# ECONOMIC SURVEY OF SINGAPORE

# Second Quarter 2016

MINISTRY OF TRADE AND INDUSTRY SINGAPORE

August 2016

**Ministry of Trade and Industry**
**Republic of Singapore**

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# MAIN INDICATORS OF THE SINGAPORE ECONOMY

## OVERALL ECONOMY

| | 1Q16 | 2Q16 |
|---|---|---|
| Real GDP (Year-on-Year Growth) | +2.1% | +2.1% |
| GDP at Current Market Prices | $99.9 billion | $99.3 billion |

## PRICES

| (Year-on-Year Growth) | 1Q16 | 2Q16 |
|---|---|---|
| Consumer Price Index - All Items | -0.8% | -0.9% |
| Domestic Supply Price Index | -11.6% | -11.6% |

## LABOUR MARKET

| | 1Q16 | 2Q16 |
|---|---|---|
| Change in Employment (Quarter-on-Quarter) | 13.0 thousand | 5.5 thousand |
| Overall Unemployment Rate | 1.9% | 2.1% |
| Value Added per Worker (Year-on-Year Growth) | 0.8% | 0.7% |

## COSTS

| (Year-on-Year Growth) | 1Q16 | 2Q16 |
|---|---|---|
| Unit Labour Cost for Overall Economy | +3.1% | +3.6% |
| Manufacturing Unit Business Cost | +0.8% | -0.9% |
| Manufacturing Unit Labour Cost | -0.2% | -0.7% |

## MERCHANDISE TRADE

| (Year-on-Year Growth) | 1Q16 | 2Q16 |
|---|---|---|
| Merchandise Exports | -11.6% | -4.7% |
| Merchandise Imports | -7.4% | -6.7% |

## SERVICES TRADE

| (Year-on-Year Growth) | 1Q16 | 2Q16 |
|---|---|---|
| Services Exports | -0.9% | +0.9% |
| Services Imports | +0.2% | +1.6% |

# CHAPTER 1
## Economic Performance

CHAPTER 1

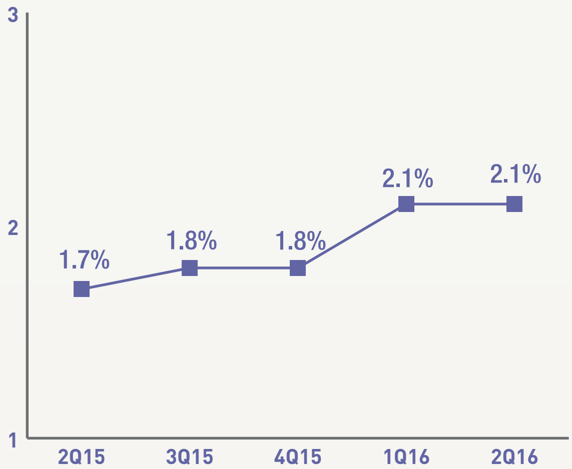
# THE SINGAPORE ECONOMY

## ECONOMIC PERFORMANCE

Real GDP grew by

**2.1%** in 2Q16

### Quarterly Growth (Year-on-Year)




### Main Drivers of Growth in 2Q16

WHOLESALE & RETAIL TRADE

**0.4%-point** contribution

TRANSPORTATION & STARAGE

**0.2%-point** contribution

MANUFACTURING

**0.2%-point** contribution

In total, these sectors accounted for

**0.8%-points** of GDP growth

## LABOUR MARKET

RESIDENT UNEMPLOYMENT RATE

**3.0%** in 2Q16

EMPLOYMENT (Q-O-Q CHANGE)

**+5,500** employed

### Sectors with the Highest Employment Growth in 2Q16

| | |
| --- | --- |
| OTHER SERVICES INDUSTRIES | +4,800 employed |
| BUSINESS SERVICES | +3,900 employed |
| TRANSPORTATION & STORAGE | +1,700 employed |

## PRODUCTIVITY

VALUE ADDED PER WORKER

**+0.7%**

### Sectors with the highest Value Added per Worker Growth in 2Q16

| | |
| --- | --- |
| MANUFACTURING | +4.6% |
| WHOLESALE & RETAIL TRADE | +2.2% |
| CONSTRUCTION | +1.5% |

## COSTS

Overall Unit Labour Cost rose by

**3.6%** in 2Q16

WITHIN THE MANUFACTURING SECTOR

| Unit Business Cost | Unit Labour Cost |
| --- | --- |
| -0.9% | -0.7% |

2Q16

## PRICES

The Consumer Price Index (CPI) declined by

**0.9%** in 2Q16

### CATEGORIES WITH PRICE INCREASES

Quarterly Growth (Year-on-Year)

| | |
| --- | --- |
| EDUCATION | 3.2% |
| FOOD | 2.2% |

### CATEGORIES WITH PRICE DECLINES

Quarterly Growth (Year-on-Year)

| | |
| --- | --- |
| COMMUNICATION | -0.5% |
| HOUSING & UTILITIES | -4.2% |
| TRANSPORT | -5.2% |

## INTERNATIONAL TRADE

Total Merchandise Exports declined by

**4.7%** in 2Q16

| NON-OIL DOMESTIC EXPORTS | RE-EXPORTS | OIL DOMESTIC EXPORTS |
| --- | --- | --- |
| 0.0% | -3.4% | -18.4% |

Main Drivers of Services Export Growth were...

| TRANSPORT SERVICES | MAINTENANCE AND REPAIR SERVICES | INSURANCE SERVICES |
| --- | --- | --- |
| +2.3% | +13.8% | +12.1% |

## OVERVIEW

In the second quarter of 2016,

- The economy expanded by 2.1 per cent compared to the same period last year, with the contributions to growth led by the wholesale & retail trade, transportation & storage and manufacturing sectors.

- The seasonally-adjusted overall unemployment rate rose to 2.1 per cent, from 1.9 per cent in the previous quarter. Total redundancies also increased over the same period.

- Total employment grew by 5,500 on a quarter-on-quarter basis, lower than the levels recorded in the preceding quarter and the same period a year ago.

- The Consumer Price Index (CPI) declined by 0.9 per cent on a year-on-year basis.

## OVERALL PERFORMANCE

The economy grew by 2.1 per cent year-on-year in the second quarter, unchanged from the first quarter (Exhibit 1.1). On a quarter-on-quarter seasonally-adjusted annualised basis, the economy expanded by 0.3 per cent, slightly faster than the 0.1 per cent growth in the preceding quarter.

*Exhibit 1.1: GDP and Sectoral Growth Rates in 2Q 2016*


The manufacturing sector grew by 1.1 per cent in the second quarter, a reversal from the 0.5 per cent decline in the previous quarter. Growth was supported by the electronics and biomedical manufacturing clusters. On the other hand, the transport engineering and general manufacturing clusters continued to contract.

Meanwhile, the services producing industries collectively grew by 1.4 per cent in the second quarter, following the 1.7 per cent growth in the previous quarter. All services sectors saw positive growth, with the exception of the business services sector. The transportation & storage sector posted the strongest growth of 2.9 per cent, followed by the wholesale & retail trade (2.2 per cent), other services (1.6 per cent) and accommodation & food services (1.6 per cent) sectors. The information & communications and finance & insurance sectors also recorded growth of 1.2 per cent and 0.8 per cent respectively. By contrast, the business services sector recorded a slight contraction of 0.2 per cent, weighed down primarily by the real estate segment.

Growth in the construction sector moderated to 3.3 per cent in the second quarter, from 4.0 per cent in the preceding quarter. The weaker performance was mainly due to a decline in private sector construction works.

The sectors that contributed the most to GDP growth in the second quarter were the wholesale & retail trade, transportation & storage and manufacturing sectors (Exhibit 1.2). Collectively, they accounted for 0.8 percentage-points of overall GDP growth in the quarter.

*Exhibit 1.2: Percentage-Point Contribution to Growth in Real GDP in 2Q 2016 (By Industry)*

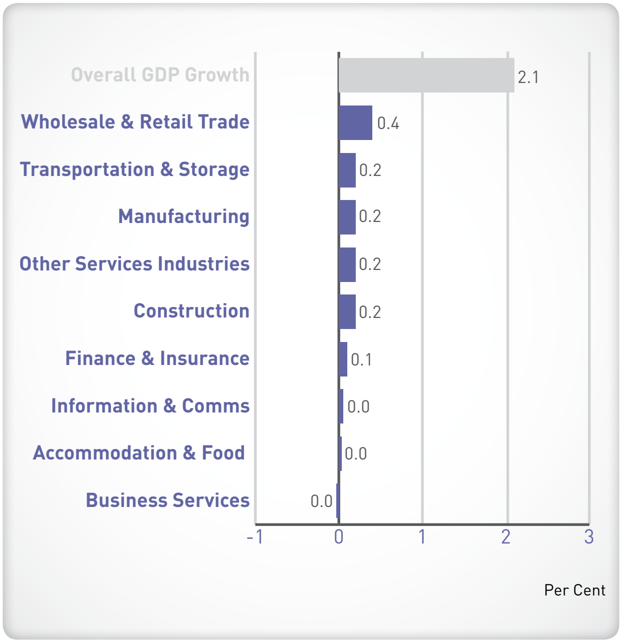



*Exhibit 1.3: Changes in Total Demand**

| | 2015 | | | 2016 | |
|---|---|---|---|---|---|
| | II | III | IV | I | II |
| Total Demand | 0.8 | 4.2 | 1.7 | 1.7 | **1.9** |
| External Demand | 0.4 | 2.7 | 2.8 | -1.0 | **4.1** |
| Total Domestic Demand | 1.8 | 8.7 | -1.4 | 9.6 | **-4.0** |
| Consumption Expenditure | 3.8 | 6.1 | 6.3 | 5.3 | **4.8** |
| Public | 1.0 | 12.2 | 9.4 | 8.6 | **12.0** |
| Private | 4.5 | 4.6 | 5.5 | 4.2 | **3.2** |
| Gross Fixed Capital Formation | 2.3 | -1.6 | -0.7 | -2.8 | **1.1** |
| Changes in Inventories | -0.9 | 3.8 | -3.6 | 4.7 | **-5.2** |

** For inventories, this refers instead to change as percentage of GDP in the previous year.*

# SOURCES OF GROWTH

Total demand rose by 1.9 per cent in the second quarter, higher than the 1.7 per cent growth in the preceding quarter (Exhibit 1.3). The expansion was driven by external demand, which rose by 4.1 per cent, a rebound from the 1.0 per cent contraction in the preceding quarter. By contrast, domestic demand fell by 4.0 per cent, a reversal from the 9.6 per cent growth in the previous quarter.

Domestic demand was weighed down by a drawdown in inventories by firms, which more than offset the increases in consumption expenditure and gross fixed capital formation.

Consumption expenditure rose by 4.8 per cent on account of both public and private consumption growth. Meanwhile, gross fixed capital formation increased by 1.1 per cent, reversing the 2.8 per cent decline in the preceding quarter. Gross fixed capital formation was supported by public investments, which registered strong growth of 9.4 per cent. Public investments were in turn driven by an expansion in public construction works. On the other hand, private investments fell by 0.9 per cent, extending the 6.2 per cent decline in the previous quarter. The fall in private investments was primarily due to weakness in the construction of private residential buildings.

# LABOUR MARKET

## Unemployment and Redundancy[1]

The seasonally-adjusted overall unemployment rate rose from 1.9 per cent in March 2016 to 2.1 per cent in June 2016 (Exhibit 1.4). Over the same period, the resident and citizen unemployment rates increased, from 2.7 per cent to 3.0 per cent and from 2.6 per cent to 3.1 per cent respectively. Notwithstanding the increase, the unemployment rates in June 2016 were comparable to that in December 2015 (Residents: 2.9 per cent, Citizens: 3.0 per cent).[2]

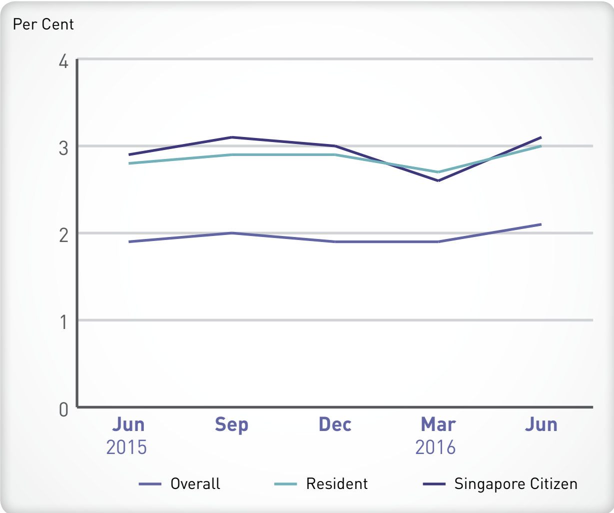
In June 2016, an estimated 68,300 residents, including 60,300 Singapore citizens, were unemployed. These were higher than the 60,400 and 50,800 respectively in March 2016.[3]

[1] *Figures pertain to private sector establishments with at least 25 employees and the public sector.*

[2] *In the first quarter of 2016, unemployment among residents and citizens declined due to a lower labour force participation rate among youths aged 15 to 24.*

[3] *Based on seasonally-adjusted data on the number of unemployed persons.*

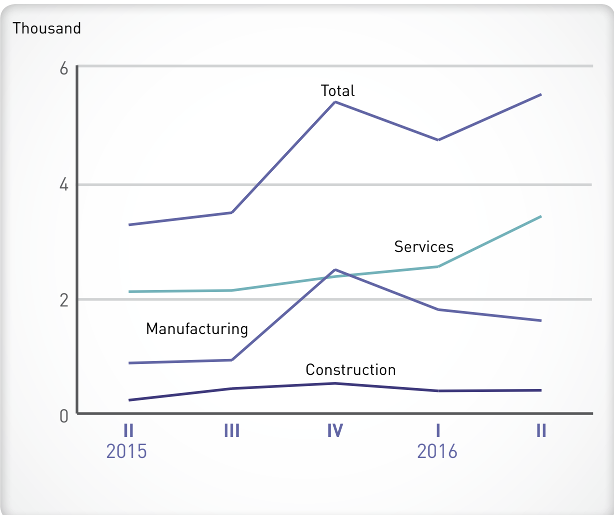
*Exhibit 1.4: Unemployment Rate (Seasonally Adjusted)*




Redundancies continued to trend up. Some 5,500 workers were made redundant in the second quarter, which was higher than the 4,710 in the preceding quarter and the 3,250 in the same period a year ago (Exhibit 1.5).

Across broad sectors, redundancies in the services sector increased to 3,400, from 2,530 in the previous quarter. Meanwhile, redundancies fell in the manufacturing sector (from 1,790 to 1,600) and remained relatively unchanged for the construction sector (from 390 to 400).

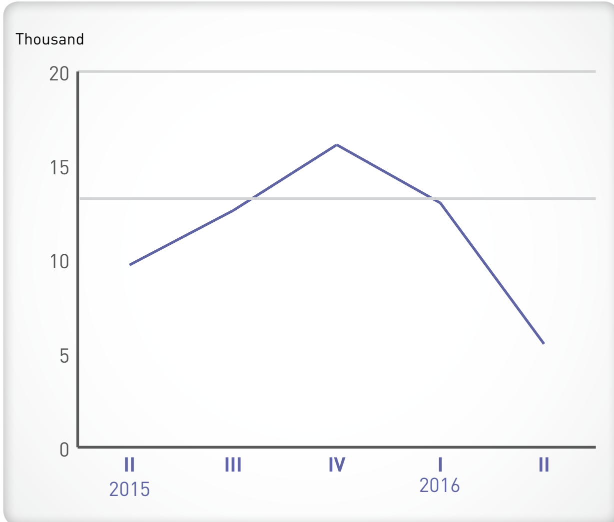
*Exhibit 1.5: Total Redundancies*




## Employment[4]

Total employment increased by 5,500 on a quarter-on-quarter basis in the second quarter, lower than the growth recorded in the previous quarter (13,000) and in the second quarter of 2015 (9,700) (Exhibit 1.6).

