare and education services, as well as public infrastructure spending. GDP growth in Singapore is likely to come in at around 2–2.5% in 2015 as a whole, with risks tilted towards the downside. The economy is expected to expand at a broadly similar pace next year, with cyclical headwinds likely to persist into early 2016.

**Inflation**

7. MAS Core Inflation, which excludes the costs of private road transport and accommodation, remained subdued at 0.3% y-o-y in July–August 2015, following the 0.2% registered in Q2. Compared to a year ago, imported fuel prices continued to fall in Q2 and July–August, which filtered through to the domestic prices of oil-related items. Services inflation was dampened by enhanced medical subsidies and other Budget measures, SG50-related promotions as well as the modest pass-through of costs to consumer prices. Reflecting these factors, and further declines in imputed rentals on owner-occupied accommodation and car prices, CPI-All Items inflation fell to −0.6% y-o-y in July–August 2015 from −0.4% in Q2.

8. External sources of inflation are likely to stay generally benign, given ample supply buffers in the major commodity markets and weak global demand conditions. Oil prices are projected to remain low and increase only slightly in 2016. On the domestic front, some wage cost pressures remain, but their pass-through to consumer prices will continue to be constrained by the subdued growth environment. Meanwhile, the disinflationary effects of lower global oil prices, Budget measures and SG50 price promotions will begin to fade from the end of this year. As a result, MAS Core Inflation is forecast to rise gradually over the course of 2016 towards its historical average of close to 2%. For the year as a whole, MAS Core Inflation is projected to average 0.5–1.5% in 2016, compared to around 0.5% in 2015.
9. Car prices and imputed rentals on owner-occupied accommodation will dampen overall inflation amid the expected increase in the supply of COEs and newly-completed housing units. CPI-All Items inflation is forecast to come in at around −0.5% in 2015, and −0.5–0.5% in 2016.

**MONETARY POLICY**

10. The Singapore economy is projected to expand at a modest pace in 2015 and 2016, with growth slightly weaker than earlier envisaged. MAS Core Inflation is expected to pick up gradually over the course of 2016 towards its historical average.

11. MAS will therefore continue with the policy of a modest and gradual appreciation of the S$NEER policy band. However, the rate of appreciation will be reduced slightly. There will be no change to the width of the policy band and the level at which it is centred. This measured adjustment follows the move to reduce the rate of appreciation of the policy band in January this year, and is supportive of economic growth into 2016, while ensuring price stability over the medium term.
Chapter 1

The International Economy
1 The International Economy

Emerging Market Concerns Weigh On Global Growth In 2015

Global economic growth slackened in Q2 2015, with a rebound in the US unable to fully compensate for more subdued outturns in the Eurozone and Japan, as well as weakening momentum in emerging economies. Growth in Asia ex-Japan eased, led by slowing industrial activity in China—the erstwhile locomotive for emerging markets. Goods exports from the region have been disappointing, dragged down by the commodity downturn as well as sluggish global demand. Longer-term factors, including an ongoing reconfiguration of the region’s cross-border production networks, could also have played a part in exacerbating the decline in trade flows.

Looking ahead, the G3 economies are expected to stay on a path of modest expansion, with the US recovery sufficiently entrenched for the Federal Reserve to contemplate a policy rate hike by the end of this year, while in the Eurozone and Japan, the pickup in economic activity is envisaged to be more gradual. However, the positive effects that steady growth in the G3 would have on exports from Asia ex-Japan are likely to be limited, given the consumption- rather than investment-driven expansions in all three economies. Further, the region will have to confront the gathering headwinds from China’s slowdown, tighter external financing conditions, and domestic idiosyncratic factors including political uncertainty and flagging reforms. Overall, the outlook for global growth has softened, compared to the last Review, dipping slightly to 3.9% in 2015 from 4.1% last year, before recovering to 4.0% in 2016. (Table 1.1)

Global headline inflation remained subdued, mostly on account of a renewed decline in oil prices over the period Jun–Aug, even as food prices moderated. Sustained low inflation also reflected persistent slack in some advanced economies as well as decelerating activity in Emerging Asia. As such, several central banks have eased monetary policy, which should offer some support to growth in the quarters ahead.

### Table 1.1

<table>
<thead>
<tr>
<th>Global GDP Growth</th>
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<tr>
<td>(%)</td>
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<tr>
<td>Q1 2015</td>
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<tr>
<td>q-o-q SAAR</td>
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<tr>
<td><strong>Total</strong>*</td>
</tr>
<tr>
<td><strong>G3</strong>*</td>
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<tr>
<td>US</td>
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<tr>
<td>Japan</td>
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<td>Eurozone</td>
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<td><strong>NEA-3</strong>*</td>
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<tr>
<td>Hong Kong</td>
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<tr>
<td>Korea</td>
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<td>Taiwan</td>
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<td><strong>China</strong></td>
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<td><strong>India</strong>*</td>
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<td>China</td>
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<tr>
<td>India***</td>
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</tbody>
</table>

Source: CEIC, Consensus Economics, Oct 2015 and EPG, MAS estimates

* Weighted by shares in Singapore’s NODX.

** Refers to fiscal year ending March.
1.1 G3 Economies

A Modest Upturn With Limited Positive Spillover Effects

The US economy picked up pace in Q2 2015, mainly on the back of stronger private consumption. Yet, against the backdrop of elevated financial market volatility and slower growth in emerging markets, the Federal Reserve decided not to raise the policy rate in September, while retaining the possibility of a hike in December. The Eurozone managed to maintain moderate growth momentum despite softer domestic demand in the core economies, but the Japanese economy contracted unexpectedly due to weak household consumption and exports. On the whole, growth in the G3 economies is expected to rise to 1.7% in 2015 and further to 2.0% in 2016. However, this is likely to provide less support to global growth via the trade channel than in previous upturns, as it is driven more by consumption of services, which have lower import content.

Consumer spending has underpinned US growth.

US GDP growth rebounded to 3.9% q-o-q SAAR in Q2 2015 from a tepid 0.6% in the previous quarter. The growth rate of 2.3% registered in the first half of this year was a discernible, though modest, improvement from the average of 2.1% achieved since the recovery commenced in 2010. Private consumption continued to underpin the recovery, with growth picking up to 3.6% in Q2 from 1.8% in Q1, as households benefited from lower oil prices, steady employment growth and modest wage increases. (Chart 1.1) Unlike in Q1, net exports no longer detracted from overall growth in Q2, with goods exports recording a sharp turnaround as the effects of the West Coast port strikes faded.

In Q2 2015, residential investment expanded at a robust pace of close to 10% q-o-q SAAR for the third consecutive quarter. (Chart 1.1) New home sales volumes reached a post-crisis high, while inventories of homes available for sale have been pared back. Overall, however, gross fixed capital formation (GFCF) continued to disappoint. It took six years for US investment to return to its pre-GFC level in Q1 2014, compared to 2–4 years in past recoveries. The US is not alone in experiencing a muted capex upturn—investment in the advanced economies as a whole grew by only 2.1% p.a. between 2011 and 2014, well short of the 2.5–3.5% seen in past recoveries. On a sectoral basis, moreover, US economic activity appears to be driven more by services, which tend to have lower import content compared to manufacturing. (Chart 1.2) Indeed, new export orders in the manufacturing sector contracted for the fourth straight month in September.
The ongoing deceleration in production is likely to have been exacerbated by the strong US dollar. The cumulative dollar appreciation of 15% since Q3 2014 has contributed to weak net exports, which subtracted 0.6% point from GDP growth between Q3 2014 and Q2 2015.

Taken together, these developments imply that the moderate recovery in the US may not generate large positive spillovers for the rest of the world, including the trade-oriented economies of Asia. Conversely, weakening growth in emerging market economies (EMEs) may restrain US economic activity somewhat.1

Since the beginning of the year, core PCE inflation has not experienced an appreciable pickup even as the headline unemployment rate has fallen to 5.1%—in the vicinity of most estimates of full employment. (Chart 1.3) Other labour market developments, such as the decline in the labour force participation rate and muted wage growth, suggest that there is still some slack in the economy. Given the absence of a pickup in inflationary pressures, the Federal Reserve has deferred the decision to raise interest rates, possibly to the end of this year. With the pace of interest rate normalisation expected to be gradual and unlikely to derail growth, US GDP is projected to strengthen to 2.5% this year and 2.6% in 2016.

Growth in the Eurozone eased in Q2 ...

Eurozone growth retreated to 1.4% q-o-q SAAR in Q2 2015, from a relatively vigorous 2.1% in the preceding quarter. (Chart 1.4) Weaker growth momentum in France, Italy and the Netherlands accounted for the moderation in the headline figure. In comparison, Germany and Spain expanded by 1.8% and 4.0% respectively, supported by buoyant exports and a recovering labour market. From an expenditure perspective, the composition of Eurozone growth bore some similarities with that in the US—consumer spending was resilient while private investment faltered, registering an outright contraction from the previous quarter. However, unlike in the US, the Eurozone benefited from firmer net exports on account of the weaker euro.

... but is poised to pick up slightly in H2 2015.

Together with the US, the Eurozone is expected to be one of the brighter spots in the global economy.

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1 Similar views were reflected in the minutes of the Federal Open Market Committee, Federal Reserve System, September.
The ECB’s bold decision to launch quantitative easing (QE) earlier this year has led to an easing of financial conditions, which in turn contributed to a pickup in bank lending to both households and firms, to 1.0% y-o-y and 0.4% y-o-y in August, respectively. Consumption spending is likely to firm on the back of steady wage growth and employment gains, while real disposable incomes will continue to be supported by low inflation. Moreover, the uncertainties stemming from the Greek debt situation have been mitigated, with the country entering into a new bailout programme.

Nonetheless, new downside risks to growth have emerged, chiefly in the form of a deterioration in the external environment. The slowdown in EMEs, especially China, will pose a drag on the Eurozone’s exports, particularly for Germany. (Chart 1.5) Automobile exports could be severely affected in the wake of the Volkswagen emissions scandal, in which Europe’s largest carmaker admitted to misstating diesel vehicle emissions. More generally, cutbacks in consumption and investment spending by EMEs will impact the recovery in the Eurozone more than in the US, given the former’s higher dependence on trade. These downside risks, in addition to persistent weakness on the inflation front, have left the door open for the ECB to intensify its QE programme. Meanwhile, discretionary fiscal policy remains constrained and is unlikely to provide significant support to growth. The assimilation of large numbers of refugees could impose substantial fiscal costs, thus delaying the attainment of fiscal targets in some deficit countries. Germany alone is expected to incur an additional €10 billion, or 0.3% of GDP, in public spending on account of the refugee crisis.² On balance, growth in the Eurozone is projected at 1.5% this year and 1.7% in 2016.

non-residential investment pulled back in Q2 after a double-digit increase in the previous quarter. Meanwhile, Japan’s imports shrank in tandem with the decline in private consumption and non-residential investment (Chart 1.6), while exports plunged by even more due to tepid Asian demand. As a result, net exports subtracted 1.1% points from overall GDP growth in Q2.

The weakness in shipments to Asia, which make up about 54% of Japan’s total exports, can be traced to the slowdown in China (18% of total exports). The sharp pullback in China’s capex amid excess capacity in a number of industries has significantly reduced the country’s absorption of capital goods imports. In Q2 2015, Japan’s real exports of machinery to China, including industrial and electrical machinery and transport equipment, contracted by 7.7% y-o-y. Similarly, machinery exports to the ASEAN-10 economies fell by 5.0% over the same period, reflecting depressed private investment activity in the region as a whole.

In view of these recent trends, exports are not envisaged to contribute strongly to Japan’s growth in the coming quarters, notwithstanding the weak yen. However, a steady pickup in private consumption—undergirded by lower oil prices and rising wages—should still support a gradual recovery in the economy. The successful wage negotiations earlier this year have resulted in a moderate increase in base pay (excluding overtime pay and bonuses) of 0.3% y-o-y in Jul–Aug 2015. At the same time, downward pressure on wages stemming from increased participation by part-timers in the labour force has also been waning. (Chart 1.7) In addition, private non-residential investment is expected to pick up gradually alongside healthy corporate profits and diminishing industrial excess capacity, as indicated by the latest BOJ Tankan survey. All in, the Japanese economy is projected to grow by 0.6% in 2015 and 1.3% in 2016.

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3 ASEAN-10 economies consist of ASEAN-4, Brunei Darussalam, Cambodia, Lao PDR, Myanmar, Singapore, and Vietnam.
1.2 Asia

The Growth Outlook Has Dimmed

Asia ex-Japan saw a broad-based growth deceleration in Q2, as exports registered a dismal performance alongside more muted domestic demand growth. China’s current transition towards a less investment-driven growth model, together with deleveraging efforts, has impacted negatively on regional trade flows of primary commodities, as well as intermediate and final goods. In the third quarter of 2015, the large corrections in the Chinese stock market and the uncertainty surrounding the country’s revamp of its exchange rate fixing mechanism triggered a bout of currency volatility and a wave of investor pessimism.

In the quarters ahead, Asia ex-Japan will continue to contend with three major transitions—downward momentum in China’s economy, tightening financial conditions accompanied by rising borrowing risks, and a generalised downshift in trade. Buffeted by these headwinds, the immediate growth outlook for the region has dimmed. Moreover, political uncertainty in some countries is hindering reforms and impeding longer-term potential growth. Consequently, growth in Asia ex-Japan is projected to come in at a lower 4.7% in 2015, before rising marginally to 4.8% in 2016.

China’s growth is likely to slow next year, as the efficacy of policy easing measures wanes ...

In Q2 2015, China’s economy grew by 7.0% y-o-y, on par with the previous quarter’s performance. (Chart 1.8) In sequential terms, growth rose to 1.8% q-o-q SA in Q2, from 1.3% in Q1. Headline growth in the second quarter held up on account of a 17.5% y-o-y year-to-date surge in financial services value added, attributable to increased brokerage activity, as the stock market boomed in Q2. Meanwhile, trade-related services posted slower growth from a year ago, as both exports and imports contracted. At the same time, growth slackened in secondary industries, with weaker expansions recorded by the manufacturing and construction sectors. Against a backdrop of substantial industrial slack and subdued real estate construction activity, fixed asset investment (FAI) rose by a slower 11.4% y-o-y year-to-date in Q2, down from 13.5% the quarter before.

China’s GDP growth slipped to 6.9% y-o-y in Q3, amid a continued slowdown in industrial production and FAI growth. In sequential terms, the economy expanded by 1.8% q-o-q SA, the same as the previous quarter. Going into 2016, the country’s GDP growth rate is likely to decelerate further, although successive policy measures rolled out since last year will cushion economic activity to some extent. Following a series of policy rate and reserve requirement cuts since November 2014, the government has intensified fiscal policy support through infrastructure investment,
tax reductions and increased lending by policy banks. Nonetheless, the impact of these measures could be blunted somewhat by a number of factors. First, the persistence of excess capacity and supply gluts in China has inserted a wedge between improved final demand and higher production. In turn, corporate fixed investment will likely be hampered. Second, some local government officials were reportedly hesitant to execute stimulus-financed investment projects, concerned that they would run afoul of the central government’s anti-corruption campaign which continues unabated.4 Third, shrinking industrial profits and heightened risk aversion in the wake of the Chinese stock market correction could also dampen firms’ and households’ willingness to invest and consume. (Chart 1.9) Indeed, China’s consumer confidence index has been sliding since May 2015.

Despite the near-term slide in consumer sentiment, consumption has been a resilient component of China’s GDP growth over the past decade, accounting for slightly over half (51%) of its growth from 2005–14, from a low of 36% in 2003. In the first half of this year, its contribution went up to 58%. (Chart 1.10) Meanwhile, the role of gross capital formation (GCF) has been more volatile. After falling to a low in 1997, its contribution to GDP growth has fluctuated substantially, in part due to the role of investment as a countercyclical tool. For example, in 2009, GCF accounted for 86% of growth, as Beijing embarked on an investment-led stimulus to counter a plunge in external demand. By H1 2015, its share of GDP expansion had tapered to around a third. With the exception of 2009, China’s net exports have played a relatively modest role in recent years, adding only 0.1% point to growth last year, compared with nearly 2% points in 2006. In the medium term, China’s policies to rebalance its economy away from an investment-led model to one that is more consumption-driven should result in more sustainable and stable growth.

In the short term, however, a gradual deceleration in China’s growth can be expected, from both the supply and demand perspectives. On the supply side, labour force growth will be limited by the projected fall in China’s working-age population. Prospects for a marked pickup in China’s total factor productivity growth could also be stymied if structural reforms are carried out more slowly than planned. In terms of the structure of demand, China’s services industry has seen

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its share of GDP rise to around 48% in 2014, compared with the combined 43% contribution from manufacturing and construction. However, the services sector’s already robust expansion will not be sufficient to offset the effects of subdued export demand and weak industrial output on overall growth. Taking these developments into consideration, China’s growth is projected to dip to 6.8% this year and fall further to 6.5% in 2016.

... while India's economy is on an upswing.

The Indian economy expanded strongly by 7.0% y-o-y in Q2 2015, albeit slower than the 7.5% seen in the previous quarter. (Chart 1.11) Private consumption, the main driver of the expansion in Q2, contributed 4.3% points to headline growth, as the effects of earlier monetary easing and lower oil prices filtered through to the economy. GFCF also ratcheted up in tandem with the government’s infrastructure push, recording a 4.9% y-o-y increase. Reversing a contraction of 7.9% in Q1, when the administration consolidated spending to meet the fiscal year-end target, government expenditure added to growth in Q2 with a 1.2% expansion.

Looking ahead, India’s GDP growth is expected to remain on an upward trajectory. Depressed global commodity prices have translated into benign domestic inflation, allowing the Reserve Bank of India (RBI) to lower rates by a cumulative 125 bps since the start of the year. The effects of four rounds of rate cuts should continue to filter through the economy and spur private investment, but a fuller pass-through to lending rates would be impeded by banks’ weak balance sheets, which remain saddled with non-performing loans. Current reforms in the banking sector, such as capital infusions by the government, should enhance monetary policy transmission over time. Meanwhile, foreign investors have increased their investment in India, signalling rising confidence in the economy. Foreign direct investment inflows amounted to US$19.4 billion year-to-date in June—a 29.5% improvement over the same period last year. (Chart 1.12) In particular, the computer software, automobile and construction sectors saw a discernible uptick in investment flows. All in, India’s GDP growth is expected to increase to 7.5% in FY2016, from 7.3% in FY2015, making it the fastest growing economy in the region.
The slowdown in China will continue to dampen growth in the NEA-3.

Average GDP growth in the NEA-3 economies fell to −0.9% q-o-q SAAR in Q2 2015, following an expansion of 2.9% in Q1. The dip was led by a sharp fall in net exports, as these countries took a severe hit from the downshift in global trade flows. (Chart 1.13) A decline in heavy industrial shipments, owing to the investment pullback in China, was especially pronounced in Korea and Taiwan. Despite relatively robust domestic demand, Taiwan’s GDP contracted by 6.6% q-o-q SAAR, after growing by 2.3% in Q1. At the same time, growth in Korea slowed to 1.3% q-o-q SAAR in Q2 from 3.3% in the preceding quarter, as the country’s ailing exports was compounded by a MERS-induced downturn in the retail and hospitality-related sectors. Subsequently, the economy rebounded in Q3, expanding by 5.0% q-o-q SAAR. Household spending recovered following the dissipation of MERS, while investment picked up strongly, aided by the accommodative monetary policy environment. Meanwhile, Hong Kong’s GDP growth eased to 1.6% q-o-q SAAR in Q2 from 3.0% in Q1, owing to anaemic transhipment activity and lower tourist arrivals.

Going into 2016, the launch of new consumer IT products, alongside improving G3 conditions, is expected to provide a modest boost to the region’s electronics shipments. However, this will be more than offset by reduced demand from China’s slowdown. Critically, China represents the largest export market for both Korea and Taiwan, forming about a quarter of all shipments. As a popular mainland tourist destination and transhipment hub, Hong Kong is even more reliant on China as its largest trading partner, accounting for around half of total trade. Given this dependence, the latest PMI readings for both Hong Kong and Taiwan came in significantly below 50 in September, even as the manufacturing PMI for Korea indicated a milder pace of contraction. (Chart 1.14)

The more subdued outlook for China’s economy, coupled with muted global trade flows, have dampened economic prospects in the NEA-3 economies, leading to a notable downgrade in growth projections for the next two years. Consensus forecasts for NEA-3 growth have been lowered markedly over the course of the year, from 3.2% to 2.1% for 2015, and from 3.2% to 2.4% for 2016.
Growth in ASEAN-4 will be hindered by external and domestic headwinds.

GDP growth in the ASEAN-4 economies as a whole decelerated from 4.8% y-o-y in Q1 2015 to 4.5% in Q2. This was attributable to a further deterioration in the region’s export performance, as well as easing domestic demand growth. (Chart 1.15) Aggregate merchandise exports from ASEAN-4 contracted in Q2, dragged down by the commodity downturn, as well as subdued intra-regional demand. The persistent weakness in exports, which started around Q4 2014, in turn depressed private investment activity, particularly in Malaysia and Thailand. Nevertheless, resilient household spending in Indonesia and the Philippines, coupled with increased public sector spending across the region, provided some support to growth in Q2.

