Inflation and Cost of Living in Singapore and Asia: Post-Pandemic Implications

Thursday April 29, 2021, 9:00 a.m. – 12 noon

Welcome and Opening Remarks 9:00 a.m. − 9:15 a.m.

Mr. Stephan Danninger was appointed Director of the IMF – Singapore Regional Training Institute in August 2017. Prior to taking on the position, he worked for 17 years at the IMF headquarters in Washington D.C. During this period, he led projects and teams in various capacities, including the macroeconomic analysis and forecast for Germany, Japan and the United States. He also worked in the IMF's Research Department and published in various academic journals on topics related to growth, inflation, trade, fiscal policy, financial spillovers and labor market issues. Mr. Danninger is an Austrian national and holds a PhD in Economics from Columbia University, New York.

Mr. Edward Surendran Robinson is Deputy Managing Director of the Economic Policy Group (EPG) and Chief Economist, MAS. He currently heads the EPG which formulates Singapore's monetary policy and conducts macro-financial surveillance. The Group also undertakes research on broader economic and financial issues facing the domestic and external economies. He has a particular interest in macroeconometric modeling and continues to be engaged in the developmental work for the suite of MAS models, which are used for both price and financial stability analysis. He has also been involved in other areas of economic policy work including in various inter-governmental work groups and served as a Board Member of the Competition Commission of Singapore.

Session 1: Inflation in Industrial Economies 9:15 a.m. − 10:30 a.m.
Moderated by Mr. Stephan Danninger

Dr. Aurobindo Ghosh is an Assistant Professor of Finance Education at the Lee Kong Chian School of Business in Singapore Management University. Dr Ghosh is the Program Director for the Citi-SMU Financial Literacy Program for Young Adults leading the development, design, digitization and gamification of learning content development in Financial Literacy.

As the Founding Principal Investigator and Creator for the DBS-SKBI Singapore Index of Inflation Expectations (SInDEx), Asst Prof Ghosh conceptualized and developed the Behaviorally Adjusted CPIEx indices of Inflation Expectations in research collaboration with the Monetary Authority of Singapore supported by DBS. He has published and won awards for theoretical and applied academic research and Business Case Studies in different areas in Financial Economics. He is an editor of a forthcoming book on Managing Complexity and Covid19: Life, Liberty Or the Pursuit of Happiness. Asst Professor Ghosh is a frequent commentator on financial economic news and inflation and has been featured in various print and electronic news outlets.

Mr. Thomas Lam has approximately two decades of experience in the financial industry, with expertise ranging from covering the global economy, deciphering financial markets, including macro forecasting, to advising on investment strategy.

He commenced his career in New York, initially at a large money-center bank and then at a hedge fund. Thereafter, Tom joined a banking institution in Singapore as a senior economist, positioning traders for high-frequency adjustments and guiding upper management on longer-term strategy. Subsequently, as chief economist at a financial institution, he established a global-focused research team, tending to a broad array of buy-side clients regionally and contributing to the investment banking business. He is currently a principal researcher at Sim Kee Boon Institute for Financial Economics, a think-tank within Singapore Management University.

Tom has been ranked consistently among the world's top five most accurate economists on forecasting the US economy overall by Bloomberg from 2013 through April 2017 (placed third, last published). Formerly, he was also recognized as the second best US forecaster worldwide during the Global Financial Crisis. Additionally, he has been widely publicized as one of "Wall Street's Most Prophetic Economists". Moreover, he was exclusively identified by Bloomberg to have accurately predicted the onset of the 2009 US recovery 16 months ahead of the official announcement.

DBS-SKBI Singapore Inflation Expectations (SInDEx) Survey (2011-2021): 10 Years of Inflation Expectations*

Dr. Aurobindo Ghosh
Asst Prof of Finance Education and Principal Investigator, DBS-SKBI SInDEx
Lee Kong Chian School of Business
SINGAPORE MANAGEMENT UNIVERSITY

Primer on Inflation Expectations

- **Inflation expectations form a key influence** that affect the behavior of households, businesses and consequently the decision of the policymakers in designing economic policies to "nudge" behavior of investment and consumption.

- The major hurdle in **controlling inflation is its measurement and expectations**. It is now widely accepted by both academic and practice professionals that survey-based measures play an important role in such policy analysis among others.

- However, the **major shortcomings of survey-based measures are personal perceptions** can get swayed due to different factors.

- We want to identify such factors to evaluate how to better understand **how consumers and businesses make decisions** vis-à-vis their expectations of inflation, to help influence policy.

DBS-SKBI SInDEx: Why do policymakers need a Measure for Inflation Expectations of Consumers?

- **DBS-SKBI Singapore Index of Inflation Expectations (SInDEx)** started in 2011 in collaboration with SMU-SKBI and other private partners, subsequently funded by MOE Tier 1 Grant under Assistant Professor Aurobindo Ghosh at LKCSB, SMU before SKBI and DBS co-funded it 2019

- The **ONLY index of its kind** in Singapore and in its 10th year. SMU research team partnered with researchers in **MAS and Behavioral Insights Team** to update the questionnaire to address any improvements that can be made.

- **Effective and well "anchored" monetary policy depends on future expected inflation** based on model and survey-based measures. However, **effective communication** is quite challenging (Bernanke, 2007)

Results from the 39th wave of the DBS-SKBI SInDEx Survey: One-Year-Ahead Expectations

CPIEx	March 2021	December 2020
CPIEx	2.7	2.3
CPIEx Core	2.7	2.5
SInDEx1	2.7	3.3
Subgroup Core	2.6	2.1

- **In Mar 2021, CPIEx Inflation Expectations (Headline) inched up to 2.7%** from 2.3% in December 2020

- This is **lower than longer term average of 3.4%** (2012-2018)

- **CPIEx Core Inflation Expectations** (w/o accommodation and private road transport) **was 2.7% in Mar 2021** (compared to 2.5% in Dec 2020)

- As a comparison **subgroup who owns accommodation and use public transport**, effectively face core inflation, **polled 2.6 in Mar 2021 (from 2.1 in Dec 2020)**. SInDEx1, a composite index, also inched up to **2.6 from 2.1 in Dec 2020**

Results from the 39th wave of the DBS-SKBI SInDEx Survey: Five-Year-Ahead Expectations

CPIEx	March 2021	December 2020
CPIEx5	3.4	3.2
CPIEx5 Core	3.3	3.1
SInDEx5	3.3	3.1

- In Mar 2021, **Five-year-ahead CPIEx5 Inflation Expectations (Headline) inched up to 3.4%** from 3.2% in December 2020

- This is **lower than longer term average of 4.2%** (2012-2018)

- **CPIEx5 Core Inflation Expectations** (w/o accommodation and private road transport) **was 3.3% in Mar 2021** (compared to 3.1% in Dec 2020)