*Exhibit 1.6: Change in Total Employment, Quarter-on-Quarter*



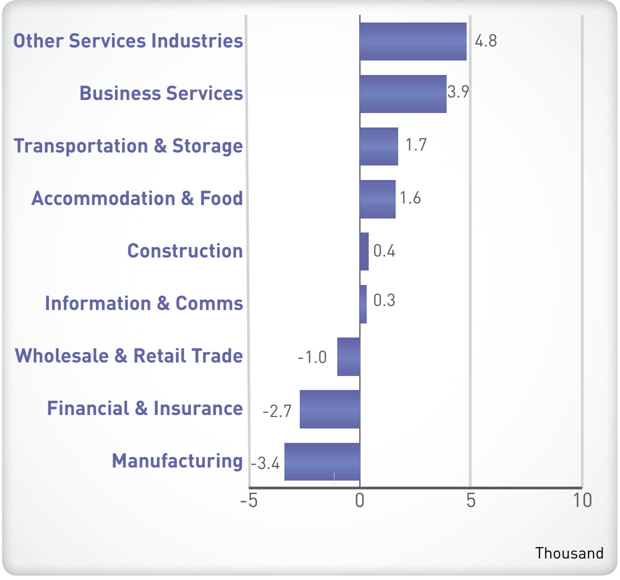

The slowdown in employment growth was broad-based. Manufacturing employment declined by 3,400 in the second quarter, the seventh consecutive quarter of decline, weighed down by the sluggish performance of the transport engineering cluster amidst sustained low oil prices (Exhibit 1.7).

Employment in the services and construction sectors increased by 8,600 and 400 respectively, lower than the gains seen in the preceding quarter (13,200 and 1,900 respectively). Among the services sectors, the wholesale & retail trade and financial & insurance sectors registered declines in employment. Employment in the wholesale & retail trade sector fell by 1,000 on the back of sluggish retail sales (excluding motor vehicles). Meanwhile, employment in the financial & insurance sector declined by 2,700, in part due to persistent regional headwinds weighing on lending activities. However, these declines were more than offset by employment gains in the other services sector (4,800), which was in turn supported by growth in the education, health & social services segment.

The overall increase in employment in the second quarter brought the total number of employed persons in June 2016 to 3,674,700, 1.3 per cent higher compared to the same period a year ago.

[4] *Based on preliminary estimates.*

*Exhibit 1.7: Change in Employment by Industry in 2Q 2016*




## Hiring Expectations

Manufacturers remained cautious in their hiring plans, reflecting the subdued external outlook for the sector. A net weighted balance of 12 per cent of manufacturers expected to hire fewer workers in the third quarter of 2016 as compared to the second quarter. The negative hiring expectations for the sector remained primarily driven by the oil-related segments. In particular, in the marine & offshore engineering segment, a net weighted balance of 39 per cent of firms expected lower levels of hiring.

Firms in the services sector were more optimistic in their hiring outlook, with a net weighted balance of 3 per cent of services firms expecting to increase hiring in the third quarter of 2016. Notably, firms in the accommodation and real estate industries were the most optimistic, as a net weighted balance of 17 per cent and 10 per cent of firms in the respective industries expected to increase hiring in the third quarter. By contrast, firms in the transport & storage and retail trade industries registered negative hiring expectations, on the back of weak trade flows and sluggish retail sales (excluding motor vehicles) respectively. A net weighted balance of 6 per cent of firms in each of these industries expected to reduce hiring in the third quarter.

# COMPETITIVENESS

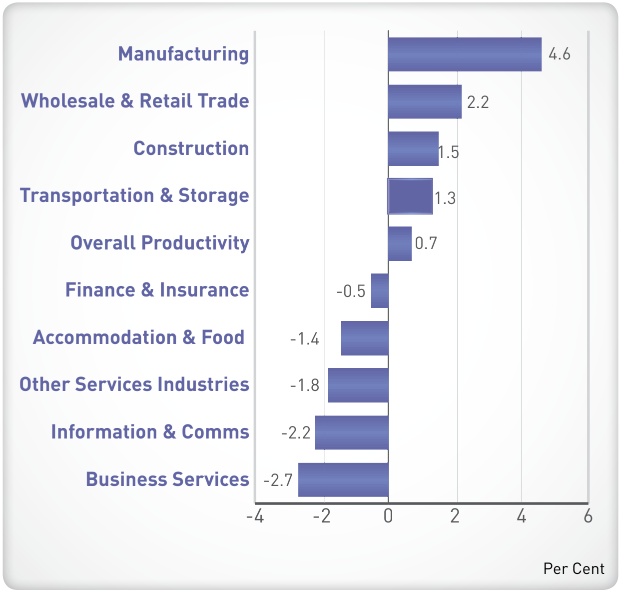
## Productivity

Overall labour productivity, as measured by value-added per worker, improved by 0.7 per cent in the second quarter compared to the same period a year ago (Exhibit 1.8).

The manufacturing (4.6 per cent), wholesale & retail trade (2.2 per cent) and construction (1.5 per cent) sectors registered the highest productivity growth rates. By contrast, the business services (-2.7 per cent), information & communications (-2.2 per cent) and other services (-1.8 per cent) sectors saw the most marked declines in productivity.

Outward-oriented sectors as a whole achieved higher productivity growth than domestically-oriented sectors. Compared to the same period last year, the productivity of outward-oriented sectors grew by 2.0 per cent in the second quarter, while that of domestically-oriented sectors fell by 1.5 per cent.[5]

*Exhibit 1.8: Changes in Value Added per Worker for the Overall Economy and Sectors in 2Q 2016*



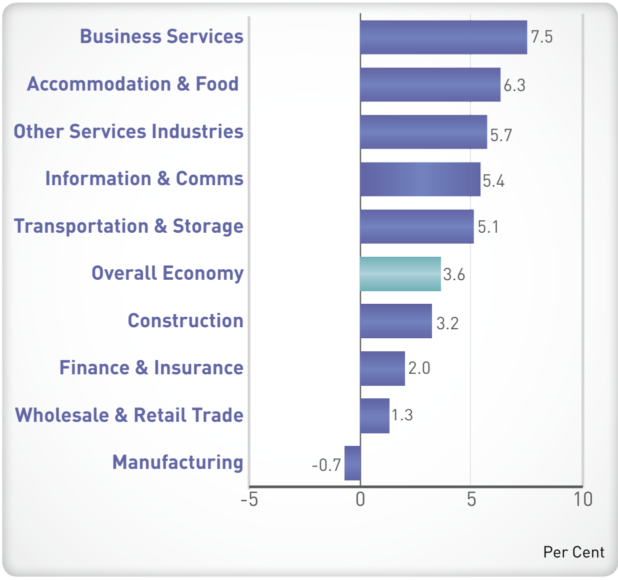

[5] *Based on MTI estimates. Outward-oriented sectors refer to manufacturing, wholesale trade, transportation & storage, accommodation, information & communications, and finance & insurance. Domestically-oriented sectors refer to construction, retail trade, food & beverage services, business services and other services industries.*

## Unit Labour Cost and Unit Business Cost

Overall unit labour cost (ULC) for the economy rose by 3.6 per cent in the second quarter, faster than the 3.1 per cent increase in the first quarter (Exhibit 1.9). The increase in overall ULC was due to an increase in total labour cost per worker, which outpaced labour productivity gains.

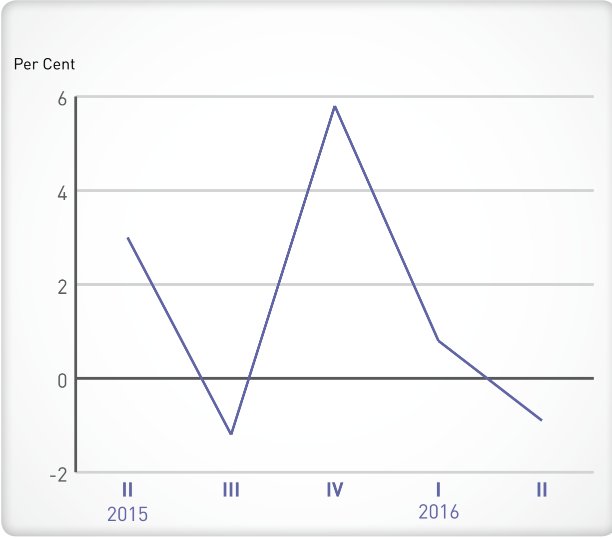
Manufacturing ULC fell by 0.7 per cent in the second quarter, extending the 0.2 per cent contraction in the previous quarter. The decline in manufacturing ULC came on the back of robust productivity growth in the sector. By contrast, services ULC increased by 4.5 per cent in the second quarter, with all services sectors registering positive ULC growth. In particular, the ULC for the accommodation & food services and business services sectors rose by 6.3 per cent and 7.5 per cent respectively, in part due to declines in labour productivity in both sectors. Construction ULC also increased by 3.2 per cent, as the increase in total labour cost per worker exceeded the growth in labour productivity for the sector.

*Exhibit 1.9: Changes in Unit Labour Cost in 2Q 2016*




Unit business cost (UBC) in the manufacturing sector declined by 0.9 per cent in the second quarter, a reversal from the 0.8 per cent increase in the previous quarter (Exhibit 1.10). The decline in manufacturing UBC was driven by declines in both the unit services cost (including utilities and rental costs) and the ULC in the sector.

*Exhibit 1.10: Changes in Unit Business Cost for Manufacturing*

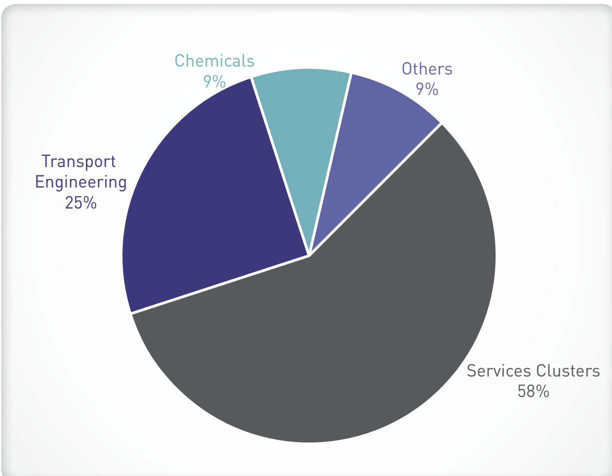



## Investment Commitments

Investment commitments in terms of total fixed asset investments (FAI) and total business expenditure (TBE) amounted to $2.8 billion and $3.5 billion respectively in the second quarter (Exhibit 1.11 and Exhibit 1.12).

In terms of FAI, the largest contribution came from the services cluster, which secured $1.6 billion in commitments, mainly from the logistics industry. This was followed by the transport engineering cluster, which garnered $0.7 billion in commitments, mainly from the marine & offshore engineering segment. Investors from Singapore were the biggest contributors to total FAI (56 per cent). In terms of foreign contributors, investors from the United States were the top contributors, accounting for $0.5 billion (17 per cent) of total FAI commitments.

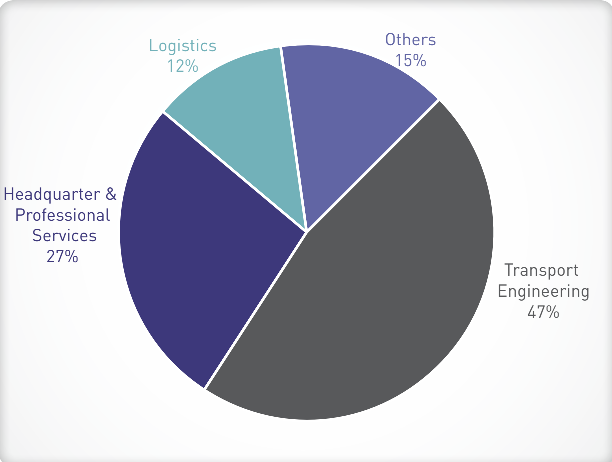
*Exhibit 1.11: Fixed Asset Investments by Industry Cluster in 2Q 2016*



For TBE, the transport engineering cluster attracted the highest amount of commitments, at $1.6 billion, followed by the headquarters & professional services cluster with $0.9 billion. Similarly, investors from Singapore were the largest source of total TBE, accounting for $2.1 billion (60 per cent) of the total TBE commitments.

When fully realised, these commitments are expected to generate value-added of $3.2 billion and more than 7,400 jobs.

***Exhibit 1.12: Total Business Expenditure by Industry Cluster in 2Q 2016***

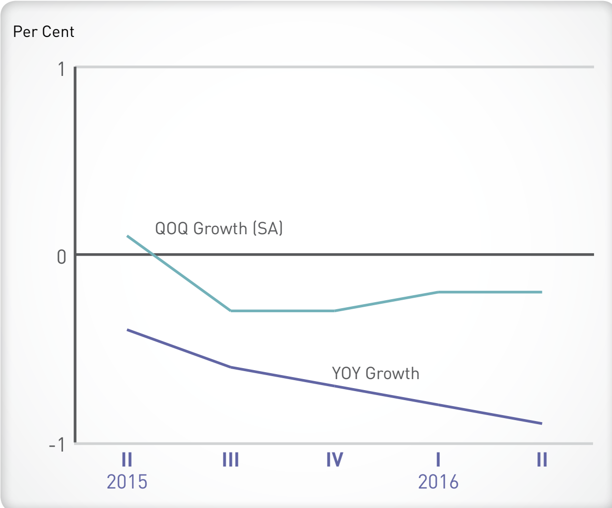



# PRICES

## Consumer Price Index

The Consumer Price Index (CPI) fell by 0.9 per cent on a year-on-year basis in the second quarter, extending the 0.8 per cent decline in the previous quarter (Exhibit 1.13). On a quarter-on-quarter seasonally-adjusted basis, the CPI declined by 0.2 per cent, the same pace of decline as in the preceding quarter.

***Exhibit 1.13: Changes in CPI***




Among the CPI categories, food was the largest positive contributor to CPI inflation in the second quarter, with prices rising by 2.2 per cent on a year-on-year basis (Exhibit 1.14). This was due to price increases for hawker food and restaurant meals, as well as non-cooked food items such as fish & seafood and vegetables.

Education costs increased by 3.2 per cent as a result of higher fees at commercial institutions, universities, polytechnics, childcare centres, kindergartens and playgroups, which more than offset the effect of the waiver of national examination fees for Singaporeans. The prices of household durables & services rose by 2.3 per cent, as the increase in the salaries of foreign domestic workers outweighed the dampening effect of lower concessionary levies for these workers. Recreation & culture costs went up by 1.2 per cent, owing to the higher costs of holiday travel and newspapers, which more than offset the fall in the prices of cinema tickets.