Economic activity in the ASEAN-4 is projected to remain soft in the quarters ahead. Despite a gradual improvement in the G3 economies, weakness in Asian final demand will continue to impinge on trade flows. The Philippines is expected to turn in the strongest performance in the region, given its relatively large exposure to the G3, as well as sustained strength in household spending and ongoing construction of basic infrastructure. In Indonesia and Malaysia, commodity-dependent sectors, such as mining and manufacturing, will continue to be weighed down by low prices and restrained demand—especially from China—with knock-on effects on private spending. At the same time, investor sentiment has been negatively affected by political uncertainty and flagging reform momentum. Nonetheless, Indonesia’s renewed efforts to expedite infrastructure investment should help to bolster economic activity. In Thailand, private consumption and investment will be dampened by the political impasse. Nevertheless, growth for this year is still expected to improve somewhat, compared to 2014, on the back of increased spending on infrastructure projects and tourism-related activities. On the whole, growth in the ASEAN-4 is projected to moderate from 4.7% in 2014 to 4.5% in 2015, before rising to 4.6% next year.

Asia ex-Japan’s trade prospects are clouded by several developments.

Over the medium term, the outlook for Asia ex-Japan’s exports has downshifted due to several factors. First, oil and other primary commodity prices have eased since the middle of last year, marking...
the end of what some have called a “super cycle”. These developments have been a key factor behind the fall-off in Asia-7’s exports, with a significant part of the decline since early 2015 due to commodities. (Chart 1.16) There has been a corresponding fall in the nominal value of merchandise imports into the G3. (Chart 1.17)

Second, as discussed earlier, the step-down in G3 investment growth is likely to have further depressed Asia ex-Japan’s exports. Investment tends to be more trade-intensive than other types of expenditure and, as such, less robust investment activity could partly explain a decoupling of the relationship between G3 demand and the region’s exports. Indeed, in real (price-adjusted) terms, exports from the region decelerated in H2 2014 and then contracted in H1 this year, even as economic conditions in the G3 improved. (Chart 1.18)

Third, the growing importance of emerging Asia’s demand for final goods has accentuated the impact of cyclical weaknesses on the region’s trade flows. In particular, China has grown considerably as a market for consumption goods in its own right. Over the past 10 years, its imports of consumption goods have risen by more than five-fold, amounting to US$218 billion last year, or one-third of US imports. However, the contribution of consumption to GDP growth in China has taken a step down from an average of 5.4% p.a. in 2009–11, to about 4% p.a. since 2012. In many other Asian economies, growth in household spending is poised to soften in line with weakening real incomes, amid subdued economic activity. Furthermore, nominal earnings in commodity-dependent countries will remain depressed, while the slide in regional currencies since the middle of last year will translate into higher imported inflation. In recent quarters, growth of consumer goods imports has started to decelerate in some Asian economies, a trend that is expected to continue into 2016.

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5 Asia-7 refers to ASEAN-4, NEA-2 (Korea and Taiwan) and China, while exports and imports pertain only to merchandise trade.
Fourth, there are tentative signs of shifts in the region’s cross-border production networks. As China continues to move up the technological ladder, Chinese manufacturers may have intensified the vertical integration of their domestic production processes and, accordingly, depend less on imported components from the region. The share of imports that went into China’s processing and assembly plants (for subsequent export) has fallen steadily over time, from around 40% in 2003 to 24% in 2013 and 2014. (Chart 1.19)

Source: CEIC and EPG, MAS estimates
Note: “Processing and Assembling” captures inward processing in which imported inputs and finished outputs remain the property of foreign suppliers. All other instances of inward processing are included under “Processing with Imported Materials”.
1.3 Global Inflation

Global Inflationary Pressures Remain Subdued

Global inflation outturns have continued to moderate, reinforced by the decline in oil and commodity prices and a protracted period of below-potential global growth. The moderation in price increases, particularly in Asia, should be seen in the context of fairly strong inflation rates in recent years, as well as generally stable core inflation. With continued weakness in aggregate demand, global inflation is expected to come in lower at 1.0% in 2015, compared to 1.9% in 2014. However, a pickup is expected next year, with inflation rising back to 1.9%.

Inflation remains below trend in the G3 economies.

In the G3 economies, inflation rates have stayed at very low levels, mainly on account of a renewed decline in oil prices over the period Jun–Aug. (Chart 1.20) Headline inflation in the US rose marginally to 0.1% y-o-y in Q3 2015, from 0% in Q2, reflecting the continued pass-through of the steep decline in energy prices since end-2014. (Chart 1.21) Nonetheless, core inflation has been relatively firmer at 1.8% y-o-y in Q3 2015, as the labour market returns to full employment.

In the Eurozone, headline inflation has been similarly depressed, with the Q3 reading coming in at 0.1% y-o-y. Unlike in the US, where headline inflation is expected to rebound next year, inflationary pressures in the Eurozone are likely to remain subdued even after the impact of energy prices has dissipated, given the smaller headway made in closing the negative output gap. Meanwhile, in Japan, headline CPI inflation declined to 0.5% y-o-y in Q2 from 2.3% in the preceding quarter, largely because of diminished base effects from the April 2014 consumption tax hike. Inflation is likely to pick up slightly next year, in line with a gradual economic recovery. Overall, G3 inflation is projected to come in at 0.3% in 2015, before rising to 1.4% in 2016.

Asia ex-Japan inflation will be lower in 2015.

Inflation in Asia ex-Japan will be influenced by countervailing forces in the quarters ahead. The negative contribution from low global energy prices to the CPI is likely to fade next year as oil prices stabilise. At the same time, the broad-based depreciation in Asian currencies, particularly the ringgit and the rupiah, will translate into higher imported inflation. Nevertheless, persistent economic slack in the regional giant, China, and economies such as Korea and Thailand, will exert downward pressure on prices in...
the region. Accordingly, inflation in Asia ex-Japan is expected to come in milder at 2.3% in 2015 before rising to 2.9% in 2016.

In China, headline inflation rose to 1.7% in Q3 2015 from 1.4% the previous quarter, primarily owing to a 17.9% y-o-y spike in pork prices, while non-food CPI inflation remained tame. (Chart 1.22) At the same time, PPI deflation intensified to 5.7% y-o-y and encompassed not only commodities and industrial materials, but also electrical equipment, consumer durables and daily sundries. Against this backdrop, China’s CPI inflation is forecast to slip to 1.6% in 2015, before rising to 2.1% in 2016.

India’s CPI inflation eased sharply to 3.9% y-o-y in Q3 from 5.1% in Q2, mostly on account of contained food prices. Looking ahead, while a deficient monsoon could lead to an increase in food costs, effective food supply management by the government could mitigate the upside risk. On balance, CPI inflation in India is expected to come in at 5.4% in FY2016, below the RBI’s target of 6% by January 2016.

Within the NEA-3, inflation has remained muted, registering 0.7% y-o-y in Q3 2015, compared to 0.6% in the preceding quarter. Subdued energy prices were again the main factor behind the soft Q3 outturns in Korea and Taiwan, with Korea’s inflation rate coming in at 0.7% and Taiwan’s consumer prices falling by 0.3%. Meanwhile, Hong Kong’s composite inflation decreased to 2.3% in Q3 from 3.0% in the previous quarter, primarily due to electricity rebates. On the whole, inflation in the NEA-3 is expected to be mild in 2015 at 0.8%, before rising to 1.7% in 2016.

In the ASEAN-4 economies, CPI inflation held steady at 4.2% in Q3. Inflation in Indonesia stayed elevated at 7.1% in Q3, largely due to an uptick in food prices and transportation costs. In Malaysia, price pressures strengthened further, possibly reflecting second-round effects from the implementation of the GST in April and the impact of the sharp ringgit depreciation. Meanwhile, falling energy prices continued to exert downward pressure on headline inflation in the Philippines and Thailand, with the prolonged weakness in domestic demand further dampening the outcome in Thailand. For ASEAN-4 as a whole, inflation is forecast to come in at 3.7% this year, and rise slightly to 4.0% in 2016, in line with a modest pickup in economic activity, and the diminishing impact of low oil prices.
Chapter 2

The Singapore Economy
2 The Singapore Economy

Confronting The Challenges To Growth

Faced with a weakening external environment, domestic economic activity has been lacklustre over the past six months. The external-facing industries bore the brunt of the cyclical slowdown, although there were some upsides to certain oil-related industries. Meanwhile, domestic-oriented activities remained resilient.

The outlook for the global economy has softened since the April 2015 Review. A confluence of persistent regional headwinds and limited positive spillovers from the US recovery will cap growth in the external-oriented sectors. However, pockets of activity within the oil-related and other selected exportable industries, as well as steady growth in the domestic-oriented sectors, should shore up the overall growth outcome. Apart from cyclical factors, the ongoing reconfiguration of regional supply chains could weigh on the trade-related industries, although stronger trade linkages with emerging economies may confer some countervailing support. On balance, the Singapore economy is expected to see growth of 2–2.5% in 2015, with risks tilted to the downside. A similar growth outcome is anticipated for 2016.

Looking further ahead, as Singapore progresses into the next phase of economic restructuring, growth will have to be driven by productivity gains that are underpinned by knowledge and skill upgrades. As such, technology and innovation-intensive activities will play an increasingly important role in propelling Singapore to the new economic frontier. With Asia’s push into the manufacture of advanced products set to continue, Singapore is expected to feature in the high-tech goods and services space. Investment in the digital economy, as well as a complementary labour force with the requisite skillsets, will be critical.
2.1 Recent Economic Developments

Persistent Global Headwinds

Over the last half year, the Singapore economy has navigated through a challenging external environment. Overall growth was tepid, with the trade-related industries bearing the brunt of a slowdown in regional economies and a dip in intra-regional trade. Idiosyncrasies in the oil trade also led to mixed outcomes in the oil-related industries. Despite the muted external backdrop, visitor arrivals saw a turnaround, which benefited the consumer-facing services sectors. Meanwhile, other domestic-oriented activities, such as healthcare, remained a source of support for growth.

Growth momentum in the Singapore economy slowed over the past six months.

Domestic economic activity eased significantly over the last two quarters. (Chart 2.1) Following a contraction of 2.5% q-o-q SAAR in Q2, the latest Advance Estimates pointed to continued weakness into Q3 with provisional growth of 0.1%. In level terms, activity was 0.2% higher than in the last quarter of 2014.

The sluggish performance of the domestic economy largely reflected the deterioration in the external environment. Despite some improvement in the US economy in Q2, persistent headwinds from the regional economies weighed on most production and trade-related services. Industry-specific factors also led to varying outcomes across the oil-related industries, which are plugged into different parts of the global oil supply chain. EPG’s Economic Activity Index underscored the intensity of negative external forces on trade-related sectors over recent quarters, while activity in domestic-oriented sectors generally held up. (Chart 2.2)

A pullback in the global IT industry, coupled with slowing regional trade, took a toll on the domestic electronics cluster.

The weakness in the trade-related industries was particularly pronounced in the IT segment. The global IT industry has been trending down in recent quarters amid a worldwide slowing in PC demand. Within Asia, there has been a discernible step-down in intra-regional trade flows since the beginning of this year, particularly those associated with the IT supply chain. A number of the ASEAN-4 and NEA-3 economies witnessed shrinking electronics export volumes in Q2 which, in some cases, persisted into early Q3.
Being a key node in the regional IT supply chain, Singapore’s manufacturing industry has also been affected. Domestic electronics output recorded a steep 5.0% q-o-q SA fall in Q3 2015, following a decrease of 1.7% in the preceding quarter. Notably, production of computer peripherals saw a sharp pullback in Q3, contracting for the second consecutive quarter. The dismal outcome in IT output in turn generated negative spillovers into semiconductor-related segments within the precision engineering cluster.

Meanwhile, non-oil tradable services turned in a muted performance.

The cyclical slowdown was likewise evident among the trade-related services sectors. Abstracting from oil-related activities, non-oil sea cargo volumes were weak, with sea container throughput contracting in Q3, following two consecutive quarters of negative growth. More broadly, the shipping industry has been undergoing a period of consolidation as it continues to be plagued by oversupply and depressed freight rates. A recent example is the formation of two major shipping alliances, 2M and Ocean Alliance, which have in turn impacted domestic port activities due to the consolidation of some of their port calls elsewhere.

The financial services industry was also buffeted by regional headwinds. The offshore financial intermediation segment posed a persistent drag as credit demand from the region—the main driver of ACU non-bank loan growth—remained weak. (Chart 2.3) Loans to East Asia fell by an average of 0.8% m-o-m in Jul–Aug, similar to Q2.

In addition, the sentiment-sensitive cluster had to contend with a series of negative confidence shocks to global financial markets over the last few months. Most recently in August, rising concerns over the weakness in the Chinese economy contributed to a heightened degree of risk aversion. According to EPFR Global, investors withdrew US$14.4 billion from Asia ex-Japan equity funds in August alone, outpacing the rate seen during the “taper tantrum” in 2013. Nevertheless, the forex segment registered better performance in Q3 as increased volatility in the currency markets lifted trading activity. Daily forex turnover rose by an average of 10.8% m-o-m SA in Jul–Aug, compared to 0.3% in Q2.
After a soft patch in Q2, some oil-related industries picked up strongly into Q3, shoring up sequential growth in the overall economy.

Despite the general weakness in the external-oriented industries, oil-related activities rebounded robustly in early Q3, after a dip in Q2. However, the performance was very uneven across the supply chain. Table 2.1 lists the activities associated with the upstream, midstream and downstream segments of the oil supply chain.

The strong aggregate outturn in Q3 for oil-related industries stemmed largely from the midstream segment. (Chart 2.4) Specifically, oil export and cargo volumes registered healthy expansions of 6.7% and 13.3% respectively in Q3, turning around from the contractions in Q2. Possible reasons for this include China’s stockpiling of crude oil for its strategic reserves amid further declines in oil prices, as well as speculative trading of fuel oil used for air-conditioning, due to an unusually hot summer in the Middle East.

In contrast, the upstream marine & offshore engineering industry languished for the third consecutive quarter, due to delays in rig deliveries and a slowdown in new orders as global oil and gas exploration activities fell off in response to low energy prices. (Chart 2.4)

<p>| Table 2.1                                                                 |</p>
<table>
<thead>
<tr>
<th>Segments</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>Marine &amp; Offshore Engineering</td>
</tr>
<tr>
<td>Midstream</td>
<td>Oil-related Transport &amp; Storage</td>
</tr>
<tr>
<td></td>
<td>Oil Wholesale Trade</td>
</tr>
<tr>
<td>Downstream</td>
<td>Petroleum</td>
</tr>
<tr>
<td></td>
<td>Petrochemicals</td>
</tr>
</tbody>
</table>

Demand for consumer-facing services strengthened into Q3.

The hospitality sector was the bright spot in the economy. Visitor arrivals recovered in Q2 2015 after declining in the preceding quarter, and surged by 7.5% m-o-m SA in July, led mainly by tourists from China. This rebound could, in part, be attributed to promotional efforts by the Singapore Tourism Board since May this year. In particular, $20 million had been earmarked for a marketing campaign to attract visitors from key markets such as China, Indonesia and India. In tandem with the uptick in arrivals, hotel occupancy rates rose to 87% SA in Jul–Aug after averaging 83% in Q2. The pickup in the tourism industry in turn generated positive spillovers into the domestic retail sector, with overall retail sales volumes (excluding motor vehicles) seeing good gains across discretionary and essential purchases in Jul–Aug.
Domestic-oriented industries remained broadly supportive of overall growth.

Domestic-oriented activities generally held steady over the past two quarters. After a strong performance in Q2 underpinned by robust civil engineering works, momentum in the construction sector eased to −0.8% q-o-q SAAR in Q3, due to a temporary pause in infrastructural developments as well as public non-residential works. (Chart 2.5)

Meanwhile, supply-side expansions continued to meet increased demand for essential services such as healthcare. For example, the phased opening of Ng Teng Fong General Hospital at the end of June expanded hospital capacity by bringing on-stream new outpatient facilities and approximately 500 additional beds. The subsidies from the Pioneer Generation Package also provided greater access to outpatient services for elderly citizens, resulting in higher utilisation of healthcare services.

Chart 2.5
Certified Construction Payments

Source: EPG, MAS estimates
2.2 Economic Outlook

Modest Growth Amid A Challenging External Environment

The overall outlook for the global economy has softened since the April 2015 Review. While the US economy is likely to expand at a steady pace, US import demand has been more muted in this current cycle. Concomitantly, regional headwinds have intensified recently, and are likely to persist. Taken together, the Singapore economy will be weighed down by weakness in the external-oriented sectors in the next few quarters. However, there will be tentative support from pockets of activities within the oil-related and some other manufacturing industries, as well as steady growth in the domestic-oriented sectors. Apart from cyclical factors, the trade-related industries continue to grapple with structural challenges, including the ongoing reconfiguration of regional supply chains. Nonetheless, stronger linkages with emerging nodes in the regional supply chains should provide some offset. On balance, GDP growth in Singapore is likely to come in at around 2–2.5% for 2015 as a whole, with risks tilted towards the downside. The economy is expected to expand at a broadly similar pace next year.

Cyclical challenges will continue to weigh on the Singapore economy.

The external environment is likely to remain challenging in the quarters ahead. While the recovery in the US economy has gained some traction, the strength of the recovery may not filter down as strongly to import demand this time round. Meanwhile, the region will have to contend with challenges arising from China’s slowdown and tighter external financing conditions.

Given Singapore’s close linkages with the region, the external-oriented sectors are likely to remain sluggish. Apart from cyclical downturns, the domestic IT industries will have to confront the effects of ongoing reconfigurations in regional supply chains. Nonetheless, Singapore’s strengthening linkages with emerging economies, such as Vietnam, in regional supply chains could provide some support at the margins. Supply-side expansions in some manufacturing industries could also help to augment activity.

Going forward, oil trading should remain buoyant. Arbitrage opportunities in the market could persist in the months ahead, keeping demand for cheaper crude oil strong. Further, the domestic-oriented industries will benefit from firm demand for essential services such as healthcare and education. Overall, GDP growth in Singapore is likely to come in at around 2–2.5% in 2015, with risks tilted towards the downside. The economy is expected to grow at a broadly similar rate next year.
Weakness in Singapore’s major trading partners will dampen domestic growth.

The slowdown in our major regional trading partners, such as China, Indonesia and Malaysia, will impact negatively on Singapore’s near-term GDP growth. These three economies have experienced a moderation in GDP growth this year, expanding by 5.7% y-o-y on average in H1, compared to 6.1% in 2014. (See Section 1.2.) Concomitantly, total imports (in nominal US$ terms) into these economies has, on average, contracted by about 16% since the start of this year.

Collectively, these three economies account for a third of Singapore’s goods exports and are also significant sources of demand for services such as tourism. (Table 2.2) Given this, Singapore’s export performance this year has been weighed down by softening demand from the regional economies, with NODX contracting in the first nine months of the year. (Chart 2.6)

### Table 2.2

<table>
<thead>
<tr>
<th>Economic Linkages with China, Indonesia and Malaysia</th>
<th>China</th>
<th>Indonesia</th>
<th>Malaysia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Exports</td>
<td>11.9 (2)</td>
<td>8.9 (3)</td>
<td>12.1 (1)</td>
</tr>
<tr>
<td>Re-exports</td>
<td>13.4 (2)</td>
<td>9.9 (4)</td>
<td>11.8 (3)</td>
</tr>
<tr>
<td>Visitor Arrivals</td>
<td>11.4 (2)</td>
<td>20.0 (1)</td>
<td>8.2 (3)</td>
</tr>
<tr>
<td>FDI into Singapore*</td>
<td>1.9 (15)</td>
<td>0.4 (28)</td>
<td>3.2 (10)</td>
</tr>
<tr>
<td>Overall Economic Exposure to Final Demand (% of Singapore’s GDP)</td>
<td>6.2</td>
<td>3.4</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Source: OECD-TiVA Database (2011) and EPG, MAS estimates

Note: Figures in parentheses refers to the country’s ranking in terms of its share of the total.

* FDI data is only available up to 2013 while domestic exports, re-exports and visitor arrivals are updated to 2014.

The demand for Singapore’s external-oriented services will also remain lacklustre. With intra-regional trade flows likely to remain muted in the near term, Singapore’s port traffic and other ancillary logistics activities are expected to turn in modest performances for the rest of the year. Air cargo volumes, for instance, recorded its lowest reading since December 2012. Container throughput has also weakened significantly since the beginning of the year. (Chart 2.7)

Notwithstanding the uptick in visitor arrivals over the last six months, persistent softness in the regional economies could temper tourist arrivals for the rest of the year and into 2016. This would have a knock-on effect on the retail and food & beverages industries. In fact, the share of shopping as a percentage of

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**Monetary Authority of Singapore**

**Economic Policy Group**
tourism receipts has been declining over the last three years, from a high of 22% in Q4 2011 to 17% in Q4 2014. Increased regional penetration of established brands and the growing prevalence of online retailing are some of the challenges facing domestic retailers.

**Singapore may not be able to leverage fully on the recovery in the US economy.**

While regional activity is expected to remain weak, the G3 could provide some countervailing support in the near term. Collectively, G3 final demand accounts for about 20% of Singapore’s overall value added, compared to 12% for the regional economies, and most local industries have a higher exposure to final demand in the G3 than the regional economies. (Chart 2.8)

The US economy, in particular, is expected to be the main driver of G3 growth. However, the step-up in US GDP growth, from an annual average of 2.0% over 2012–14 to 2.7% y-o-y over Q3 2014 – Q2 2015, has been largely consumption-driven, and mainly met by domestic supply. In comparison, growth of goods and services imports was weak, averaging only 0.7% over the same period. (Chart 2.9) Consequently, any boost from a resurgent US economy could be more muted than before. (See Special Feature A for an analysis of how Singapore’s trade elasticities have evolved in recent years.)