- As a comparison benchmark, a **composite index with lower weights for more volatile components SInDEx5 polled 3.3 in Mar 2021** (from 3.1 in Dec 2020)
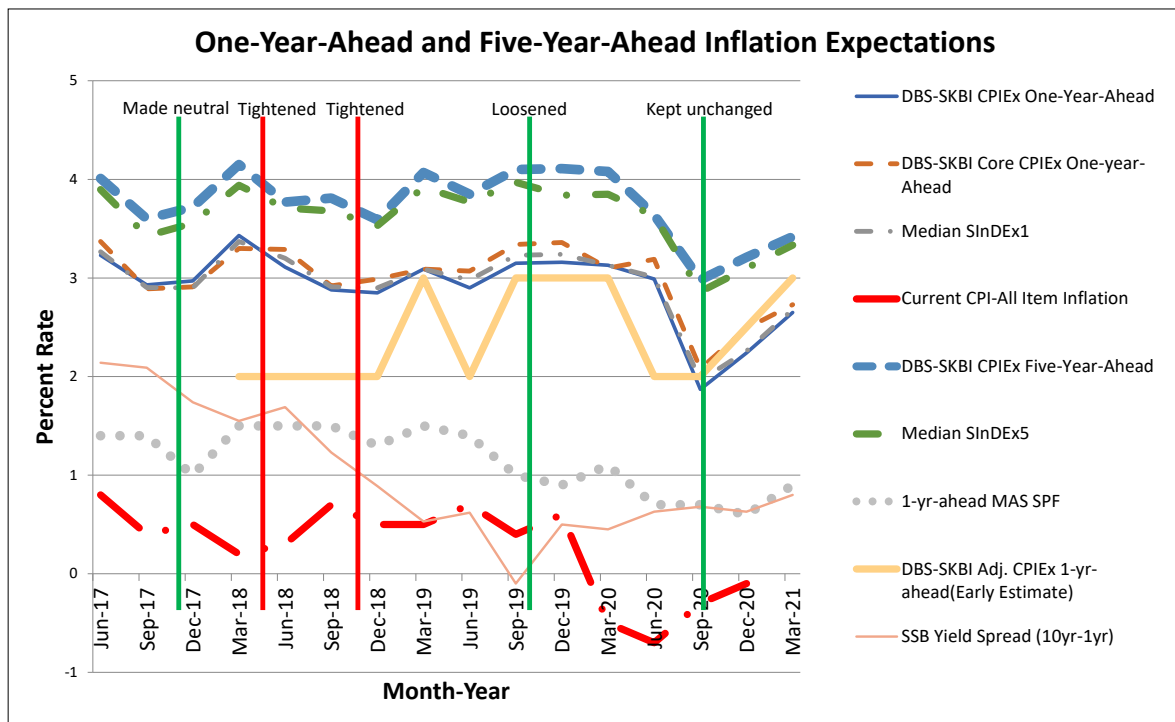
Source SMU, SKBI, MAS, DOS

DBS-SKBI SInDEx: What are the drivers of bias?

- Median One-Year-Ahead Inflation Expectations is **higher for individuals who are married, citizens, high real estate expectations, high current inflation, feels higher uncertainty, higher future investment in equity**, while **lower** for those who are **older, unemployed, longer stay, makes decisions, follow media and expect increment**.

- Additionally, the bias measured by difference of median expectation between individuals and experts (SPF) is affected by **age (-), marriage (+), citizen (+), length of stay (-), decision maker (-), expect increment (-), high real estate (+), current inflation (-), uncertainty (+), future investment (+) and unemployment (-).**

Sample Questions for Reducing Bias:

The charts[CS1] below shows quarterly data on inflation and GDP growth rates of the Singapore economy since 2012[CGS(2)]

Please review the charts in Figures 1-3 and together with any other information that you might know or heard, give us your best guess for the following annualized rates for Quarter 1 2019 (one-year-ahead average January-March 2019) and for Quarter 1 2023 (five-year-ahead average January-March 2023) in the space provided, in percentage terms.

a) 1-year-ahead Headline CPI All Item Rate [_____]%
b) 1-year-ahead Inflation less Housing and Pvt Road Transport [_____]%
c) 1-year-ahead ahead Food Inflation [_____]%
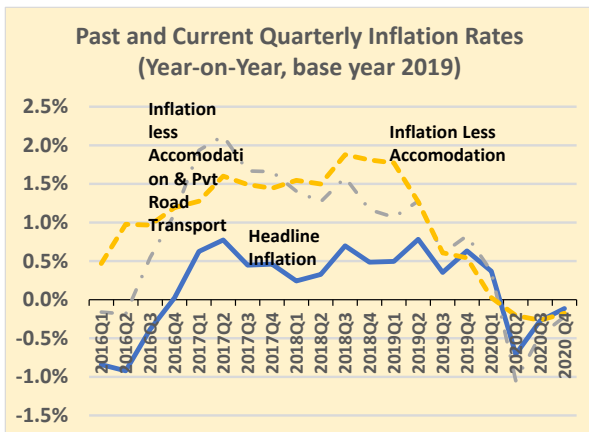
Source MAS, DOS

Source MAS, DOS

SMU-LKCSB

10
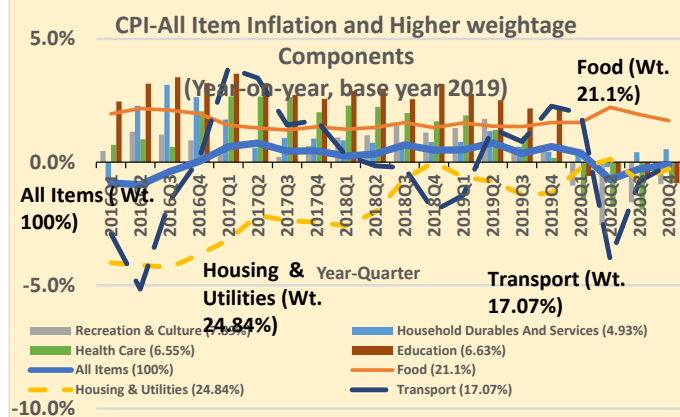
Inflation Component	Raw Median	Trimmed Median	Weights (%)
Food	3.00	2.00	21.1
Transport	3.00	2.00	17.1
Housing/Utils	3.00	2.00	24.8
Healthcare	4.00	3.00	6.6
Education	3.00	2.00	6.6
Recreation	4.00	2.00	7.9
Clothing & footwear	3.00	2.00	2.1
Household durables/services	3.00	2.00	4.9
Communications	3.00	2.00	4.1
Miscellaneous	4.00	2.30	4.8
Adj CPIEx1	3.00	2.00	100
Wtd. Adj. CPIEx1	**3.11**	**2.08**	**100**
Adj. Core CPIEx	3.00	2.00	100
Wtd. Adj. Core CPIEx	**3.17**	**2.12**	100

SMU-LKCSB

11

Behaviorally Adjusted CPIEx and Components

- When we adjust for behavioural biases, we see an uptick in inflation expectations, both in raw (reported) and trimmed median (response<10%)

- Overall Mar 2021 estimates gives Adj. CPIEx at 3.0, same as December 2020. Adj. CPIExCore at 3.0, slight increase from Dec 2020

- When aggregated for components, Wtd. Adj. CPIEx drops to 3.1% which is slightly lower than Dec 2020, whereas the Wtd. Adj. Core to 3.2% slightly higher from Dec 2020

Perceived impact of Covid19 on Healthcare Inflation

We find that there has been some impact on healthcare inflation, **average seem to have no impact in September 2020 (left) and but a positive impact March 2021 (right).** We **do not find any change healthcare in consumption basket** due to Covid19 disruptions (Cavallo, 2020).

