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MEASURING THE ECONOMICS OF A PANDEMIC





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STATISTICS

COVID-19 and the CPI: Is Inflation Underestimated?

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Marshall Reinsdorf
Senior Economist
IMF Statistics Department

Introduction

COVID-19 disrupted compilation of the Consumer Price Index (CPI) in many ways

- Products disappeared
- Outlets closed, and online shopping surged
- Spending patterns changed abruptly, and the CPI weights suddenly became obsolete

This paper brings some new perspectives to the question of how consumers' altered spending patterns affected the measurement of inflation during the pandemic

- Covers all parts of the world
- Tests alternative assumptions about the changes in spending patterns
- Breaks down the sources of the difference between the COVID-19 index and the CPI
- Offers practical recommendations for CPI compilers

Presentation has 3 sections: **Methods, Results, Recommendations & Conclusion**

Methods

Background on CPI Weights

Steps to produce the CPI:

1. Construct price indexes for products from individual observations of the product's price
2. Construct upper-level and top-level aggregates as weighted averages of the product indexes
 - **Weights = adjusted* base period budget shares; these weights allow the overall index to track the cost of the basket purchased in the base period**

Under normal conditions, regular updating of the base period suffices to keep the differences between the CPI weights and current period spending patterns within an acceptable range

- Laspeyres/Lowe indexes tend to overstate inflation slightly: e.g., the US chained Törnqvist index rises 0.25 percent per year *less* than the headline CPI
- International standards allow up to 5 years between rebasings

*** for price changes between the base period and the starting point of the rebased index**

Spending Patterns Disruptions caused by COVID-19

Large shifts in consumers' spending patterns due to lockdowns, staying at home, working from home, social distancing, and lost income

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

Housing and communications also had an increased budget share

It's not practical to update the CPI weights in real time capture these changes

In effect, CPI weights suffered sudden obsolescence when the pandemic arrived

Potential Effect on Measurement of Inflation

The things people used to buy might have significantly different inflation from the things purchased during the pandemic

Undetected inflation might be a problem in the early months of the pandemic

When the shocks are on the demand side, producers tend to respond to falling demand by cutting prices, and to rising demand by raising prices

⇒ If weights are not updated, the weights on items with falling prices could end up too big and the weights on the items with fast-rising prices could end up too small, resulting in an understatement of inflation

Will calculate each item's contribution to gap between the COVID-19 index and the CPI as:

$(\text{Change in item's weight}) \times (\text{Deviation of item's price index from the overall CPI})$

Weights for a COVID-19 Index

Statistics Canada has developed a COVID-19 price index whose weights reflect spending pattern changes during the pandemic

I use the information on impacts of COVID-19 on spending patterns in Canada to adjust CPI weights of every country with complete data in the IMF CPI database

The CPI weights of 83 adjusted in proportion to relative changes in spending in Canada between February and April

For comparison, I repeat the analysis using the spending changes in the US from Cavallo (2020)

- US estimates have smaller decline in spending on clothing/footwear, perhaps because the pandemic budget shares of Canada came from a lockdown period, and penetration of online shopping is lower in Canada
- But US estimates have larger decline for spending on transport

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
01 Food and non-alcoholic beverages	27.1	38.2	36.7
02 Alcoholic beverages, tobacco, and narcotics	4.0	5.1	5.6
03 Clothing and footwear	5.3	2.1	3.9
04 Housing, water, electricity, gas and other fuels	17.7	21.8	22.6
05 Furnishings and household equipment and maintenance	5.4	5.5	5.0
06 Health	4.1	3.9	2.5
07 Transport	11.9	7.0	4.6
08 Communication	3.5	3.8	4.4
09 Recreation and culture	5.6	1.3	2.1
10 Education	2.7	2.5	3.5
11 Restaurants and hotels	6.3	2.8	3.2
12 Miscellaneous goods and services	6.4	6.0	6.0

Source: Authors' calculations based data from the IMF CPI database, Mitchell et al. (2020), and Cavallo (2020).

RESULTS

Highlights of the Estimates

COVID-19 weights implies more inflation than the CPI in almost every region

Global average impact is 0.23 percentage points with CPI weight adjustments based on the impact of COVID-19 on spending patterns in Canada, or 0.32 ppts with weight adjustments based on impact of COVID-19 on spending patterns in the US

Rising food prices in all regions contribute 0.16 ppts to the total effect

Falling transport prices in almost all regions also contribute 0.16 ppts.