Notably, the sectoral breakdown in Table 2.3 shows a sharp pullback in US imports of oil and chemicals over the past year. The steep fall in imports of oil and chemicals has been driven by declining product prices and the growth of the shale gas industry in the US. The development of logistics and infrastructure has enabled US shale resources to be economically extracted and transported. This has reduced US reliance on imports to meet their energy needs. Indeed, there is some evidence of reshoring in the US chemicals sector, which has experienced stronger growth in employment of 1.4% in 2014 compared to its historical average of −1.3% over 2000–14. Furthermore, the chemicals sector saw an uptick in domestic industrial production alongside a moderation in the growth of outward direct investment from a high of 14.4% in 2011. (Chart 2.10)
Table 2.3
US Imports by Sector (Average YOY % Growth)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Q1 2001 – Q2 2015</th>
<th>Q3 2014 – Q2 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance &amp; Insurance Services</td>
<td>8.7</td>
<td>−2.4</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>5.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Business Services</td>
<td>10.5</td>
<td>3.9</td>
</tr>
<tr>
<td>Electrical &amp; Optical Equipment</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Chemicals &amp; Non-metallic Mineral Products</td>
<td>9.0</td>
<td>−23.4</td>
</tr>
<tr>
<td>Transport &amp; Storage</td>
<td>4.3</td>
<td>4.9</td>
</tr>
<tr>
<td>Retail Trade; Hotels &amp; Restaurants</td>
<td>4.4</td>
<td>8.2</td>
</tr>
<tr>
<td>Other Manufacturing, Mining &amp; Primary Products</td>
<td>5.1</td>
<td>6.0</td>
</tr>
<tr>
<td>Machinery &amp; Equipment</td>
<td>6.1</td>
<td>7.0</td>
</tr>
<tr>
<td>Other Services</td>
<td>6.0</td>
<td>−1.3</td>
</tr>
<tr>
<td>Basic Metals &amp; Fabricated Metal Products</td>
<td>8.8</td>
<td>5.9</td>
</tr>
<tr>
<td>Transport Equipment</td>
<td>5.3</td>
<td>6.4</td>
</tr>
<tr>
<td>Total</td>
<td>5.4</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Below-trend and contracting
Below-trend, but positive growth
At or above trend

Source: Bureau of Economic Analysis and EPG, MAS estimates

As witnessed in recent months, declining oil prices have been a boon to the midstream segments of the oil-related industries. Going forward, stockpiling should continue to lend support to oil trading, as long as arbitrage opportunities remain.\(^1\) (Chart 2.11) Furthermore, the build-up in China’s strategic crude oil reserves is expected to continue, given the scheduled opening of more storage facilities in H2 2015.

The outlook is more circumspect for downstream petroleum and petrochemical production. When global crude oil prices saw another bout of weakness in Jun–Aug 2015, Singapore benefited from a step-up in its oil terms of trade, as import prices of crude oil fell more sharply than export prices of refined products. (Chart 2.12) However, this could be short-lived as refined product prices typically mirror the trend of crude oil prices, albeit with a lag. Moreover, should oil prices start to rise, the terms of trade could reverse. Indeed, the oil terms of trade saw a pullback

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\(^1\) The current crude oil market is in “contango”, in that the futures price is above the current price. Traders can purchase oil at cheaper rates from the spot market, store it and gain from selling forward contracts at the higher price.
in Feb–May 2015 following the initial spike at the turn of the year, as oil prices recovered mildly during this period. More broadly, in light of the regional economic slowdown, oversupply in the petrochemical segment and scheduled plant maintenance shutdowns in H2 2015, activity in the downstream segments is expected to remain subdued.

Meanwhile, upstream oil & gas (O&G) production, in particular Singapore’s marine & offshore engineering (M&O) segment, has been hit hardest by developments in the global oil market. According to the latest Survey of Business Expectations of the Manufacturing Sector, sentiment among M&O manufacturers has taken a turn for the worse since the previous quarterly survey. New-build orders for offshore rigs and support vessels in Singapore’s shipyards are anticipated to remain weak in the coming quarters amid the global cutback in O&G capital expenditure.

… while supply-side expansions could shore up manufacturing output.

Although activity in the manufacturing sector has been lacklustre recently, supply-side expansions, particularly in the chemicals segment, should augment the cyclical uplift from improved demand in the G3. For instance, the gradual ramping up of production at German firm Evonik should provide a boost to the specialty chemicals sector. Despite the headwinds in the petrochemical industry, some firms, such as Shell, have also been expanding their operations in Singapore, with a medium-term view to leverage on growing regional demand.

Domestic-oriented activities, especially essential services, will remain a source of support.

The domestic-oriented sectors will continue to see positive growth, albeit at a slower pace. These sectors can be further divided into essential services, such as healthcare, education and telecommunication, and more cyclically-sensitive sectors like retail trade, construction, and financial & business services.

Essential domestic services will be lifted by increased government expenditure in the healthcare and education sectors. Conversely, the cyclically-sensitive sectors could witness some moderation in the quarters ahead, particularly in property-related sectors. The continued weakness in the private real estate segment will have negative spillovers into construction,
architectural & engineering services, and domestic lending. However, there will be increased building activity from government infrastructure projects, such as Changi Airport Terminals 4 and 5. Box A examines the longer-term relationship between Singapore’s housing and business cycles, and characterises the impact of the residential property cycle on construction employment.

Over the medium term, the rise of Vietnam and the rest of CLMV will lead to a shift in Asia’s trade patterns ...

Aside from cyclical factors, Singapore also has to respond to the ongoing changes in global supply chains. As highlighted in the April 2015 Review, the growing centrality of China’s manufacturing sector in the region’s production network will have a profound impact on companies’ operations across different geographical locations. Specifically, the step-up in China’s capabilities in the IT intermediate goods space has led to some slowdown in imports from the rest of the region, including Singapore. Nonetheless, China’s internalisation of their midstream production could be mitigated somewhat by the strengthening trade linkages with emerging nodes in regional supply chains. Chart 2.13 shows that CLMV (Cambodia, Lao PDR, Myanmar and Vietnam) was the main source of support for Singapore’s exports thus far this year. More broadly, across the region, the share of ASEAN-4 exports to CLMV economies has doubled to around 4% over the last 10 years.

The integration of CLMV into regional production networks has led to some changes in Asia’s trade patterns. In particular, the rapid rise of Vietnam has made it a bright spot in the region. Bucking the broader regional trend, the increase in Vietnam’s export market share in the G3 was the second largest after China between 2006 and 2013. (Chart 2.14)

In the early 2000s, Vietnam’s role in the region’s production networks was marginal and largely based on the manufacture of lower-value consumption goods such as apparel and footwear. Post-2010, however, Vietnam features as a prominent production node between China, NEA-3 and the end-markets of the US and the EU. These flows are concentrated in electronics, with a strong emphasis on the mobile phone segment. In light of significant investment inflows from firms such as Samsung Electronics, LG Electronics, Intel and Foxconn Technology,
Vietnam’s importance in the region’s electronics trade network should increase. (Chart 2.15) … which should confer benefits to Singapore’s domestic exporters and wholesalers.

The integration of CLMV, particularly Vietnam, into Asia’s trade networks has benefited Singapore both directly and indirectly. Vietnam’s growing role as an electronics assembly hub does not pose a direct competitive threat to Singapore’s IT manufacturers at present. The low degree of electronics export similarity shows that Singapore and Vietnam IT exporters are not competing in the same product space. (Chart 2.16) While Singapore’s electronics export basket largely comprises semiconductors, Vietnam’s comparative advantage lies in the manufacturing and assembly of mobile communication devices and office equipment. (Chart 2.17) Leveraging on such complementarities, Singapore’s semiconductor exporters received a significant boost from the surge in Vietnam’s tech trade, with both domestic and re-exports of semiconductors to Vietnam increasing by seven and fifteen times respectively in 2014, as compared to 2010. Upon completion of the assembled products in Vietnam, Singapore subsequently imports and re-exports finished goods, such as mobile phones and PCs.

Going forward, deeper economic integration among the ASEAN members, spurred by the ASEAN Economic Community (AEC) initiative, should transform the region into a competitive market with the free flow of goods, services, investment, skilled labour and capital. Apart from Vietnam, countries such as Cambodia, Lao PDR and Myanmar also stand to gain from the expansion of low-cost, labour-intensive manufacturing. In turn, this heralds new opportunities for Singapore and other ASEAN exporters, which extend beyond the trade in electronics. For instance, increased investment activity in CLMV could support greater demand for refined oil exports as energy requirements rise in line with their industrialisation drive. Further, the boost to incomes in CLMV will raise the purchasing power of households in these countries, which bodes well for Singapore re-exporters plugged into the consumption goods space.
Box A
Housing and Business Cycles in Singapore

Introduction

This Box investigates the relationship between housing and business cycles in Singapore. The nexus between the property market and macroeconomic outcomes has increasingly been the subject of academic study as well as a focus of government and central bank policies, due in part to the experiences arising from the GFC. Among researchers, Leamer (2015), for example, concluded that housing is the single most critical component of the US business cycle.¹/ Policymakers have also been made aware that asset cycles, in particular developments in the housing market especially when accompanied by a credit boom, can present significant financial stability risks as well as contribute to and worsen an economic downturn.

Housing has a longer cycle and is generally not synchronised with Singapore’s overall business cycle.

Over the past four decades, the Singapore housing market has expanded at a sustained pace, alongside population and economic growth. During the period from 1975 to 2014, real housing investment (both public and private) rose at a compounded annual growth rate of 5.9% and led to overall construction output growth of 5.6%. An examination of the movements in these aggregates indicates two distinct peaks in the housing cycle: in 1984–85 and in 1996–97. (Chart A1) These turning points appear to correspond with, but slightly lag, the cycles in property prices, as developers react to price movements by increasing or decreasing the supply of new housing.

Chart A1
Singapore’s Property, Residential Investment and Construction Cycles

To compare the housing cycle with the overall business cycle, the trend components in real GDP and real residential investment are removed using the Corbae-Ouliaris (2006) frequency domain filter.²/ The resultant series suggests that there have only been two major housing cycles in Singapore, although smaller downturns are evident in the mid-2000s and in recent quarters. (Chart A2) As for the business cycle, the Singapore Department of Statistics’ Composite Coincident Index is used as the reference series to identify the turning points in Singapore’s growth cycle.³/ Among the nine growth recession episodes identified for the Singapore economy, the contribution of residential investment to overall GDP growth was modest or countercyclical, with the exceptions of the 1985 recession and the Asian Financial Crisis of 1997–98. (Chart A3)

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¹/ He showed that nine out of the eleven recessions in the US over the period 1950–2014 were preceded by a slowdown in the housing market, and that the housing market was characterised by a volume-driven rather than a price-driven cycle.

²/ This technique has the advantage of preserving observations at the end-points. See MAS (2009) for an explanation of frequency domain extraction techniques.

³/ The Composite Coincident Index aggregates five real macroeconomic indicators—GDP, Index of Industrial Production (IIP), Non-oil Domestic Exports (NODX), Total Employment and Retail Sales Index, excluding motor vehicles—and tends to move in tandem with the general business cycle and GDP. See MTI (2012).
That the two cycles do not coincide is a reflection of the strong role played by external factors in Singapore’s growth outcomes, with export demand, on average, accounting for three-quarters of total demand. Indeed, the correlation coefficient between the cyclical components of residential investment and GDP is weak at 0.06, which is statistically insignificant. Concomitantly, the share of residential investment in overall GDP has been on a secular decline, falling from a peak of 20% in Q2 1984 to around 6.5% in Q2 2015.

The desynchronised behaviour of the housing cycle in Singapore vis-à-vis the general business cycle can be attributed, in part, to the occasional use of public construction as a countercyclical stabilisation tool during periods of weak growth. For instance, during the GFC, the Singapore government announced in its FY2009 Budget that it would be increasing public sector construction that year, proceeding with contracts worth $18–20 billion, including spending on MRT and road transport networks. It also brought forward $1.3 billion worth of wide-ranging construction projects, including HDB lift upgrading works and the building of park connectors.

**Chart A2**

Cyclical Components of Singapore’s Housing and Business Cycles

**Chart A3**

Contribution of Residential Investment to GDP Growth During Downturns

Despite being volume-driven, the impact of housing cycles on the labour market has been limited.

The standard demand-supply model of the housing market suggests that, faced with weakness in demand, house prices will fall and volumes will tend to be maintained by price cuts. However, Leamer (2015) argued that the inefficient price discovery process in the US housing market creates a mismatch of price expectations between buyers and sellers. In addition to informational inefficiencies, price adjustments are hindered by high transaction costs, infrequent trades and the locational fixity and indivisibility of housing. This in turn leads to larger changes in sales volumes and accordingly, the housing cycle in the US can be characterised as a volume cycle, and not a price cycle. As depicted in the phase diagram in Chart A4a, a stylised volume-driven housing cycle moves in a counter-clockwise manner from a trough (labelled A) through its peak and to a new trough (labelled B), and is associated with larger changes in sales volumes relative to price movements.

To examine if this is the case for Singapore, the URA private residential property price index (PPI) is plotted against the annual change in total private residential sales volumes from 1997–2003, and a similar counter-clockwise movement is observed. (Chart A4b) Property prices in Singapore fell after 1997 and thereafter, volumes recovered strongly and drove the increase in prices, which was relatively muted in comparison with the rise in volumes. Subsequently, volumes fell for an extended period during the downswing phase before prices followed suit. The larger-than-expected volume adjustments seen in Singapore likely reflect the active role of local developers in managing their available-for-sale inventories over the property cycle. Typically, developers would hold back on releasing new units for sale during cyclical downswings so as to preserve their profit margins.

A volume-led housing cycle implies a relatively larger adjustment in sales transactions compared to price changes during turning points in the cycle. Consequently, construction output and the number of workers...
employed in the sector could be subject to larger swings as housing demand adjusts through the quantity of homes sold, leading to structural displacement of workers in the construction sector.

However, Singapore’s construction workforce is generally able to adjust flexibly to changes in demand, without a discernible impact on local employment. This is shown by the strong linear relationship between investment in construction & works and employment. (Chart A5) Movements along the fitted regression line have been accommodated by the largely transitory foreign workforce in the construction sector, which is subject to quotas tied to ongoing construction projects. During a downturn, as housing sales and construction activity decline, foreign workers are laid off, so there is no increase in resident unemployment in the housing sector. Hence, Singapore does not experience the large booms and busts in construction employment typically seen in countries with a volume-driven housing cycle.

**Sum-up**

This Box has reviewed the characteristics of fluctuations in the Singapore housing market, as proxied by real housing investments. There are three key findings. First, Singapore’s housing cycle has a longer duration than, and is generally not synchronous with, the overall business cycle. Second, the housing cycle appears to be volume-driven, with changes in sales volumes of new and resale homes leading price changes around the turning points. Finally, despite being volume-driven, the impact of housing cycles on the domestic labour market has been limited, as Singapore’s construction employment has been able to adjust flexibly to fluctuations in the residential property market.

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4/ Construction projects are subject to Man-Year Entitlement quotas, which stipulate limits on the number of workers employable depending on the total value of the project.
References


2.3 The New Economic Frontier

The Rise Of Technology And Innovation

The technology and innovation cluster will play an instrumental role in fostering the Singapore economy’s upgrade to a new production frontier. Over the last decade or so, Asia has made significant headway as a production base for high-tech products. This expansion is likely to persist, with Singapore contributing high-tech and high-value goods and services, supported by a vibrant technology and innovation cluster. Against this backdrop, capital inputs associated with the digital revolution, such as ICT hardware, software, and R&D, will be the key drivers of economic activity in the future. At the same time, given the crucial role of intellectual capital in the next phase of development, the labour force will need an appropriate mix of relevant technical expertise and soft skills in order to meet the demands of the frontier industries.

A closer look at the role of technology and innovation in Singapore’s long-term development path.

The next phase of Singapore’s economic development will be characterised by a knowledge- and skills-based economy, with the associated productivity gains overcoming Singapore’s supply-side constraints. In this regard, the development of the technology and innovation cluster is critical, as it has important implications for Singapore’s long-term economic growth. This section provides an overview of the external production landscape in the high-tech space, before turning to the contribution of such activities to the domestic economy. The resource requirements, including capital and labour, will be discussed in the latter part of the section.

Production of high-tech products will continue to reside in Asia.

Asia has seen a step-up in its importance in global trade over the past decade as China and other fast-growing regional economies became an integral part of global supply chains. Concomitantly, Asia’s export profile has seen a significant transformation. Ranking Asia’s merchandise exports by technological intensity shows that Asia’s production landscape followed a broadly bimodal profile in the mid-2000s, with low-tech and high-tech products forming twin peaks in the distribution. (Chart 2.18) By 2013, however, Asia’s export profile appeared more skewed, with a greater concentration in high-tech goods. This trend will likely increase, with some Asian exporters gradually specialising in areas such as niche pharmaceutical drugs, industrial robots and satellite equipment.

Source: BACI-CEPII and EPG, MAS estimates

Note: Adopting the methodology employed by the OECD, the classification of the products into technological tiers is based on the direct R&D intensity of a specific product class. This classification provides insights into the relative changes in knowledge intensities of an economy, which is often mirrored in shifts in trade patterns.
Over the past decade, exporters from NEA-3, China and India have made significant headway in the production of high-tech goods, with such products accounting for a larger proportion of their export baskets in 2013 compared with 2005. (Chart 2.19) The shifts by regional producers into higher value-added goods should pave the way for further deepening in intra-Asian trade flows, as greater opportunities for specialisation enlarge the scope for gains in trade. Preliminary evidence shows a positive correlation between the level of product sophistication—proxied by R&D intensity—and the number of international production stages. (Chart 2.20) As the push by NEA-3, China and India into the high-tech space gains traction, the number of production stages spanning multiple locations should increase, giving rise to a larger volume of intra-industry trade flows.

At the same time, in the low-tech segment, Asia will assume the roles of investor, producer and consumer. China’s growing investment in East Asia, which accounted for 60% of its outward direct investment in 2008–12 on average, will expand the production capabilities of the ASEAN-4 and CLMV economies in low-tech industries. Producers in these countries will stand to gain, anchored by firm regional demand for basic consumption goods as shown by a sizeable import share of low-tech consumer goods for most Asian economies. (Chart 2.21) Such trends will provide a fillip to intra-Asian trade flows.

**Singapore stands to benefit from the increased trade in high-tech goods and services** ...

The growth in regional trade will bring about a closer integration of the Asian economies. Successful implementation of the Trans-Pacific Partnership would also open up new markets for exporters from the region. Singapore’s role in a highly-liberalised and integrated global economy will be as a supplier of high-tech and high-value goods and services, supported by a vibrant domestic technology and innovation cluster. In fact, over the past two decades, Singapore’s exporters have scaled the value chain, exporting more complex products while becoming more integrated into the region’s supply chain. (See Box B.)

Firms that engage in activities related to technology and innovation span across the manufacturing and services sectors, and range from electronics and pharmaceuticals, to architectural & engineering,
and professional, scientific & technical services. The information & communications industry also plays a central facilitating role by providing the necessary infrastructure (mainly the Internet, but also telecommunications technologies) and facilitating the growth of e-commerce.

... with its new industrial structure shaped by technology- and innovation-intensive activities.

EPG estimates show that technology and innovation activities, taken together, already accounted for around 18% of Singapore’s real GDP in 2014. While the ongoing reconfigurations in the domestic electronics industry could weigh on these activities in the short term, this cluster will play a critical role in bringing the Singapore economy to a new production frontier with increased R&D activities and intensive use of cutting-edge technology.

Cross-country comparisons show that relative to other advanced economies, Singapore’s aerospace, pharmaceuticals, and electronics industries have lower R&D intensity, and are focused on the production of these high-tech products. For example, Singapore’s R&D intensity in the electronics space averaged 9.5% in 2009–13, lower than Korea’s 25%. However, electronics accounted for a relatively higher share of nominal manufacturing value added in Singapore (28%) as compared to Korea (19%). Creating a vibrant R&D ecosystem is a long-term endeavour and requires continued efforts by both the public and private sectors. For its part, the Singapore government has pledged to enable the development of R&D and innovation capabilities under the Research, Innovation & Enterprise (RIE) plans. Such consistent and firm support has resulted in steady growth in domestic R&D activities over the past decade, as measured by total expenditure, manpower employed and the number of organisations performing R&D. (Chart 2.22) The recent opening of Fusionopolis Two, as part of the research and innovation hub located in one-north, provides further opportunities for interdisciplinary collaboration in the manufacturing sector.

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2 R&D intensity is defined as the ratio of business expenditure on R&D to nominal value added. For Korea, electronics R&D intensity and share of nominal manufacturing value added is based on the latest available estimates in the OECD Structural Analysis Databases from 2006–10.

3 The RIE 2015 plan was unveiled in 2010 and committed $16.1 billion of public funds over 2011–15 to further boost R&D and sustain the competitive edge of the economy. The next five-year plan (RIE 2020) will be announced soon and is expected to place a greater emphasis on innovation clusters such as additive manufacturing, advanced robotics and the Internet of Things.
The nature of activity within the manufacturing sector will change over the medium term. The move towards higher-value production is making steady progress, with domestic manufacturers gaining global market share in many niche products, ranging from military-related equipment, biomedical products, to speciality chemicals, which command a high price premium in the world market. (Chart 2.23) Major electronics manufacturers are also upgrading their production capabilities, with Micron’s new US$4 billion fabrication facility, specialising in innovative 3D NAND flash, set to open in 2017. The intensive use of technology in such niche production activities would further complement the rise of manufacturing-related services such as chip design and R&D, which were discussed in previous issues of the Review.

These shifts in economic activity will transform industrial and corporate profiles, bringing about fundamental changes in the characteristics of capital and labour inputs which will be needed to meet the demands of the new economy. The composition and quality of these factors of production will have to be enhanced, as technology and innovation activities come to the fore.