*Exhibit 1.14: Percentage Changes in CPI over Corresponding Quarter of Previous Year*

| | 2015 | | | 2016 | Per Cent |
|---|---|---|---|---|---|
| | II | III | IV | I | II |
| All items | -0.4 | -0.6 | -0.7 | -0.8 | -0.9 |
| Food | 1.9 | 1.8 | 1.7 | 2.0 | 2.2 |
| Clothing & Footwear | -0.6 | 0.7 | 1.2 | 2.1 | 0.6 |
| Housing & Utilities | -3.8 | -3.6 | -4.2 | -4.1 | -4.2 |
| Household Durables & Services | -0.7 | -1.9 | -1.4 | -0.8 | 2.3 |
| Health Care | -0.3 | -0.1 | -0.2 | 0.7 | 0.9 |
| Transport | 0.1 | -1.4 | -1.2 | -2.9 | -5.2 |
| Communication | 1.0 | -0.6 | -0.5 | -1.1 | -0.5 |
| Recreation & Culture | -0.1 | 0.4 | 0.9 | 0.4 | 1.2 |
| Education | 3.1 | 3.6 | 3.7 | 2.5 | 3.2 |
| Miscellaneous Goods & Services | -0.3 | -0.3 | -0.4 | 0.5 | 0.4 |

Healthcare costs increased by 0.9 per cent as the higher cost of outpatient services outweighed the fall in the cost of hospital services. The prices of miscellaneous goods & services edged up by 0.4 per cent due to an increase in the prices of personal care items and personal effects. Prices of clothing & footwear rose by 0.6 per cent on account of more expensive ready-made garments.

The price gains in these CPI categories were outweighed by declines in other categories. In particular, housing & utilities continued to pose the largest drag on headline inflation, with prices declining by 4.2 per cent as the fall in accommodation costs and electricity tariffs more than offset the increase in housing maintenance charges. Transport costs saw a decline of 5.2 per cent as lower car prices, petrol prices, road tax and bus & train fares outweighed the effect of higher vehicle repair & maintenance fees. Communications costs dipped by 0.5 per cent due to the lower cost of telecommunication services.

# INTERNATIONAL TRADE

## Merchandise Trade

Singapore's total merchandise trade fell by 5.7 per cent year-on-year in the second quarter, following the 9.7 per cent decline in the preceding quarter (Exhibit 1.15). This was mainly due to the 25 per cent drop in oil merchandise trade.

*Exhibit 1.15: Growth Rates of Total Merchandise Trade, Merchandise Exports and Merchandise Imports (In Nominal Terms)*

| | 2015 | | | | 2016 | Per Cent |
|---|---|---|---|---|---|---|
| | II | III | IV | Ann | I | II |
| Merchandise Trade | -10.9 | -8.5 | -7.7 | -9.5 | -9.7 | -5.7 |
| Merchandise Exports | -9.0 | -8.0 | -5.7 | -7.2 | -11.6 | -4.7 |
| Domestic Exports | -12.2 | -14.4 | -12.9 | -12.9 | -16.8 | -6.0 |
| Oil | -31.3 | -32.6 | -29.9 | -32.2 | -33.8 | -18.4 |
| Non-Oil | 1.5 | -2.2 | -3.5 | -0.1 | -9.0 | 0.0 |
| Re-Exports | -5.6 | -0.5 | 1.4 | -0.9 | -6.5 | -3.4 |
| Merchandise Imports | -13.0 | -9.1 | -9.9 | -12.1 | -7.4 | -6.7 |
| Oil | -34.7 | -34.1 | -40.0 | -38.2 | -37.6 | -29.2 |
| Non-Oil | -2.9 | 2.4 | 1.2 | -0.3 | 1.3 | 0.4 |

Total merchandise exports declined by 4.7 per cent in the second quarter, following the 12 per cent contraction in the preceding quarter. This marked the eighth consecutive quarter of decline, and was caused by a 6.0 per cent and 3.4 per cent drop in domestic exports and re-exports respectively.

The fall in domestic exports was mainly due to continued weakness in oil domestic exports. In particular, oil domestic exports declined by 18 per cent in the second quarter, moderating from the 34 per cent decrease in the previous quarter, on the back of a smaller decline in oil prices. In volume terms, oil domestic exports grew by 14 per cent.

On the other hand, non-oil domestic exports (NODX) registered flat growth, in contrast to the 9.0 per cent decrease in the previous quarter. This was due to an expansion in non-electronics NODX, which offset the decline in electronics NODX.

Total merchandise imports contracted by 6.7 per cent in the second quarter, extending the 7.4 per cent decline in the previous quarter. This was due to a decline in oil imports, which outweighed the increase in non-oil imports. Specifically, oil imports decreased by 29 per cent, as weak oil prices depressed the nominal value of oil imports. In volume terms, oil imports increased by 2.2 per cent. By contrast, non-oil imports expanded by 0.4 per cent in the second quarter, driven mainly by an increase in non-electronics imports.

## Services Trade

Total services trade expanded by 1.2 per cent in the second quarter, a turnaround from the 0.4 per cent decline in the previous quarter (Exhibit 1.16). Services exports rose by 0.9 per cent, reversing the 0.9 per cent contraction in the preceding quarter. The growth in services exports could be attributed to expansions in transport, maintenance & repair, and insurance services exports. Similarly, services imports grew by 1.6 per cent, faster than the 0.2 per cent growth in the previous quarter. This was mainly due to increases in transport services and other business services imports.

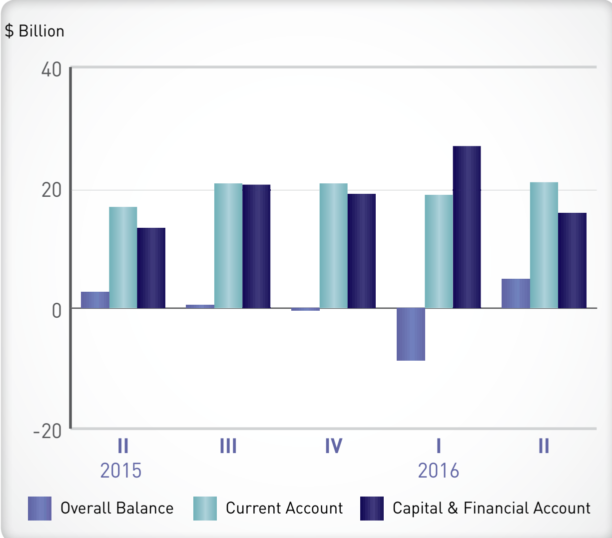
***Exhibit 1.16: Growth Rates of Total Services Trade, Services Exports and Services Imports (In Nominal Terms)***

| | | | | | | Per Cent |
|---|---|---|---|---|---|---|
| | 2015 | | | | 2016 | |
| | II | III | IV | Ann | I | II |
| **Total Services Trade** | 0.2 | 1.1 | -0.3 | 0.3 | -0.4 | **1.2** |
| Services Exports | 1.1 | 1.4 | 0.0 | 0.5 | -0.9 | **0.9** |
| Services Imports | -0.6 | 0.8 | -0.5 | 0.1 | 0.2 | **1.6** |

# BALANCE OF PAYMENTS

The overall balance of payments swung from a deficit of $8.7 billion in the first quarter of 2016 to a surplus of $4.8 billion in the second quarter. This was largely on account of a decline in net outflows from the capital and financial account, while the current account also recorded a higher surplus.

***Exhibit 1.17: Balance of Payments[6]***




## Current Account

The current account surplus rose by $2.0 billion to $21 billion in the second quarter, as the higher surplus in the goods balance more than offset wider deficits in the services and primary income balances. Meanwhile, the secondary income deficit remained largely unchanged.

The surplus in the goods balance increased by $3.9 billion to $30 billion in the second quarter, as goods exports expanded by more than imports. At the same time, the deficit in the services balance rose by $0.7 billion from the first quarter to $2.7 billion. Although net receipts from maintenance & repair services increased while net payments from insurance services turned into net receipts during the quarter, these were more than offset by the decline in net receipts from transport services and larger net payments for travel and other business services.

Meanwhile, the deficit in the primary income balance widened to $4.3 billion from $3.1 billion in the previous quarter, as the rise in primary income payments exceeded that of receipts.

*[6] Decrease in assets and liabilities, and net inflows in net balances, are indicated by a minus (-) sign. For more details regarding the change in sign convention to the financial account, please refer to DOS's information paper on "Singapore's International Accounts: Methodological Updates and Recent Developments".*

## Capital and Financial Account

Net outflows from the capital and financial account fell to $16 billion in the second quarter, from $27 billion in the previous quarter. Net inflows of direct investment increased, while the financial derivatives account experienced a turnaround from net outflows to net inflows. These factors, coupled with the decline in net outflows from the "other investment" account, outweighed the effect of the switch from net inflows to net outflows for portfolio investment.

Net inflows of direct investment increased to $15 billion in the second quarter, from $6.9 billion in the first quarter, as foreign direct investment into Singapore rose at a faster pace than residents' direct investment abroad.

At the same time, financial derivatives recorded net inflows of $9.8 billion in the second quarter, reversing the net outflows of $12 billion in the previous quarter.

Meanwhile, net outflows from the "other investment" account declined by $12 billion to $26 billion in the second quarter. This was driven by a decrease in net outflows from the domestic non-bank private sector, which more than offset the increase in net outflows from domestic deposit-taking corporations.

By contrast, the portfolio investment account saw a reversal from net inflows of $16 billion in the first quarter to net outflows of $14 billion in the second quarter. Domestic deposit-taking corporations switched from net sales of foreign securities to net purchases. This exceeded the fall in the domestic non-bank private sector's net purchases of securities abroad.

BOX ARTICLE 1.1

# Box 1.1: Economic Sentiments in Singapore

Many macroeconomic data series, including Gross Domestic Product (GDP), are published with a lag. The problem of data lag is partially mitigated by the use of more regular activity-based indicators such as the monthly industrial production and retail sales indices. Such indicators are further complemented by survey-based sentiment indices[1] which measure economic agents' perception of the outlook of the economy in the near future.

In this study, we tap on unconventional data sources to obtain a higher-frequency and more real-time measure of economic sentiments in Singapore. This is part of our effort to expand the use of high frequency, real-time data to complement traditional indicators for better monitoring of the health of the Singapore economy.[2]

## *Role of economic sentiments in understanding the health of the economy*

Economic sentiments play a role in influencing economic outcomes (Throop, 1992). For example, the level of optimism in the economy can affect consumers' saving and spending activities, business owners' hiring and capital expenditure plans, and the amount of credits available to businesses. Both activity-based indicators and economic sentiments are thus important barometers for assessing the overall health of the economy and can offer new insights to policymakers (Exhibit 1). For instance, when both economic sentiments and activity-based indicators are positive (negative), they may reinforce each other to increase the likelihood of an improving (deteriorating) economy. On the other hand, mixed signals could suggest that the economy is at a turning point.

*Exhibit 1: Sentiment-based and Activity-based Economic Indicators*

| | | Economic Activity | |
|---|---|---|---|
| | | **Positive** | **Negative** |
| **Economic Sentiments** | **Positive** | Sentiments and real economic activity are aligned (i.e., self-reinforcing a favorable economic outcome) | Recovery expected in the coming months |
| | **Negative** | Weakness expected in the coming months | Sentiments and real economic activity are aligned (i.e., self-reinforcing a negative economic outcome) |

*[1] For example, the Department of Statistics' / Economic Development Board's Services and Manufacturing Business Expectation Surveys, SBF-DP SME index and Thomson Reuters/INSEAD Asia Business Sentiment Survey provide a gauge of the level of optimism among business owners.*

*[2] In 2013, MTI economists leveraged on Google searches to improve Singapore's visitor arrivals forecast (see Goh & Leong (2013)). In the following year, MTI economists text-mined local newspapers to measure economic policy uncertainty in Singapore (see Feng (2014)). The MTI Economics Division is also developing a suite of other high frequency, activity-based indicators using data such as electricity consumption to complement traditional indicators for better monitoring of the health of the Singapore economy.*

## *Measuring economic sentiments in Singapore using non-survey based information*

As far as we are aware, almost all sentiment-based indices in Singapore rely on purpose-built surveys to gather the sentiments of consumers or businesses.

However, another possible source of data on economic sentiments is the news media. This is particularly since the news media is the primary source of information on the latest economic events and developments for many economic agents (i.e., consumers and businesses). The tone used in economic reporting thus not only reflects current sentiments, but could also prompt the economic agents to revise their sentiments. Increasingly, text analytics techniques have been used overseas to mine sentiments from the news media. For example, studies overseas have focused on using text-derived sentiments to predict stock market movements (Schumaker & Chen, 2009; Garcia, 2013), labour market outcomes (Levenberg, Pulman, Moilanen & Simpson, 2014) and economic growth (Ormerod, Nyman & Tuckett, 2015).

Here, we construct the Singapore News Economic Sentiment Index (SNES) to measure economic sentiments as portrayed by the local newspapers, and also assess the extent to which it correlates with the performance of the Singapore economy.

To construct the SNES, economic-related articles published in the local newspapers[3] between January 2001 and June 2016 were first identified.[4] In total, more than 217,300 economic-related articles were identified for the construction of the SNES.

Next, the economic-related articles were analysed at the sentence-level using a proprietary polarity lexicon[5] to determine the semantic orientation of the sentence (i.e., whether the sentence is positive, negative or neutral). Specifically, from each sentence, polarised words were tagged and context clusters of words around the polarised words were extracted to identify any contextual valence shifters. The valence shifters affect the polarity of a sentence through negation (e.g., 'not' and 'no'), amplification (e.g., 'very' and 'extremely'), or de-amplification (e.g., 'barely' and 'slightly'). Taking the number of polarised words and the valence shifters into consideration, a numerical score that reflects whether the sentence conveyed positive (i.e., larger than 0), negative (i.e., smaller than 0) or neutral (i.e., equal to 0) sentiments was assigned to each sentence. The scores of all the polarised sentences (i.e., sentences with at least one polarised word) were averaged across all the articles published within the day, month or quarter to form the daily, monthly or quarterly SNES. The SNES index was then normalised to range from -1 to 1. A value larger than 0 indicates the overall economic sentiment is positive.

The advantage of using the SNES is two-fold. First, the SNES is not based on surveys, and as such, avoids the traditional limitations of surveys.[6] Second, it is high-frequency and close to real-time, which allows policymakers to obtain an immediate sensing of economic sentiments in Singapore.