Source SMU-SKBI

Source SMU-SKBI

SMU-LKCSB

12

Impact of Covid19 on Food and consumption basket

We find that there has been a divergent impact on food prices, even though **average seem to have no impact between September 2020 (left) and March 2021 (right)**. We also **do not find any change in food in consumption basket** due to Covid19 supply dislocations, even though **transport, recreation and culture and footwear and clothing baskets reduced to a limited extent temporarily** in Sep 2020 (Cavallo, 2020).

B14_1 Food (In view of the novel Coronavirus (COVID-19) outbreak globally, including the cautiously optimistic situation in Singapore, what do you expect the impact to be on 1-year-ahead component-wise inflations expectations, 1-year and 5-year-ahead over

Source SMU-SKBI

B14_1 Food (What do you expect the impact to be on 1-year-ahead component-wise inflations expectations, 1-year and 5-year-ahead overall inflation expectations in Singapore?)

Source SMU-SKBI

DEEEPER LOOK AT CONSUMER PRICE INDEX (CPI):

The Laspeyre's index (Laspeyre, 1871) is given by

$$CPI_L = \frac{\sum_{i=1}^{n} p_{1i} q_{0i}}{\sum_{j=1}^{n} p_{0j} q_{0j}} = \sum_{i=1}^{n} \frac{p_{1i}}{p_{0i}} \left[\frac{p_{0i} q_{0i}}{\sum_{j=1}^{n} p_{0j} q_{0j}} \right] = \sum_{i=1}^{n} \frac{p_{1i}}{p_{0i}} s_{0i},$$

where for the ith commodity or service the prices p_{ki}, and the quantities q_{ki} are for the current (period k=1) and base periods (k=0).

$$s_{0i} = p_{0i} q_{0i} / \sum_{j=1}^{n} p_{0j} q_{0j}$$ is the expenditure weight of the ith item in price and quantity at period 0, the reference period.

Diewert (1987, p. 6231) also claims that both the Laspeyre's and the Paasche indices (Paasche, 1874) can "…approximate the *superlative* indexes to the first order at an equal price and quantity point…"

- Laspeyre's index over estimates the true CPI
- Paasche's index under estimates the true CPI
- Fisher's "ideal index" (geometric mean of Laspeyre's and Paasche's index) was proposed and was proved to be a superlative and exact index (Diewart, 1976, 1987)

Assumptions as a Cost of Living index:
- **Quantities remained unchanged** even when the prices change
- This **violated the law of demand** (*ceteris paribus*) *unless* the demand was goods is inelastic (which is true for some components overall but not all)
- In the context of CPI constructed in Singapore (DOS, 2019), **this assumption of inelastic demand is not sustainable** for over 600 items, 6800 brands of items or for 140 items in Economic Intelligence Unit (EIU WCOL)

True Index of Cost-of-Living

- **True index of cost of living** can be obtained by **dividing the cost of living at one period by the cost of living in the other period, provided the standard of living** (or the general status of want-satisfaction or utility) remains the same for the family (Konus, 1939)

- This index shows the **relative change occurring in the monetary cost of those consumers' goods** which are necessary for the maintenance of a **certain standard of living** (Konus, 1939)

- Simplifying assumption: The cost-of-living index is **more of an *economic* interpretation rather than a statistical one**
- Main assumption is that the **consumption of goods and services reacts continuously due to changes in prices and the pattern of change in quantity consumed is stable** (ergodic) and changing geometrically over time between two surveys of household expenditures
- Under the simplifying assumption, **relative cost of living is the ratio if the expenditures** on two baskets that give **similar levels of satisfaction**
- Hence, we propose **a more encompassing and dynamic measure of inflation as a cost of living** where we address the **changing consumption patterns over time in response to changes in price** (Aoki and Kitahara 2010 and Sutoris, 2020)

SMU-LKCSB

15

Framing Cost of Living as a weighted index:

$$CLI_L = \frac{\sum_{i=1}^{n} p_{1i}q_{1i}}{\sum_{j=1}^{n} p_{0j}q_{0j}} = \sum_{i=1}^{n} \frac{p_{1i}}{p_{0i}} \left[\frac{p_{0i}q_{0i} \Big/ q_{0i}}{\sum_{j=1}^{n} p_{0j}q_{0j}} \right] = \sum_{i=1}^{n} \frac{p_{1i}}{p_{0i}} \left[\frac{p_{0i}q_{0i}k_{01i}}{\sum_{j=1}^{n} p_{0j}q_{0j}} \right],$$

where k_{01i} is the ratio of the quantity consumed in the current period and the base period.

- As attractive as it may seem to look at the formula, it is **nearly impossible to calculate *unless* we have the exact composition of the basket *every year,*** in particular the quantities of goods and services consumed

However, to make it operational, **we will replace the k_{01i} with an approximation with the assumption that quantities of good consumed changes geometrically** over the duration between two periods of the household economic survey in 2014 and 2019 (HES 2017/2018)

$$CLI_L = \frac{\sum_{i=1}^{n} p_{1i}q_{1i}}{\sum_{j=1}^{n} p_{0j}q_{0j}} = \sum_{i=1}^{n} \frac{p_{1i}}{p_{0i}} \left[\frac{p_{0i}q_{0i} \Big/ q_{0i}}{\sum_{j=1}^{n} p_{0j}q_{0j}} \right] = \sum_{i=1}^{n} \frac{p_{1i}}{p_{0i}} \left[\frac{p_{0i}q_{0i}\hat{k}_{01i}^{m}}{\sum_{j=1}^{n} p_{0j}q_{0j}} \right],$$

where $\hat{k}_{01i} = \left(\frac{q_{1i}}{q_{0i}} \right)^{0.2}$ and $m = 1, 2, 3, 4, 5$ is the number of years after the base year.

SMU-LKCSB

16

How does the CLI$_L$ relate to the CPI$_L$?

$\hat{k}_{01i}$ is fixed for all commodities or services, then the average value $\hat{k}_{01i}$, say $\hat{k}_{01}$, or more precisely

$$\hat{k}_{01i}^{m}, \text{ m=1,2,3,4,5 depending on number of years}$$

after the base year can be used as a rate multiplier of the CPI to get the CLI, this would be the average ratio of the quantity indices for period 0 and 1. In that case, we have the following relationship

$$CLI_L = \frac{\sum_{i=1}^{n} p_{1i}q_{1i}}{\sum_{j=1}^{n} p_{0j}q_{0j}} = \sum_{i=1}^{n} \frac{p_{1i}}{p_{0i}} \left[\frac{p_{0i}q_{0i}\hat{k}_{01i}^{m}}{\sum_{j=1}^{n} p_{0j}q_{0j}} \right]$$

$$= \sum_{i=1}^{n} \frac{p_{1i}}{p_{0i}} \left[\frac{p_{0i}q_{0i}\hat{k}_{01}^{m}}{\sum_{j=1}^{n} p_{0j}q_{0j}} \right] = \hat{k}_{01}^{m} \sum_{i=1}^{n} \frac{p_{1i}}{p_{0i}} \left[\frac{p_{0i}q_{0i}}{\sum_{j=1}^{n} p_{0j}q_{0j}} \right]$$

$$= \hat{k}_{01}^{m} CPI_L,$$

where $\hat{k}_{01i}^{m} = \left(q_{1i} \big/ q_{0i} \right)^{0.2m} = \hat{k}_{01}^{m}$

and $m = 1, 2, 3, 4, 5$ is the number of years after the base year.