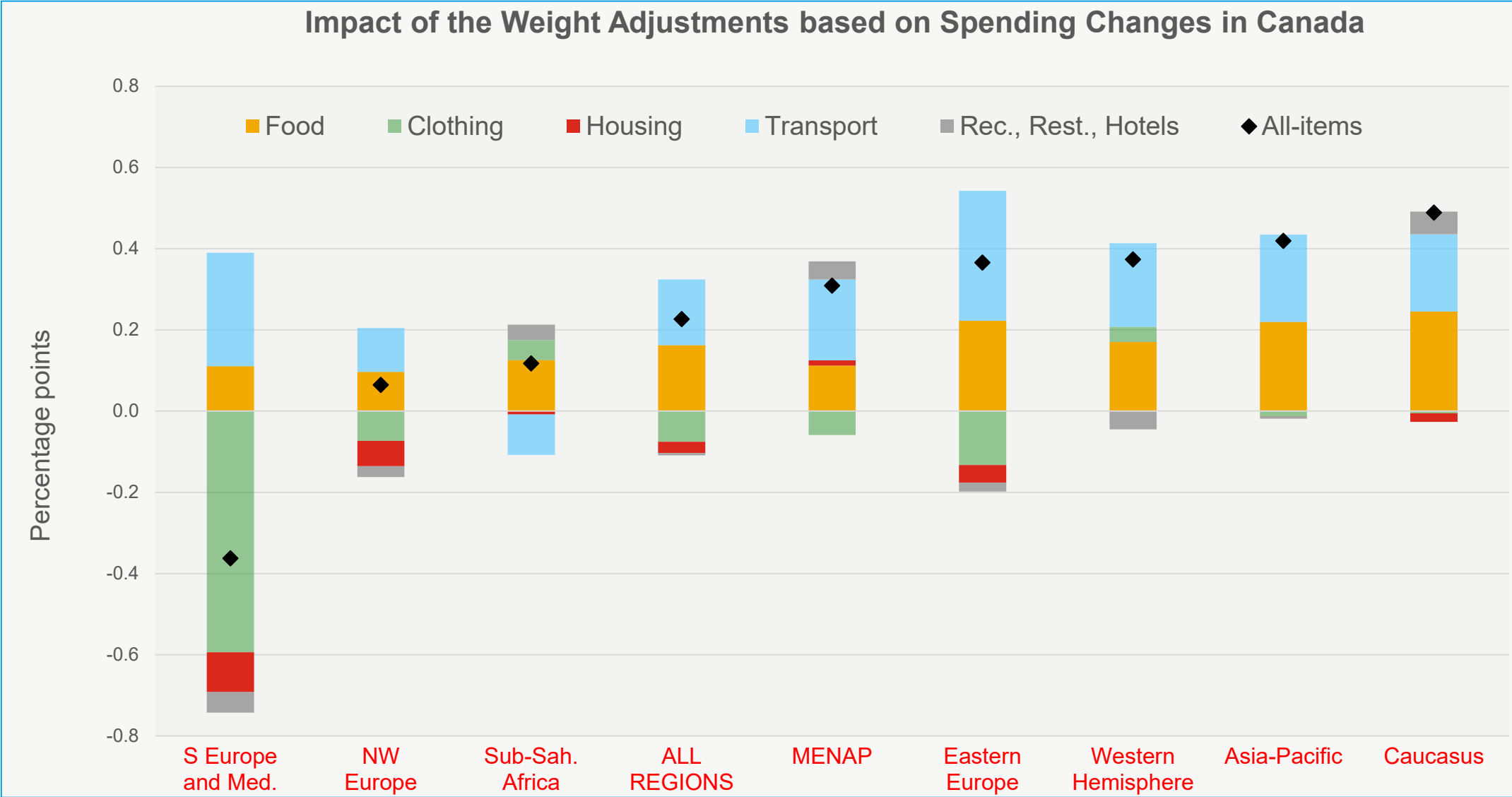
Seasonal increases in clothing prices subtract 0.08 ppts and falling housing prices relative to the all-items CPI subtract 0.03 ppts based spending changes in Canada