*[3] Six local newspaper publications were used, namely The Straits Times, The Business Times, The Edge Singapore, Today (Singapore), MyPaper and The New Paper. Other text sources (e.g., economic reviews by professional bodies) could also be included in future work to augment the SNES.*

*[4] Local newspaper articles were pre-selected using the keywords 'Singapore' and any of the following five words: 'econom*', 'busin*', 'industr*', '*employ*', and 'inflation', where the asterisk represents truncation character used to replace one or more characters. A list of over 700 economic-related terms (e.g., 'export', 'gross domestic product/GDP', 'fiscal policy', etc.) were used to determine the proportion of economic-related terms in each article. Based on an analysis of a sample of articles, a threshold on the proportion of economic-related terms that ought to appear in an article before the article could be classified as economic-related was determined. Using this reference threshold, 25% of the pre-selected articles were dropped from the construction of the SNES. An audit of a random sample of the dropped articles indicated that only a minority were incorrectly dropped.*

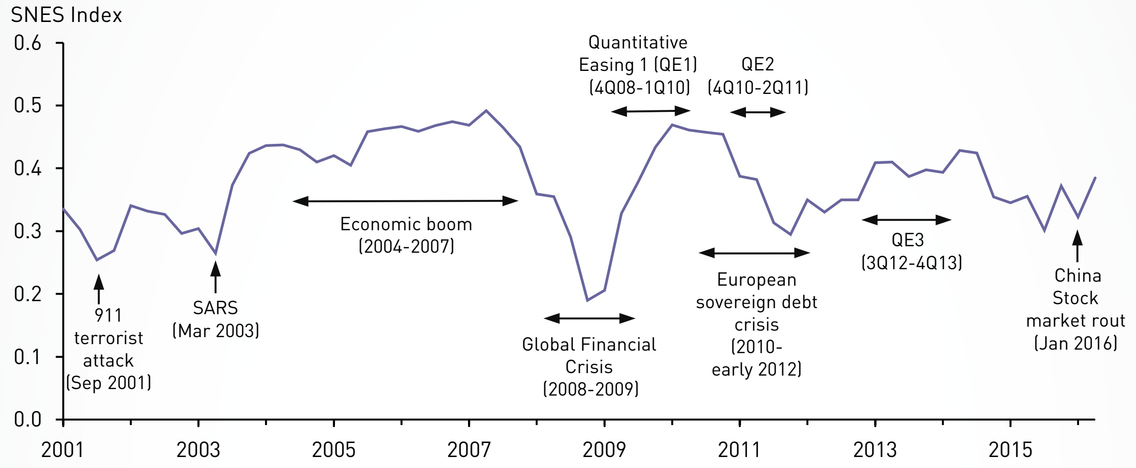
*[5] The polarity lexicon consists of 1,794 emotionally-charged words, of which 1,209 words are negatively-charged (e.g., 'hopeless', 'worsen', etc.), and 585 words are positively-charged (e.g., 'bullish', 'prosperous', etc.).*

*[6] The quality of the data elicited from surveys is a common concern. For instance, respondents may not answer survey questions accurately. Many surveys also do not track particular individuals through time, making it difficult to measure changes in attitude over time. In addition, the choice of words and questions can have unintentional effects on the responses. Lastly, surveys may be subject to sampling and data recording errors.*

## *The SNES correlates well with economic events*

The SNES generally correlates well with significant economic events that have occurred since 2001 (Exhibit 2). For instance, the SNES tumbled during the 11 September 2001 terrorist attack in the United States and the SARS outbreak in 2003. This was followed by an upward swing which was sustained throughout the period of economic boom between 2004 and 2007. The SNES then fell to a new low during the 2008-2009 Global Financial Crisis (GFC), but rebounded strongly in the second quarter of 2009. Subsequently, the SNES experienced various troughs on the back of events such as the European sovereign debt crisis in September 2011 and the China stock market rout in January 2016.

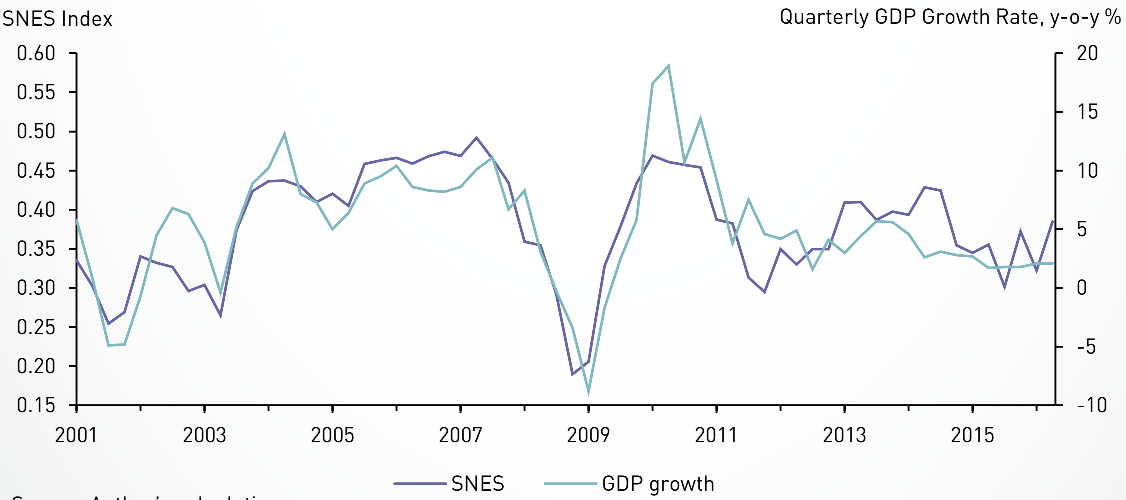
***Exhibit 2: The SNES Index for Singapore (1Q01-2Q16)***




Source: Author's calculations

To assess the SNES's contemporaneous correlation with respect to key economic indicators, we used the quarterly GDP growth rate as the reference indicator. We found that through the years, the quarterly SNES and GDP growth rate moved closely together (Exhibit 3). In particular, both series exhibit a strong contemporaneous correlation of 0.79.

***Exhibit 3: The SNES and GDP Growth Rate (1Q01 – 2Q16)***




Source: Author's calculations

## Incorporating the SNES helps to explain variations in GDP growth

The informational value of the SNES is also evaluated by assessing how much of the variation in the quarterly GDP growth rate can be explained by the SNES. A benchmark Autoregressive Distributed Lag (ADL) model as represented by equation (1) was first estimated.[7]

$$GDP\ growth_t = \beta_0 + \beta_1\ GDP\ growth_{t-1} + \beta_2\ GDP\ growth_{t-4} + \epsilon_t \qquad (1)$$

where $GDP\ growth_t$ is the quarterly GDP growth rate in quarter $t \in \{1,2,\ldots,T\}$.

We then extended the benchmark model by including the contemporaneous SNES as represented by equation (2) to test if its inclusion improved the model.

$$GDP\ growth_t = \beta_0 + \beta_1\ GDP\ growth_{t-1} + \beta_2\ GDP\ growth_{t-4} + \alpha_0\ SNES_t + \epsilon_t \qquad (2)$$

where $SNES_t$ is the quarterly SNES in quarter $t$.

The benchmark and extended models were estimated using data for the period of January 2001 to June 2016. The coefficient estimates in both models were all statistically significant at the 1% level and the positive sign of $\alpha_0$ indicates that the SNES was positively associated with the GDP growth rate (Exhibit 4). In addition, the adjusted $R^2$ of the extended model was 0.77, higher than that for the benchmark model. This suggests that the SNES provides useful information to explain variations in the GDP growth rate.

***Exhibit 4: Model estimates and goodness of fit of the benchmark and extended model***

| | **Benchmark Model** | **Extended Model** |
|---|---|---|
| **Coefficients** | | |
| $\beta_0$ | 2.88***<br>(0.85) | -8.10***<br>(2.01) |
| $\beta_1$ | 0.77***<br>(0.06) | 0.50***<br>(0.06) |
| $\beta_2$ | -0.27***<br>(0.11) | -0.23***<br>(0.08) |
| $\alpha_0$ | | 31.76***<br>(6.14) |
| **Goodness of fit** | | |
| Adjusted $R^2$ | 0.64 | 0.77 |

Source: Author's calculations

Note: The asterisks *** denote statistical significance at 1% using a 2-sided t-test. The heteroscedasticity-autocorrelation robust standard errors of the estimated coefficients are given in parenthesis. The goodness of fit was assessed by adjusted $R^2$. The larger the adjusted $R^2$, the better the model fit.

## Unconventional data sources offer the potential for higher-frequency, real-time sensing of the performance of the Singapore economy

The use of text analytics to derive economic sentiments expands our effort to tap on unconventional data sources to monitor the health of the Singapore economy. In particular, the SNES enables us to measure economic sentiments in Singapore on a higher frequency and close to real-time basis. Our analysis shows that the SNES correlates well with Singapore's economic performance, and can hence be used to complement other indicators to improve our sensing of the health of the Singapore economy.

[7] Higher order autoregressive models were also estimated, but they do not offer any advantage over the selected benchmark model.

*Contributed by:*

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Ministry of Trade and Industry

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# CHAPTER 2
## Sectoral Performance

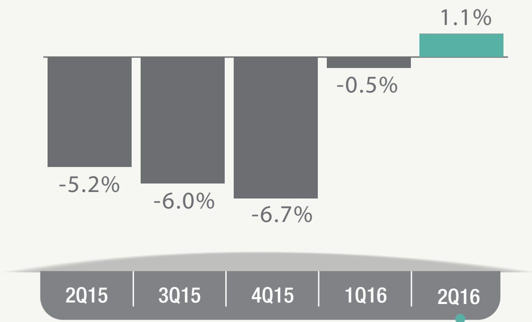
Image courtesy of Singapore Economic Development Board

CHAPTER 2

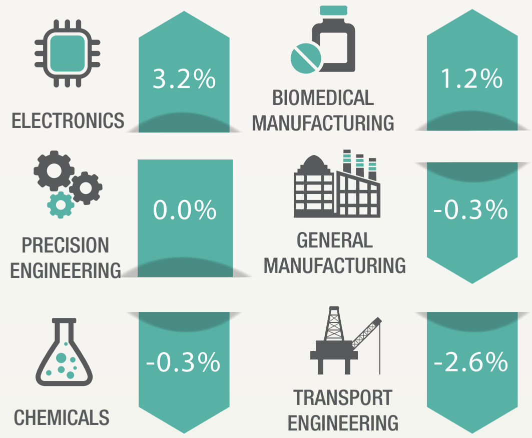
# SECTORAL PERFORMANCE

## MANUFACTURING

### Real Growth

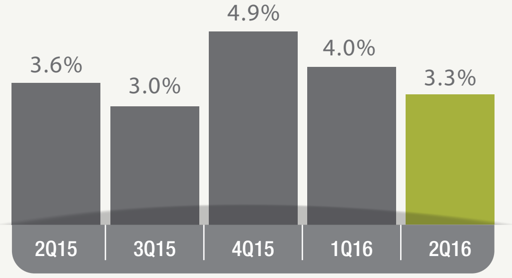



### Clusters in Manufacturing Sector %-point contribution in 2Q16

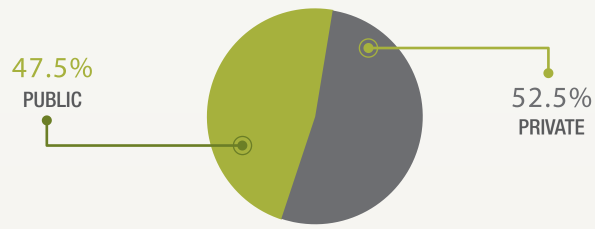



## CONSTRUCTION

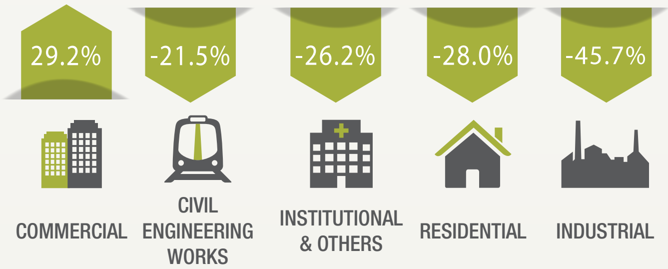
### Real Growth




### Certified Payments in 2Q16

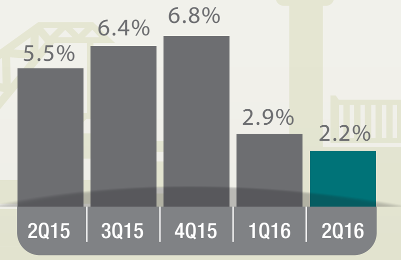



### Contracts Awarded in 2Q16

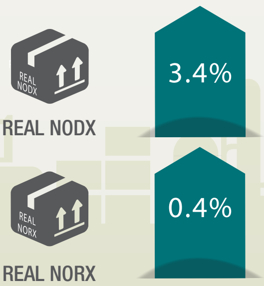



## WHOLESALE & RETAIL TRADE

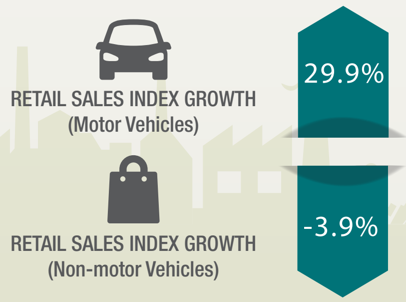
### Real Growth




### Real Non-Oil Exports

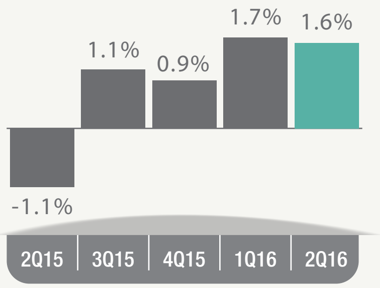



### Retail Trade



## ACCOMMODATION & FOOD SERVICES

### Real Growth




### Accommodation

Performance of hotels

LUXURY
UPSCALE
MID-TIER
ECONOMY

Gross lettings growth: 4.7%
Room revenue growth: 1.6%

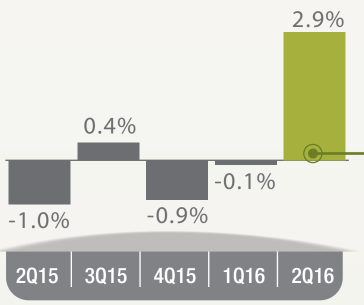
### Food Services

Performance of F&B (Sales growth)

| | |
|---|---|
| OTHERS | 4.2% |
| FAST FOOD | -3.6% |
| CATERING | -3.9% |
| RESTAURANTS | -4.7% |

## TRANSPORTATION & STORAGE

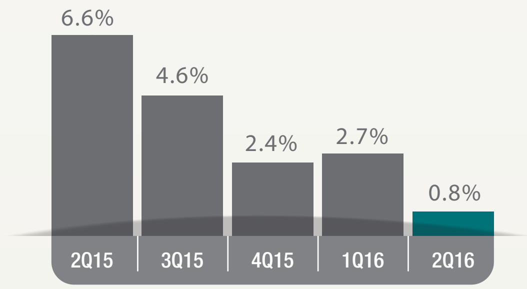
### Real Growth




| | |
|---|---|
| TOTAL SEA CARGO HANDLED GROWTH | 4.7% |
| MOTOR-VEHICLE POPULATION GROWTH | -0.9% |
| AIR PASSENGERS HANDLED GROWTH | 6.6% |

## FINANCE & INSURANCE

### Real Growth

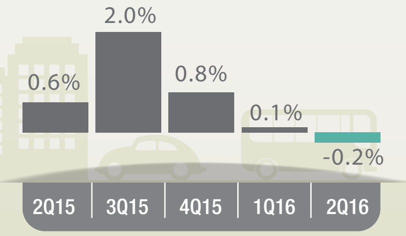



### Growth of bank loans & advances to non-bank customers in 2Q16

| | |
|---|---|
| LOANS TO BUSINESSES | -6.2% |
| CONSUMER LOANS | +2.8% |

## BUSINESS SERVICES

### Real Growth




### Private Residential Real Estate

| | |
|---|---|
| UNITS TRANSACTED (Y-O-Y CHANGE) | 10.9% |
| PRICE INDEX (Q-O-Q CHANGE) | -0.4% |

## OVERVIEW

In the second quarter of 2016,

- The manufacturing sector expanded by 1.1 per cent, a reversal from the decline of 0.5 per cent in the previous quarter. Growth was supported by output expansions in the electronics and biomedical manufacturing clusters, while output declines in the general manufacturing, chemicals and transport engineering clusters weighed on growth.