DATA: Estimating the CPI-All Item and the Cost-of-Living Index (CLI)

- Price data available through the Economic Intelligence Unit (EIU) City database that includes the prices from 2010 onwards

- Two sets of price data are available: supermarket and mid-priced store: we conclude from the results that the mid-priced store prices reflect market more accurately

- Weights are calculated using 2017/18 HES for CPI and CLI calculation

- As we do not have the most current value of k_{01i} we will be using the proxy which is the ratio of the commodities between subsequent Household Economic Surveys (HES, 2017/18 and 2012/13)
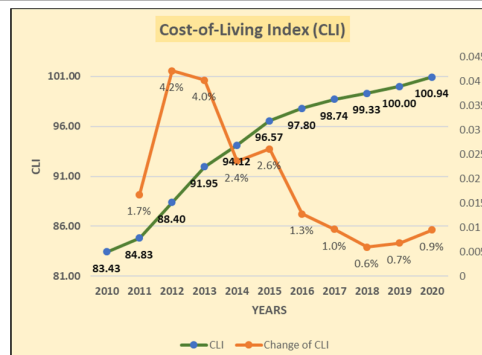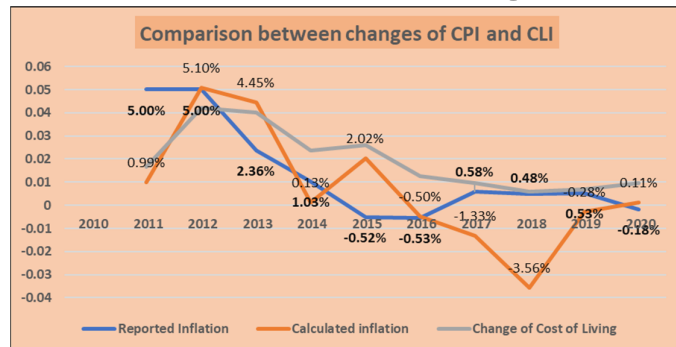
Comparison between changes of CPI and CLI

Cost-of-Living Index (CLI)

THANK YOU!

Inflation in Industrial Economies

Thomas Lam*

Sim Kee Boon Institute for Financial Economics (SKBI)

29th April 2021

*The views expressed herein are mine and do not reflect the views of SKBI or SMU

Alike or Less Alike?

Average Cross-Correlation of Inflation — Headline (G7), Core (G7)

Average Cross-Correlation of Inflation — Headline (Other AE*), Core (Other AE*)
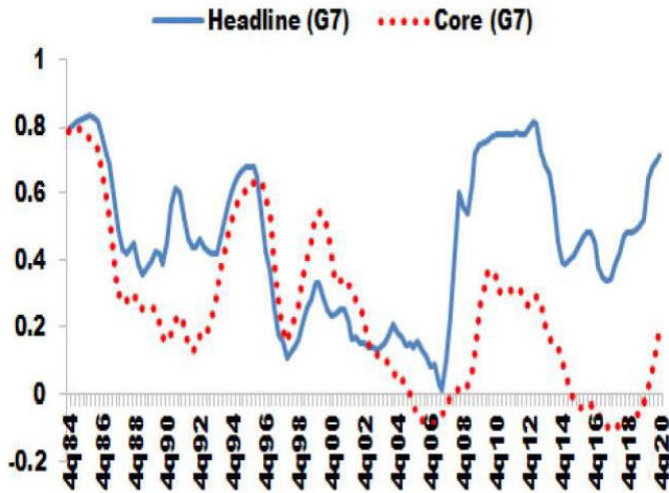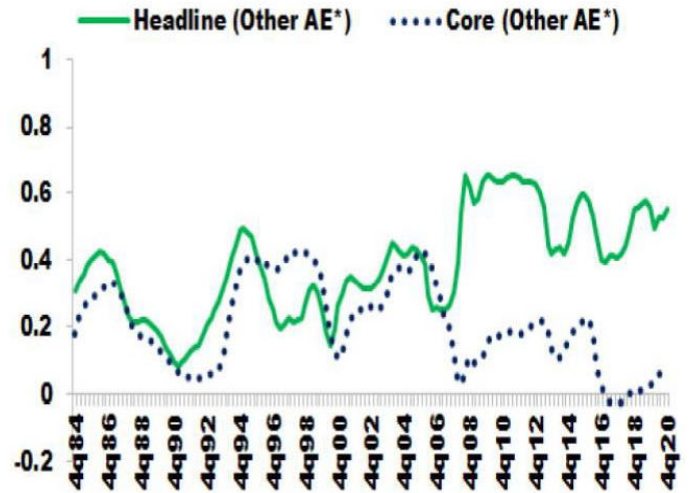
Source: FRED, Haver Analytics and Author's calculations
*17 Advanced Economies

thomaslam@smu.edu.sg
4/29/2021

Undershooting or Overshooting?

Average Frequency
Above the Mid-Point (2010-2019)
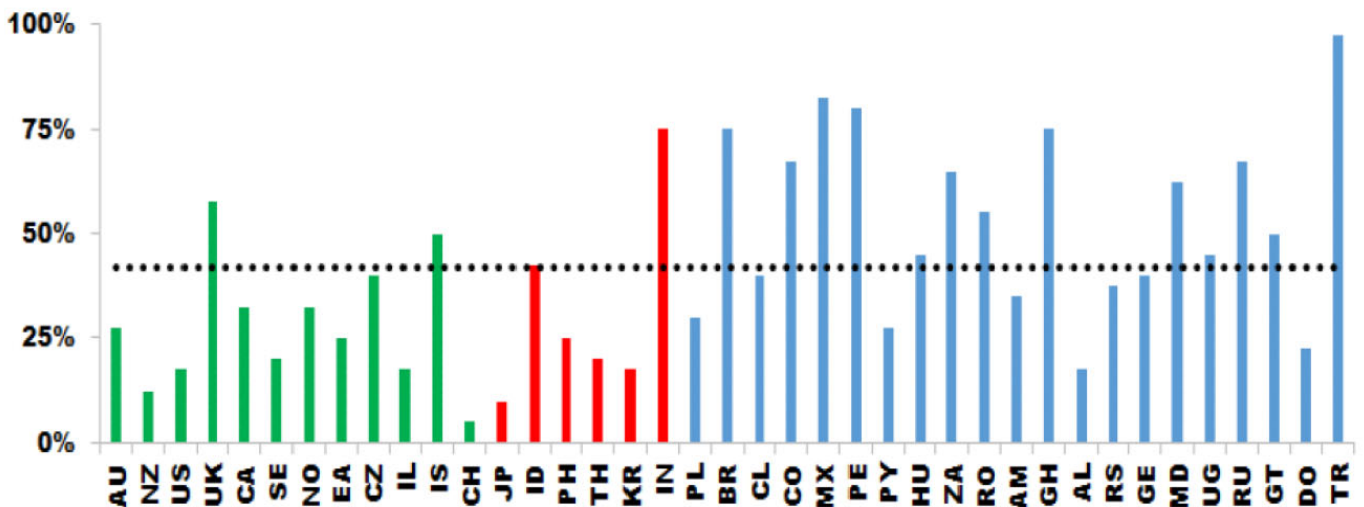
Source: Websites of central banks, FRED, IMF and Author's calculations

thomaslam@smu.edu.sg
4/29/2021

Whose Inflation Expectations?

