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GCC Economies in the Wake of Covid19:
Charting the Road to Recovery and
Resilience**

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**The Dubai Consumer Price Index in the time
of Coronavirus**

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Outline

- 1. Introduction**
- 2. Dubai CPI methodological challenges (prices collection, weights, imputation and the choice of the proper CPI formula)**
- 3. International practices**
- 4. Conclusions**
- 5. Recommendations**

1. Introduction


- This PPT is not for Dubai only and could relate to any statistical agency in the region that updates its basket every five years
- The CPI is used as a measure of inflation or cost of living
- It measures the average price change of a basket of goods and services that is kept constant over time

- A fixed basket index is a *Low*e price index

$$I_{0:t}^{Lo} = \frac{\sum P_t^i q_b^i}{\sum P_0^i q_b^i}$$

- *Low*e is a general type of basket index and the basket can refer to any period or combination of periods
- To construct the index we need to select the weight reference period and use expenditure shares rather than quantities
- Drastic changes in consumer spending will result in biasness of inflation

- The CPI is among the economic statistics most affected by sudden changes caused by the pandemic
- The pandemic has brought prices data to the center of attention and is pressing us to accelerate innovation and think differently
- Spending patterns changed abruptly, products disappeared, outlets closed, online shopping surged and pre-pandemic CPI weights became obsolete

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- The gap between perceived and actual inflation rate is more pronounced during covid19 and that influence macroeconomic outcome
 - Most consumers don't believe the CPI during the pandemic reflect the true inflation

2. Challenges

- Data Collection
- Weights
- Imputation
- Calculation Method and Choice of the Formula

Data collection

- The need for high quality and timely data is more urgent than ever
- Prices are compiled from a range of different sources and types (traditional modalities are no longer helpful)
- The new collection methods and data sources will be the key to the future of official statistics

Table 1.: Main Aspects of CPI Price Data Collection During Lockdown

Percentage of prices collected	Effects of the health emergency	Categories affected by the health emergency
Below 65%	Restrictions on the movements of price collectors	All those sectors where prices are collected face-to-face
	Establishments closed	Recreation services: cinemas, theatres, sporting events, among others
	Products and services are temporarily unavailable	Food away from home services, hotel services
		Personal care and household cleaning products

Table 2: Response outcomes for the commodities and services price survey (US)

Outcome and mode	April 2019	April 2020
Collected prices	86%	66%
Uncollected prices	14%	34%
Collection mode:		
Personal visit	66%	0%
Telephone	9%	15%
Online	14%	68%
Other	11%	16%
^[1] Includes prices used in index collection not designed to be obtained by field collection, such as corporately provided data and sample collected by the national office.		