- The construction sector registered growth of 3.3 per cent, moderating from the 4.0 per cent expansion in the previous quarter. The slowdown came on the back of a decline in private sector construction activities, which was in turn dragged down by a slump in private residential building works.

- The wholesale & retail trade sector grew by 2.2 per cent, slower than the 2.9 per cent growth in the previous quarter. Growth in the sector was supported by both the wholesale trade and retail trade segments.

- The transportation & storage sector expanded by 2.9 per cent, reversing the 0.1 per cent contraction in the previous quarter. Growth in the sector was supported largely by the water transport segment.

- The accommodation & food services sector grew by 1.6 per cent, extending the 1.7 per cent growth in the previous quarter. Growth came on the back of an improvement in visitor arrivals to Singapore, which benefitted the accommodation segment.

- Growth in the finance & insurance sector eased to 0.8 per cent, from 2.7 per cent in the preceding quarter. Robust growth in the forex segment helped to mitigate the slowdown in banking and fund management activities.

- The business services sector contracted by 0.2 per cent, moderating from the 0.1 per cent expansion in the previous quarter. Growth in the sector was supported by the rental & leasing segment, as well as the professional services segment.

## MANUFACTURING

In the second quarter, manufacturing output increased by 1.1 per cent, a rebound from the 0.5 per cent contraction in the first quarter (Exhibit 2.1). Growth was underpinned by an increase in the output of the electronics and biomedical manufacturing clusters. On the other hand, the fall in the output of the general manufacturing, chemicals and transport engineering clusters placed a drag on growth (Exhibit 2.2).

*Exhibit 2.1: Manufacturing Sector's Growth Rates*

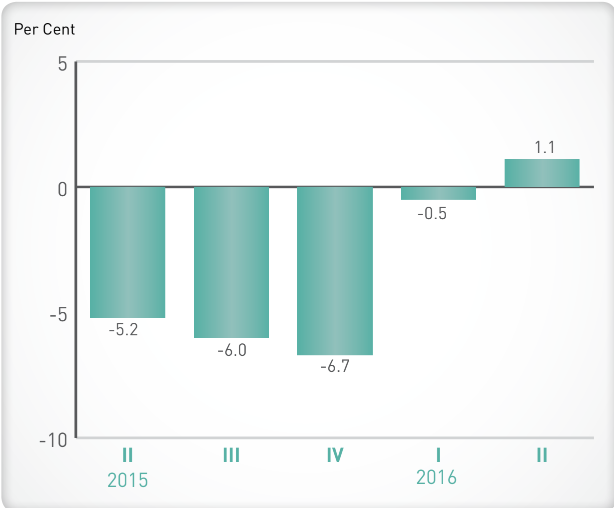
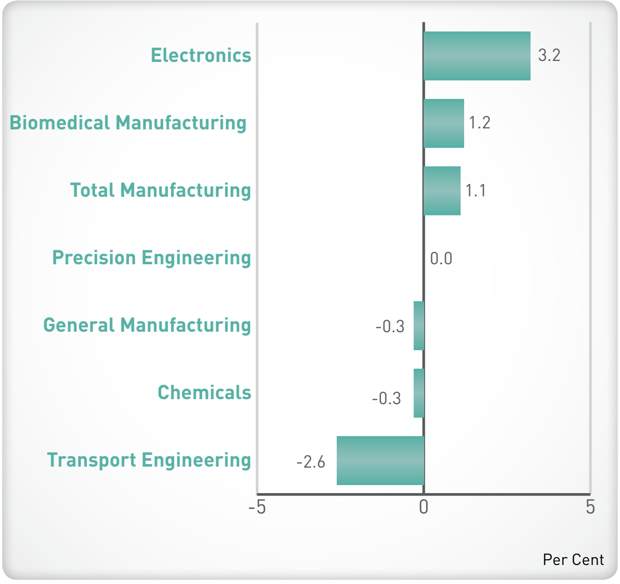


*Exhibit 2.2: Percentage-Point Contribution to Manufacturing Clusters' Growth in 2Q 2016*




Output of the electronics cluster rose by 12 per cent in the second quarter, primarily on the back of robust growth in the semiconductors segment (26 per cent). However, weak performances for the other segments weighed on growth. Specifically, the output of the infocomms & consumer electronics, computer peripherals, data storage, and other electronics modules & components segments contracted by 19 per cent, 10 per cent, 6.5 per cent and 0.5 per cent respectively.

The biomedical manufacturing cluster expanded by 5.6 per cent in the second quarter, supported by increases in the output of both pharmaceuticals and medical technology segments. In particular, output of the pharmaceuticals segment increased by 4.9 per cent on the back of a higher production of active pharmaceutical ingredients. Meanwhile, output of the medical technology segment rose by 8.2 per cent due to higher export demand for medical devices.

Growth in the output of the precision engineering cluster was flat in the second quarter. The machinery & systems segment expanded by 5.1 per cent due to higher export demand for semiconductor-related equipment, as well as a higher volume of mechanical engineering works. However, this increase in output was offset by a contraction in the output of the precision modules & components segment (-7.7 per cent). The latter was weighed down by lower levels of production in metal precision components, industrial rubber and wire & cable products.

The general manufacturing industries cluster saw a 2.6 per cent drop in output in the second quarter, weighed down by output declines in the printing and miscellaneous industries segments. Specifically, the printing segment contracted by 15 per cent due to lower demand for commercial printing, while the miscellaneous industries segment shrank by 4.0 per cent on account of a lower production of steel structural components. On the other hand, the food, beverages & tobacco segment expanded by 3.0 per cent due to an increase in the production of confectionery products.

The chemicals cluster contracted by 3.4 per cent in the second quarter. The cluster was weighed down by output declines in the petrochemicals (-14 per cent) and specialty chemicals (-2.0 per cent) segments, arising from plant maintenance shutdowns in the petrochemicals segment. On the other hand, robust growth in the other chemicals segment (9.3 per cent) on the back of higher output of fragrances lent some support to the cluster.

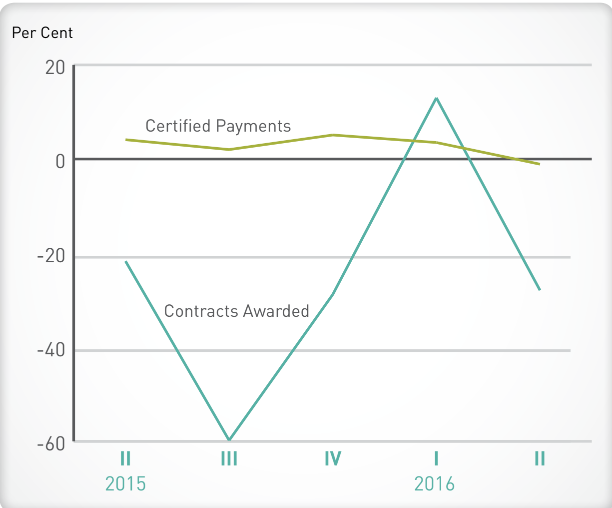
The output of the transport engineering cluster fell by 15 per cent in the second quarter, the eighth consecutive quarter of decline. Even as the output of the aerospace segment increased by 19 per cent on the back of more engine repair jobs from commercial airlines, as well as a low base, the plunge in production in the marine & offshore engineering (M&O) segment placed a drag on growth. Specifically, the M&O segment contracted sharply by 30 per cent, as rig-building activity and demand for oilfield & gasfield equipment remained weak with the cut-back in global capital expenditure for oil & gas exploration and production activities amidst the low oil price environment.

## CONSTRUCTION

The construction sector expanded by 3.3 per cent in the second quarter, moderating from the 4.0 per cent expansion recorded in the previous quarter. The slowdown in growth came on the back of a decline in private sector construction activities, which was in turn dragged down by a contraction in private residential building works.

Nominal certified progress payments fell by 1.1 per cent in the second quarter, reversing the 3.5 per cent increase in the previous quarter (Exhibit 2.3). The drop was largely due to an 8.1 per cent decline in private certified progress payments, which was in turn driven by weakness in private residential building (-21 per cent) and private commercial building (-11 per cent) works. By comparison, public certified progress payments provided support to the sector, registering growth of 8.0 per cent on the back of a healthy expansion in public sector civil engineering works (15 per cent) such as the construction of various stations and associated tunnels for the Thomson-East Coast MRT Line.

*Exhibit 2.3: Changes in Contracts Awarded and Certified Payments*



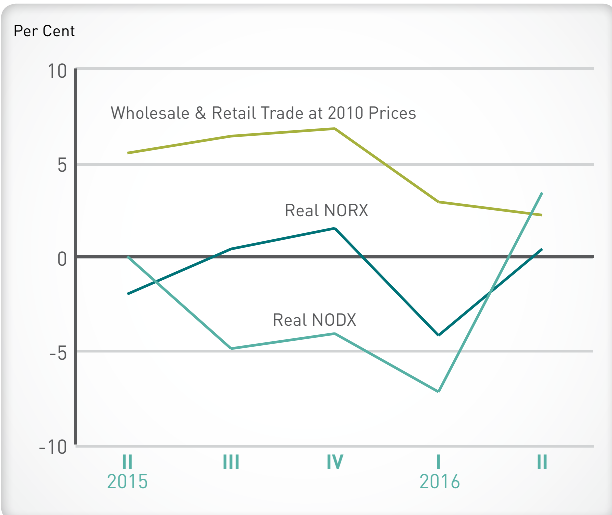

Construction demand in terms of contracts awarded plunged by 28 per cent in the second quarter, a reversal from the 13 per cent increase in the previous quarter (Exhibit 2.3). The decline was broad-based, with both public and private sector contracts awarded registering contractions. Public sector construction demand (-9.9 per cent) fell on the back of a decline in public civil engineering contracts awarded (-21 per cent) and public industrial building (-72 per cent) contracts awarded. Similarly, private sector contracts awarded remained weak, contracting by 44 per cent in the second quarter, extending the 62 per cent decline in the preceding quarter. Specifically, segments such as private industrial building (-37 per cent), private residential building (-51 per cent) and private institutional & other building (-82 per cent) developments registered large declines in contracts awarded.

## WHOLESALE & RETAIL TRADE

The wholesale & retail trade sector grew by 2.2 per cent in the second quarter, easing from the 2.9 per cent increase in the previous quarter.

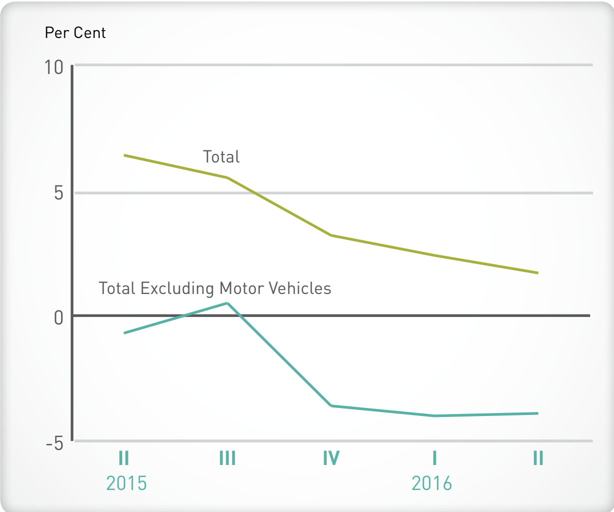
Growth of the wholesale trade segment came on the back of an uptick in trade volumes in Singapore. In particular, Singapore's non-oil domestic exports (NODX) expanded by 3.4 per cent in volume terms in the second quarter, a reversal from the 7.2 per cent contraction in the preceding quarter (Exhibit 2.4). This improvement was partly due to faster growth in the domestic exports of chemicals & chemical products and miscellaneous manufactured goods. Similarly, non-oil re-exports in volume terms grew by 0.4 per cent, a turnaround from the 4.2 per cent decline registered in the previous quarter. The improvement came on the back of growth in the re-exports of chemicals & chemical products.

*Exhibit 2.4: Changes in Wholesale & Retail Trade VA at 2010 Prices, Real NODX and Real NORX*



For the retail trade segment, overall retail trade sales volume rose by 1.7 per cent in the second quarter, slowing from the 2.4 per cent growth in the previous quarter (Exhibit 2.5). Growth was supported primarily by a 30 per cent increase in the volume of motor vehicle sales, in line with an on-year uptick in the supply of Certificates of Entitlement in the second quarter. Excluding motor vehicle sales, retail sales volume remained sluggish, declining by 3.9 per cent in the second quarter, extending the 4.0 per cent contraction recorded in the preceding quarter. The fall in retail sales volume (excluding motor vehicles) was more keenly felt by retailers of discretionary goods. In particular, the sales of telecommunications & computers, watches & jewellery, and optical goods & books registered the largest declines of 23 per cent, 8.5 per cent and 8.4 per cent respectively.

*Exhibit 2.5: Changes in Retail Price Index at Constant Prices*

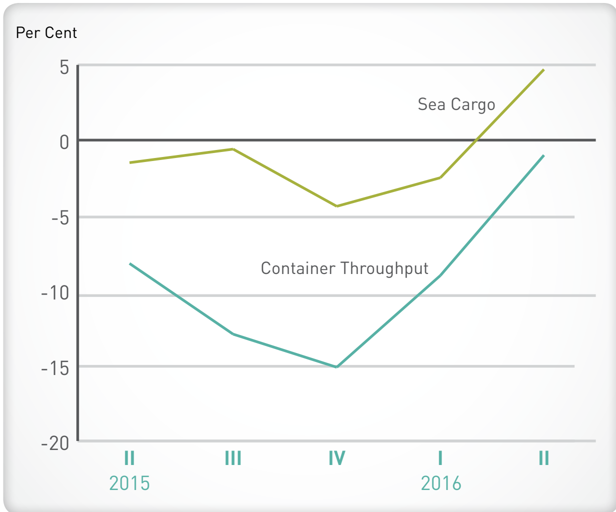



## TRANSPORTATION & STORAGE

The transportation & storage sector grew by 2.9 per cent in the second quarter, reversing the 0.1 per cent contraction in the previous quarter.

Growth of the sector was largely supported by the water transport segment. Specifically, the volume of total sea cargo handled expanded by 4.7 per cent in the second quarter, rebounding from the 2.5 per cent decline in the preceding quarter. This was in turn led by a 21 per cent surge in oil-in-bulk cargo handled. By comparison, container throughput handled at Singapore's ports registered the fifth consecutive quarter of decline, falling by 1.0 per cent in the second quarter, extending the 9.0 per cent contraction in the previous quarter (Exhibit 2.6).

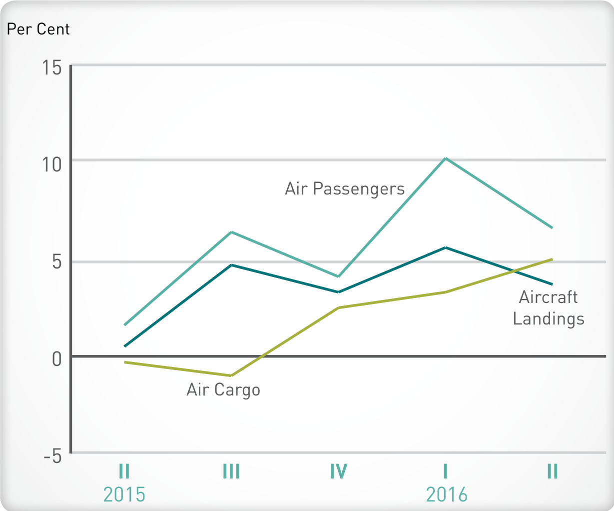
*Exhibit 2.6: Changes in Container Throughput and Sea Cargo Handled*




The performance of the air transport segment strengthened on the back of improved air passenger traffic at Changi Airport. In particular, the number of air passengers passing through Changi Airport increased by 6.6 per cent in the second quarter, extending the 10 per cent increase in the previous quarter (Exhibit 2.7). The higher air passenger traffic was supported by continued increases in passenger movements to and from China, Thailand, Malaysia and Indonesia. Likewise, total air cargo shipments handled at Changi Airport continued to improve, growing by 5.0 per cent in the second quarter, faster than the 3.3 per cent increase in the preceding quarter.