In the new economy, capital will increasingly be defined by ICT and intellectual property assets...

On the capital front, Singapore already has one of the highest capital-to-labour ratios in the world. (Chart 2.24) Looking ahead, capital inputs associated with the digital revolution, such as ICT hardware, software, and R&D, will be the key drivers of the future Singapore economy. However, the adoption of ICT capital is currently not widespread throughout the corporate sector, with a significant number of SMEs not owning a computer nor having a presence on the web. (Chart 2.25) In particular, sectors such as health, social & other services, construction, and transport & storage rank relatively low in these ICT adoption indicators. Nevertheless, there has been some recent improvement, with the overall proportion of businesses using computers and having a website each increasing by 3% points in 2014 from the previous year, due in part to the $500 million ICT for Productivity and Growth programme announced in Budget 2014, which was targeted at SMEs. The Smart Nation initiative, which seeks to harness ICT, networks and data to support better living and create more business opportunities, will also have a profound effect on the way that technology is used by households and firms.
Another form of capital that will drive medium-term growth is intellectual property. Major US IT firms, spanning both IT manufacturing and services, devote a large proportion of their capital expenditures to R&D and the acquisition of intangible assets. (Chart 2.26) This reflects the broader move towards capital- or asset-light investment as tech firms spend relatively less on physical capital including property, plant and equipment. A similar trend can also be observed in Singapore at the macro level, where the share of intellectual property products in total real capital stock (excluding construction & works) has gradually increased to just over 20%.4 (Chart 2.27) There is a strong impetus to grow investments in this area as intellectual property will be a key form of capital in the knowledge-intensive and innovation-driven economy of the future.

... while workers will need to possess a complex mix of hard and soft skills.

Given the crucial role of intellectual capital, R&D and ICT in the next phase of Singapore’s economic development, the labour force will need to have the relevant technical expertise for these frontier industries. In particular, graduates with science, technology, engineering and math (STEM) related qualifications will be a key component of Singapore’s human capital stock. Over the last decade, almost three quarters of the new occupational codes created in the domestic labour market were in STEM-related fields, reflecting the growing importance of technology and innovation in today’s dynamic work environment.

As Singapore moves towards the new frontier, the increasing demand for skilled workers in the technology and innovation cluster will need to be addressed. In addition to the minimum requirement of a STEM-related degree, many job vacancies in these fields now require post-graduate qualifications, substantial work experience, a creative and design background as well as other soft skills such as leadership and communications. Therefore, it will take focused effort over time to ensure that the typical resident worker masters the multi-disciplinary mix of technical, innovative and soft skills required in these new jobs. The launch of the SkillsFuture initiative, which will help Singaporeans develop and master skills in new growth clusters, is therefore, an important step to prepare the labour force for a rapidly changing work environment.

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4 Intellectual property products comprise R&D and software investment. R&D expenditure is recognised in national accounts as a form of GFCF and is accumulated as an intangible capital asset.
**Box B**

*Singapore’s Export Elasticities: The Role of Global Value Chains and Economic Complexity1/*

**Introduction**

Singapore’s highly open economy plays an integral role in regional and global supply chains. Its exports and production rely heavily on foreign content. (Chart B1) Over time, Singapore has successfully moved up the value chain, exporting more sophisticated and complex products. (Chart B2) This Box explores the size and determinants of Singapore’s export elasticities at the disaggregated industry/product level to understand the impact of integration into global value chains (GVCs) and the complexity of export products. Exploring the heterogeneity of Singapore’s exports with respect to GVC integration and economic complexity is important in understanding the ongoing structural change in Singapore’s economy and the tilt of exports towards more sophisticated products. (Charts B3 and B4) Structural change in the composition of Singapore’s exports could also have important implications for monetary policy transmission.

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1/ This Box was contributed by Elif C. Arbatli and Gee Hee Hong from the IMF. It is based on Arbatli and Hong (2015) and a shorter version of it was published in IMF (2015b). The views in this Box are solely those of the authors and should not be attributed to the IMF or MAS.
In GVCs, intermediate output cross borders multiple times and feature complex input-output linkages, with important implications for trade elasticities. For instance, recent analytical and empirical studies point to the importance of distinguishing between gross versus value-added (net of imported inputs) trade data in estimating trade elasticities.2/ In related work, IMF (2015a) distinguishes between GVC and non-GVC-related trade in assessing trade elasticities and finds that a country’s position in GVCs (upstream versus downstream position) plays an important role. Similarly, other studies have found that as backward participation or the import content of exports increases, exchange rate pass-through and trade elasticities decline (Koopman et al., 2010; Riad et al., 2012). This is due to the foreign content in a downstream country’s exports, which mitigates the impact of exchange rate changes, given that an appreciation makes exports more expensive but also implies cheaper imports.3/

The economic complexity of a country’s export products is also relevant in assessing price and demand elasticities. The notion of economic complexity used in this Box follows Hausmann and Hidalgo (2009), where product complexity is defined by the number of countries that export the product and the diversity of those countries’ exports. If a product is produced by a small number of countries and if those countries have a diverse export product mix, the economic complexity of the product is measured to be higher. One can conjecture that the producers of more complex products enjoy higher pricing power and demand for such products may be relatively inelastic with respect to price.

**Methodology**

Trade elasticities for Singapore’s export volumes are estimated using gross trade data from the UN Comtrade Database for about 1,180 individual products for the 1989–2013 period at annual frequency. Interaction terms are used to capture the effects of integration in global value chains and economic complexity on relative price and demand elasticities. In particular, the following equation is estimated using a fixed effects panel regression model:

\[
\text{exp}_{ij,t} = c_{i,j} + \beta \text{rp}_{ij,t} + \gamma \text{yr}_{ij,t} + \delta (\text{IV}_{ij,t} * \text{rp}_{ij,t}) + \theta (\text{IV}_{ij,t} * \text{yr}_{ij,t}) + \epsilon_{ij,t}
\]

where \(\text{exp}_{ij,t}\) denotes export volumes for individual products at the level of 6-digit HS codes. The relative price variable \(\text{rp}_{ij,t}\) is calculated as Singapore’s export price divided by the average global import price of the same product that year. Each 6-digit price is calculated by dividing the total trade value (in US$) by total quantity available from the data source. Foreign demand \(\text{yr}_{ij,t}\) is calculated as a weighted average of demand by Singapore’s trading partners, whereby the weights are the shares of Singapore’s exports to

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3/ Similar findings were reported for Belgium (Amiti et al., 2014), Switzerland (Fauceglia et al., 2014) and the US (Powers and Riker, 2013).
different trading partners at the HS 2-digit product group level. Trading partners’ demand is estimated by total imports of the country in USS, divided by the US GDP deflator. All variables enter in logarithmic form.

The effects of GVC integration and economic complexity were captured separately through two interaction terms with relative price and demand variables, \( IV_{t,t} \). To explore the role of GVCs, sector-specific information on the domestic value content of Singapore’s exports from input-output tables were linked to different export products, allowing for the construction of a product-specific measure of the domestic value-added content.\(^4\) As for economic complexity, the index from Hausmann et al. (2011) was used to match Singapore’s export products with complexity at the HS 4-digit level.\(^5\)

**Results**

Table B1 presents regression estimates using domestic value-added share in exports as an interaction variable. As discussed earlier, Singapore’s exports have a high import content. However, there exists substantial heterogeneity in the import intensity of exports. Consistent with our expectations, the higher the domestic value-added share of exports, the higher is the absolute value of the price elasticity of exports. The impact of domestic value-added share on demand elasticity is negative, indicating that products with higher domestic value added also demonstrate lower demand elasticity.

### Table B1

**Effect of Domestic Value-added Share on Export Elasticities**

<table>
<thead>
<tr>
<th>Variables</th>
<th>( \log(\text{Export Volume}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td>12.14*** (0.450)</td>
</tr>
<tr>
<td>( \log(\text{Relative Price}) )</td>
<td>(-0.179*** (0.0249))</td>
</tr>
<tr>
<td>( \log(\text{Foreign Demand}) )</td>
<td>0.262*** (0.0221)</td>
</tr>
<tr>
<td>( \log(\text{Relative Price}) \times \log(\text{Domestic Value Added}) )</td>
<td>(-0.0841* (0.0472))</td>
</tr>
<tr>
<td>( \log(\text{Foreign Demand}) \times \log(\text{Domestic Value Added}) )</td>
<td>(-0.122*** (0.0170))</td>
</tr>
<tr>
<td><strong>R-squared</strong></td>
<td>0.404</td>
</tr>
<tr>
<td><strong>No. of Observations</strong></td>
<td>67,059</td>
</tr>
</tbody>
</table>

Note: Standard errors are in parentheses.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

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\(^4\) Industry characteristics obtained from Singapore’s input-output tables were matched with the HS 4-digit level product codes. When there is a match between a certain product code and multiple input-output industry codes, a weighted average of the input-output industries was used, with the exports of that industry used as weights.

\(^5\) The complexity index for individual products is available at the HS 4-digit level for 1995–2012, which allows one to match Singapore’s export products with the index of complexity. All 6-digit products under the same 4-digit product code were assumed to have the same complexity. For years where there is no product-level economic complexity index, it was assumed that it is the same to the closest available year.
Baseline regressions for export volumes using the full sample imply a weak relationship between economic complexity and trade elasticities. However, within Singapore’s major individual product groups, there is a significant and large effect of product complexity on price elasticities. It is important to look at the sensitivity of trade elasticities within individual groups because Singapore’s trade is concentrated in a few major product groups and there is significant product heterogeneity within those segments. For instance, within the pharmaceuticals group, price elasticities decline with product complexity. (Table B2) This relationship is somewhat weaker for the other three product groups. The relationship between complexity and demand elasticities is relatively small within individual product groups.

### Table B2

<table>
<thead>
<tr>
<th>Product Groups</th>
<th>Machinery, Mechanical Appliances &amp; Computers</th>
<th>Electrical Machinery &amp; Telecomm. Equipment</th>
<th>Organic Chemicals</th>
<th>Pharmaceuticals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>( \log(\text{Export Volume}) )</td>
<td>( \log(\text{Export Volume}) )</td>
<td>( \log(\text{Export Volume}) )</td>
<td>( \log(\text{Export Volume}) )</td>
</tr>
<tr>
<td>Constant</td>
<td>32.14*** (3.059)</td>
<td>10.87*** (1.332)</td>
<td>2.983*** (0.420)</td>
<td>10.46*** (0.840)</td>
</tr>
<tr>
<td>log(Relative Price)</td>
<td>-0.513*** (0.0122)</td>
<td>-0.510*** (0.0196)</td>
<td>-0.187*** (0.0167)</td>
<td>-0.656*** (0.165)</td>
</tr>
<tr>
<td>log(Foreign Demand)</td>
<td>-0.933*** (0.136)</td>
<td>0.169*** (0.0595)</td>
<td>0.639*** (0.0195)</td>
<td>0.0996* (0.0573)</td>
</tr>
<tr>
<td>log(Relative Price) * log(Economic Complexity)</td>
<td>0.00781** (0.00353)</td>
<td>0.0176** (0.00718)</td>
<td>0.0235** (0.00556)</td>
<td>0.135** (0.0541)</td>
</tr>
<tr>
<td>log(Foreign Demand) * log(Economic Complexity)</td>
<td>0.00406** (0.00171)</td>
<td>0.00638** (0.00280)</td>
<td>0.00503** (0.00187)</td>
<td>0.0420** (0.0171)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.874</td>
<td>0.918</td>
<td>0.974</td>
<td>0.942</td>
</tr>
<tr>
<td>No. of Observations</td>
<td>7,269</td>
<td>3,195</td>
<td>4,502</td>
<td>226</td>
</tr>
</tbody>
</table>

Note: Standard errors are in parentheses.

* Statistically significant at the 10% level.
** Statistically significant at the 5% level.
*** Statistically significant at the 1% level.

### Conclusion

Singapore’s exports have been increasingly integrated in GVCs and are growing more complex. These features are important in understanding export elasticities. Product-level analysis of export volumes and prices shows that products with higher import content tend to have lower export price elasticities. Economic complexity is also found to be an important determinant of export elasticities, with more complex products having lower price elasticities, especially in the machinery, mechanical appliances and computers and pharmaceuticals segments. The use of the exchange rate in Singapore’s monetary policy framework suggests that evolving trade elasticities could play an important role in driving changes in its monetary policy transmission.
References


3  Labour Market And Inflation

MAS Core Inflation Is Set To Rise Gradually

Inflation has moderated since the April policy review, largely due to lower oil prices, as well as budgetary and other one-off measures. While MAS Core Inflation has stabilised more recently, coming in at a modest 0.4% in Q3, CPI-All Items inflation continued to ease on the back of a further decline in car prices and housing rentals.

Going forward, external sources of inflation are likely to stay generally muted. Global oil prices should remain subdued, with the supply overhang expected to persist for longer than initially projected. However, imported food inflation could face some upside risk towards the year-end and into 2016 as a result of the strong El Niño weather phenomenon.

On the domestic front, the labour market is settling at a lower level of employment gains, in tandem with the step-down in GDP growth and a more gradual rise in the resident labour force. However, slower employment growth has not been accompanied by a general easing of labour cost pressures, given binding labour supply constraints. Aggregate wage growth is projected to pick up in 2015 and stay firm in 2016.

MAS Core Inflation is expected to rise gradually over the course of 2016 towards its historical average, partly as the drag from lower oil prices wears off. Moreover, budgetary and other one-off measures have temporarily suppressed the pass-through of domestic costs. However, the effects of these factors will dissipate in 2016, and higher operating costs in the economy should filter through moderately to consumer prices. For the whole year, MAS Core Inflation is projected to average around 0.5% in 2015 and pick up to 0.5–1.5% in 2016.

CPI-All Items inflation could remain negative in the first half of 2016 owing to lower car prices and housing rentals, before picking up more significantly in H2. For the year as a whole, it is projected to come in at around −0.5% in 2015 and −0.5–0.5% in 2016.
3.1 Labour Market

Wage Pressures Will Persist

Net employment gains fell in H1 2015, reflecting both cyclical and structural factors impinging on the labour market. With slower employment growth, overall labour market tightness eased slightly, though some labour-intensive sectors continued to face acute manpower shortages. Looking ahead, overall job creation will remain moderate as labour demand and supply growth settle at a lower level in tandem with the step-down in GDP growth and Singapore’s evolving demographic trends. Nonetheless, unmet labour demand in some segments will persist, sustaining overall wage pressures in the economy. Resident wage growth is expected to reach close to its 10-year historical average of 3.6% over the next 12–18 months.

Overall net employment gains slowed in H1 2015.

Overall net employment gains fell to 3,600 in H1 2015, compared to the 56,100 jobs added in the same period a year ago. (Chart 3.1) The decline was broad-based and due to both cyclical and structural factors.

The external-oriented sectors, such as manufacturing and wholesale trade, as well as the sentiment-sensitive domestic-facing industries, namely retail trade, real estate and food services, were the hardest hit. (Chart 3.2) Manufacturing employment shrank by 11,300 in H1 2015 as production activities slowed in line with softer global demand. At the same time, hiring was reduced by ongoing restructuring in the electronics industry, while lower oil prices dampened employment in the petroleum, chemical & pharmaceutical products and transport equipment industries. The wholesale trade cluster also suffered a cutback of 2,500 jobs in the first half of 2015, in line with the weaker performance of re-exports.

The retail trade and accommodation & food clusters shed 9,000 and 1,200 workers respectively in H1 2015. This was largely due to temporary workers, especially younger part-timers, being let go after the unusually strong hiring in Q4 2014 for the festive season. Sluggish non-motor vehicle retail sales amplified the employment losses in the industry, while fewer tourist arrivals earlier this year also dampened hiring in the accommodation & food services cluster.
Firms in the real estate industry cut 5,300 jobs in H1 2015 amid the slowdown in the private residential property market and a reduction in the number of property launches. Job gains in the transport & storage and financial & insurance segments were modest, as a result of weak economic sentiment as well as ongoing consolidation in the financial sector.

The less cyclical domestic-oriented sectors, including community, social & personal services (CSP), administrative & support services, professional services, information & communications and construction provided the bulk of the employment gains in H1. (Chart 3.2) The CSP industry hired a sizeable 10,400 workers, although this was fewer than the 16,500 jobs created in the same period a year ago. Labour demand in the CSP cluster was relatively firm, underpinned by ongoing initiatives to build long-term capacity in healthcare, education and other social services. There were also healthy employment gains in professional services, such as legal, accounting & management services, which saw 2,900 jobs added in H1.

Administrative & support services and information & communications hired 9,000 and 2,800 workers respectively in H1 2015, more than in the corresponding period a year earlier. Demand for workers in cleaning & landscaping and security & investigation services (under administrative & support services) remained robust, supported by the launch of new residential and commercial buildings, as well as the opening of new suburban malls, such as HillV2 and East Village. Hiring in information & communications was bolstered by firms’ increasing need for enhanced data security and the adoption of new technologies.

Finally, the construction industry increased headcount by 4,000, though this was a step-down from the 9,100 jobs created a year ago. Hiring was supported by ongoing public-sector building activities, amid efforts to enhance Singapore’s infrastructure in the areas of transport, public housing, healthcare and education.
The net employment gains in H1 2015 accrued entirely to foreigners. (Chart 3.3) Nonetheless, foreign labour inflow continued to slow amid the tightening measures. A total of 12,500 foreign workers were added in H1 2015, compared to 15,100 in the corresponding period a year ago. The services sector accounted for the majority of foreign employment gains. The largest proportion of foreign hires were work permit holders, who were employed in the administrative & support, transport & storage, and accommodation & food services sectors as cleaners, kitchen assistants and bus drivers.

Local employment shrank by 8,900 in H1 2015, following strong gains of 41,000 in H1 2014. A significant share of these job losses was accounted for by temporary workers in the retail trade and accommodation & food services industries, as well as workers in the real estate segment who were affected by the slowdown in the private residential property market. Despite a contraction in total local hires, older workers continued to see positive employment growth.

Overall labour market tightness eased slightly ...

In line with the slowdown in employment, labour market tightness at the economy-wide level eased marginally. Notably, the seasonally adjusted resident unemployment rate rose to 2.8% in Q2 2015, from 2.5% in Q1, while the ratio of vacancies to unemployed persons fell to 1.21 in Q2 2015, from 1.43 in Q1. (Chart 3.4)

Accordingly, EPG’s Labour Market Pressure Indicator (LMPI)—a summary statistic which captures the extent of labour market tightness using 31 indicators—softened in Q2 2015, but remained higher than its historical average. (Chart 3.5)

... even as manpower shortages remained in some industries.

While the vacancy rate for the overall economy moderated, those for the retail trade, information & communications and financial & insurance industries picked up in Q2 2015. Further, the vacancy rates for
all sectors, except construction and manufacturing, were higher than their 10-year historical average. (Chart 3.6)

Overall, this suggests that businesses continued to face significant difficulty in filling positions, particularly in the labour-intensive industries. In Q2 2015, unmet labour demand was most acute for accommodation & food services, retail trade and administrative & support services, while it moderated in real estate, professional services and manufacturing.

Accordingly, underlying wage pressures remained firm, with resident wage growth rising to 3.4% y-o-y in H1 2015, from 1.6% in the preceding half-year period. (Chart 3.7) Moreover, the average weekly hours worked per employee has fallen steadily to 45.6 hours in Q2 2015, from 46.1 in the same period a year ago.\(^1\) Adjusting for the decline in hours worked, resident wage growth is estimated to have been even higher at 4.3% in H1 2015.

Meanwhile, labour productivity contracted by 0.5% y-o-y in H1 2015. (Chart 3.8) The manufacturing sector witnessed the sharpest decline in output per worker, while productivity gains in construction and services were negligible. Consequently, unit labour cost rose at a fairly rapid pace of 5.2% in H1 2015, following the 4.0% increase in the preceding quarter.

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**Job gains will step down in tandem with reduced labour demand and increasing labour supply constraints.**

Labour demand and supply growth are both expected to slow, with employment increases settling at a lower level than in the past. On the supply side, given the record high resident labour force participation rate of 67% in 2014 and Singapore’s evolving demographic trends, net entrants to the resident labour force will ease considerably from historical levels. Net resident employment gains have declined from an annual average of 70,300 workers (4.1% growth p.a.) in 2005–09 to 66,300 (3.2% growth) in 2010–14, and are expected to slow to 20,000 (around 1% growth) towards the end of the decade.\(^2\) At the same time,

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\(^1\) The decline in average weekly paid hours worked is the result of a greater reliance on part-time workers to cope with the binding labour supply constraints in certain industries. It could also be due to firms cutting back on hours in line with slower growth.

\(^2\) See MOM’s Statement on Labour Market Developments, 15 September 2015.
foreign labour inflows could moderate further in light of foreign worker tightening measures.

On the demand side, new headcount requirements are expected to decline to a lower level in tandem with the step-down in real GDP growth.\(^3\)

Notwithstanding the permanently slower pace of overall job creation in the economy, headcount gains in 2015 are expected to be stronger in sectors where demand remains firm, especially in the less cyclical domestic-oriented segments. In particular, employment gains should stay healthy in CSP to support capacity expansion in healthcare and education, as well as administrative & support services. The retail sector should also see increased hiring of temporary workers in the second half of 2015 to meet higher seasonal demand, alongside new retail store openings. Latest results from the \textit{ManpowerGroup Manpower Employment Outlook Survey} for Q4 2015 corroborate this—while overall hiring intentions have weakened, employers still expect steady headcount increases in sectors such as public administration and education. (Chart 3.9) In contrast, job gains should remain muted in the manufacturing sector.