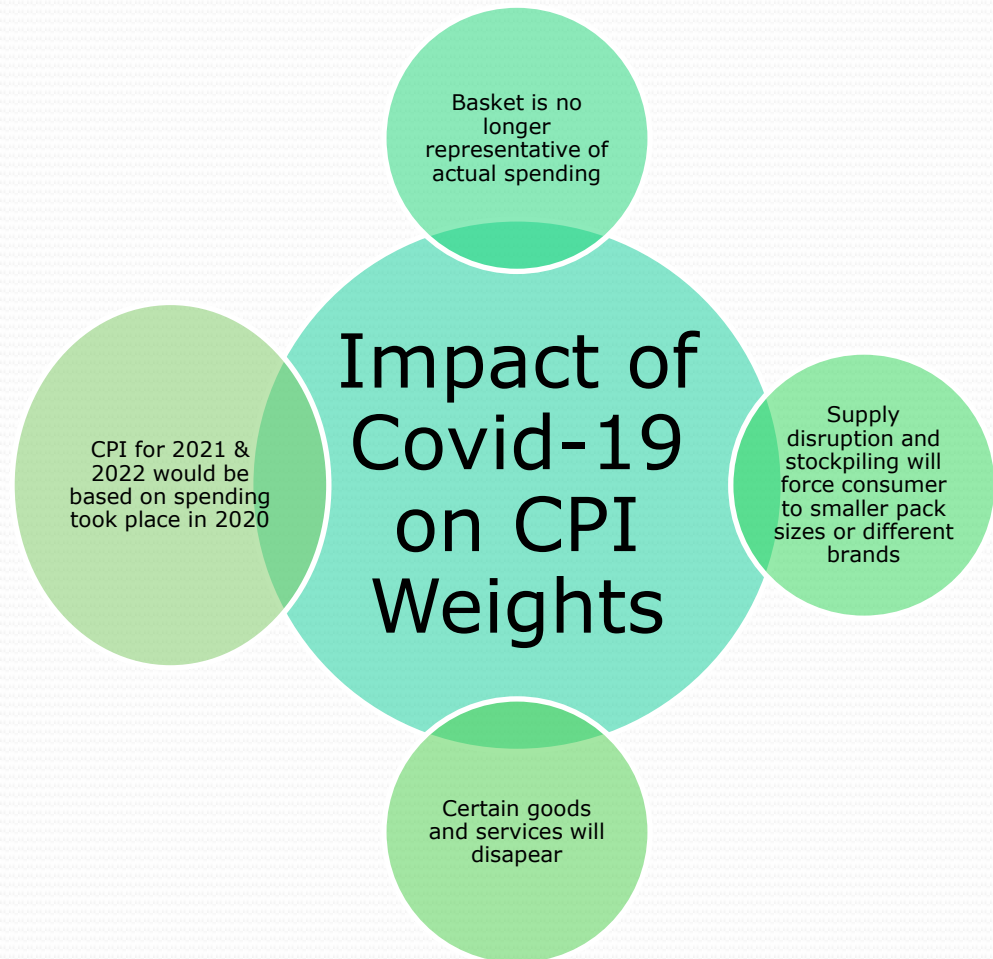
- Alternative modes of price collection may include telephone, e-mail, online prices, big data, web scraping and scanner data.
- Using these modes may lead to difficulties in ensuring a minimum coverage of all products (goods and services).
- Dubai Statistics Center may want to cooperate with Smart Dubai on using debit and credit transaction records.

Consumer Spending and the CPI Weights

- The consumer price index is calculated as a weighted average of the price change of the goods and services covered by the index
- Expenditure weights have to be consistent with the conceptual framework of the index.
- When exploiting this data source, the scope and the concept of the index will determine what should be included or excluded in the CPI weights.

Chart 1: Factors driving weights in the CPI during Covid19

How consumers' altered spending patterns affected the measurement of inflation during the pandemic?










- Large shifts in consumers' spending patterns was due to lockdowns, staying at home, working from home, social distancing, and lost income
- When shocks are on the demand side, producers adjust prices accordingly
- Credit card and payments data from advanced economies show increased importance in household budgets of food, and decreased spending on transport, clothing/footwear, recreation/ entertainment, and restaurants/hotels, resulting in a decline in overall spending

- If expenditure weights are not updated, the price-updated weights on items with above average price increases will tend to be overweighted and the price-updated weights on the items with below average increases will tend to be underweighted, resulting in an overstatement of inflation.
- This is precisely because of the natural tendency of consumers to

- The Dubai CPI weights used reflect the relative importance of the goods and services as measured by their shares in the total consumption of household survey conducted in 2014, the current basket is 2019 and the next is for 2024
- Weights in 2020 are probably unlike the official weights that DSC constructed based on the consumption habits of consumers in 2014

Table 3: Weight for the Dubai CPI (2014)

Product	Weights	Direction change during coronavirus
Shelter	43%	
Health	.85	
Transport	10.62	
Communication	5.22	
Recreation and culture	2.33	
Restaurants and hotels	4.0	
Other products	76.92	

Measuring the effect of Covid19-induced weighting bias

- Consumer spending is greatly affected by the pandemic containment measures, introducing a weighting bias into the measurement of CPI inflation.
- Use of the family budget survey weights is problematic when there are huge shifts in monthly spending patterns within the months of a pandemic year.
- At least one country, Canada, uses new models of measuring expenditure weights to construct a monthly analytical CPI (Covid-CPI).