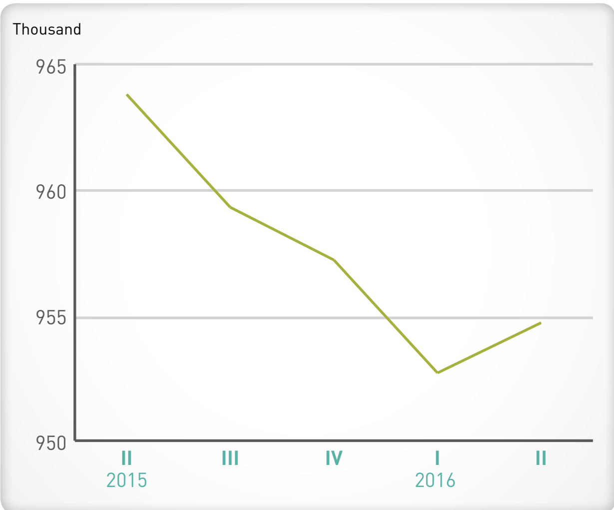
The number of aircraft landings rose by 3.7 per cent in the second quarter to reach 44,508, moderating from the 5.6 per cent growth in the previous quarter.

Exhibit 2.7: Changes in Air Transport




As of June 2016, the total number of vehicles registered with the Land Transport Authority fell by 0.9 per cent to a total of 954,717 (Exhibit 2.8). These comprised 563,833 private and company cars, 38,353 rental cars, 28,193 taxis, 18,529 buses, 143,192 motorcycles and scooters, and 162,617 goods vehicles and other vehicle types.

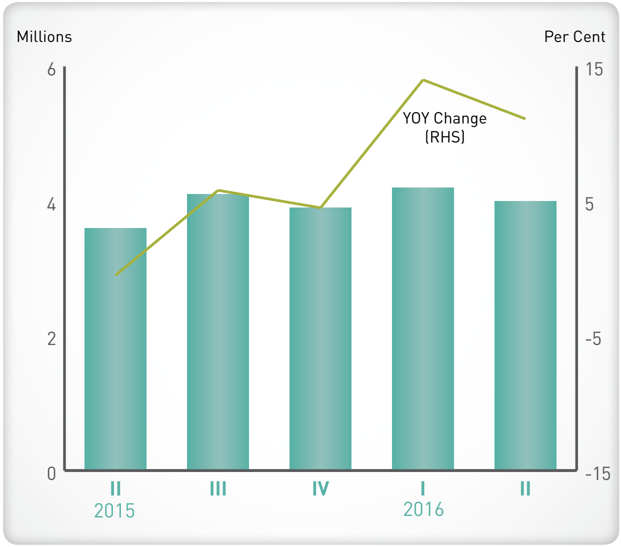
Exhibit 2.8: Motor Vehicles Registered




# ACCOMMODATION & FOOD SERVICES

The accommodation & food services sector registered growth of 1.6 per cent in the second quarter, similar to the 1.7 per cent growth in the previous quarter. Growth was largely supported by a recovery in visitor arrivals, which benefitted the accommodation segment.

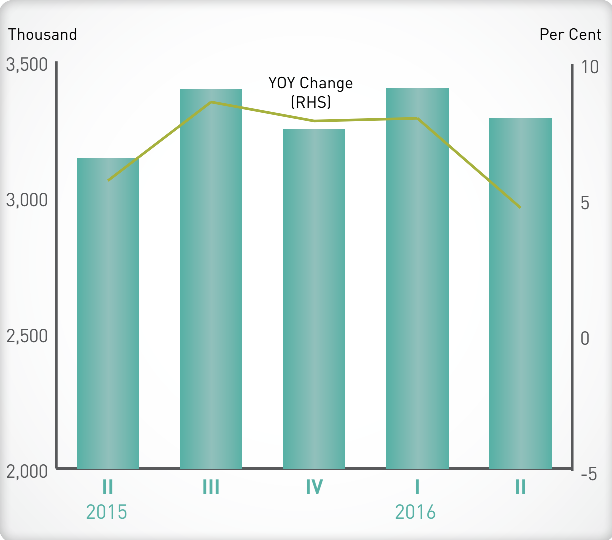
Exhibit 2.9: Visitor Arrivals




Total visitor arrivals rose by 11 per cent in the second quarter, following the 14 per cent increase in the previous quarter (Exhibit 2.9). The positive showing was in large part contributed by strong Chinese arrivals, which surged by 65 per cent during the quarter, compared to the 47 per cent growth in the first quarter. This was in turn partly bolstered by improvements in flight connectivity between Singapore and Chinese cities. In addition, an uptick in MICE events in the second quarter, such as the biennial Food & Hotel Asia 2016, also provided some support to the overall growth in visitor arrivals.

In tandem with the healthy growth in visitor arrivals, the gross lettings of gazetted hotels rose by 4.7 per cent in the second quarter, following the 8.0 per cent increase in the previous quarter (Exhibit 2.10). The improvement in gross lettings outstripped a 4.3 per cent increase in room supply, resulting in a 0.3 percentage-point rise in the average occupancy rate of gazetted hotels to 83 per cent.

*Exhibit 2.10: Gross Lettings (Room Nights)*




On the other hand, the volume of food & beverage sales remained weak in the second quarter, falling by 1.2 per cent following the 2.9 per cent decline in the previous quarter (Exhibit 2.11). Food & beverage sales volume was weighed down by sustained weakness in restaurant sales, which shrank by 4.7 per cent, extending the 8.9 per cent decline in the previous quarter. By contrast, the sales of other eating places rose by 4.2 per cent, an improvement from the 2.0 per cent increase in the preceding quarter.

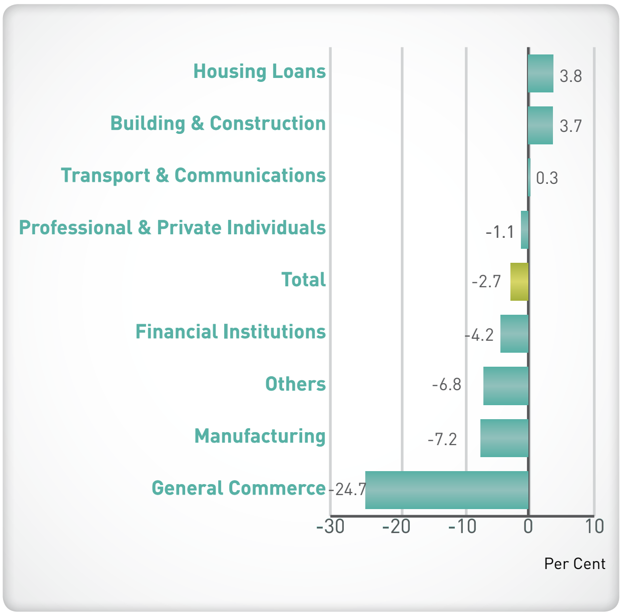
*Exhibit 2.11: Changes in Food & Beverage Services Index at Constant Prices*


## FINANCE & INSURANCE

The finance & insurance sector grew by 0.8 per cent in the second quarter, slowing from the 2.7 per cent growth in the preceding quarter.

The more subdued pace of expansion was attributed mainly to the banking segment, as persistent regional headwinds continued to weigh on lending activities. Specifically, Asian Currency Unit (ACU) non-bank lending contracted by 5.5 per cent in the second quarter, largely reflecting the pullback in credit to East Asia. Similarly, Domestic Banking Unit (DBU) non-bank lending declined by 2.7 per cent, extending the 1.7 per cent decline in the previous quarter. The fall in DBU non-bank lending was due to a 6.2 per cent step-down in corporate loan volumes, amidst a reduction in credit extended to trade-related segments such as general commerce and manufacturing (Exhibit 1.12). At the same time, fees and commissions received by banks turned in a dismal performance, alongside the dampened demand for banking services such as portfolio management and trade financing.

*Exhibit 2.12: Growth of ACU Loans & Advances to Non-Bank Customers by Region in 2Q 2016*



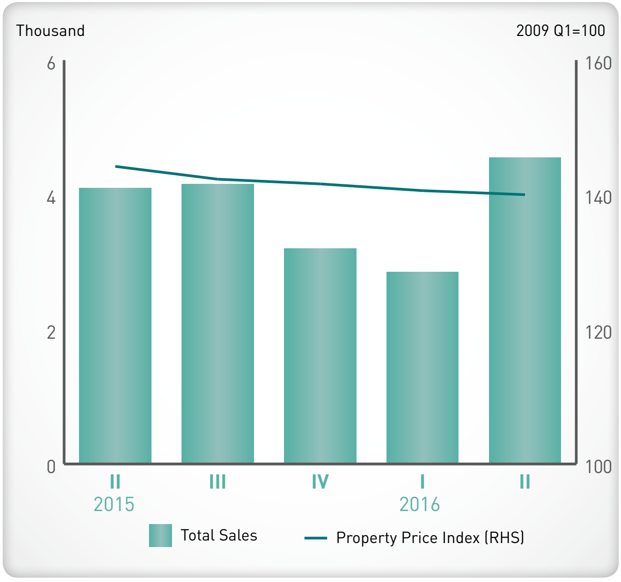

Meanwhile, activities within the sentiment-sensitive cluster recorded mixed performances. The forex market registered strong average daily turnover growth of 32 per cent in the second quarter, alongside higher demand for safe haven currencies in an environment of heightened financial market volatility. This helped to offset the impact of falling net fees and commissions in the fund management segment, which was confronted with sustained outflows from Asian equity funds. Concomitantly, investor interest on the local bourse also dipped, after a firm showing in the preceding quarter.

# BUSINESS SERVICES

The business services sector contracted by 0.2 per cent in the second quarter, a slight pullback from the 0.1 per cent growth in the previous quarter.

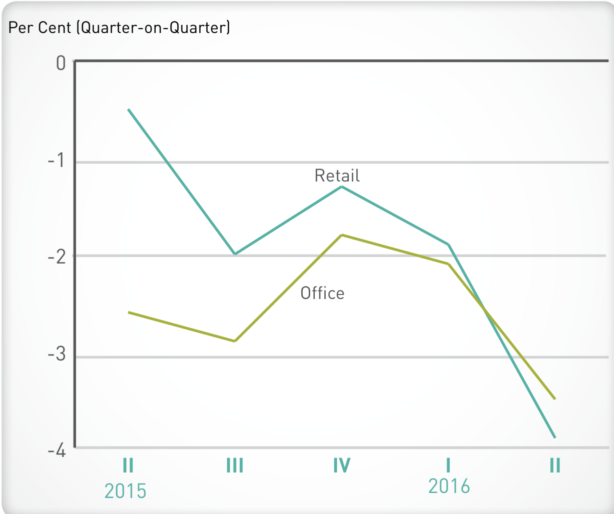
While the rental & leasing[1] and professional services segments provided support to growth, the real estate segment continued to languish, following sustained weaknesses seen in the private residential property market. In particular, private residential property prices weakened by 0.4 per cent on a quarter-on-quarter basis, the eleventh consecutive quarter of decline. However, sale transactions of private residential units improved as the private residential property market adjusted to lower prices. Specifically, private home sales rose by 11 per cent year-on-year, extending the 7.2 per cent increase in the previous quarter (Exhibit 2.13).

*Exhibit 2.13: Total Sales Transaction for Private Residential Units and Private Residential Property Price Index*




In terms of the private retail space segment, rentals remained subdued, declining by 3.9 per cent on a quarter-on-quarter basis, extending the 1.9 per cent contraction in the previous quarter (Exhibit 2.14). This came as retailers continued to face challenging operating conditions, contributed by increasing labour costs and lacklustre consumer demand. In line with the subdued rental growth, occupancy rates dropped marginally to 91 per cent, as compared to the 92 per cent rate registered last quarter.

*Exhibit 2.14: Changes in Rentals of Private Sector Office and Retail Spaces*

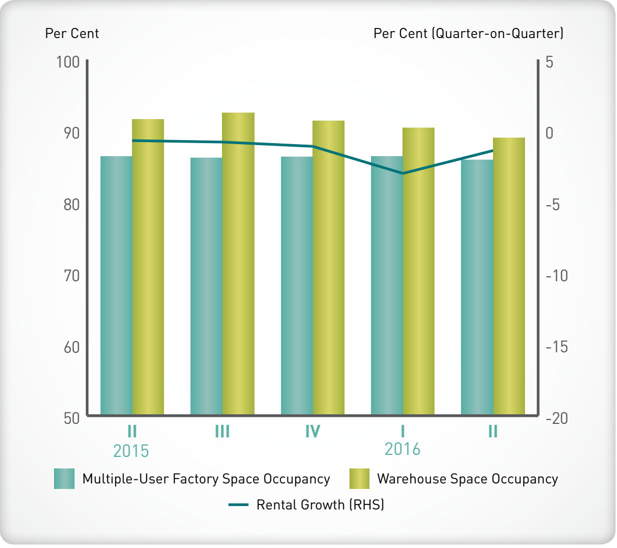



Likewise, the private office space segment deteriorated on the back of weaker demand, with rentals declining by 3.5 per cent on a quarter-on-quarter basis, extending the 2.1 per cent fall in the previous quarter. At the same time, occupancy rates remained stable at 90 per cent.

In the private industrial space market, overall rentals fell by 1.4 per cent on a quarter-on-quarter basis, extending the 3.0 per cent contraction registered in the previous quarter. The occupancy rate in the private multiple-user factory space segment came in at 86 per cent, similar to the previous quarter (Exhibit 2.15). By contrast, occupancy rates for private sector warehouse space continued to decline, reaching 89 per cent in the second quarter, as compared to the 90 per cent in the previous quarter.

[1] This comprises renting and leasing of motor vehicles, renting and leasing of other machinery, equipment and tangible goods, and the leasing of non-financial intangible assets.

*Exhibit 2.15: Occupancy Rate and Rental Growth of Private Sector Industrial Space*



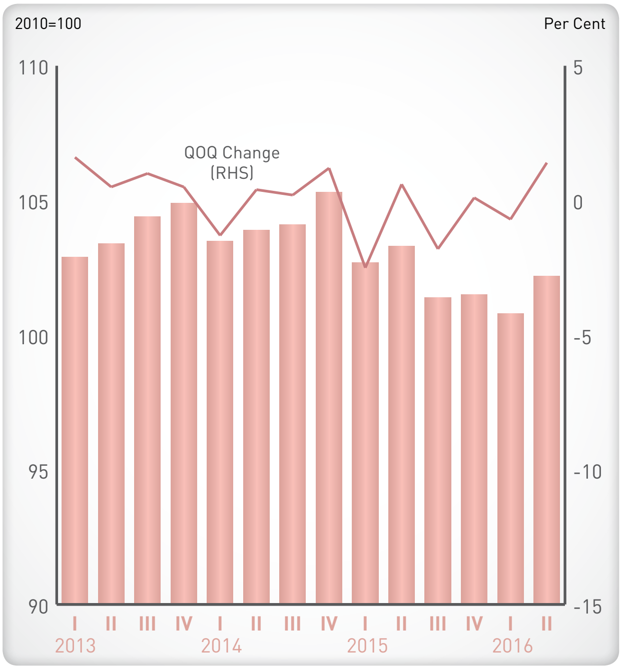
# CHAPTER 3
## Economic Outlook

# CHAPTER 3
# ECONOMIC OUTLOOK

## LEADING INDICATORS

The composite leading index (CLI) rose by 1.4 per cent on a quarter-on-quarter basis in the second quarter of 2016, a reversal from the 0.7 decline in the previous quarter (Exhibit 3.1).