P=Professional Forecaster Survey
H=Household Survey
M=Market-based Proxy

Root-Mean-Squared-Error (1999-2009)   **Root-Mean-Squared-Error (2010-2019)**
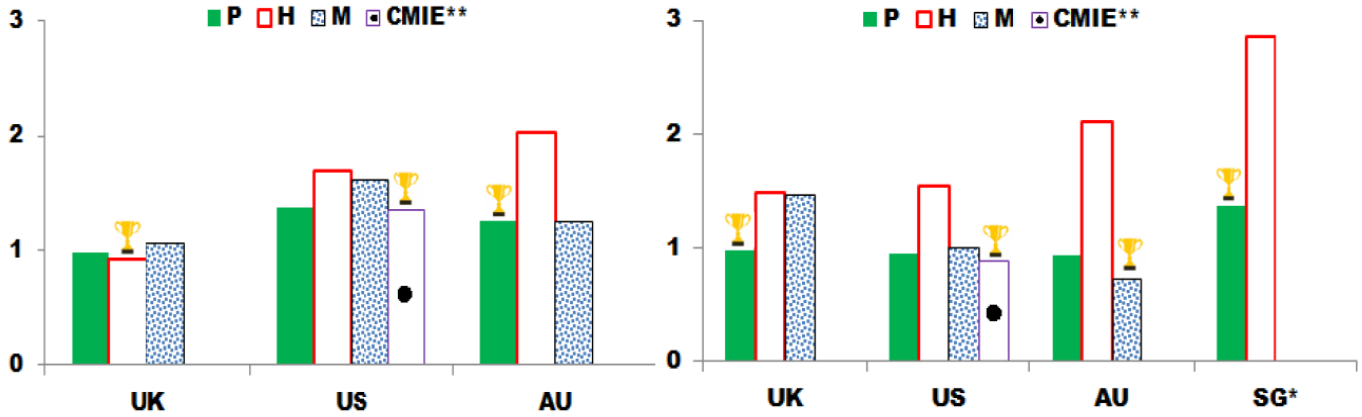
Source: Bloomberg, SPF, FRED, BoE, SKBI, Fed, MAS, RBA, UniMelb and Author's calculations
*2011-2019 and combination of full-year average/four-quarter ahead for P
**Composite Measure of Inflation Expectations (CMIE)
Note: The charts depict the RMSEs of four-quarter ahead inflation forecasts in %-points

thomaslam@smu.edu.sg
4/29/2021

3

An Experimental Measure for the US

Composite Measure of Inflation Expectations (CMIE)

(1): Longer-run inflation goal of 2%

(2): "Symmetric" inflation objective

(3): "Flexible average inflation targeting"
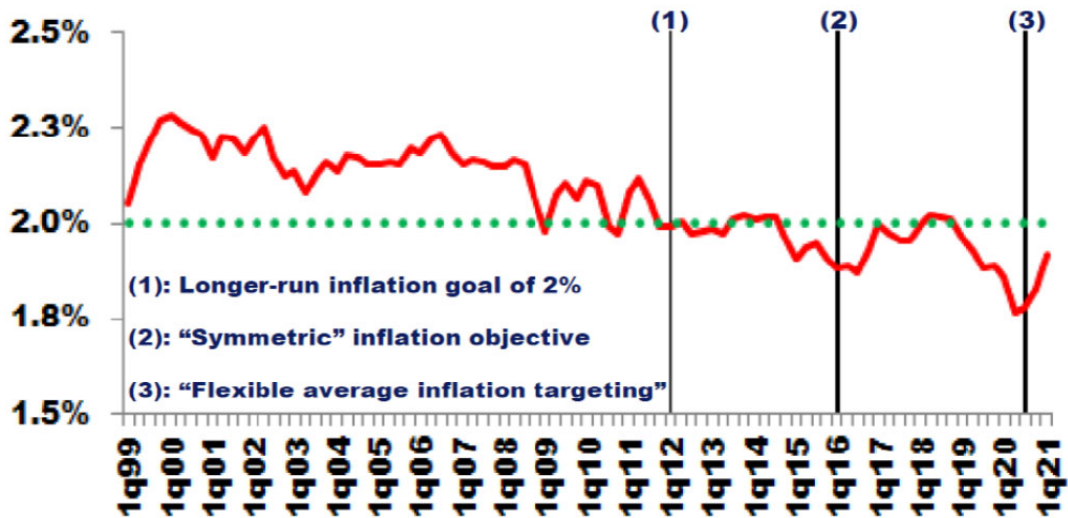
Source: Fed and Author's estimation
thomaslam@smu.edu.sg
4/29/2021

4

Takeaways and What-ifs

1. Crucial to distinguish between headline and core inflation, even among advanced economies, as recent fluctuations appear less synchronous.

2. The natural tendency for inflation to overshoot seems weaker, at least in most advanced economies with explicit goals or targets, in recent years.

3. Measures of inflation expectations, while not fungible, tend to exhibit different degrees of forecasting accuracy; hence, a composite measure is a promising alternative.

- *Hybrid and atypical inflation forecasting frameworks?*
- *Tradeoff between price and financial stability?*
- *Emerging inflation bias and psychology?*

thomaslam@smu.edu.sg
4/29/2021

5

IMF | STI IMF – Singapore Regional Training Institute | DBS | SMU SINGAPORE MANAGEMENT UNIVERSITY | Sim Kee Boon Institute for Financial Economics

Inflation and Cost of Living in Singapore and Asia: Post-Pandemic Implications

Thursday April 29, 2021, 9:00 a.m. – 12 noon

Session 2: Inflation in Emerging Asia 10:45 a.m. – 12 noon
Moderated by Mr. Dave Fernandez

Mr. Dave Fernandez is the Director of the Sim Kee Boon Institute (SKBI) for Financial Economics and Professor of the Practice of Finance at the Lee Kong Chian School of Business at Singapore Management University (SMU) He is also the Co-Director of the Singapore Green Finance Centre which is jointly run by SKBI and Imperial College London's Centre for Climate Finance & Investment. Outside of SMU, he sits on the Advisory Panel of the ASEAN+3 Macroeconomic Research Office.

Prior to returning to academia in 2018, Prof Dave worked as an economist in the private sector at Barclays and J.P. Morgan. He started his career in the public sector, serving as an economist in the administration of President George H.W. Bush and at the Federal Reserve Bank of New York.