- To estimate the expenditure shares in the COVID basket, many countries started with the latest official CPI expenditure weights *and* multiplied them by the average percentage change in the corresponding expenditure category each month and normalize them as a share of the total
- Therefore the importance of the item in the basket can change even when its expenditure does not.

Table 4: Average COVID-19 Weights based on Spending Changes between February and April in Canada and the US

COICOP Division	CPI price updated Weight of April 2020	COVID-19 Weight, based on Spending in Canada	COVID-19 Weight, based on Spending in the US
Food and Non-Alcoholic Beverages, tobacco and alcohol	27.10	38.20	36.70
Clothing and footwear	4.00	5.10	5.60
Housing, water, electricity, gas and other fuels	5.30	2.10	3.90
Furnishings and household equipment	17.70	21.80	22.60
Health	5.40	5.50	5.00
Transport	4.10	3.90	2.50
Communication	11.90	7.00	4.60
Recreation and culture	3.50	3.80	4.40
Education	5.60	1.30	2.10
Restaurants and hotels	2.70	2.50	3.50
Miscellaneous goods and services	6.30	2.80	3.20
	6.40	6.00	6.00
	100.00	100.00	100.10

Source: IMF CPI database, Mitchell et al. (2020), and Cava

Imputations

- Imputation is the process used to assign replacement values for missing, invalid or inconsistent data that have failed edits
- If someone wants to refer to the international [Consumers Price Index Manual](#), it provides best practice advice on imputation under normal conditions, but doesn't give guidance on extreme situations, such as those experienced during the recent coronavirus lockdown

- A small amount of data should be missing due to some goods and services not being sold for the entire period
- Default imputation methods should change
- Countries have an imputation methodology for missing price observations, depending on whether the product is seasonal or not, with an average imputation rate per month of between 3% and 7%.
- During Covid19 the ratio of missing price observations will be higher than usual and, therefore, the percentage of prices to be imputed will be higher.

Ideal imputation methods for prices during Covid19

- For unavailable items such as air tickets, use the quarterly all group CPI for available items
- For unavailable items that are collected annually in other periods, DSC may use carry forward imputation.
- That means they can use the last available price for the current period, assuming that the price has not changed since they last collected it.

- For missing available items, DSC may use the lowest aggregation level of available items where the response rate was more than 25 percentage points below the usual response rate (for example, if the typical response rate of an item was 95%, DSC officials may review if this fell below 70%) and assess the quality and reliability

Calculation Methods and the Choice of the proper Formula

- A chain Fisher index, or a chain index using any formula that satisfies the time reversal test, will largely eliminate upper-level substitution bias
- A chain Laspeyres index with links every five years normally has its basket reference year as the initial year of the five-year span but a chain Laspeyres index with a mid-term basket performs much better.
- In particular cases, it may be better to adjust the span of a basket, so one basket reference year is used only for four years and its predecessor for six years.

- The DSC practice compares poorly with the calculation of initial-year Laspeyres chain indexes, which compares even more poorly with Laspeyres chain indexes using mid-term baskets.
- The use of a mid-year basket approach would require the 2022=100 index to be calculated for another four or five years, before it was replaced by a 2027=100 index that would be revised back to 2025 to reflect the impact of the new 2027 basket.

- Going forward from 2024 the Dubai CPI should be calculated as much as possible using the mid-year basket approach, until such time as resources were available to consider replacing it with an annually chained consumer price series.
- For this reason, there would be a lot of merit for DSC in having a special budget survey in 2022
- The Dubai CPI could be calculated as a 2022=100 Laspeyres index with the 2022 basket carried back to 2020, except perhaps for those categories where experts believed the use of 2019 weights was more appropriate