*Exhibit 3.1: Composite Leading Index Levels and Growth Rate*




Of the nine components within the CLI, seven of them increased compared to the preceding quarter, namely domestic liquidity, money supply, new companies formed, stock price, stock of finished goods, non-oil retained imports and the US Purchasing Managers' Index.

Meanwhile, the other two components – non-oil sea cargo handled and wholesale trade – declined compared to a quarter ago.

## CONCLUSION

The global economic outlook has weakened slightly since three months ago in May. The UK's vote in June to leave the European Union (i.e., "Brexit") has dampened and also added uncertainties to the global growth outlook. In line with this, most key economies, except for the US, are expected to see similar or slower growth in the second half of the year as compared to the first half of the year.

The US economy grew modestly in the second quarter, following the weak growth momentum in the first quarter. Looking ahead, growth is expected to pick up in the remaining quarters of the year. Growth will be supported by domestic demand as the labour and housing markets have remained resilient. Monetary conditions are also likely to be accommodative to growth. For the year as a whole, the US economy is projected to grow at a slower pace compared to 2015.

In the UK, while growth picked up in the second quarter, forward-looking indicators suggest a potential slowdown in growth in the second half of the year as the uncertainties associated with Brexit could weigh on investments and consumption. For the Eurozone, growth in the first half of the year came in better than expected, but is likely to slow marginally in the second half of the year on the back of weakening consumer confidence in the region. Nonetheless, growth is expected to be supported by highly accommodative monetary policy. On balance, full-year growth in the Eurozone is likely to remain modest and come in slightly lower compared to 2015.

In Asia, China's growth in the second quarter was unchanged from that in the first quarter, at 6.7 per cent year-on-year. While the continued slowdown in investments will weigh on growth for the rest of the year, the expansion of credit and fiscal stimulus by the Chinese government is likely to contain downward pressures on the economy. Overall, growth is expected to slow in the second half of the year relative to the first half, with full-year growth projected to be lower than in 2015. In ASEAN, growth in the Indonesian and Malaysian economies in the second half of the year is expected to be broadly similar to that in the first half, supported by resilient domestic demand.

At the same time, additional downside risks in the global economy remain. First, Brexit has heightened uncertainties in the UK and EU economies. If the impact on consumer and business confidence is more severe than expected, there could be a sharp pullback in consumption and investments, which could in turn lead to a further slowdown in economic growth. The uncertainties could also spark bouts of risk aversion and volatility in global financial markets, with potential knock-on effects on global growth. Second, amidst rising corporate credit levels in China, there is a risk that debt defaults could spike as the economy continues to restructure, thus leading to a tightening of financial conditions. If this materialises, the Chinese economy could slow down more sharply than expected.

Domestically, the growth of externally-oriented services sectors, such as finance & insurance and wholesale trade, has slowed. While the manufacturing sector has seen an improvement in performance on account of pockets of strength in segments such as semiconductors and biomedical manufacturing, this may not be sustained in the light of sluggish global economic conditions. Growth in the construction sector is also likely to weaken in the coming quarters, with firms in the sector becoming more pessimistic about their business outlook.

On the other hand, tourism-related sectors such as the accommodation segment may see a boost from healthy growth in visitor arrivals, supported by the launch of new flights between Singapore and key inbound markets. Growth in "other services industries" and the information & communications sector is also likely to remain resilient, supported by growth in the education, health & social services and IT & information services segments respectively.

In line with weaker global growth outlook, and barring the full materialisation of downside risks, the 2016 growth forecast for the Singapore economy is narrowed to **1.0 to 2.0 per cent**, from 1.0 to 3.0 per cent.

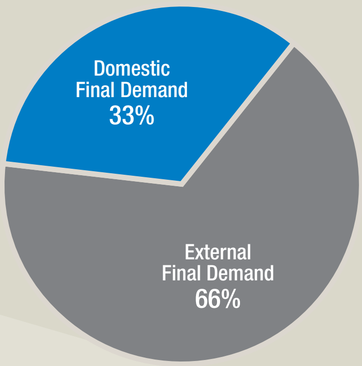
# FEATURE ARTICLE

FEATURE ARTICLE

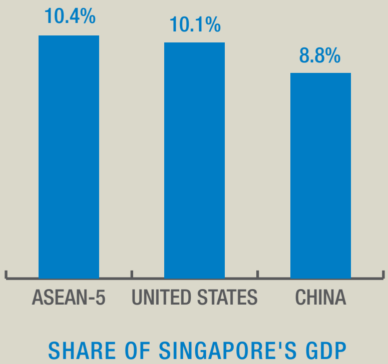
# ANALYSIS OF SINGAPORE'S EXTERNAL SOURCES OF FINAL DEMAND

As a small open economy, Singapore is dependent on external markets for demand.

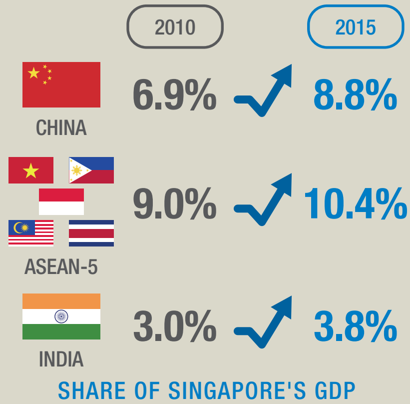
External final demand markets contributed two-thirds of Singapore's GDP in 2015



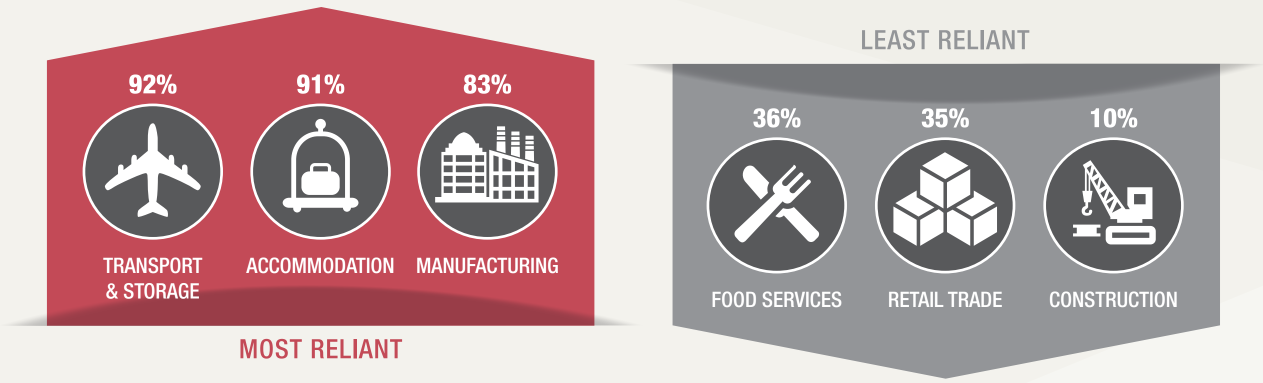

The most important final demand markets for Singapore were ASEAN-5, US and China




China, ASEAN-5 and India have risen in importance as final demand markets over the years




At the sectoral level, manufacturing, transportation & storage and accommodation are the most reliant on external demand, while construction, retail and food services are the least reliant.




EXTERNAL DEMAND SHARE OF SECTORS' VA, %

Looking ahead, there is a need to closely monitor the changes in final demand drivers in key external markets as well as the shifts in global value chains, given their impact on our exports and hence GDP.

For instance, the shift towards consumption-driven growth in China and robust demand prospects in ASEAN-5 and India may present new opportunities for Singapore's goods and services exporters.

## EXECUTIVE SUMMARY


- This article examines the external sources of final demand for Singapore, derived based on data from the OECD Inter-Country Input-Output (ICIO) tables.

- At the overall economy level, external final demand contributed to two-thirds of Singapore's Gross Domestic Product (GDP) in 2015. The most important final demand markets for Singapore were ASEAN-5 (Malaysia, Indonesia, Philippines, Thailand and Vietnam), the United States (US) and China. While China, ASEAN-5 and India have risen in importance as final demand markets over the years, the advanced economies (e.g., the US, Eurozone and Japan) remain key final demand destinations for Singapore's exports of goods and services.

- At the sectoral level, the reliance on external final demand varies. The manufacturing, transportation & storage and accommodation[1] sectors were the most reliant on external final demand, while sectors such as construction, other services[2], retail trade and food services catered predominantly to domestic final demand.

- Looking ahead, there is a need to continue to closely monitor the changes in final demand drivers in key external markets as well as the shifts in global value chains, given their impact on our exports and hence GDP. Doing so will also allow us to formulate strategies to ensure that we remain plugged into growth opportunities in key final demand markets either directly or via global value chains. For instance, even though the slowdown in investments and increased insourcing of intermediate inputs in China may weigh on Singapore's goods exports, the shift towards consumption-driven growth in China as well as robust demand prospects in ASEAN-5 and India may present new opportunities for Singapore's goods and services exporters.


*The views expressed in this paper are solely those of the authors and do not necessarily reflect those of the Ministry of Trade and Industry or the Government of Singapore.*[3]

## INTRODUCTION

As a small open economy, Singapore is heavily dependent on external markets for the goods and services that it produces. There are two ways to measure the importance of different external markets to Singapore's Gross Domestic Product (GDP). The first is based on the value-added (VA) from direct exports to a market, while the second is based on the VA from meeting the final demand in that market.[4]

Given the rising prominence of global supply and value chains, the two measures offer different insights on the relative importance of various external markets to Singapore's GDP. In particular, a significant share of Singapore's exports are intermediates used by industries overseas to produce goods and services intended for export to another destination, either as final products or as further intermediate inputs. Using the first measure (i.e., direct exports to a market) therefore has the potential effect of overstating our reliance on our direct trading partners, and understating our reliance on countries which purchase the final goods and services produced at the end of the value chain.

[1] *This refers primarily to the hotels industry.*

[2] *Other services include the "Health & Social Services", "Education", "Arts, Entertainment & Recreation" and "Other Community" segments.*


[3] *We would like to thank Ms Yong Yik Wei for her useful suggestions and comments. All remaining errors belong to the authors.*


[4] *We measure the VA derived from the exports of goods and services rather than the gross value of the exports, as the former more accurately measures the value that accrues to Singapore from exports since it removes the cost of imports required to produce the exports.*

The second measure, which accounts for these global value chain effects, offers a more accurate assessment of the relative importance of different final demand markets to Singapore's GDP. Our study uses data from the OECD Inter-Country Input-Output (ICIO) tables to trace the external sources of final demand for Singapore. Doing so allows us to gain a better understanding of how changing patterns of final demand (e.g., consumption by consumers and investments by businesses) in end-markets affect Singapore's GDP.

## LITERATURE REVIEW

A number of previous studies had estimated the importance of various external markets to the Singapore economy using the first measure, i.e. the share of GDP attributable to Singapore's direct export destinations. Using the 2005 input-output tables published by the Singapore Department of Statistics, Jayaram and Neo (2010) found that the G3 economies (US, EU-27 and Japan) were collectively the largest contributor to Singapore's export VA in 2005, summing to 20 per cent of GDP. Chan et al. (2012) updated the analysis and found that while the G3 economies still accounted for most of the VA from Singapore's exports in 2010, an increasing share of the VA was derived from exports to China and other Northeast Asian economies.

Due to data limitations then, these studies could only inform us of Singapore's reliance on our direct trading partners and did not account for global value chain linkages.

## METHODOLOGY AND DATA

Our study extends the previous studies in a few ways. First, we used new data from the OECD ICIO tables to establish the sources of final demand for Singapore's exports of goods and services. Second, we updated the analysis to 2015, and examined the changes in the relative importance of our final demand markets over the last five years. Third, we estimated the VA shares of our final demand markets at the sectoral level, to uncover the differences in exposure to various markets across sectors.

The OECD ICIO tables track the inter-country, inter-industry flows of intermediate and final goods and services for 61 countries (including Singapore), 34 industries and 3 sources of final demand (consumption by consumers, investments by businesses, and expenditure by government).[5] As the OECD ICIO tables are currently only available up to 2011, we used the RAS methodology to update the tables to 2015 data.[6] We then used standard open input-output multipliers to calculate the share of Singapore's GDP and sectoral VA attributable to each final demand market. Please refer to the Annex for more details of the methodology.

## EMPIRICAL RESULTS

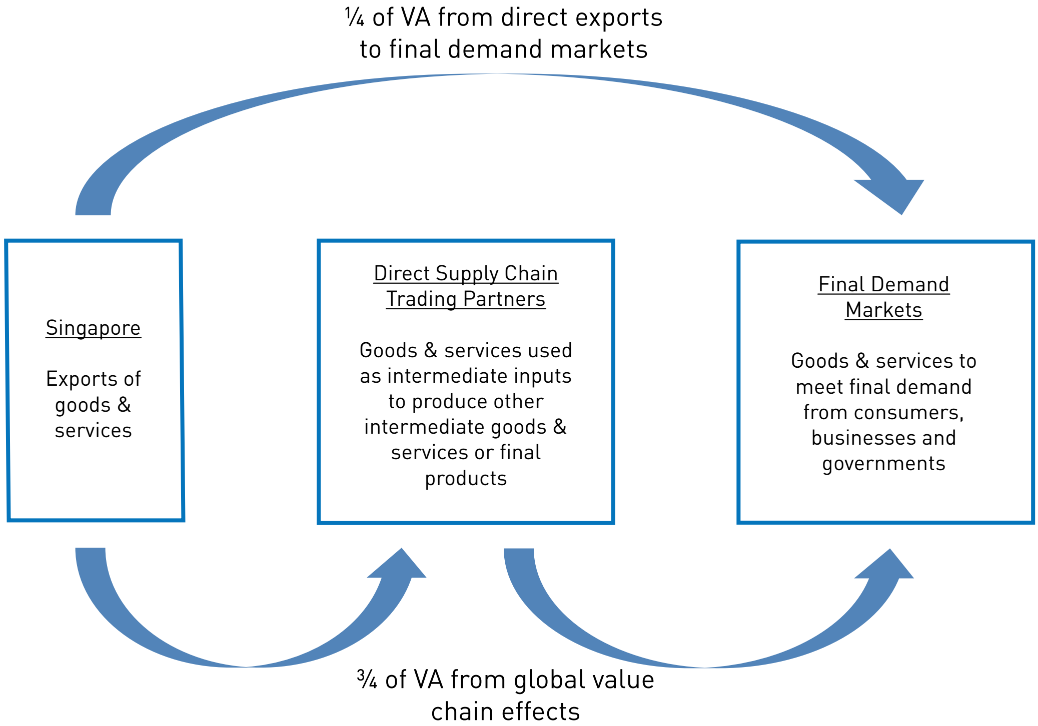
### (i) External Sources of Final Demand at the Overall Economy Level

At the overall economy level, external final demand accounted for around 66 per cent of Singapore's GDP in 2015, while domestic final demand accounted for the remaining share. Of the VA derived from external final demand, only one-quarter was attributable to the direct exports of goods and services to final demand markets. The remaining three-quarters of the VA from external final demand were generated through global value chain effects (Exhibit 1).