Outside of his activities as an economist, he sits on the board of EMpower, a global philanthropy focused on at-risk youth in emerging market countries. He is also a member of Phillips Exeter Academy's Asia Council and the Exco of the Princeton Alumni Association of Singapore.

Prof Dave holds an M.A. and Ph.D. in Economics from Princeton University where he completed his dissertation under the guidance of Ben S. Bernanke. His undergraduate degree is from the University of Pennsylvania where Robert S. Mariano was his mentor.

Ms. Natalia Novikova is the IMF Resident Representative in Singapore covering macro-financial developments in ASEAN. Natalia has worked on design of macroeconomic policies in a range of advanced and emerging economies, including in the context of development and implementation of the IMF-supported programs.

Prior to joining the IMF, Natalia was an Economist at Citigroup and worked at the Monetary operations department of the Central bank of Russia. Her research interests and publications cover the analysis of sovereign debt sustainability, monetary policy, modelling of inflation and exchange rates.

Mr. Taimur Baig, Ph.D., heads economics as well as macro strategy for interest rate, credit, currency, and equities at DBS Group Research. He also advises the bank on risk management and investment strategy.

Prior to joining DBS, Dr. Baig was a Principal Economist in the Economic Policy Group, Monetary Authority of Singapore (MAS). Earlier he spent nine years at Deutsche Bank's Singapore office, where his last position was Managing Director and Chief Economist, Asia.

Before Deutsche Bank, he was based in Washington, DC, at the headquarters of the International Monetary Fund, for eight years, where his last position was Senior Economist.

Dr. Baig has published extensively for both specialists and a general audience, on areas including monetary policy in a deflationary environment, exchange rate regime determination, demographics, energy sector, frontier markets, fiscal policy efficacy, and financial market contagion.

Dr. Baig sits as a council member for the Asian Financial Think Tank, Economic Society of Singapore, and Women's World Banking.

Dr. Baig holds a Ph.D. in Economics from the University of Illinois at Urbana-Champaign. He attended London School of Economics and Wabash College for his B.A. in Economics.

REGIONAL ECONOMIC OUTLOOK

ASIA AND PACIFIC

ASIA AND PACIFIC DEPARTMENT

Inflation Broadly Contained Amid an Uneven Recovery

APRIL 27, 2021

Divergent recovery continues

	World	Asia	Asia AE	EMDE Asia	China	Japan	Korea	India	ASEAN	AUS-NZ	PICs and Small States
2020	-3.3	-1.5	-2.9	-1.0	2.3	-4.8	-1.0	-8.0	-3.3	-2.5	-8.9
2021	6.0	7.6	3.8	8.6	8.4	3.3	3.6	12.5	4.5	4.5	4.5
Revisions from last WEO	0.5	0.3	0.4	0.3	0.3	0.2	0.5	1.0	-0.7	1.0	0.3
2022	4.4	5.4	2.8	6.0	5.6	2.5	2.8	6.9	5.8	3.6	6.3
Revisions from last WEO	0.2	0.1	0.1	0.1	0.0	0.1	-0.1	0.1	-0.1	0.5	0.9
Cummulative losses 2020 - 2021 from Pre COVID Forecast	-4.3	-4.3	-2.1	-4.8	-1.2	-2.9	-2.3	-9.2	-8.9	-3.0	-14.0

Source: IMF *World Economic Outlook*. April 2021.

The pandemic generated unprecedented economic costs

GDP Losses Relative to Pre-COVID, Asian Economies
(Current projected 2025 level relative to pre-COVID forecast, percent difference)
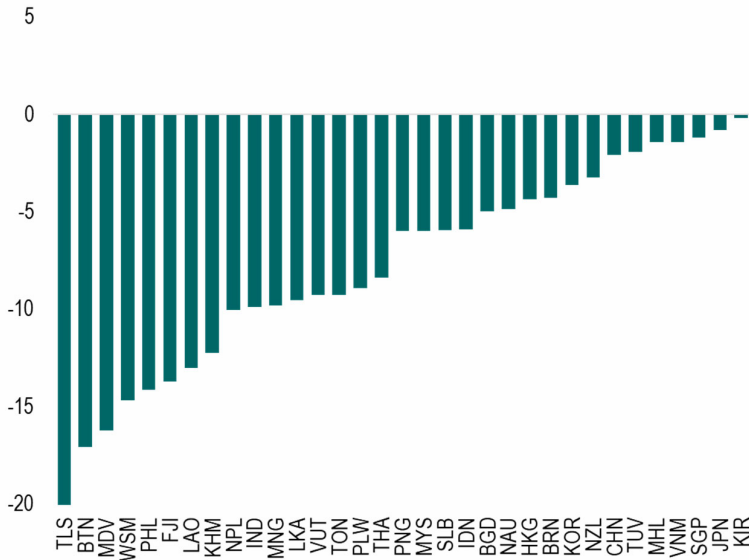
Source: IMF WEO Economic Outlook, IMF staff calculations.
Note: Current projection is based on WEO Live.

Asia: Change in employment by Industry
(percentage points; change 2019 Q4 v/s 2020Q4)
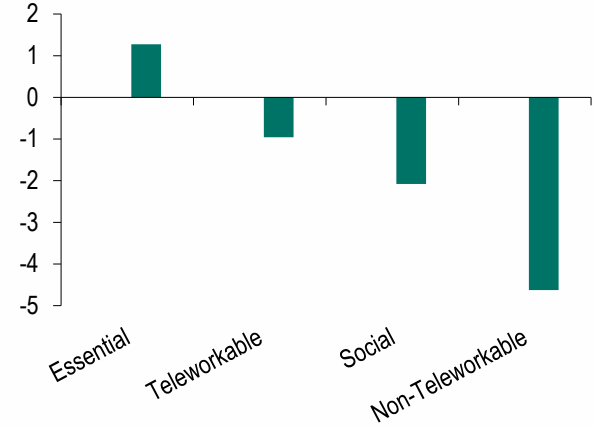
Sources: Haver Analytics; and IMF staff calculations
Asia refers to Australia, Hong Kong SAR, Indonesia, Japan, Korea, Malaysia, New Zealand, Singapore, Taiwan Province of China, Thailand, The Philippines, and Vietnam. Data are seasonally adjusted, based on December 2020 data (or latest available). Essential industries refer to agriculture, utilities, transport, information and communication, and health and public administration; social industries refer to wholesale and retail, hotels and restaurants, and arts and entertainment; teleworkable industries refer to finance, business and professional services, and education; and non-teleworkable industries refer to mining, manufacturing, and construction.