Cautions on Interpretation of the Estimates

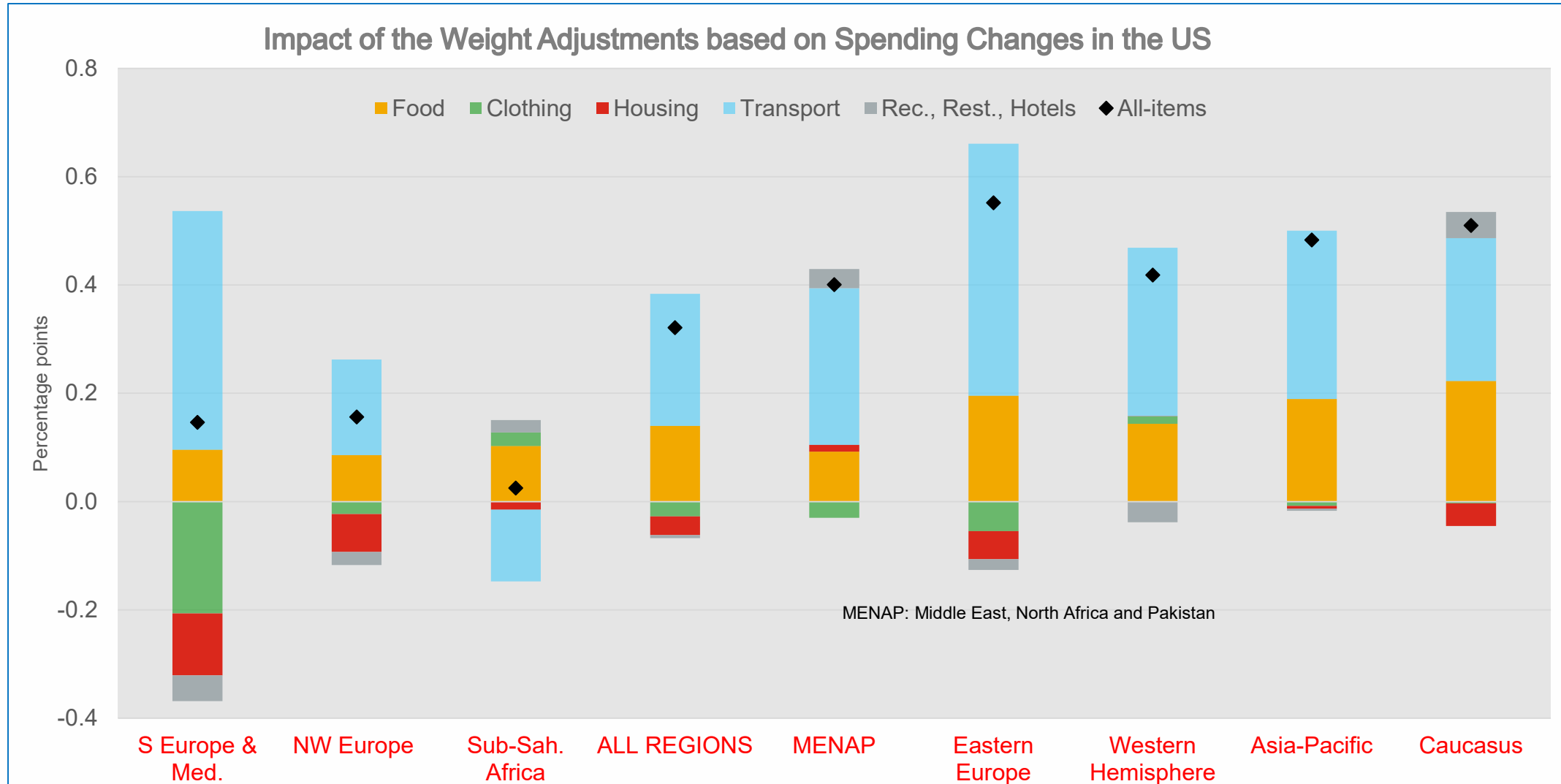
The positive gaps between the COVID-19 index and the CPI confirm the presence of undetected inflation, but are likely to overstate its size

- The COVID-19 indexes are Paasche indexes, but a chained Törnqvist index would be a better benchmark for “true” inflation and would likely be closer to the CPI
- Impact on spending patterns may be more muted in emerging market and low-income countries, where lockdowns and working from home were less frequent
- In subsequent months spending patterns partially reverted to where they were before the pandemic
- *On the other hand, the COVID-19 indexes only adjust for higher-level changes in spending patterns; taking lower-level changes into account might add to the gap*
- *Also, no downward effect of seasonal increases in clothing prices on the difference between the COVID-19 after March*