- Of all the official consumer price series currently used for escalation, only the US C-CPI-U or the US chain CPI, adequately deals with the situation created by the pandemic, since it is already a monthly chained price index with a formula, Törnqvist, that passes the time reversal test
- The US model is expensive, but worth trying it in the future
- The Swedish CPI is an annually chained consumer price series that offers another model for better reflecting the influence of the pandemic on inflation (offers more revision than the US and annual linking of series doesn't have to be in December)
- Swedish model is suitable for countries with limited resources

3. International Practices

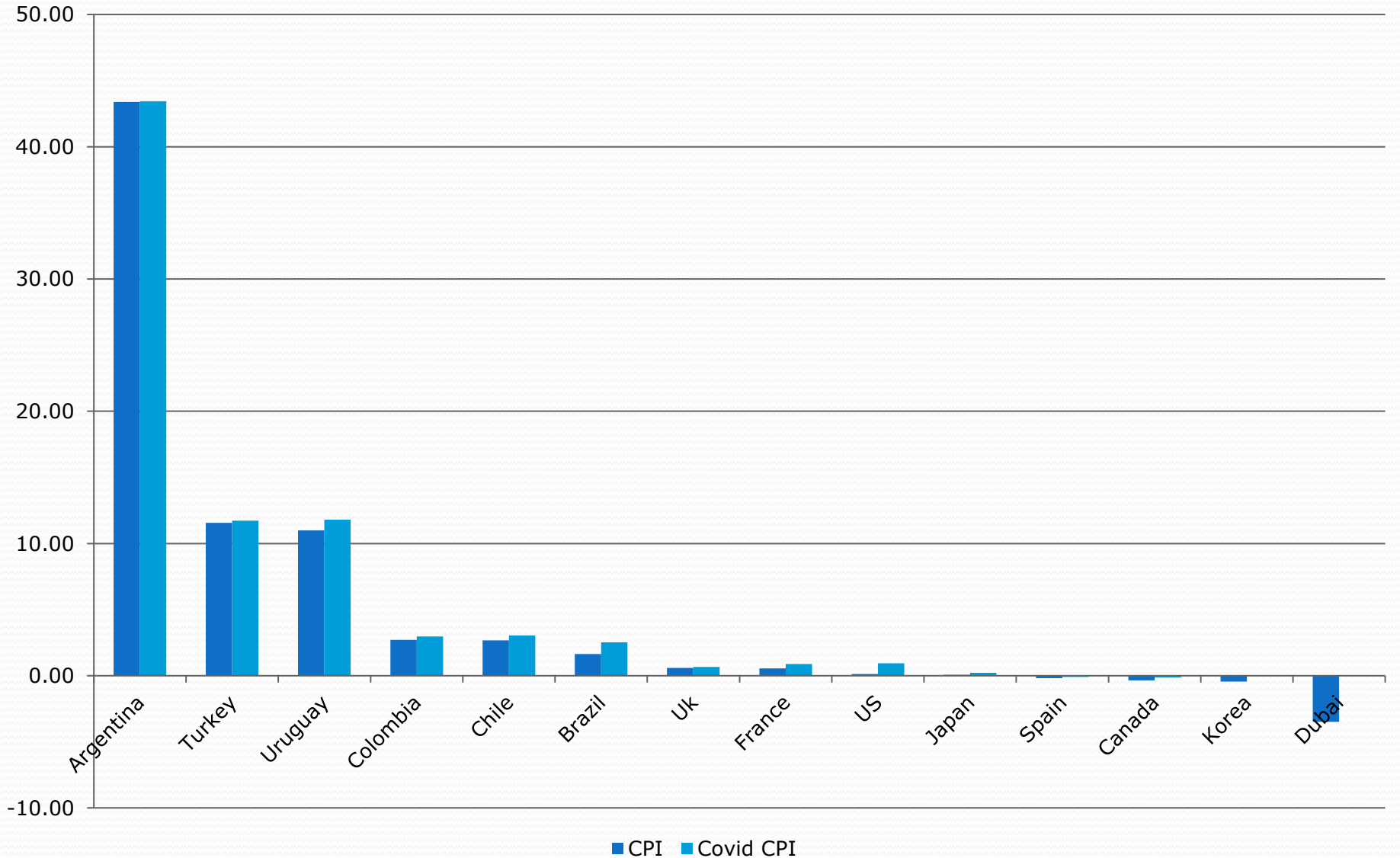
- The Canadian analytical CPI approximates a monthly-linked chain Laspeyres formula, but a monthly-linked chained Törnqvist index would be a better inflation measure.
- In a worst case scenario a monthly-linked chain Laspeyres index based on data not adjusted for seasonal variation can generate substantial upward drift, showing considerable inflation over 12 months even if there is no change in prices at all over 12 months.