\textbf{Wage pressures will persist, exacerbated by manpower shortages in particular sectors.}

The slower pace of overall employment growth does not imply an easing of wage pressures. Reflecting stronger labour demand in some sectors, pockets of labour market tightness are expected to continue. Vacancy rates are likely to remain uneven, persisting at elevated levels for the less cyclical domestic-facing sectors, including administrative & support services and CSP. Consequently, pay increments in these sectors will remain firm relative to the external-oriented segments. On balance, overall resident wage growth is expected to pick up from 2.3% in 2014, and come in at close to its 10-year historical average of 3.6% in 2015 and 2016.

\(^3\) This is consistent with empirical estimates based on EPG’s MMS model as well as Okun’s Law equation.
SkillsFuture will help to ensure that the local workforce remains relevant to the needs of an evolving economy.

Apart from cyclical developments, the quality of the resident workforce continues to improve, with the share of workers who have degrees, diplomas and post-secondary qualifications increasing over time. (Chart 3.10) Indeed, according to an index constructed by Nomura and Amano (2012)\(^4\), labour quality in Singapore rose steadily between 1974 and 2011 (Chart 3.11), contributing 1.0% point to the 6.8% average annual GDP growth over this period. The most significant factor contributing to higher labour quality in Singapore is the rising education attainment of workers, which accounted for 65% of the increase in the index.

Taking into account the effects of population ageing on overall labour quality, Nomura and Amano projected that improvements in Singapore’s labour quality index would continue until 2030, albeit at a slower pace. Several other studies have further demonstrated that technological advances are likely to cause shifts in the type of skills required across a wide spectrum of jobs. On this front, SkillsFuture aims to promote industry support for individuals to progress based on skills upgrading. It involves developing an integrated system of education, training and career progression, and fostering a culture of lifelong learning to ensure that the workforce remains relevant for the economy. In particular, an emphasis on combining routine technical tasks with non-routine roles would be important for workers.\(^5\) This will require them to have interpersonal skills, be highly flexible and adaptable, and be able to engage in problem-solving tasks. Accordingly, the lifelong learning process of human capital investment should be aimed at producing skills that complement, rather than substitute for, technological change.


3.2 Consumer Price Developments

Domestic Factors Will Be The Main Driver Of Core Inflation

Domestic inflation has been on a general downtrend, largely because of the effects of lower oil prices, Budget measures, and SG50-related promotions, which have temporarily suppressed the pass-through of domestic costs to consumer prices. External price influences are likely to stay generally benign, given ample supply buffers in the major commodity markets and soft demand. Domestic cost pressures remain, but are expected to filter through only moderately to consumer prices in light of subdued economic activity. Taking these factors into account, MAS Core Inflation will pick up gradually over the course of 2016 towards its historical average, as the temporary dampening influences on inflation dissipate. Meanwhile, CPI-All items inflation could remain negative in the first half of 2016, with further weakness in car prices and housing rentals.

Both MAS Core Inflation and CPI-All Items inflation have remained tame since the April policy review, mainly on account of lower global oil prices, as well as administrative and other one-off measures. (Chart 3.12 and Table 3.1) While labour cost pressures remained, the pass-through to consumer prices was modest, given the slower growth environment.

MAS Core Inflation, which excludes the costs of accommodation and private road transport, has been on a downtrend since the middle of last year but stabilised more recently, averaging 0.3% in Q2–Q3 2015, compared to 1.1% in Q1.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Date</th>
<th>CPI-All Items inflation</th>
<th>MAS Core Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced Healthcare Subsidies</td>
<td>Sep 2014, Jan 2015</td>
<td>−0.15</td>
<td>−0.23</td>
</tr>
<tr>
<td>Waiver of fees for national examinations</td>
<td>Mar–May 2015</td>
<td>−0.03</td>
<td>−0.04</td>
</tr>
<tr>
<td>Reduction in Foreign Domestic Worker Levy</td>
<td>May 2015</td>
<td>−0.07</td>
<td>−0.11</td>
</tr>
<tr>
<td>Rise in Petrol Duty Rates</td>
<td>Feb 2015</td>
<td>0.08</td>
<td>N.A</td>
</tr>
<tr>
<td>Road Tax Rebate</td>
<td>Aug 2015</td>
<td>−0.02</td>
<td>N.A</td>
</tr>
<tr>
<td>Free Public Transport (Bus &amp; MRT) for one day on 9 August*</td>
<td>Aug 2015</td>
<td>−0.005</td>
<td>−0.008</td>
</tr>
<tr>
<td>Price promotions for selected places of interest*</td>
<td>Jun–Aug 2015</td>
<td>−0.006</td>
<td>−0.006</td>
</tr>
<tr>
<td><strong>Combined Impact</strong></td>
<td><strong>Q1–Q3 2015</strong></td>
<td><strong>−0.2</strong></td>
<td><strong>−0.4</strong></td>
</tr>
</tbody>
</table>

Source: EPG, MAS estimates  
* In conjunction with the SG50 celebrations.
Meanwhile, CPI-All Items inflation continued to ease due to further declines in housing rentals and car prices, falling to −0.6% in Q3 from −0.3% in Q1. (Chart 3.13)

... mainly due to a sharp fall in the prices of oil-related items and other one-off administrative measures.

On a sequential basis, core inflation came in at −0.4% in Q2 as the earlier fall in global oil prices filtered through more significantly to consumer prices, particularly electricity tariffs. Core inflation picked up in Q3 but remained below its historical average, partly dampened by budgetary measures and the suite of SG50-related promotions. In comparison, the overall CPI declined for the fourth consecutive quarter in Q3, reflecting the weakness in car prices and housing rentals. (Chart 3.14)

External sources of inflation remained subdued.

Commodity prices have generally fallen since the last policy review. (Chart 3.15) Global oil prices, based on the Brent benchmark, rose briefly to US$62 per barrel in Q2 but slipped back to US$50 in Q3 as markets reacted to more resilient-than-expected oil production in OPEC and non-OPEC countries, softer demand from China, and the prospect of Iranian oil exports resuming in 2016. Prices of industrial materials also corrected on excess supply and slackening demand from China. However, global food commodity prices were relatively stable as the plunge in dairy product and rice prices was offset by the rise in other grain prices on account of unfavourable weather conditions in the Northern Hemisphere.

At the same time, price pressures emanating from both the developed and emerging economies weakened amid the subdued economic environment. Overall foreign wholesale price inflation fell to −1.1% in H1 2015, the lowest since H2 2009.

Against this backdrop, Singapore’s overall import price declined by a sharp 13.9% y-o-y in Jul-Aug. Given lower oil import costs, the domestic prices of oil-related items, including petrol and electricity tariffs, fell by 8.1% y-o-y in Q3. Meanwhile, lower imported food inflation, coupled with temporary price promotions by supermarkets, contributed to a further easing of domestic non-cooked food inflation from 2.3% in Q1 to 0.8% in Q3.
Price increases were uneven across consumer items.

Domestically, overall wage growth picked up in H1 2015 compared to the second half of last year. In turn, higher labour costs were passed through fairly strongly to the prices of services with relatively resilient demand, such as education, healthcare services and restaurant meals. (Chart 3.16) As a result, price increases for hospitalisation and education services have remained elevated at above 3% y-o-y. Pricier restaurant food also pushed up domestic cooked food inflation to 2.5% in Q3, from 2.3% in Q1 2015.

For a wide range of other services, however, the pass-through of domestic costs was generally muted. This, along with Budget measures and SG50-related promotions, continued to dampen prices for these services. (Chart 3.16) As a result, overall services inflation eased further to 0.6% in Q3 2015, from 1.4% in Q1.

In the retail sector, weak consumer demand and ongoing industry reconfigurations were at play to keep retail goods inflation subdued.\(^6\)

**Price declines persisted for non-core CPI items.**

The significant number of new residential units in the market has put further downward pressure on housing rentals. Indeed, the rental housing market continued to soften, with the private property vacancy rate rising to its highest level since Q4 2005. (Chart 3.17) Correspondingly, accommodation costs lowered CPI-All Items inflation by 0.7% point in Q3, after shaving off 0.6% point in Q2.

Car COE premiums have fallen substantially over the past six months, on account of the continued increase in COE quotas and as the earlier bout of purchases ahead of the revision in the Carbon Emissions-based Vehicle Scheme (CEVS) subsided. (Chart 3.18) On a year-ago basis, new car prices fell by 2.9% in Q3, after declining by 0.2% in Q2.

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\(^6\) Several major retailers, such as Metro, Isetan and Marks & Spencer, have consolidated their operations this year, even as new brands have entered the retail scene.
Global inflation is unlikely to pick up strongly, though there could be upside risks to food prices.

Price pressures emanating from abroad are expected to remain generally benign, on account of weak commodity prices and soft demand conditions, especially in emerging markets.

Global oil prices should remain subdued, with the supply overhang likely to persist for some time, resulting in a continued build-up of inventories. (Chart 3.19) Relative to the projection at the last policy review, oil prices are now expected to stay “lower for longer”, given efficiency gains in non-conventional oil production and the likely sanctions relief on Iran. (Chart 3.20) Nevertheless, oil prices could rise gradually in 2016 when North American oil production is anticipated to slow more significantly. For the whole year, the Brent oil price benchmark is expected to average US$54 in 2015, before edging up slightly in 2016.7 Accordingly, direct oil-related items should contribute modestly to CPI-All Items inflation in 2016, after subtracting 0.5% point this year.

Meanwhile, global food commodity prices could face some upward pressure towards the end of this year and into 2016. This is on account of the ongoing El Niño phenomenon, the strongest since 1997, although ample food inventories from recent bumper harvests should provide some buffer against sharp price increases. Further, the dampening effects of supermarket price discounts will start to fade from early 2016. As a result, domestic non-cooked food inflation is expected to rise, pushing overall food inflation up slightly in 2016 from around 2% in 2015.

Domestic cost pressures remain ...

On the domestic front, businesses will continue to face pressures from operating costs, particularly due to higher wages. The pace at which domestic costs are changing, or “domestically-generated cost inflation”, is commonly proxied by a suite of indicators such as the rate of increase in unit labour cost, unit business cost in manufacturing, resident wages, and the overall GDP deflator. While these individual measures can be volatile, the average reading suggests that domestic cost increases have been stable but firm at

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7 The EIA currently projects the Brent oil price to average US$54 and US$59 for the whole of 2015 and 2016 respectively. Futures prices suggest that the market expects Brent oil prices to average US$54 and US$55.
around 3% y-o-y in H1 2015. (Chart 3.21) This trend is likely to persist going forward, given binding labour supply constraints.

**... but the cost pass-through to consumer prices is likely to be restrained.**

However, the pass-through of higher domestic costs to inflation will likely be modest amid soft economic conditions. Indeed, firms appear to have already taken into account expectations of more subdued demand conditions in their price-setting decisions.

Following the methodology of Bryan & Meyer (2010) and Millard & O’Grady (2012), two sub-indices of the core CPI (excluding accommodation and private road transport costs) were computed: a sticky price CPI and a flexible price CPI. A CPI category is classified as ‘sticky’ if the frequency of price adjustment is lower than the median frequency of price adjustment for the entire core CPI basket, and ‘flexible’ if it is higher. Examples of sticky prices in Singapore include the cost of prepared meals, medical and dental treatment, public road transport and education, while flexible prices include the cost of non-cooked food, clothing & footwear, utilities, holiday expenses and personal care.

Compared to flexible prices, sticky prices, which are held unchanged for a longer period of time, tend to incorporate more information about firms’ expectations of future demand and prices. Chart 3.22 shows that sticky price core inflation has been on a mild downtrend since the start of 2015. With price expectations better anchored against the backdrop of modest economic growth, cost pass-through is therefore less likely to accelerate in the near term.

Nevertheless, there will be varying degrees of cost pass-through across industries. For healthcare and education services, the cost pass-through and, hence, the rate of price increases will be stronger given their higher labour share and relatively inelastic demand. Prices of these services were also reduced by subsidies this year, but the effects will dissipate in 2016. Moreover, the introduction of MediShield Life could

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9 Across CPI categories, the median duration over which firms in Singapore keep their prices unchanged is 13.7 months.
cause healthcare insurance costs to rise slightly, even after accounting for the transitional subsidies.\footnote{Transitional subsidies are available for the first four years of MediShield Life, for all Singapore citizens. In the first year, the government will pay 90\% of the net increase in MediShield Life premiums (after taking into account other premium subsidies) above MediShield premiums, and will cover 70\%, 40\% and 20\% of the net premium increase in the second, third, and fourth years of MediShield life respectively.} As a result, the average pace of price increases in healthcare and educational services is expected to pick up to around 3\% in 2016, from 1.8\% in 2015.

In comparison, price increases of sentiment-sensitive items, such as recreational services and holiday travel, are likely to remain modest, given weak consumer spending. Public road transport fares will also be lowered in line with the decline in fuel costs. Overall services inflation is expected to rise modestly in 2016, from around 1\% in 2015.

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**Car prices and housing rentals are expected to exert a stronger drag on inflation in 2016.**

Car COE premiums are likely to be dampened by the expected increase in COE supply which, in turn, is driven by the rising number of cars due to be de-registered. (Chart 3.23)

Demand for rental housing should soften as foreign worker inflows moderate, while supply will be boosted by the large number of newly completed housing units coming on-stream. Actual rentals and imputed rentals on owner-occupied accommodation are thus expected to edge down modestly for the rest of 2015 and into 2016.

Together, car prices and accommodation costs are expected to reduce CPI-All Items inflation by around 0.7\% point in 2015, and exert a stronger drag of slightly over 1\% point in 2016.

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**Both MAS Core Inflation and CPI-All Items inflation are anticipated to pick up gradually in 2016.**

In sum, inflation is expected to pick up in 2016, partly due to the diminishing effects of lower global oil prices. Overall imported inflation should generally be benign, although food prices could rise as El Niño impairs harvests. Budgetary and other one-off measures have suppressed the pass-through of domestic costs to consumer prices this year, but the disinflationary...
effects are only temporary. As a result, MAS Core Inflation is expected to pick up gradually over the course of 2016 towards its historical average of close to 2%, and come in between 0.5–1.5% for the full year, from around 0.5% in 2015. (Chart 3.24)

CPI-All Items inflation will likely continue to be dampened by further declines in COE premiums and housing rentals. However, COE premiums are volatile and any sharp price fluctuations would pose both upside and downside risks to the headline inflation forecast (see dotted lines in Chart 3.25). MAS’ baseline projection is for CPI-All Items inflation to remain negative throughout H1 2016, before picking up gradually and turning positive in the second half of the year. For 2016 as a whole, CPI-All Items inflation is projected to average between −0.5–0.5%, compared to around −0.5% this year. (Charts 3.25 and 3.26)
Chapter 4

Macroeconomic Policy
4 Macroeconomic Policy

Supporting Medium-Term Sustainable Growth

In October 2015, MAS reduced the slope of the S$NEER policy band slightly, while keeping it on a modest and gradual appreciation path. This measured adjustment took into account the weaker-than-envisioned growth outlook for the Singapore economy, even as MAS Core Inflation is expected to pick up gradually over the course of 2016. Together with the policy easing in January 2015, the October policy move will be supportive of economic growth into 2016, while ensuring price stability over the medium term.

On the fiscal front, Budget 2015 sought to further advance the aim of economic restructuring by focusing on value creation, while continuing to provide a base level of support to help companies improve efficiency. Major commitments were also made to invest in physical infrastructure to meet Singapore’s future economic and social needs, as well as to develop human capital through the SkillsFuture initiative. In addition, the government is enhancing retirement adequacy and strengthening social mobility.

Overall, the macroeconomic policy mix—a continuation of the modest and gradual appreciation path for the exchange rate policy band and a moderately expansionary fiscal policy stance—is assessed to be appropriate, given the expected growth and inflation dynamics in the economy.
4.1 Monetary Policy

Appreciation Rate Of The S$NEER Policy Band Reduced Slightly

Since the last policy review in April 2015, prospects for the global economy, in particular that for the region, have dimmed. Against this backdrop, the Singapore economy should grow at a modest pace in 2015 and 2016. At the same time, the outlook for inflation remains benign, although MAS Core Inflation is expected to pick up gradually over the course of 2016 towards its historical average. MAS retained the modest and gradual appreciation path for the S$NEER policy band, but reduced its slope in October 2015. This policy stance was deemed to be an appropriate response to cyclical developments and will contribute to price stability over the medium term.

The rate of appreciation of the S$NEER policy band was reduced in October 2015.

Global oil prices peaked in June 2014, and began falling in a sustained fashion towards the end of that year amid significant increases in supply and weaker prospects for global demand. Meanwhile, the pass-through of accumulated wage costs to consumer prices was weaker than expected, notwithstanding the tight labour market. These developments were expected to persist for the rest of 2015: oil prices would average significantly below the US$93 recorded in 2014, while the extent of cost pass-through would be restrained by the moderate economic growth environment.

As the outlook for MAS Core Inflation and CPI-All Items inflation had downshifted significantly, MAS reduced the rate of appreciation of the S$NEER policy band in an off-cycle move in January this year. This adjustment to the policy stance was deemed to be consistent with the lower inflation forecasts and was also appropriate for ensuring medium-term price stability. In the April 2015 monetary policy review, MAS maintained the policy stance adopted in January, as the projections for GDP growth and inflation had not altered fundamentally.

Since the last policy review in April, global growth has moderated slightly more than previously anticipated. While GDP growth in the US rebounded in Q2 2015 as the improving labour market bolstered private consumption, the pace of expansion in the Eurozone and Japan remained relatively muted, given soft private investment and weak exports, respectively. In China, financial market volatility in August, arising from the sharp correction in the stock markets, as well as uncertainty over the exchange rate fixing mechanism, weighed on the economy. At the same time, incoming data on fixed asset investment, industrial production and exports confirmed the economy’s slowing growth momentum.

Looking ahead, the G3 economies as a whole are expected to expand at a modest pace, with the US leading the recovery. However, China’s slowdown will dampen growth prospects for the externally-oriented and commodity exporting countries in the rest of Asia. Intra-Asian trade flows could stay constrained, and forward-looking indicators, such as the inventory and new orders components of the Purchasing Managers’ Indices, are pointing to a subdued outlook for industrial production in several economies. Overall, the prospects for global growth have softened compared to the last Review.

Activity in Singapore’s trade-related sectors has been buffeted by weaker external demand and structural reconfigurations in some manufacturing clusters. The drags exerted by the external-oriented sectors have only been partly offset by expansions in the domestic-oriented sectors. Overall, Singapore’s GDP grew by only 0.1% q-o-q SAAR in Q3 2015, after contracting by 2.5% in Q2.

1 Based on the West Texas Intermediate benchmark.
For 2015 as a whole, the domestic economy is expected to grow at a modest pace of around 2–2.5%, with risks tilted towards the downside. As the cyclical headwinds could persist into early next year, the economy is likely to expand at a broadly similar pace in 2016. Against this backdrop, the level of activity in the economy is projected to keep close to its potential path for the year as a whole. (Chart 4.1)

Imported inflation is expected to be subdued, as commodity prices, such as those for oil, may only edge up in 2016, amid soft global demand and ample supply. On the domestic front, while the overall tightness in the labour market appears to have eased slightly, underlying wage cost pressures remain in specific segments. However, their pass-through to consumer prices will be fairly mild given the subdued growth environment. Meanwhile, the disinflationary effects of low oil prices, Budget measures and SG50 promotions, will fade from late 2015. Taking into account all these factors, MAS Core Inflation will rise gradually over the course of 2016 towards its historical average of close to 2%. For the year as a whole, MAS Core Inflation is forecast at around 0.5% in 2015 and 0.5–1.5% in 2016.

Imputed rentals on owner-occupied accommodation are likely to moderate further as more completed housing units come on-stream. Private road transport costs are projected to ease as well, in line with the expected increase in COE supply given a larger number of vehicles due to be de-registered. Reflecting these factors, CPI-All Items inflation is forecast to come in at around −0.5% in 2015 and −0.5–0.5% in 2016.

In view of the softer-than-anticipated outlook for GDP growth and inflation, MAS reduced slightly the rate of appreciation of the S$NEER policy band in October 2015, but kept the width of the policy band, as well as the level at which it was centred, unchanged.

This policy stance will provide support to the domestic economy, complementing the January 2015 reduction in the slope of the S$NEER policy band. Indeed, EPG’s econometric simulations suggest that the effects of the latter will continue to filter through to the economy over 2016.
An even stronger policy easing in the most recent October review, including flattening the slope of the S$NEER policy band, was clearly unwarranted, as the Singapore economy was neither experiencing an outright retraction in economic activity nor widespread price declines. Under the current policy setting, the output gap is projected to close in 2015–16, compared to the positive outturns over the preceding five years, before widening again to slightly above zero in 2017. The calibrated October move will keep the level of real GDP close to its potential over the medium term and thus help to promote price stability.

EPG’s estimates suggest that this optimal middle path between maintaining the policy status quo and adopting an even looser policy stance minimises macroeconomic volatility while promoting medium-term price stability. The measured policy move in October will therefore lead to comparatively more favourable growth and inflation outcomes for the Singapore economy.

Chart 4.2 traces the longer-term evolution of monetary policy in relation to growth and inflation developments in the Singapore economy. With the lingering risks in the external environment amid an intensification of domestic restructuring efforts, MAS will continue to monitor the impact of external and domestic developments on Singapore’s GDP growth and inflation.
Chart 4.2
Key Macroeconomic Variables and Changes in the Monetary Policy Stance

[Graph showing key macroeconomic variables and changes in the monetary policy stance.]
Exchange rate movements have been volatile since April 2015.