*[5] OECD ICIO tables cover the global flows of goods and services as one of the 61 countries in the tables is the "rest of the world" grouping.*

*[6] The RAS methodology is commonly used to update an input-output matrix to a more recent time period, when only partial information about its row and column sums is known for the more recent time period. For details of the RAS method, refer to Singapore Supply and Use, and Input Output Tables 2010, Department of Statistics (2014).*

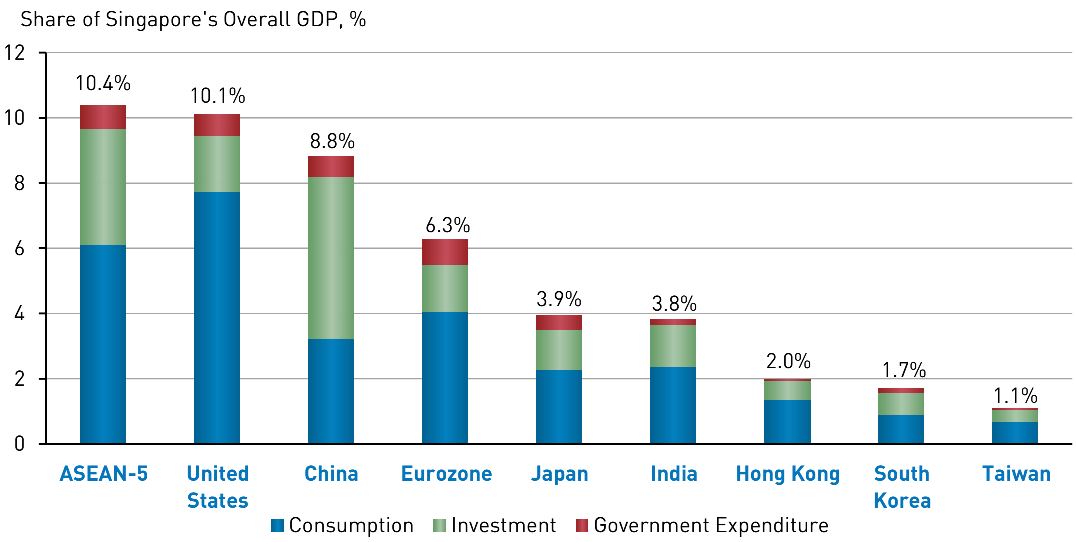
***Exhibit 1: Direct Exports to Final Demand Markets and Global Value Chain Effects***




Among Singapore's external final demand markets, ASEAN-5, US and China were the most important, contributing to 10.4 per cent, 10.1 per cent and 8.8 per cent of Singapore's GDP respectively in 2015 (Exhibit 2). These were followed by the Eurozone (6.3 per cent), Japan (3.9 per cent) and India (3.8 per cent).

A further decomposition of the contributions of our key markets by final demand type (i.e., consumption, investment and government expenditure) reveals that the largest final demand drivers for Singapore's GDP in 2015 were consumption in the US (7.7 per cent) and ASEAN-5 (6.1 per cent), followed by investments in China (5.0 per cent). This finding suggests that Singapore is well-positioned to benefit from the rising consumption of the middle class in the ASEAN-5 economies, but is also likely to be adversely affected by the slowdown in investments in China as it rebalances towards consumption-driven growth.

***Exhibit 2: Share of Singapore's Overall GDP by Final Demand Market and Type (2015)***

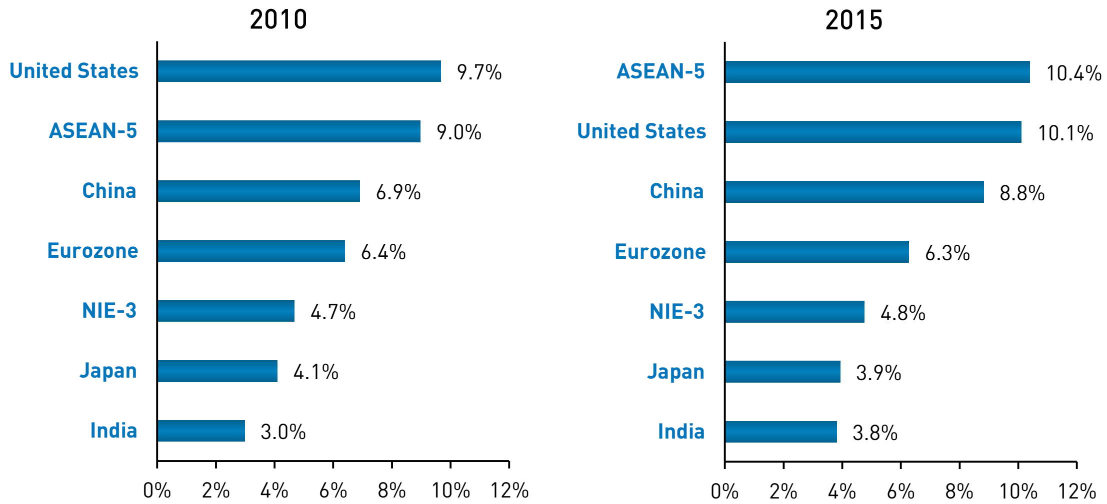



Source: MTI-ECD Estimates
Note: ASEAN-5 refers to Malaysia, Indonesia, Thailand, Philippines and Vietnam

Next, we examined the changes in the relative importance of our final demand markets over the last five years. Our results showed that China, ASEAN-5 and India have risen in importance as final demand markets for Singapore between 2010 and 2015. In particular, the share of Singapore's GDP attributable to final demand from ASEAN-5 increased from 9.0 per cent in 2010 to 10.4 per cent in 2015, overtaking that of the US (Exhibit 3). The emergence of ASEAN-5 as Singapore's largest final demand market was due to robust consumption and investment growth in the region, particularly in Indonesia and Malaysia, as well as the ability of Singapore's exporters to tap on demand opportunities in the region (Exhibit 4).

The share of Singapore's GDP that could be attributed to final demand from China also rose significantly, from 6.9 per cent in 2010 to 8.8 per cent in 2015. This reflects China's rising dominance as an end-market for consumer and capital goods, apart from its traditional role as a processing centre for intermediate goods. Meanwhile, India's share increased by 0.8 percentage-points over the same period to around 4.0 per cent in 2015 on the back of strong final demand growth in the country.

***Exhibit 3: Share of Singapore's Overall GDP by Final Demand Markets (2010 and 2015)***




Source: MTI-ECD Estimates
Note: NIE-3 refers to Hong Kong, South Korea and Taiwan

***Exhibit 4: Historical Growth of Final Demand in Key External Economies, and Change in Share of Singapore's GDP Attributable to Final Demand in these External Economies from 2010 to 2015***

| Final Demand Country | Real Growth in Final Demand (CAGR 2010-15), % | | | Change in Share of Singapore's GDP from External Final Demand between 2010 to 2015 (%-pt) |
|---|---|---|---|---|
| | Consumption | Investment | Government Expenditure | |
| **China** | 9.0 | 7.0 | 8.7 | 1.9 |
| **ASEAN-5** | - | - | - | 1.4 |
| Indonesia | 5.2 | 6.5 | 4.7 | 0.7 |
| Malaysia | 7.0 | 7.2 | 6.7 | 0.5 |
| Philippines | 5.9 | 8.8 | 6.6 | 0.1 |
| Thailand | 2.4 | 3.3 | 3.4 | 0.1 |
| Vietnam | 6.0 | 3.6 | 7.1 | 0.1 |
| **India^** | 5.8 | 3.7 | 4.4 | 0.8 |
| **G3** | - | - | - | 0.1 |
| US | 2.2 | 6.1 | -1.6 | 0.4 |
| Eurozone | 0.1 | 0.0 | 0.4 | -0.1 |
| Japan | 0.4 | 2.2 | 1.2 | -0.2 |

Source: MTI-ECD Estimates, OECD ICIO Tables, Respective National Statistics Bureaus
^ Due to data limitations, the CAGR of India's final demand is calculated from 2012 to 2015.

Notwithstanding the rising importance of China, ASEAN-5 and India as final demand markets, the advanced economies continue to remain key final demand destinations for Singapore's exports. Collectively, the contribution of final demand from the US, Eurozone and Japan to Singapore's GDP remained stable, at around 20 per cent, over the last five years.

### (ii) External Sources of Final Demand at the Sectoral Level

At the sectoral level, the exposure to external final demand varies across sectors. In 2015, the share of VA attributable to external final demand ranged from 10 per cent in the construction sector to 92 per cent in the transportation & storage sector (Exhibit 5).

For the manufacturing sector as a whole, external final demand accounted for 83 per cent of its VA in 2015, reflecting its externally-oriented nature. Within the sector, the chemicals and biomedical manufacturing clusters had the highest external reliance, with 93 per cent of their respective VA attributable to external final demand. However, their exposure varied across markets. Specifically, the chemicals cluster had the highest exposure to ASEAN-5 (26 per cent of total VA) and China (14 per cent), while the biomedical manufacturing cluster's largest exposure was to the US (32 per cent) followed by Eurozone (13 per cent).

Among the externally-oriented services sectors, the share of VA attributable to external final demand was the highest for the transportation & storage (92 per cent) and accommodation (91 per cent) sectors. In the case of the transportation & storage sector, close to half of the sector's VA from external final demand came from the water transport segment, where the bulk of its VA was in turn derived from ASEAN-5 and China. As for the accommodation sector, its key external markets were the Asian economies (India, ASEAN-5, NIE-3 and China), which collectively accounted for more than three-quarters of Singapore's total visitor arrivals in 2015.

*Exhibit 5: Share of Singapore Sectors' Total VA by Final Demand Markets, 2015 (%)*

| Sectors | Key External Final Demand Markets | | | | | | | Total External Final Demand | Total Domestic Final Demand |
|---|---|---|---|---|---|---|---|---|---|
| | ASEAN-5 | US | China | Euro-zone | NIE-3 | Japan | India | | |
| Manufacturing | 13 | 15 | 12 | 7 | 6 | 4 | 3 | 83 | 17 |
| Electronics | 9 | 16 | 19 | 7 | 9 | 5 | 2 | 83 | 17 |
| Precision Engineering | 19 | 8 | 15 | 5 | 8 | 4 | 3 | 79 | 21 |
| Chemicals | 26 | 8 | 14 | 7 | 4 | 5 | 4 | 93 | 7 |
| Biomedical Manufacturing | 9 | 32 | 9 | 13 | 7 | 3 | 2 | 93 | 7 |
| Transport Engineering | 14 | 3 | 6 | 4 | 2 | 2 | 2 | 72 | 28 |
| General Manufacturing | 15 | 6 | 10 | 4 | 5 | 4 | 3 | 70 | 30 |
| Transportation & Storage | 15 | 7 | 14 | 5 | 7 | 8 | 7 | 92 | 8 |
| Accommodation | 12 | 7 | 10 | 4 | 11 | 1 | 14 | 91 | 9 |
| Wholesale Trade | 14 | 11 | 11 | 6 | 6 | 5 | 4 | 77 | 23 |
| Finance & Insurance | 14 | 17 | 11 | 5 | 4 | 4 | 5 | 73 | 27 |
| Business Services | 7 | 8 | 6 | 11 | 4 | 3 | 4 | 68 | 32 |
| Information & Communications | 6 | 7 | 6 | 9 | 5 | 6 | 5 | 62 | 38 |
| Food Services | 5 | 5 | 4 | 4 | 2 | 2 | 2 | 36 | 64 |
| Retail Trade | 6 | 5 | 5 | 3 | 3 | 2 | 2 | 35 | 65 |
| Other Services^ | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 16 | 84 |
| Construction | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 | 90 |

Source: MTI-ECD Estimates

^Other Services include the "Health & Social Services", "Education", "Arts, Entertainment & Recreation" and "Other Community" segments.

On the other end of the scale, sectors such as construction, other services, retail and food services catered predominantly to domestic final demand in Singapore, implying that they would be less sensitive to developments in external markets.

## CONCLUSION AND IMPLICATIONS

This study analyses the external sources of final demand that contribute to Singapore's GDP. Our key observations are as follows. First, two-thirds of Singapore's GDP are derived from external final demand, while one-third is accounted for by domestic final demand. Second, the advanced economies remain key final demand destinations for Singapore's exports, even though China, ASEAN-5 and India have risen in importance as final demand markets over the years. Third, there is substantial heterogeneity in exposure to external final demand markets at the sectoral level, with external final demand accounting for 83 per cent of the VA in the manufacturing sector but only 10 per cent in the construction sector. Furthermore, sectors had varying exposure to different final demand markets. For example, the ASEAN-5 economies accounted for a quarter of the chemicals cluster's total VA, while the US and Eurozone accounted for close to half of total VA in the biomedical manufacturing cluster.

Looking ahead, it is important for us to closely monitor the changes in final demand drivers in key external markets as well as the shifts in global value chains, given their impact on our exports and hence GDP. Doing so will also allow us to formulate strategies to ensure that we remain plugged into growth opportunities in key final demand markets either directly or via global value chains.

For instance, recent trends that may weigh on Singapore's exports in the short term include sluggish final demand in the advanced economies, including weak investment demand in economies like the US. Over the medium- to longer-term, the continued slowdown in investment growth in China and the increasing trend of insourcing in its manufacturing sector may also pose a drag on Singapore's sectors with higher exposure to China's import demand for goods. Nonetheless, the shift in China's demand drivers towards consumption could bring about new opportunities for sectors that are able to cater to its consumption needs directly or via global value chains. Similarly, there is scope for Singapore's goods and services exporters to ride the wave of increasing final demand in ASEAN-5 and India, which is in turn expected to be supported by significant infrastructure investments and a rising middle class.

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## ANNEX: METHODOLOGY

We used a standard open input-output (IO) multiplier framework to calculate the share of Singapore's GDP and sectoral VA attributed to each of our key external final demand markets.[7]

The system of equations in the open IO model can be expressed as:

$$X = AX + F$$

where A is the 2074 × 2074 matrix of direct requirement coefficients[8]
X is the 2074 × 1 vector of output
F is the 2074 × 1 vector of final demand

The solution for X can be expressed as:

$$X = (I - A)^{-1} F = BF$$

where B is the 2074 × 2074 matrix of total requirement coefficients, also known as the Leontief inverse.

To derive the output generated to satisfy the final demand in economy *j*, we replace the final demand vector F with the final demand of economy *j*, $F_j$:

$$X_j = BF_j$$

The corresponding VA generated to satisfy the final demand in economy *j* can be calculated as follows:

$$VA_j = v.\ BF_j$$

where v is the 2074 × 1 vector of VA coefficients.

Finally, extracting the rows in VAj which correspond to Singapore's industries will give us the sectoral VA attributed to the final demand of economy *j*.[9]

*[7] For more details on the open IO model, please refer to Singapore Department of Statistics (2014).*

*[8] There are 2074 direct requirement coefficients as the IO tables have 61 countries and 34 industries in each country.*

*[9] As the OECD ICIO tables comprise data on the VA of industries, as well as net taxes on products, we are also able to derive the GDP generated at the overall economy level to satisfy the final demand of our key markets.*

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