Global inflation contained despite rebound in oil prices

Commodity price indices
(index; Jan 2020=100)
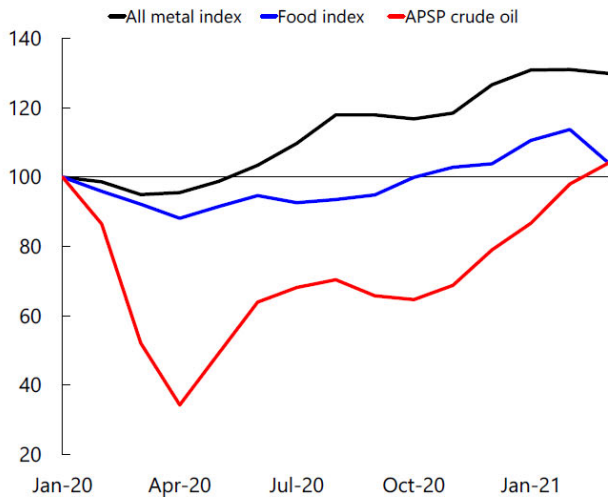
CPI inflation
(percent; year over year)
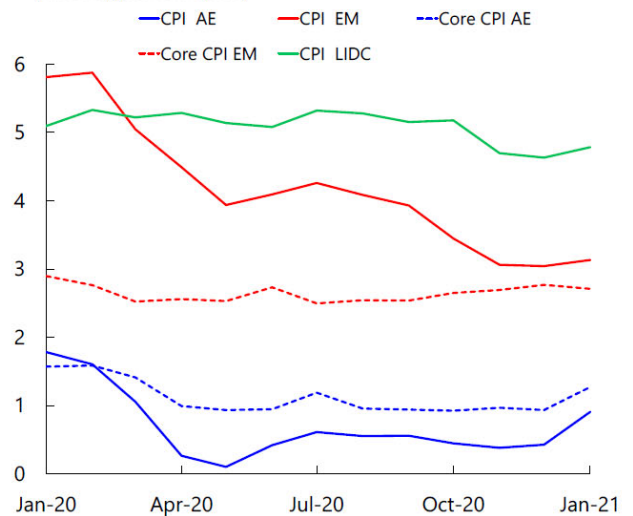
Sources: Bloomberg, L.P.; and IMF staff calculations

Inflation in Asia remains broadly subdued

Inflation
(percent change, year-over-year)

■ Headline ▬ Food ▲ Core

India, Philippines, Hong Kong SAR, New Zealand, Indonesia, Taiwan, Province of China, Korea, Australia, Vietnam, Singapore, Malaysia, Japan, China, Thailand
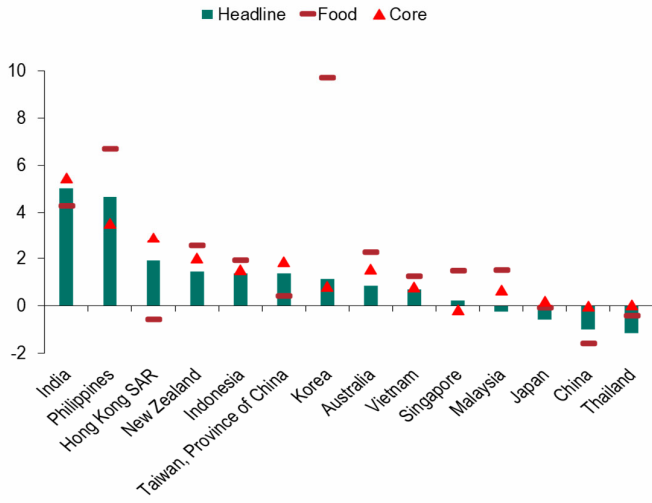
Sources: Haver Analytics and IMF staff calculations.

Decomposition of change in 10y Yield
(percent, since 11 Feb 2021)

■ Risk-neutral
■ Term-premium
◆ 10y Bond yield change

USA PHI BRA PER COL TUR ZAF THA MEX CHL MYS IDN HUN POL RUS IND
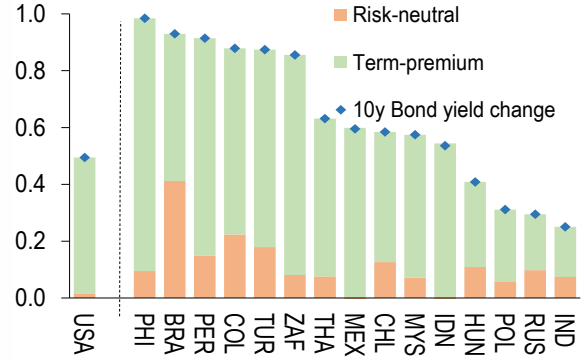
Sources: Bloomberg LLP and IMF Staff Calculations.

Inflation less sensitive to unemployment gap

Advanced Asia: Phillips Curve and Automation

Slope of Phillips Curve vs Relative price of investment goods

θ_t = -1.865*** + Pinv x 3.173***
     (0.686)   (0.832)
Time and country fixed effects
R^2 = 0.647

← Higher automation
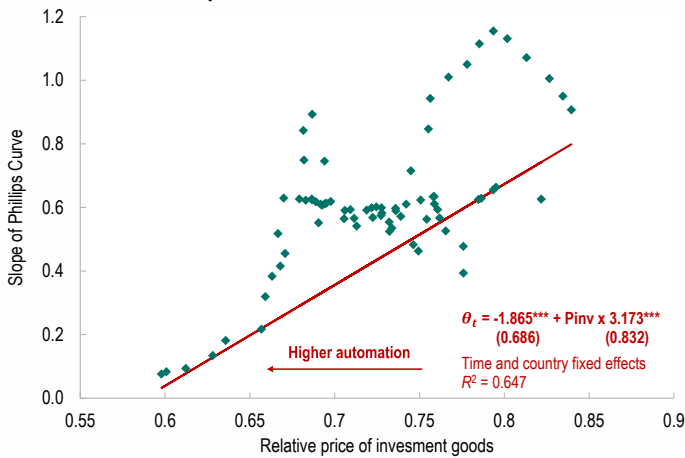
Emerging Asia: Phillips Curve and Integration into Global Value Chains (GVCs)

Slope of Phillips Curve vs Share of Foreign Value-Added in Exports (Tiva)

θ_t = 1.077*** + Foreign VA x (-0.0267***)
     (0.134)   (0.00483)
Time and country fixed effects
R^2 = 0.66

Higher GVC integration →
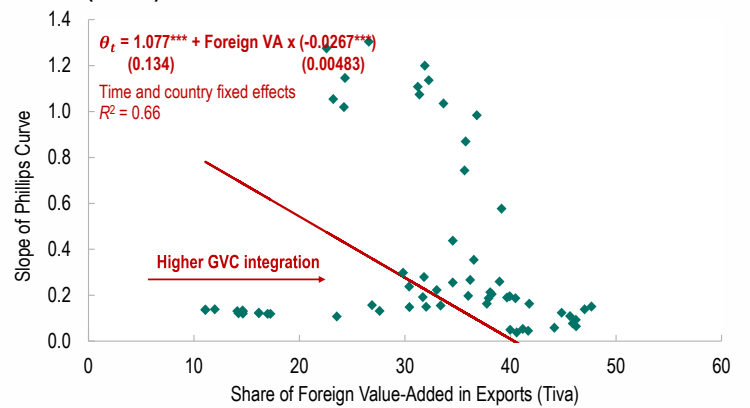
Sources: April 2018 Regional Economic Outlook: Asia Pacific, MF staff estimates.
Note: Emerging Asia excludes China and India. The Phillips Curve slope estimates for these two countries are less reliable given difficulties in measuring the unemployment gap in countries with large informal sector (India) and state-owned enterprises (China).

Thank you!

DBS Insights
Inflation upside or just base effect?