The S$NEER has been volatile since April this year, experiencing both appreciating and depreciating spurts over the period. It strengthened following the April 2015 monetary policy announcement, but weakened from mid-July. Since then, it has largely fluctuated in the lower half of the S$NEER policy band. (Chart 4.3)

In terms of bilateral exchange rates, the S$ strengthened against the US$ following the April 2015 MPS, as market expectations for MAS to further ease monetary policy did not materialise, while soft US economic data suggested that the Federal Reserve could delay the hike in the US Federal funds rate. However, stronger macroeconomic data and hawkish statements from US Federal Reserve officials subsequently resulted in depreciating pressures on the S$ and the regional currencies. At the same time, Asian currencies, including the S$, weakened against the other major reserve currencies as risk aversion rose in the wake of concerns over China’s economic slowdown, the corrections in its stock market, and the adjustment to its exchange rate.

Over the last six months (the week of 10 April to the week of 23 October 2015), the S$ generally depreciated against the major reserve currencies. It weakened by 5.7% against the euro, 1.9% against the US$, and 1.7% against the Japanese yen. In comparison, the S$ strengthened against the currencies of commodity exporters, namely, the A$, Malaysian ringgit, and Indonesian rupiah. (Chart 4.4)

The CPI-deflated S$REER remained below its peak in Q1 2013.

The S$ real effective exchange rate (S$REER) is a measure of the prices of goods and services in Singapore relative to its trading partners, expressed in terms of a common exchange rate index. Using the CPI as the deflator, the S$REER depreciated by 1.0% between Q1 2013 and Q2 2015. (Chart 4.5)

Although the S$NEER strengthened in line with the modest and gradual appreciation stance of MAS’ monetary policy, domestic CPI-All Items inflation rose at a much slower pace compared to inflation in...
Singapore’s major trading partners. The fall in relative prices was due to a moderation in MAS Core Inflation, as well as a decline in the cost of private road transport and imputed rentals on owner-occupied accommodation.

The depreciation of the S$REER was due to the fall in the price of tradable goods in Singapore.

The S$REER can be decomposed into external and internal components. The external S$REER is derived by deflating the S$NEER by the domestic price of tradable goods relative to the foreign price, in terms of a common reference currency. The internal S$REER refers to the price of non-tradables relative to tradables in the domestic market compared to abroad.

From this perspective, the depreciation in the S$REER since Q1 2013 was entirely due to the external S$REER, which fell by 7.5%. (Chart 4.6) Although the price of tradables\(^2\) in Singapore’s major trading partners fell by 1.0% between Q1 2013 and Q2 2015, prices in the domestic economy fell by 10.8%, primarily due to a softening in the prices of mineral fuels and chemicals & chemical products. (Chart 4.7) The fall in the relative price of tradables outweighed the modest appreciation of the S$NEER, resulting in the depreciation of the external S$REER.

In comparison, the internal S$REER has strengthened since Q1 2013. Although the price of non-tradables fell in Singapore, the decline in the domestic price of tradables was steeper. On balance, the relative price of non-tradables to tradables in Singapore rose compared with that abroad.

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\(^2\) The Wholesale Price Index is a reasonable proxy for the price of tradables as it encompasses a wide range of exportables and importables and is closely associated with producer prices. For Singapore, we use the Manufactured Product Price Index as a proxy for the domestic price of tradable goods.
Liquidity conditions have loosened since August 2015.

Overall liquidity conditions in the economy are reflected by changes in the Domestic Liquidity Indicator (DLI), which captures movements in the S$NEER and the three-month S$ SIBOR. Between April and July this year, domestic liquidity conditions tightened compared to the previous three months, largely due to the strengthening S$NEER. However, the DLI eased from August to September as the depreciation of the S$NEER exceeded the effect of higher domestic interest rates on domestic liquidity. (Chart 4.8)

Domestic interbank rates have generally risen since the beginning of 2015.

The three-month S$ SIBOR has been at a slight premium over the three-month US$ LIBOR since September 2012. (Chart 4.9) This premium widened to an average of 75 bps in Aug–Sep 2015, from an average of 56 bps in the first seven months of the year.

The US$ LIBOR inched up to 0.33% in Aug–Sep from an average of 0.28% in Jan–Jul 2015. The S$ SIBOR rose sharply to 1.01% in March before easing to 0.86% on average in the subsequent few months, following the release of the April MPS as well as reduced market expectations of a US Federal funds rate hike. However, the S$ SIBOR spiked again to over 1% in August, as stronger US data and the shocks emanating from China led financial markets to re-price S$ interest rates to incorporate expectations of further US$ strength against the S$. By September 2015, the S$ SIBOR had risen to 1.14%, its highest level since October 2008. More recently, it has eased to around 1%. Meanwhile, the three-month S$ Swap Offer Rate, which tends to be more responsive to liquidity conditions, rose sharply to 1.41% in August 2015, before pulling back slightly in September.

Amid the general step-up in domestic interbank rates in recent months, savings and fixed deposit rates have risen, but to a lesser degree. The savings deposit rate and 12-month fixed deposit rate inched up to an average of 0.14% and 0.34%, respectively, in Aug–Sep. (Chart 4.10) Notwithstanding these low board rates, banks have been offering significantly higher
promotional rates on deposit accounts.\textsuperscript{3} In terms of
lending, the effective interest rate on floating rate
mortgages continued to rise, as these were largely
priced off the S$ SIBOR.

**Growth in the broader monetary aggregates
continued to ease.**

Growth in M1 troughed at 0.8% y-o-y in May 2015 and
picked up over Jun–Aug. (Chart 4.11) Demand deposit
growth turned from negative in May to slightly positive
in the following three months, while growth in currency
in active circulation (CIAC) remained firm. (Chart 4.12)

Meanwhile, growth in the broader monetary
aggregates, M2 and M3, moderated from their recent
peaks in May 2015. This was largely driven by
fluctuations in fixed deposits, which recorded growth
as high as 9% y-o-y in May, but turned negative in
August. In comparison, growth in savings and other
deposits eased relative to the first six months of the
year, but remained positive at an average of 4.1% in
Jul–Aug.

**Credit growth has picked up slightly in
recent months.**

Credit growth was on a broad downtrend over the first
five months of the year, with the stock of outstanding
DBU non-bank loans contracting by 0.1% y-o-y in May
2015. (Chart 4.13) This was entirely due to falling
business loans, given the lacklustre demand for credit
from some trade-related sectors, such as
manufacturing and commerce, and non-bank financial
institutions. In comparison, consumer loans continued
to expand but at a slower pace of 3.6% y-o-y.

From Jun–Aug, however, the pace of overall credit
growth picked up slightly. Total DBU non-bank loans
grew by an average of 1.7% y-o-y over this period, with
business and consumer loans increasing by 0.5% and
3.7%, respectively.

\textsuperscript{3} For example, Standard Chartered was offering up to 1.55% for fresh funds held in 6-month fixed deposits, while UOB was offering 1.60% for fresh 13-month fixed deposits.
4.2 Fiscal Policy

**Investing In The Economy’s Future And Strengthening Social Security**

To prepare the economy for the next phase of development, Budget 2015 committed significant resources to long-term investment in infrastructure and human capital development. It also built on past budget measures to further strengthen Singapore’s social safety net. The SkillsFuture initiative and the Silver Support Scheme aim to foster lifelong learning and provide retirement assurance for the low-income elderly, respectively. On the whole, the fiscal policy stance for CY2015 is projected to be expansionary compared to CY2014.

Budget 2015 continued to lay the foundations for sustainable and inclusive growth.

Budget 2015 continued to support the restructuring of the Singapore economy by recalibrating some of the existing measures and incentives, and also introducing new initiatives to prepare firms and workers for Singapore’s next phase of development. The Transition Support Package (TSP)\(^4\) was extended for two years, but at lower support levels, and the schedule of planned foreign worker levy hikes for 2015 was deferred to 2016. This was in order to give firms more time to cope with rising costs, as they push ahead with efforts to enhance productivity. Budget 2015 also marked a more targeted approach towards restructuring by emphasising the need for value creation and innovation. The new measures introduced in this Budget focused on strengthening firms’ and workers’ capabilities as well as helping businesses to increase scale and internationalise. A pioneering initiative in this regard was SkillsFuture, which is aimed at fostering skills deepening and continuous learning through life. Meanwhile, significant commitments were made to meet Singapore’s long-term infrastructure requirements. These include the development of the new Changi Airport Terminal 5, and the continued expansion of healthcare and public transport facilities.

Budget 2015 made an important stride in augmenting Singapore’s social security system by introducing the Silver Support Scheme. The Scheme provides an income supplement to the bottom 20–30% of elderly Singaporeans based on their lifetime income, extent of family support and housing type. It complements the Workfare Income Supplement Scheme which provides systematic top-ups to the wages of the bottom 20–30% of Singaporean workers. To help Singaporeans build their retirement savings, this Budget also announced a higher CPF salary ceiling for all residents and raised employer contribution rates for older workers. Taken as a whole, Budget 2015 has built on previous measures to foster a fairer and more inclusive society. The major planks of Singapore’s social security system across all groups, including the young, elderly, low- and middle-income and disabled, continued to be strengthened significantly. The measures, introduced progressively in recent budgets, have sought to enhance every aspect of life, from work to retirement, education to healthcare, and have thereby laid the foundation for a stronger social compact, entrenching a system that mitigates inequalities while maintaining the spirit of personal and collective responsibility.

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\(^4\) The TSP comprises the Wage Credit Scheme (WCS), Corporate Income Tax (CIT) Rebate, and Productivity and Innovation Credit (PIC) Bonus. The WCS was extended for two years to 2016 and 2017, with the government co-funding 20% of wage increases given to Singaporean employees earning a gross monthly wage of $4,000 and below, compared to 40% previously. Similarly, the CIT Rebate was extended for Years of Assessment (YA) 2016 and 2017 at the same rate of 30% of tax payable, but up to a lower cap of $20,000 instead of $30,000 per YA. The PIC Bonus expires in YA2015 as planned.
Over the longer term, government expenditure is expected to rise due to higher spending on healthcare, transport and other critical infrastructure. There is also a need to invest more heavily in human capital development to secure Singapore’s economic future. Accordingly, Budget 2015 took steps to strengthen government revenues by raising the personal income tax rates of top income earners and including Temasek’s expected returns in the Net Investment Returns (NIR) framework. These measures will help preserve the fiscal sustainability of Singapore’s economic and social strategies and, in turn, underpin the economy’s long-term growth.

The fiscal stance is estimated to be slightly expansionary in 2015.

The Fiscal Impulse (FI) measure indicates the short-term stimulus to aggregate demand arising from fiscal policy changes. It is projected to be 0.9% of GDP in CY2015, suggesting a moderately expansionary fiscal policy stance relative to the previous year. (Chart 4.14) This is consistent with the closing of the output gap in the economy, and largely reflects the higher expenditure associated with social and economic spending as well as infrastructure investment. The investments in physical infrastructure, ICT and human capital will serve to raise the economy’s potential output over the longer term, beyond the short-term cyclical boost to the economy.

Government operating revenue increased in H1 2015.

The following provides an overview of the government’s budgetary position in the first half of CY2015 compared to the same period last year.

Operating revenue rose slightly from $29.4 billion in H1 2014 to $31.2 billion (15.8% of GDP) in H1 2015, partly bolstered by the $1.1 billion increase in “fees & charges”, which largely comprise COE receipts. (Chart 4.15) While COE premiums remained relatively stable compared to the same period last year, the number of new vehicle registrations rose, supporting an overall increase in COE receipts of $0.9 billion. (Chart 4.16) The government also collected $11.9 billion in income

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5 The previous NIR framework allowed the Government to spend up to 50% of the expected long-term real returns (including capital gains) from the net assets managed by GIC and MAS. Temasek was on the Net Investment Income (NII) framework.
taxes, which was $0.3 billion more than that in the first half of last year. Both corporate and personal income tax receipts rose while GST collections showed only a small increase as private consumption growth, especially in discretionary retail items, remained relatively weak.

In comparison, receipts from stamp duties decreased slightly by $0.1 billion in H1 2015 compared to the same period a year ago. Muted activity in the housing market, as reflected by low transaction volumes, continued to weigh on stamp duty receipts. (Chart 4.17)

Operating and development expenditure rose in line with commitments in recent budgets.

On a year-ago basis, total government expenditure rose by $3.1 billion to $30.7 billion (15.5% of GDP) in H1 2015. Operating expenditure accounted for $1.2 billion of the total increase in expenditure, largely due to higher spending on security and external relations as well as social development.6 (Chart 4.18)

Within social development, operating expenditures by the Ministry of Health and Ministry of Social & Family Development increased by $0.4 billion and $0.3 billion, respectively. The former was in line with the upward trajectory of public expenditure on health and aged-care services given the ageing of the resident population, while the latter could be attributed to higher expenditure on early childhood education. As a proportion of GDP, healthcare operating expenditure by the government has risen from 0.7% of GDP in CY2007 to 1.4% in 2014. (Chart 4.19)

In contrast, the Ministry of Education recorded a $0.2 billion decline in operating expenses in H1 2015 compared to H1 2014. This was primarily due to the one-off provision of a seed endowment grant in H1 2014 to the Singapore Institute of Technology.

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In terms of development expenditure, a considerable $1.8 billion more was incurred in H1 2015 compared to the first half of 2014. The economic and social development sectors saw the biggest increases in development expenditures over this period. (Chart 4.20) Specifically, development spending by the Ministry of Transport rose on the back of planned expenditures related to the development of the new airport facilities at Changi East as well as rail transport projects, such as the Tuas West Extension and the Thomson-East Coast Line. Meanwhile, JTC’s land and infrastructure projects as well as the development of Tampines Town Hub represented major components of development expenditure by the Ministry of Trade & Industry and Ministry of Culture, Community & Youth, respectively.

The government’s primary surplus fell, while its basic balance was in deficit in the first half of CY2015.

As the increase in total expenditure exceeded that of operating revenue, the government’s primary balance fell to $0.5 billion in H1 2015, compared to $1.7 billion in H1 2014. Over the same period, special transfers, excluding top-ups to endowment and trust funds, rose by $0.7 billion, reflecting the larger disbursement of pay-outs from the Wage Credit Scheme. Accordingly, the basic balance, which is the primary balance less special transfers, excluding top-ups to endowment and trust funds, recorded a deficit of $2.0 billion in H1 2015 compared to the almost neutral position in the first half of the preceding year. (Chart 4.21)

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7 Economic development includes the activities of the Ministry of Transport, Ministry of Trade & Industry, Ministry of Manpower (excluding Financial Security Programme) and expenditure under Info-Communications and Media Development.
Box C
Review of MAS Money Market Operations in FY2014/15

This Box reviews MAS’ money market operations in FY2014/15. Money market operations are undertaken to manage liquidity within the banking system, and are distinct from the implementation of exchange rate policy. More information is available in the monograph on “Monetary Policy Operations in Singapore” published in March 2013.

A description of money market operations is provided, followed by a review of banks’ demand for cash balances with MAS and the behaviour of autonomous money market factors in FY2014/15. Finally, the composition of money market operations carried out during this period is examined.

Money Market Operations in Singapore

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

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

Banks’ Demand for Cash Balances

Banks in Singapore hold cash balances with MAS to meet reserve requirements and for settlement purposes. They are required to maintain with MAS a Minimum Cash Balance (MCB) equivalent to 3% of their liabilities base on a two-week average basis. This forms a base demand for cash balances. The total demand for reserve balances could vary across periods as banks also hold excess cash balances to make large payments (settlement purposes), or as high-quality liquid assets (regulatory purposes). Since the GFC, there has been a tendency for banks to hold slightly more liquidity in the form of central bank reserves.

In FY2014/15, banks’ demand for balances to meet reserve requirements rose in tandem with the growing liabilities base. (Chart C1)

Chart C1
Average Reserve Requirements over Two-week Maintenance Periods

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1/ This Box is contributed by the Monetary & Domestic Markets Management Department of MAS.
Although banks are required to keep an average MCB ratio of 3% over the two-week maintenance period, their daily effective MCB ratios may fluctuate between 2% and 4% of their liabilities base, providing them with more flexibility in their liquidity management. Hence, there may be day-to-day variations in banks’ demand for cash balances within each maintenance period.

Chart C2 shows the daily fluctuations in cash balances within an average maintenance period in FY2014/15. Banks tend to maintain higher cash balances during the start of a maintenance period so as to avoid being caught short of cash towards the end of the period. Hence, the daily cash balances required by the banking system during the last few days of a maintenance period are usually lower.

**Money Market Factors**

Chart C3 shows the liquidity impact of the autonomous money market factors, which include, (i) public sector operations; (ii) currency in circulation; (iii) Singapore Government Securities (SGS) and Treasury Bills (T-bills) issuance, redemption and coupon payments, over FY2014/15. Public sector operations include the Government’s and CPF Board’s net transfers of funds between their accounts with MAS and their deposits with commercial banks.

In FY2014/15, the liquidity impact of the autonomous money market factors was net contractionary, largely due to the withdrawal of funds by public sector operations, which more than offset the expansionary impact arising from SGS issuance and redemption. The liquidity impact of currency in circulation was negligible.
Composition of Money Market Operations

MAS relied on four instruments to inject liquidity into, and withdraw liquidity from, the banking system in FY2014/15, namely, (i) FX swaps; (ii) SGS repos; (iii) clean borrowings; and (iv) MAS Bills. Since MAS Bills were introduced in 2011, they have grown in importance as an instrument for money market operations, with the total outstanding issuance rising to S$92.1 billion in FY2014/15, up from S$74.4 billion in FY2013/14. Chart C4 compares the composition of instruments between FY2013/14 and FY2014/15.
Special Features
The Impact Of Foreign Demand Shocks On The Singapore Economy: A Disaggregated Analysis

Introduction

Previous issues of the Review have carried Special Features examining the impact of foreign GDP shocks on domestic macroeconomic variables, using the Monetary Model of Singapore (MMS) and the Satellite Model of Singapore (SMS). In these earlier studies, a shock to foreign GDP was introduced through a change in the composite foreign GDP index, which served as a proxy for external demand. The simulation results from the models suggested that Singapore’s GDP would fall by 1.2–1.3% points below baseline in the first year in response to a 1% fall in external demand, and recover after four to six quarters. CPI inflation would similarly decline relative to baseline, and reach its trough in the second year.

While an understanding of the impact of overall foreign demand shocks is crucial for monetary policymaking, the country composition of such shocks is likely to matter as well. Over the past two decades, China and Asia, in general, have become increasingly significant sources of intermediate and final demand for Singapore. This has resulted in a progressive reorientation of domestic exports towards the region, with the consequence that shocks originating thereof could have larger effects on Singapore’s trade and output.

An indication of the relevance of country and region-specific shocks can be seen in their correlations with the growth of the Singapore economy. This association is depicted in Chart 1, which shows the dynamic correlations between Singapore’s GDP growth rate and the growth rates in the US and China from 2000 to 2014. Throughout the early to mid-2000s, the US’ and China’s GDP growth was about equally strongly correlated with Singapore’s. However, after the Global Financial Crisis (GFC), Singapore’s growth rate appears more highly correlated with China than the US, with a discernible downshift in the latter’s correlation.

This Special Feature undertakes a disaggregated analysis of the impact of changes in Singapore’s external demand on domestic growth and inflation outcomes. Such an analysis is necessary when growth in Singapore’s major trading partners is uneven. In these instances, a composite foreign GDP variable may fail to fully capture the varying effects of changes in final demand in different export markets. Accordingly, this Feature will focus on country/region-specific shocks emanating from the large US, China and ASEAN-4 economies. However, before undertaking the analysis using the MMS, the next section provides an overview of how foreign GDP, from the perspective of Singapore, has evolved over the last 50 years.
Historical Evolution Of Foreign Demand

Over the past 50 years, Singapore’s key trading partners saw robust GDP growth averaging 4.1% p.a. (on a GDP-weighted, PPP-adjusted basis), with their aggregate economic output rising by close to seven times between 1965 and 2014. (Chart 2)

The expansion in external demand, however, was punctuated by several downturns—the oil price shocks in the mid- and late 1970s, the early 1980s recession in the developed countries, the Asian Financial Crisis (AFC) in 1997–98, and the GFC in 2008–09.

Alongside robust growth, the pattern of Singapore’s trade flows has also evolved significantly over the years, reflecting changes in the relative importance of different markets and, on the supply side, shifts in the composition of exports. In particular, Singapore transited from being an entrepôt port in the 1960s to a manufacturing base in the 1980s to 2000s, before increasingly taking on the role of a regional hub for modern services over the past decade.

At the time of Singapore’s independence in 1965, the country’s external demand was largely dependent on the trading activities of its ASEAN neighbours, given its role as an entrepôt. Over the next two decades, as Singapore rapidly industrialised and moved up the value-added ladder, it benefited from rising final demand in the advanced economies. (Chart 3) However, Singapore’s exports were hit in the mid-1970s and

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**Chart 1**
Dynamic Correlations of US and China GDP Growth with Singapore

**Chart 2**
Real GDP of Singapore’s Key Trading Partners

**Chart 3**
Composition of Singapore’s Total Non-oil Exports by Destination

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Source: The Conference Board and EPG, MAS estimates
Note: “Other Industrial-4” refers to France, Germany, Netherlands and the UK; ASEAN-4 includes Indonesia, Malaysia, Thailand and the Philippines; and NEA-3 refers to Hong Kong, Korea and Taiwan.

Source: UN Comtrade and EPG, MAS estimates
Note: NEA-2 refers to Hong Kong and Korea as data for Taiwan is unavailable for the full period.
again in the early 1980s when major trading partners such as the US and the UK went into recession, in part due to oil price shocks.