Table 5: US CPI weights and Incidence, April 2020

- Changes in expenditures introduced significant biases in inflation measurement
- Covid weights are obtained from debit and credit card transactions
- Covid 19 CPI is higher than the CPI

CPI Category	CPI inflation	W-CPI	W-CovidCPI	Incidence-CPI	Incidence-CovCPI
Food at home	2.67	7.58	11.28	0.20	0.30
alcohol beverages	0.30	1.02	1.52	0.00	0.00
Apparel	-4.38	2.81	2.20	-1.12	-1.00
Housing	-0.03	42.11	55.80	-0.01	-0.02
Medical Care	0.28	8.83	5.60	0.02	0.02
Transportation	-4.97	15.74	6.25	-0.78	-3.10
Recreation	-0.27	5.82	2.23	-0.02	-0.01
Education and Communication	0.13	6.77	8.97	0.01	0.01
Food away from home	0.15	6.19	3.13	0.01	0.00
Other goods and services	-0.04	3.13	3.03	0.00	0.00

Chart 2: CPI and Covid Annual Inflation in May 2020, 12-month change, %



4. Conclusions


- The CPI is an essential tool for economic policy making and the results from many countries have important implications for Covid19 period and beyond.
- Consumption patterns are greatly affected by the lockdowns and social-distancing behaviors, introduced a potential bias into the measurement of CPI inflation.
- The basket purchased during the pandemic differs significantly from the one purchased before the pandemic, on which the CPI weights are based


- Research showed inflation is higher than the one measured by the CPI in almost all countries in early months of the pandemic and users have to bear that in mind
- Although underestimation of inflation may have been a short-run problem caused by the unusual conditions of the early months of the pandemic, the potential for the differences between current spending patterns and the CPI weights affect the accuracy of the CPI
- A supplementary COVID-19 price index could provide useful information on the prices being paid during the pandemic and may lead to policy recommendations

- Expenditure weights are not the only issue to address during Covid pandemic, but the choice of the proper formula is as important as well
- Chaining the CPI to bring in weights that reflect pandemic expenditure patterns could jeopardize the long-run accuracy of the CPI
- Complete return to pre-pandemic purchasing patterns will take more time than expected and will depend largely on improving conditions

5. Recommendations

- Cooperate with Smart Dubai to obtain debit and credit transactions data to produce current weights (Covid-weights)
- Explore alternative price mechanisms, by constructing different CPI's based on different formulas and compare them to the conventional CPI to see the degree of biasness (Törnqvist, Fisher and Edgeworth-Marshall).
- Using the Laspyres formula, DSC may want to collect a minimum of prices for the most important or the most representative products and use their weights from the 2019 basket to produce an alternative measure for the CPI

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- Because pre-pandemic CPI weights may understate inflation during the pandemic, check the sensitivity of the CPI to upward adjustments to weight on food and housing and downward adjustments to weights on transport and clothing
 - The five years between rebasing allowed by the international standards may be too long for DSC in times of rapid change.
 - A special 2022 household budget survey should be seriously considered and a Laspeyres index based on this basket could be carried back to 2020, consistent with the mid-term basket approach.

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- If it were not feasible to have a special household budget survey for 2022, there would still be merit in adopting the middle-term basket approach starting with the 2019 basket updating.
 - For 2020 forward there should be adjustments of the basket shares of categories sensitive to the pandemic and the lockdown, along the lines suggested by Eurostat (2020).
 - Document methods and procedures to assist continuing production of the CPI and for information of users



Thank you