Taimur Baig, PhD, Chief Economist
Economics and Strategy, Group Research
29th April 2021

Inflation is ticking up
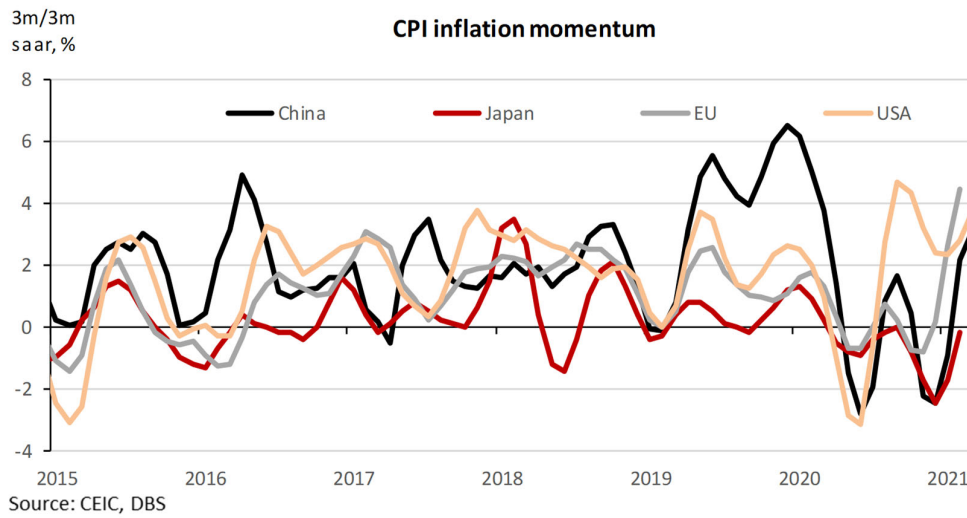
CPI inflation momentum

3m/3m saar, %

Legend: China, Japan, EU, USA

X-axis: 2015 2016 2017 2018 2019 2020 2021
Y-axis: -4 to 8

Source: CEIC, DBS

Inflation is ticking up in Asia too

CPI inflation momentum

3m/3m, saar, %

Legend: China, EM Asia (PPP weighted)

X-axis: 2015 2016 2017 2018 2019 2020 2021
Y-axis: -3 to 7

Source: CEIC, DBS

Is it all base effect?

CPI inflation momentum in Asia

3m/3m saar, %

Legend: Taiwan — South Korea — Singapore — Philippines

Source: CEIC, DBS

Tracking food inflation
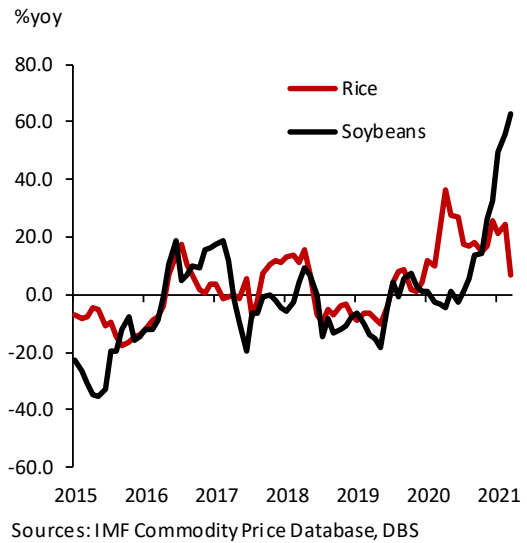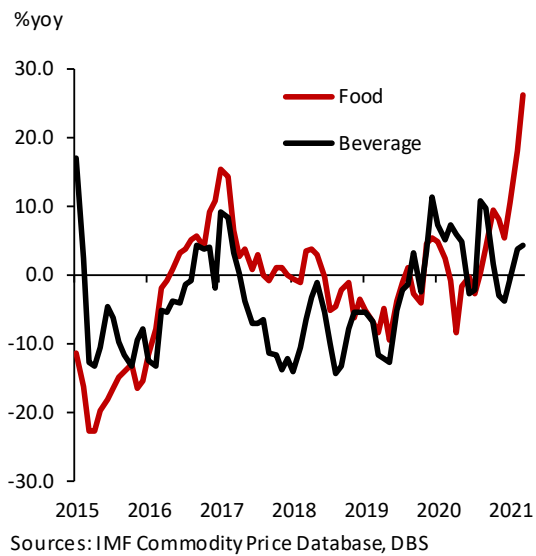
%yoy

Legend: Food — Beverage

Sources: IMF Commodity Price Database, DBS

%yoy

Legend: Rice — Soybeans

Sources: IMF Commodity Price Database, DBS

Tracking food-related inflation
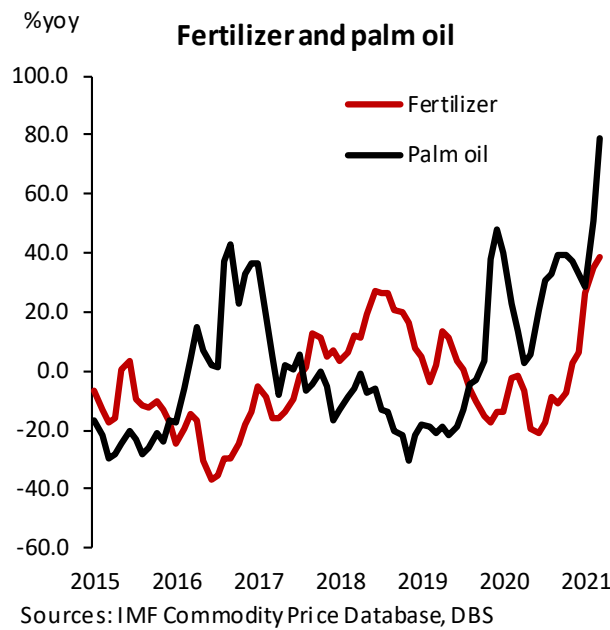
Fertilizer and palm oil

%yoy

Sources: IMF Commodity Price Database, DBS

Tracking metals inflation

Metals

%yoy

Sources: IMF Commodity Price Database, DBS

Tracking energy

Energy

%yoy

Sources: IMF, DBS

Tracking freight costs

Baltic Dry Freight Index vs China Manufacturing PMI

Baltic Dry Freight Index (RHS)

China Manufacturing PMI (LHS)

Source: Bloomberg

Also keep an eye on--

- Construction material
- Semiconductor chips
- Appliances
- Basic electronics
- Pre-owned cars
- Services

Disclaimer: The information contained in this document is intended only for use during the presentation and should not be disseminated or distributed to parties outside the presentation. Each of DBS Bank Ltd. and DBS Bank (Hong Kong) Limited accepts no liability whatsoever with respect to the use of this document or its contents. Please refer to the Important Notice and Disclaimer found at the end of this document.

43

Disclaimer & Important Notice

Disclaimer: The information contained in this document is intended only for use during the presentation and should not be disseminated or distributed to parties outside the presentation. Each of DBS Bank Ltd. and DBS Bank (Hong Kong) Limited accepts no liability whatsoever with respect to the use of this document or its contents. Please refer to the Important Notice and Disclaimer found at the end of this document.

44