In the late 1980s and the first half of the 1990s, the ASEAN-4 countries started to boom, as they increasingly welcomed foreign investment and industrialised rapidly. Concurrently, Singapore moved into the production of higher value-added intermediate products, particularly electronics parts and components such as disk drives, as well as financial and other exportable services. Unfortunately, the region’s growth came to a grinding halt when the AFC broke out in 1997. By 1999, however, confidence was largely restored and economic conditions had recovered.

In the new millennium, the economic centre of gravity veered sharply towards Asia, spurred by China’s rise as a manufacturing base, following its WTO accession in 2001. This gave rise to the build-up of extensive cross-border production networks that were centred on China as a final assembly centre. At the same time, Asia as a whole became an increasingly significant source of final demand for Singapore, as economic development engendered a virtuous cycle of rising employment and growing incomes.

Meanwhile, over the past two decades, growth in the advanced economies has slowed, reflecting Japan’s ‘lost decade’ in the 1990s and sluggish growth in the 2000s, the 2008–09 GFC originating in the US, and the ongoing economic challenges in the Eurozone. Nonetheless, the progressive reorientation of Singapore’s exports towards Asian demand has helped to maintain foreign GDP growth at close to the historical average of 4% p.a., except during the GFC period.

### The Impact Of Country And Regional Shocks

#### Analytical Framework

The first part of this section develops a simple model that shows how a country’s GDP growth is related to foreign GDP growth. This derivation uses the framework in Forbes and Abeyesinghe (2005), in which a shock in one country affects other countries’ GDP through trade linkages. The total output of an individual country can then be expressed as the sum of exports to its trading partners and domestic production:

\[
Y_i = \sum_{j=1}^{n} X_{i,j} + A_i
\]

(1)

where \( j \neq i \) indexes the country’s export destinations. Writing this equation in terms of growth rates yields:

\[
\frac{dY_i}{Y_i} = \frac{1}{Y_i} \left[ \sum_{j=1}^{n} dX_{i,j} + dA_i \right]
\]

(2)

Next, exports from country \( i \) to country \( j \) can be represented as a reduced-form function of the output in country \( j \):

\[
X_{i,j} = X_{i,j}(Y_j)
\]

(3)

Differentiating equation (3) and inserting the result into equation (2) yields:

\[
\frac{dY_i}{Y_i} = \frac{X_i}{Y_i} \sum_{j=1}^{n} \eta_j \left( \frac{X_{i,j}}{X_j} \right) \left( \frac{dY_j}{Y_j} \right) + \frac{dA_i}{Y_i}
\]

(4)

where \( \eta_j = \frac{\partial X_{i,j}}{\partial Y_j} \left( \frac{Y_j}{X_{i,j}} \right) \) is the elasticity of country \( i \)’s exports to country \( j \), with respect to country \( j \)’s income. Assuming that income elasticities are equal across countries, that is, \( \eta_j = \eta \), the growth rate of output in country \( i \) is:

\[
y_{i,t} = \alpha_i y_{i,t}^f + u_{i,t}
\]

(5)

where \( \alpha_i = \eta \frac{X_i}{Y_i} \), \( y_{i,t}^f = \sum_{j=1}^{n} \left( \frac{X_{i,j}}{X_{j,t}} \right) y_{j,t} \) and \( u_{i,t} \) captures domestic demand and omitted influences. In equation (5), the variable \( y_{i,t}^f \) is an export-share weighted average of output growth in country \( i \)’s trading partners. By allowing the export shares to vary over time, the use of \( y_{i,t}^f \) accounts for changes in the relative importance of different markets and introduces a changing parameter structure into the model, thus stabilising estimates of the \( \alpha_i \) coefficients during times of major shocks.

Monetary Authority of Singapore

Economic Policy Group
**Recent Changes in Trade Elasticities**

The practice of using an export-weighted foreign GDP variable to proxy for changes in a country’s external demand has been adopted in macroeconometric models at many central banks. In the MMS, the $y^f_{t,t}$ variable defined in equation (5) is allowed to enter into the equation describing manufacturing exports. Movements in this variable will, in turn, have an impact on domestic GDP growth and inflation, as discussed in the next section. The behavioural equation for manufacturing exports is given by:

\[
\ln(EX_t) = \alpha + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 TF + 
\sum_{j=0}^{3} \phi_j y^f_{t-j} = \sum_{j=0}^{1} \gamma_j \ln(RBB_{t-j}) + \epsilon_t \tag{6}
\]

where $EX_t$ represents the gap between actual and short-run equilibrium exports, with the latter capturing, among other things, the effects of changes in relative trade prices. $D_1$, $D_2$, and $D_3$ are seasonal dummy variables; $TF$ is a time trend; $y^f_t$ is the quarterly real growth rate in composite foreign GDP; and $RBB_t$ is the US book-to-bill ratio for semiconductors, included to account for the short-term effects of the global electronics cycle on Singapore’s export volumes. The export weights in $y^f_t$ are updated every year, and then converted into quarterly weights through interpolation.

Chart 4 presents the recursive estimates of the sum of the coefficients on the $y^f_t$ variable in equation (6), which can be interpreted as the elasticity of Singapore’s manufacturing exports with respect to foreign GDP growth. This elasticity has been relatively stable in the pre-GFC period, and only experienced a downshift after the crisis. While not marked, the decline in the elasticity estimate and its subsequent levelling-off indicates that allowing for time-varying export shares in the computation of the composite foreign GDP index is insufficient to stabilise the estimated coefficients, thus hinting at a possible structural break in Singapore’s trade relationships with the rest of the world.

To shed further light on the underlying causes of the decline in Singapore’s export elasticity which could have stemmed from country/region-specific effects, a disaggregated specification of equation (6) is estimated, whereby external demand changes arising from Singapore’s three major trading partners are considered separately:

\[
\ln(EX_t) = \alpha + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 
+ \beta_4 TF + \sum_{i=0}^{1} \phi_i US_{t-i} 
+ \sum_{i=0}^{1} \phi_i Chn_{t-i} 
+ \sum_{i=0}^{1} \gamma_i \ln(RBB_{t-i}) + \epsilon_t \tag{7}
\]

In the equation, $US_t$, $Chn_t$, and $ASEAN_t$ represent the quarterly real GDP growth rates of the US, China and ASEAN-4 economies, respectively.

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3 Altogether, the US, China and ASEAN-4 countries contributed around two-thirds of overall foreign GDP growth over the period 1991–2014. The inclusion of more countries and regions is constrained by the presence of multicollinearity amongst foreign GDP variables.
Chart 5 shows the recursive export elasticities by country/region, obtained by estimating equation (7) over Q1 1991 – Q1 2015. Putting aside the GFC period, the export elasticity for the US has declined steadily while that of China has risen sharply in recent years. These trends appear to mirror shifts in the respective countries’ non-oil domestic export (NODX) shares in Singapore’s export basket. (Chart 6) Notably, China’s share in Singapore’s NODX rose substantially following the GFC, which more than offset the gentler decline in the US share. In comparison, the estimated elasticity of exports for ASEAN-4 has been broadly unchanged since 2008, consistent with the relative stability of their collective weight in Singapore’s export basket.

Nonetheless, as demonstrated earlier, changes in export shares would be captured by corresponding movements in the \( \gamma_j \) variable. The fall in the overall export elasticity in Chart 4 therefore suggests that, beyond changes in trade patterns, the export elasticity for the US could have undergone a structural downshift in the post-GFC period, while the corresponding elasticity for China increased. In other words, the income elasticity \( \eta_j \) in equation (4) might well have differed across countries and over time, resulting in changes in the \( \alpha_j \) coefficients, even after shifts in export shares have been accounted for.

**Model Simulation Results**

In this final section, an attempt is made to quantify the impact of a fall-off in external demand in the three countries/regions on the Singapore economy, by embedding the estimates of equation (7) into the MMS. In this scenario, a set of negative foreign demand shocks, in the form of a 1% fall in US, China and ASEAN-4 GDP levels, are individually simulated in the MMS. At the outset, it should be pointed out that these simulation exercises only account for the impact of external demand shocks on manufacturing exports and do not consider other transmission channels, such as financial links or trade in services. In the MMS, the initial shock causes an immediate decline in manufacturing export orders. In response, producers in the various

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4 During the GFC, Singapore’s manufacturing exports actually became more elastic with respect to US income. This could have reflected the severe trade and financial dislocations caused by the initial GFC shock, which reverberated across the global economy rapidly and could not be fully explained by GDP changes alone. In particular, the synchronised downturn in the industrial countries and their collective impact on Singapore’s exports could have been indirectly captured by the decline in US growth. Since these countries were not included in the estimation, this would have had the effect of boosting the US elasticity.

5 The GDP for each region is assumed to fall 1% below baseline for four quarters, before recovering by 0.25% in each of the subsequent four quarters, and then reverting to the baseline by the end of the second year. When a demand shock is applied to any one country or region, GDP in the other two is kept unchanged.
sectors adjust their profit-maximising production and pricing decisions. As they reduce demand for domestic and imported intermediate inputs, further negative spillovers to the rest of the economy occur.

Table 1 shows the model simulation results, expressed as deviations from baseline outcomes. The first-year impact on Singapore’s GDP from a US-specific external demand shock is around −0.4%, compared to −0.3% from a China-specific shock. In contrast, a 1% downturn in the ASEAN-4 region would lead to a 0.6% drag on Singapore’s GDP, the largest among the three regions examined. The effects of these foreign demand shocks on inflation would mostly materialise in the second year due to lags in the transmission mechanisms, and are more significant in the case of ASEAN-4.

Table 1
Impact of Foreign Demand Shocks on the Singapore Economy
(via the Manufacturing Exports Channel)

<table>
<thead>
<tr>
<th>Source of Shock</th>
<th>GDP Impact</th>
<th>CPI Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 1</td>
<td>Year 2</td>
</tr>
<tr>
<td>US</td>
<td>−0.4</td>
<td>−0.2</td>
</tr>
<tr>
<td>China</td>
<td>−0.3</td>
<td>−0.1</td>
</tr>
<tr>
<td>ASEAN-4</td>
<td>−0.6</td>
<td>−0.1</td>
</tr>
</tbody>
</table>

Conclusion

While the use of a composite foreign GDP variable facilitates the monitoring of global economic conditions on an aggregated basis, potentially divergent growth paths among Singapore’s main trading partners highlight the need for a more disaggregated analysis of foreign demand shocks. The findings from this Feature also reaffirm Singapore’s increasing dependence on China as an engine of growth. China’s centrality within Asia’s production network has grown significantly since the turn of the century, transforming it from a supplier of components and parts into a core production hub. Alongside this transition, Singapore’s comparative advantage in intermediate goods exports has enabled the country to position itself favourably within regional supply chains, with China as the key node. Conversely, this development could also increase Singapore’s vulnerability to an external demand shock from China.

References


Introduction

Policymakers around the world have learned a number of lessons from the Global Financial Crisis (GFC) about requirements for a policy toolkit that will prevent the next financial crisis—or at a minimum make financial cycles much less painful for the real economy. We have learned that medium-term price and economic stability is not enough to guarantee financial stability and the absence of financial stability—as during the GFC—can cause considerable and prolonged deviations from inflation targets and full employment.

Monetary policy, by itself, has not been powerful enough to restore price and economic stability quickly once they have been disturbed by a major financial crisis. Clearly more is needed to prevent such crises from occurring in the first place. Improvements in institution-by-institution risk management and capital and liquidity buffers would help, but viewing each institution separately is not sufficient to preserve financial stability. Externalities to the behaviour of individual institutions means that the authorities need to look at the whole system, devising and administering regulations to take account of the interactions and spillovers, and dampen the procyclicality that seems naturally to be built into financial markets and their feedback on the economy.

Macroprudential regulation—the extra regulatory perspective that does take account of systemic effects—had been a feature of policy in the US and many other industrial economies in the 1950s, 60s, and 70s, and it has remained a key aspect of the regulatory approaches in many emerging market economies in the 2000s. But it had fallen out of use in most economies with open and highly developed financial markets, which were seen as both undermining its effectiveness and as making such regulation less necessary because markets were perceived as having gotten better at distributing and diversifying risks.

Now, in the wake of the GFC, macroprudential regulation has been reborn in advanced economies, mostly as a “macroprudential finish” to standard microprudential tools—like capital and liquidity requirements, applied to a wider range of institutions that are judged to be systemically important—but also with changes in market structures, for example the central clearing of derivatives, and, in many jurisdictions, with direct attention to terms and conditions for lending, especially in residential real estate markets.
Policy Interactions

This means there are now two “macro” policies focused on preserving economic stability in the interests of maximising sustained long-term growth. These two types of policies interact in a number of important ways, raising questions about their coordination, their governance, and their optimal combination.2

Both work mainly through affecting financial conditions—primarily through changes in the price and availability of credit. Monetary policy does that mostly by affecting the actual and expected level of short-term interest rates, though also, following the decline of short-term rates to about zero after the GFC, through the effect of securities purchases on term premiums at longer maturities.

Macroprudential policy is used primarily to build the resilience of the financial system—the ability of both borrowers and lenders to withstand shocks, reducing the odds that the effects on the economy of a downswing in asset prices is amplified by a failure of intermediation; in the process it may also dampen the upswing and cushion the downswing in financial imbalances and prices of assets. Macroprudential adjustments in capital and liquidity requirements and in permissible terms of lending affect the cost of intermediation and the availability of credit.

Because both affect the cost of credit, the instruments used by each policy can have important effects on the objectives of the other policy. For example, added risk-taking and increased credit availability is an important channel for easy monetary policy to return the economy to potential and achieve inflation targets. But easy monetary policy can put financial stability at risk by encouraging leverage that may prove dangerous when capital gains reverse, or a “search for yield” in which lenders and investors do not give adequate consideration to potential defaults when rates eventually rise or the economy slows. Analogously, the effects of macroprudential policy on intermediation costs can affect the incentives to borrow and spend and therefore the level of aggregate demand relative to potential supply and prospects for inflation.3

Policy Roles

Clearly, the makers of monetary and macroprudential policies need to have a clear understanding of the objectives and strategies of the other type of policy and the likely effects of actual and expected instrument settings in order to calibrate their own policies.

But some analysts go further. They argue that monetary policy, in particular, itself needs to take explicit account of financial stability risks in setting policy interest rates; in other words, the objective function for monetary policy should include a financial stability argument in addition to medium-term expectations for inflation and employment. In this view, monetary policy should regularly consider whether it needs to steer away from medium-term objectives for inflation and employment in order to safeguard longer-term stability objectives, and many of these analysts would expect the financial stability argument not infrequently to impinge on monetary policy considerations. Only in this way can the authorities be adequately assured of avoiding financial instabilities that would deflect the economy from sustained growth and inflation at near their target levels over the longer run.4

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2  IMF (2013) has a useful review of many issues concerning the intersection of monetary and macroprudential policy.

3  The effect of macroprudential policy on the cost of credit might also influence the capital intensity of production and hence the level of potential GDP, but these effects are likely to be small.

This argument rests on two premises. One, that monetary policy settings can have major effects on financial cycles—by potentially creating bubbles and imbalances when policy is easy, and by preventing such risks from developing, whatever their origin, when policy is tighter. Second, that microprudential and macroprudential policies are not themselves sufficiently robust to contain or prevent the build-up of risks or to prevent disruptive financial crises. In particular, macroprudential and microprudential policies can make banks and other heavily-regulated intermediaries more resilient, but might be weak in tackling bubbles and imbalances in securities markets and at less-regulated entities. By altering risk-taking incentives quite broadly, changing interest rates can be effective in preserving financial stability.

Another school of thought sees monetary policy only as a “last line of defence” to protect financial stability—to be used for this purpose very rarely and only after macroprudential tools have been activated and found wanting. Monetary policy is a blunt instrument, operating through multiple channels to affect aggregate demand and inflation. Many risks to financial stability are focused in particular markets and types of borrowing and lending (the residential real estate market and mortgage credit in the 2000s in the US would be a prime example). Moreover, the effects of changes in monetary policy settings on asset prices, leverage, and maturity mismatches—the sources of much financial instability—are unclear and could be quite small. As a consequence, using monetary policy to deal with threats to financial stability could well involve major costs; the monetary authority might need to steer considerably away from its medium-term objectives for output and prices to deal with financial stability risks, and the collateral damage to employment and inflation, even the credibility of its inflation target, might be considerable.

Protecting financial stability efficiently and effectively requires a different focus and different set of tools than does achieving an inflation target. Macroprudential policy is targeted on the particular intermediaries or types of lending that could threaten financial stability. And macroprudential policymakers are largely trying to build resilience against tail risk—the small odds on a major disruption to intermediation—rather than trying to influence the modal or most likely outcome that largely occupies monetary policymakers. In the process of building systemic resilience, macroprudential policies most likely would have some, albeit small, effects on the average cost of credit; the effects of the increase in the cost of capital on the output gap can be offset by the monetary policy authorities as they calibrate policies to achieve inflation or output objectives. So it would seem that, given the tools available to each type of policy, cost-benefit calculus would keep monetary policy focused on aggregate demand and overall inflation, while macroprudential policy would focus on reducing the odds that disturbances in the financial sector could have major and disruptive feedbacks on longer-term growth prospects, with monetary policy acting as a “last line of defence” in protecting financial stability.

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6 In Sweden, during the recovery from the GFC, the Riksbank tightened policy in recent years to discourage household borrowing, but the effects were muted and the consequences for achieving its inflation target sufficiently adverse that it had to back off (Milne, 2014).

Policy Tools

But where the last line of defence is depends on the effectiveness of macroprudential tools, which in turn depends on their range and type. Limited or ineffective tools affect the cost-benefit calculus in a way that would suggest greater weight for financial stability in monetary policy. Singapore has a varied kit of macroprudential tools, including the ability to raise and lower the countercyclical capital buffer for banks, as well as several tools aimed at promoting sound practices and leaning against potential asset and lending bubbles in the real estate markets. So too has the UK. There the FPC can vary the countercyclical capital buffer for banks; it also has a variety of approaches to countering potential vulnerabilities in real estate, including changing sectoral capital requirements for banks and also authority to tighten loan-to-value (LTV) and loan-to-income (LTI) standards for loans on owner-occupied housing.

Unfortunately, the toolkit in the US is not so broad and diversified. Macroprudential policy in the US has concentrated on building through-the-cycle resilience in the banking sector, including bank holding companies and the investment banks they control, and identifying and regulating a few systemically important non-bank players. Considerable progress has been made in putting in place capital and liquidity buffers and structural reforms to make these participants much more resilient to shocks, and that success will take some pressure off monetary policy to take account of potential financial cycles that do not align with medium-term macroeconomic goals.

But the capacity in the US to raise or alter macroprudential policies to protect against building vulnerabilities in particular sectors or markets is limited. In general, they do not extend to imbalances building in securities markets or in more lightly regulated intermediaries, and tighter regulation on core banks can induce activity to migrate to these less regulated corners of the system. The fragmented US regulatory system makes getting at these corners exceptionally difficult; it requires buy-in and cooperation from multiple agencies with other legislated priorities.

Countercyclical macroprudential policies are useful for pushing back the frontier at which monetary policy becomes the last line of defence. The US does have the countercyclical capital buffer for banks and their holding companies at its disposal, and it can build stress test scenarios with countercyclical characteristics for these institutions and a few other Systemically Important Financial Institutions (SIFIs). So, in boom times the US can build resilience in these core institutions, but these tools are likely to have only limited effect on an upswing in credit growth and asset prices, and they do not apply to securities markets and many of their participants. The US needs more countercyclical tools that can be aimed directly at loans or credit wherever granted. In that regard, lending on residential real estate has often been the cause of financial instability in the US as it has been elsewhere. The US has taken some steps to strengthen the securitisation process for mortgage loans, but the steps are limited. And there is no plan or allowance for countercyclical policy with respect to the terms of mortgage lending—LTVs or LTIs. This could be a serious omission that might pressure monetary policy to respond to a housing boom in the future, even if inflation and employment are falling well short of goals.

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8 See MAS (2012).

Policy Governance

It is important to have the right organisational and governance structures to appropriately take account of the complex interactions of monetary and macroprudential policies, especially if countercyclical macroprudential policy will be in use with its effects on monetary policy objectives. The different types of policies have different primary objectives, use different tools, and require a somewhat different background and expertise, so separate committees would seem to be called for. But the policymakers for each policy must have a good understanding of the goals, strategy and tactics of the other. Both types of policies require some degree of independence from short-term political pressures, within a framework that facilitates democratic accountability. This final characteristic is well known for monetary policy, but it applies as well to macroprudential policy, where decisions can affect the profits of the financial sector and the committee will need to restrain risk-taking when times are good—which may not be popular.

Singapore and the UK have approached these challenges by housing both monetary and macroprudential policy in the central bank, in separate committees with some overlap in membership. Because the committees are in the central bank, they tend to have some insulation from short-term political pressures; because they have overlapping membership, each can be well informed about the plans of the other; and because the membership is not entirely overlapping, there is opportunity to bring specialised expertise to bear on the issues. A challenge is that this concentrates considerable authority and responsibility in the central bank, so the framework for accountability needs to be carefully constructed as well.\textsuperscript{10}

The US took an important step towards better organisation for macroprudential regulation with the formation of the Financial Stability Oversight Council (FSOC) under Dodd-Frank. FSOC has a financial stability mandate and it includes the heads of all the (many) relevant regulatory agencies, but it has some serious shortcomings. These arise importantly from the fragmented regulatory structure of the US. Many people see the Federal Reserve as quite powerful in macroprudential policy, but its authority is limited mainly to bank holding companies and a few SIFIs. The other agencies on FSOC generally have little expertise in macroeconomics or emphasis on overall financial stability in their mandates. FSOC, the coordinating agency, is headed by the secretary of the Treasury, who is not independent of the politics of the day, and whose presence complicates consideration of the interactions with monetary policy, especially with regard to countercyclical aspects.

Conclusion

In sum, we have much to learn about how macroprudential and monetary policies will and should interact in highly developed, globally integrated economies. We do know that there will be more opportunities for both monetary and macroprudential policies to pursue their primary objectives the more effective the macroprudential tools are. And those interactions—the choice of tools and how they relate to the other policies—are more likely to be fruitful when decision-making is set up with these goals in mind. Singapore has done a good job of devising tools and establishing promising governance structures to use them. The US toolkit and governance structure were improved by Dodd-Frank, but there are potentially serious deficiencies in terms of coordinating across multiple agencies and of having the required tools. That is troubling for the world’s most important reserve currency and financial markets; we have seen how problems in the US can reverberate around the globe.

\textsuperscript{10} See Kohn (2013).
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Special Feature C
A Brief Survey Of Density Forecasting In Macroeconomics
by Anthony Tay

Introduction

A density forecast of an economic variable is an estimate of the conditional probability density function (p.d.f.) of the possible future values of that variable. For example, a density forecaster might say something like “based on current information, GDP growth over the next year is expected to be normally distributed with mean 3% and standard deviation 0.5%”. A density forecast therefore provides a complete probabilistic description of the possible future realisations of a variable, given some information set. It is a generalisation of the more common point forecast (“GDP growth over the next year is expected to be 3%”) and interval forecast (“GDP growth over the next year is expected to be between 4% and 5%”).

Difficulties With Point And Interval Forecasts

One difficulty with point forecasts is how to interpret them. Should a forecast user interpret a point forecast of, say, 3%, as a mean (so that 3% is the average of all possible outcomes, weighted by their relative probabilities of occurrence) or a median (so that the realisation is as likely to be above 3% as below)? Although the mean and median are equal for symmetric distributions, they are not the same for asymmetric distributions. Another difficulty with point forecasts is that they do not convey forecast uncertainty. There will be times when forecasting is inherently more difficult, and one should expect to make larger forecast errors in volatile episodes than when nothing unusual is happening. At such times, a forecast user would find an indication of forecast uncertainty useful, and she would put less weight on an uncertain forecast when making decisions or might choose to hedge her subsequent actions more aggressively. The desire to convey forecast uncertainty is one reason why many forecasters now present interval forecasts. For example, an interval forecast of 2.75% to 3.25% output growth over the next year is very different from an interval forecast of 1.75% to 4.25% growth, the latter conveying the notion that there is much more uncertainty about economic conditions.

However, interval forecasts also suffer from problems of interpretability. Does an interval forecast indicate a 0.90 probability, or an interquartile range? Or is the forecaster sure that...

1 Anthony Tay is Associate Professor of Economics at the School of Economics, Singapore Management University.
The views in this Special Feature are solely those of the author and should not be attributed to MAS.

the realisation of the variable will fall into that interval? Even if an interval forecast represents a 0.90 probability interval, is this interval centred at the mean, or the median? Is the interval chosen such that the probabilities outside the interval on either side are balanced, or so as to make the 0.90 probability interval the smallest possible such interval? Chart 1 shows two very different interval forecasts with the same probability coverage. Although interval forecasts are more common now, they are almost never accompanied by a full description of what the interval actually says.

Because it takes the form of a complete probability density function, a density forecast conveys fully the uncertainty surrounding the forecasts. This is especially useful in situations where there are considerable “downside” risks, relative to “upside” risks (or vice versa). Chart 2 shows two density forecasts, both with zero mode. The density forecast on the left suggests a significant probability of a big negative outcome, whereas the density forecast on the right shows a considerably more optimistic scenario. Two forecasters with opposing views, one represented by the density forecast on the left, and the other by the density forecast on the right, will give the same modal point forecast. Furthermore, any interval forecast centred at the modes would cover the same probability in either case.

Another advantage of density forecasts is that it allows users to derive probability forecasts of a given event. This is useful as many of the questions macroeconomists are interested in are most naturally framed in terms of the probability of a specific event occurring, for example, what is the probability of deflation over the next year? What is the probability that inflation will not fall within a certain target band? Finally, should a user prefer to provide point or interval forecasts, these can be derived directly from the probability density forecast.
Density Forecasting In Practice

In 1968, the Business and Economics Statistics Section of the American Statistical Association (ASA) and the National Bureau of Economic Research (NBER) started the ASA-NBER Survey, a quarterly survey of professional macroeconomic forecasters in the US. The Federal Reserve Bank of Philadelphia later assumed responsibility for the survey, which was then renamed as the Survey of Professional Forecasters. This survey mostly asks forecasters for their point forecasts for a range of variables and horizons, but it also asks for probability density forecasts for inflation and output growth in the form of histograms. The forecasters are given a set of intervals, or bins, and asked to assign probabilities to each bin. These are then averaged over all respondents, as shown in Chart 3. In Singapore, density forecasts of GDP growth have been published in the MAS Survey of Professional Forecasters since 2001. (Chart 4)

Other prominent examples of density forecasts in macroeconomics include the quarterly density forecasts of one-year ahead UK RPIX inflation\(^3\) issued by the Bank of England from Q1 1993 to Q2 2004, and since Q3 1992, by the National Institute of Economic and Social Research (NIESR). The former is based on a ‘two-piece normal distribution’ to allow for asymmetry in the density forecasts (see Wallis, 2004), whereas the NIESR forecasts are assumed to be normal and centred on the point forecasts generated by a large-scale macroeconomic model. The NIESR forecasts are presented in the form of histograms, whereas the Bank of England forecasts are presented in the form of ‘fan charts’ i.e., overlaid interval forecasts with a range of probability coverage (see Chart 5 for an example of a fan chart).

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\(^3\) RPIX refers to the Retail Price Index excluding mortgage interest payments.
Evaluating Density Forecasts

To evaluate point forecasts, we would compare the forecasts with the eventual realisations of the variable forecasted. But how would we compare density forecasts $p_{t|t-1}(\cdot)$ (which are p.d.f.s) with the eventual realisations $y_t$ (which are numbers)? The basic device is to use the quantities:

$$z_t = \text{Prob}(Y_t \leq y_t)$$

implied by the density forecasts. If the density forecasts of a variable $Y_t$ made using information up to time $t-1$ are correct, then the corresponding $z_t$ series should be independently and identically distributed (i.i.d.) uniformly over the interval $[0,1]$. The quantity $z_t$ is often called the probability integral transform (p.i.t.) of the density forecast because it is calculated by taking the integral:

$$z_t = \int_{-\infty}^{y_t} p_{t|t-1}(u) \, du$$

However, it is nothing more than the cumulative distribution function (c.d.f.) corresponding to the density forecasts, evaluated at the realisations.

There are two parts to this evaluation idea, the ‘uniformity’ part and the ‘i.i.d.’ part. Perhaps the best way to understand the uniformity aspect is to consider probability interval forecasts derived from the density forecasts. A series of 0.90 probability interval forecasts should be correct 90% of the time in the sense that nine out of ten realisations of the variable should fall into the interval forecasts. The uniformity property says that this should be true of all possible interval forecasts that can be derived from the density forecasts. As another example, think of a forecaster who consistently “gets it wrong”. Suppose we have a “doom-and-gloom” density forecaster who always thinks the economy is going to do worse than it actually does. Such a forecaster consistently puts too much probability on very bad outcomes, so when we calculate the $z_t = \text{Prob}(Y_t \leq y_t)$ series for this forecaster, the values of $z_t$ will tend to be closer to one than they ought to be, i.e., they will be biased upwards. For a good density forecaster, $z_t$ should be evenly distributed from zero to one.

The other aspect of the evaluation principle is the i.i.d. part. Again think of a sequence of 0.90 probability interval forecasts. Not only should these intervals be correctly sized, but we should not be able to use the past sequence of “hits” and “misses” to predict whether the forecaster will be “right” or “wrong” in the future. Thus, the i.i.d. property says that we cannot use past $z_t$ to predict future ones. This is crucial for evaluating density forecasts of economic variables, since dynamics are prevalent in time series of economic variables. A density forecasting model that produces i.i.d. and uniformly distributed p.i.t.’s would be one that describes the dynamic patterns in the data well, while also producing well-calibrated probabilities of events.
This method of evaluating density forecasts was introduced into econometrics by Diebold, Gunther and Tay (1998). In that paper, the authors use informal checks for optimality by plotting histograms and correlograms of the p.i.t. series. Berkowitz (2001) takes a more formal testing approach by further transforming the p.i.t.'s into normal random variables. Under the hypothesis that the density forecasts are correct, \( z_t \) has a standard normal distribution, which can be easily tested.

More recently, evaluation procedures have been proposed based on the Kullback-Leibler (KL) ‘distance measure’, which quantifies how far two probability density functions are from each other. In its original form, the KL measure is not operational since the true density is unknown (it is, after all, the object that we are trying to estimate). The i.i.d. and uniformity result, however, operationalises the KL testing idea, since we can evaluate how far the density of \( z_t \) (which we can estimate) is from the uniform distribution. Details on implementing the KL idea to evaluate and compare density forecasts can be found in Mitchell and Hall (2005) and Bao, Lee and Saltoglu (2007).

There is an interesting problem in density forecast evaluation in that the i.i.d. and uniformity evaluation criteria cannot distinguish between correct density forecasts constructed using different information sets. For instance, suppose Forecaster A produces correct density forecasts of \( \gamma_t \) based on all past observations of \( \gamma_t \), while Forecaster B produces correct density forecasts of \( \gamma_t \) using all past observations of \( \gamma_t \) and \( \chi_t \). Both sets of forecasts will generate i.i.d. and uniformly distributed \( z_t \) series as long as the conditional densities are correct relative to their respective information sets. This is implied by the extension of the evaluation idea to multivariate density forecasts in Diebold, Hahn and Tay (1999).

Obviously we would prefer the forecasts based on the larger information set, since we might expect these to be “more accurate”, or “more precise”. This has led some authors to propose “sharpness” as a criterion. A density forecast is “sharper” if it is more concentrated around a point, an idea which can be measured by the width of, say, the central 0.50 segment of the 0.90 probability intervals. Such an idea is analogous to saying we would prefer density forecasts with smaller variances. This idea is useful in situations where the conditional variances are constant. However, such is not the case with economic data, which often displays time-varying conditional variances.

A simple solution to the problem of the inability of the i.i.d. and uniformity criteria to distinguish between density forecasts using different information sets might be simply to see if the additional information set can predict the \( z_t \) series, an idea analogous to what is done in the point forecast literature. However, this idea has not yet been fully explored in the density forecast evaluation literature.

\[ KL = E[\ln f(y_t) - \ln p_{\theta_{\gamma_t}}(y_t)] \]

where the expectation is taken with respect to the true density function. It is called a distance because it almost behaves like the usual geometric concept of distance, in that it is never negative, and obeys the triangle inequality (the sum of the shortest distance from point A to B and then to C is never less than the shortest distance from point A directly to point C). It is, however, not a true distance measure because the KL distance from p.d.f. A to p.d.f. B is not the same as the KL distance from p.d.f. B to p.d.f. A.

The sharpness idea can be found in Gneiting, Balabdaoui and Raftery (2007), although their examples omit time series considerations; see Mitchell and Wallis (2011) for a more in-depth discussion.

---

4 The KL distance from the density forecast \( p_{\theta_{\gamma_t}}(y_t) \) to the “true” density \( f(y_t) \) is:

5 The sharpness idea can be found in Gneiting, Balabdaoui and Raftery (2007), although their examples omit time series considerations; see Mitchell and Wallis (2011) for a more in-depth discussion.
Challenges For Density Forecasting In Macroeconomics

There are still rather few examples of density forecasting in macroeconomics, apart from the ones mentioned above. The most prominent examples are those based on surveys that ask for probability estimates in given ranges. Here, much remains to be learnt regarding how such surveys can be improved to give more reliable estimates of forecast uncertainty, and perhaps also a clearer view on the expectations formation process (see Bruine de Bruine et al., 2010).

Another challenge is to develop full macroeconomic density forecasting models. Density forecasts from fully specified macroeconomic models are rare, and tend to make assumptions such as constant variances and normality of errors, which render the idea of density forecasting somewhat trivial. With better and more abundant data, we can now estimate more interesting models. Autoregressive Conditional Heteroskedasticity (ARCH) models can now be easily constructed on macroeconomic data, leading to less trivial density forecasts by explicitly taking into account the time-varying conditional variances of the underlying data series. The real benefit of density forecasting, however, will probably only be realised with the development of models that allow for time-varying conditional skewness, perhaps driven by data on expectations and sentiments.

References


Statistical Appendix

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Table 10: Balance of Payments – Capital & Financial Accounts

Table 11: Exchange Rates

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Table 13: Domestic Liquidity Indicator

Table 14: Monetary

Table 15: Fiscal
TABLE 1: REAL GDP GROWTH by Sector

<table>
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<th>Period</th>
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Year-on-Year % Change Seasonally-adjusted Quarter-on-Quarter Annualised % Change

Source: Singapore Department of Statistics

TABLE 2: REAL GDP GROWTH by Expenditure

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<th>Period</th>
<th>Total Demand</th>
<th>Consumption</th>
<th>Domestic Demand</th>
<th>Gross Fixed Capital Formation</th>
<th>Exports of Goods &amp; Services</th>
<th>Imports of Goods &amp; Services</th>
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Year-on-Year % Change

Source: Singapore Department of Statistics
### TABLE 3: LABOUR MARKET (I)

<table>
<thead>
<tr>
<th>Period</th>
<th>Average Monthly Earnings</th>
<th>Labour Productivity</th>
<th>Unit Labour Cost</th>
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Note: Labour productivity figures are based on SSIC 2010 classification. Source: Singapore Department of Statistics/Central Provident Fund Board.

### TABLE 4: LABOUR MARKET (II)

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Note: Changes in employment numbers are based on SSIC 2010 classification. Source: Ministry of Manpower.
### TABLE 5: EXTERNAL TRADE

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<th>Period</th>
<th>Total Trade</th>
<th>Exports</th>
<th>Domestic Exports</th>
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<th>Non-oil Electronics</th>
<th>Re-exports</th>
<th>Imports</th>
<th>Exports</th>
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<td>At 2012 Prices</td>
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Source: International Enterprise Singapore

### TABLE 6: NON-OIL DOMESTIC EXPORTS by Selected Countries

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% Share of All Countries

| Year-on-Year % Change | 10.8 | -7.5 | 7.4  | 4.3  | -25.3 | 1.6  | -8.6 |
|                      | -4.3 | 4.7  | 8.3  | -4.0 | -11.9 | 2.0  | -3.3 |
|                      | 11.8 | -25.5| -9.7 | -6.6 | -12.0 | 4.8  | -6.0 |
|                      | 21.5 | -7.6 | -5.5 | 7.2  | 3.2   | 2.0  | 11.2 |
|                      | 22.2 | -11.9| 10.2 | 3.0   | 2.0   | 11.2 |

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Source: International Enterprise Singapore

Monetary Authority of Singapore
### TABLE 7: CONSUMER PRICE INDEX

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Source: Singapore Department of Statistics

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Note: MAS Core Inflation is the CPI less the costs of accommodation and private road transport. Source: Monetary Authority of Singapore
### TABLE 9: BALANCE OF PAYMENTS – Current Account

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Source: Singapore Department of Statistics

### TABLE 10: BALANCE OF PAYMENTS – Capital & Financial Accounts

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Source: Singapore Department of Statistics/Monetary Authority of Singapore

Monetary Authority of Singapore
## TABLE 11: EXCHANGE RATES

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Source: Monetary Authority of Singapore

## TABLE 12: SINGAPORE DOLLAR NOMINAL EFFECTIVE EXCHANGE RATE INDEX

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Source: Monetary Authority of Singapore
### TABLE 13: DOMESTIC LIQUIDITY INDICATOR

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<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>0.388</td>
<td>0.297</td>
<td>0.339</td>
<td>0.341</td>
<td>0.397</td>
<td>0.448</td>
<td>0.489</td>
<td>0.409</td>
<td>-0.199</td>
<td>-0.882</td>
<td>-1.089</td>
<td>-0.547</td>
</tr>
<tr>
<td>2012</td>
<td>0.128</td>
<td>0.553</td>
<td>0.642</td>
<td>0.589</td>
<td>0.304</td>
<td>0.105</td>
<td>0.259</td>
<td>0.427</td>
<td>0.653</td>
<td>0.353</td>
<td>0.282</td>
<td>0.193</td>
</tr>
<tr>
<td>2013</td>
<td>0.003</td>
<td>-0.107</td>
<td>-0.175</td>
<td>0.076</td>
<td>-0.023</td>
<td>-0.031</td>
<td>-0.070</td>
<td>0.087</td>
<td>0.384</td>
<td>0.409</td>
<td>0.509</td>
<td>0.205</td>
</tr>
<tr>
<td>2014</td>
<td>-0.050</td>
<td>-0.123</td>
<td>-0.227</td>
<td>0.132</td>
<td>0.126</td>
<td>0.336</td>
<td>0.179</td>
<td>0.088</td>
<td>0.035</td>
<td>0.002</td>
<td>-0.025</td>
<td>0.021</td>
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<tr>
<td>2015</td>
<td>0.007</td>
<td>-0.068</td>
<td>-0.122</td>
<td>0.322</td>
<td>0.639</td>
<td>0.868</td>
<td>0.153</td>
<td>-0.189</td>
<td>-0.110</td>
<td>Source: Monetary Authority of Singapore</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The DLI is a measure of overall monetary conditions, reflecting changes in the S$NEER and 3-month S$SIBOR rate. A positive (negative) number indicates a tightening (easing) monetary policy stance from the previous quarter. Please refer to the June 2001 issue of the MAS ED Quarterly Bulletin for more information.

### TABLE 14: MONETARY

<table>
<thead>
<tr>
<th>End of Period</th>
<th>Money Supply</th>
<th>Interest Rates</th>
<th>Banks' Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Narrow Money M1</td>
<td>Broad Money M2</td>
<td>Broad Money M3</td>
</tr>
<tr>
<td>2013</td>
<td>154.6</td>
<td>495.9</td>
<td>506.9</td>
</tr>
<tr>
<td>2014</td>
<td>160.2</td>
<td>512.5</td>
<td>524.2</td>
</tr>
<tr>
<td>2014 Q1</td>
<td>159.1</td>
<td>502.3</td>
<td>513.3</td>
</tr>
<tr>
<td>Q2</td>
<td>154.6</td>
<td>495.1</td>
<td>506.6</td>
</tr>
<tr>
<td>Q3</td>
<td>156.5</td>
<td>505.0</td>
<td>516.9</td>
</tr>
<tr>
<td>Q4</td>
<td>160.2</td>
<td>512.5</td>
<td>524.2</td>
</tr>
<tr>
<td>2015 Q1</td>
<td>162.7</td>
<td>521.9</td>
<td>533.8</td>
</tr>
<tr>
<td>Q2</td>
<td>158.3</td>
<td>512.5</td>
<td>525.0</td>
</tr>
</tbody>
</table>

Source: Monetary Authority of Singapore/ABS Benchmarks Administration Co Pte Ltd/ICE Benchmark Administration Ltd
### TABLE 15: FISCAL

<table>
<thead>
<tr>
<th>Period</th>
<th>Operating Revenue</th>
<th>Expenditure</th>
<th>Less: Special Transfers</th>
<th>Add: Net Investment Returns Contribution</th>
<th>Overall Budget Surplus (+)/Deficit (−)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total (Total)</td>
<td>Total</td>
<td>of which</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total (Income Tax)</td>
<td>Assets Taxes</td>
<td>Stamp Duty</td>
<td>GST</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>$ Million</td>
<td>$ Million</td>
<td>$ Million</td>
<td>$ Million</td>
<td>$ Million</td>
</tr>
<tr>
<td>FY2012</td>
<td>55,814</td>
<td>50,119</td>
<td>22,411</td>
<td>3,768</td>
<td>4,309</td>
</tr>
<tr>
<td>FY2013</td>
<td>57,020</td>
<td>51,146</td>
<td>22,050</td>
<td>4,182</td>
<td>3,930</td>
</tr>
<tr>
<td>FY2014 (Revised)</td>
<td>61,348</td>
<td>54,350</td>
<td>24,024</td>
<td>4,409</td>
<td>2,790</td>
</tr>
<tr>
<td>FY2015 (Budgeted)</td>
<td>64,272</td>
<td>55,745</td>
<td>24,349</td>
<td>4,414</td>
<td>2,595</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% of Nominal GDP</th>
<th>FY2012</th>
<th>FY2013</th>
<th>FY2014 (Revised)</th>
<th>FY2015 (Budgeted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income Tax</td>
<td>15.3</td>
<td>14.9</td>
<td>15.7</td>
<td>16.0</td>
</tr>
<tr>
<td>Assets Taxes</td>
<td>13.7</td>
<td>13.4</td>
<td>13.9</td>
<td>13.9</td>
</tr>
<tr>
<td>Stamp Duty</td>
<td>6.1</td>
<td>5.8</td>
<td>6.1</td>
<td>6.1</td>
</tr>
<tr>
<td>GST</td>
<td>1.0</td>
<td>1.1</td>
<td>0.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Total Income Tax</td>
<td>25</td>
<td>25</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Net Operating</td>
<td>1.6</td>
<td>1.5</td>
<td>1.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Development</td>
<td>3.4</td>
<td>3.1</td>
<td>3.5</td>
<td>-1.0</td>
</tr>
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</table>

| Source: Ministry of Finance |
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</tr>
<tr>
<td>Others</td>
<td>☐ S$ 75.00 (Inclusive of postage and handling)</td>
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