Difference between the COVID-19 Index and the CPI over the 3 Months ending May 2020

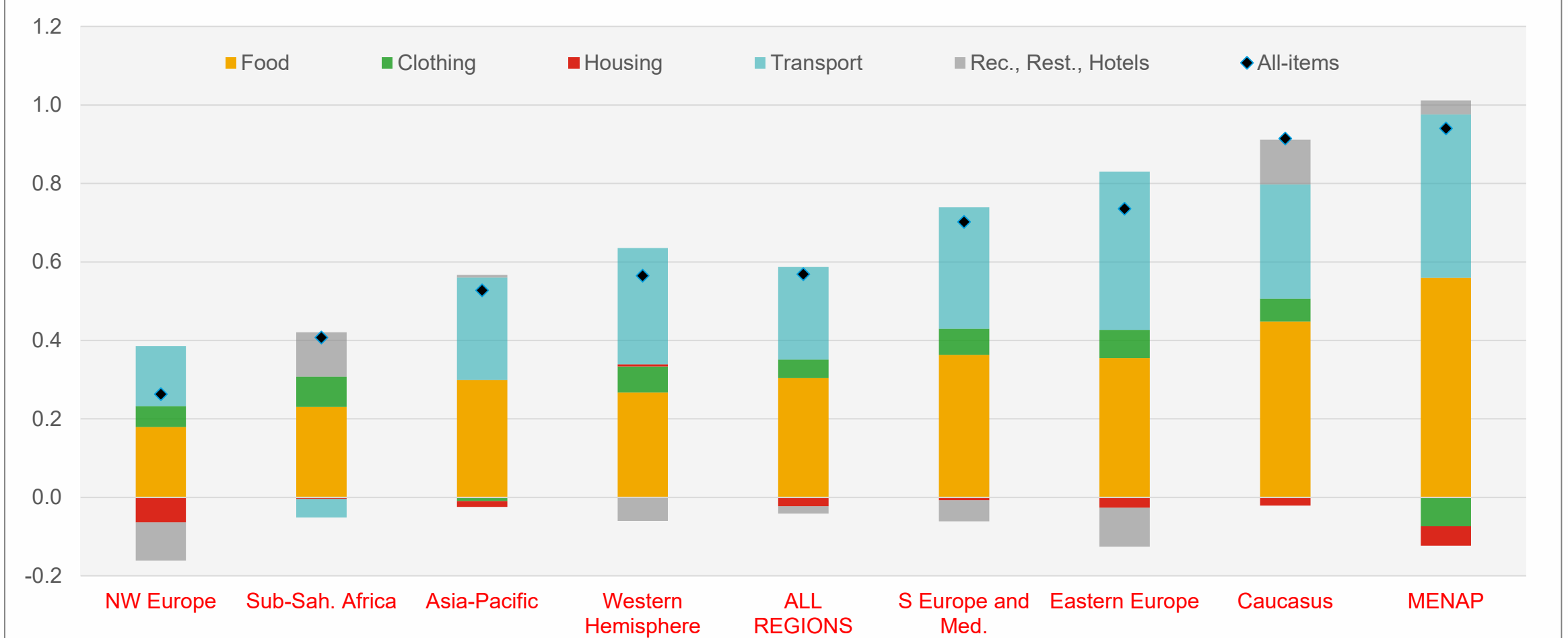


Difference between the COVID-19 Index and the CPI over the 3 Months ending May 2020



12-Month Difference between COVID-19 Index and CPI and Items' Contributions to that Difference

Impact of Weight Adjustments based on Spending Changes in Canada on Inflation, May 2019-May 2020



Recommendations and Conclusion

Recommendations for Compilers

A supplementary COVID-19 price index could provide useful information on the prices being paid during the pandemic, but a quick interim update of CPI weights based on credit card and payments data would be impractical and could jeopardize accuracy over the long run

Rapid changes in spending patterns increase the urgency, but potentially also the difficulty, of a timely rebasing of the CPI

- The 5-years between rebasings allowed by the international standards may be too long in times of rapid change
- But while budget shares are still in flux, special procedures may be needed to develop weights that approximate post-pandemic spending patterns
 - ◆ 2019 may be too anomalous to use by itself as a new base period; perhaps a two-year long base period could help with managing the volatility in spending patterns

Conclusions

More inflation than measured by the CPI virtually worldwide in early months of the pandemic

Food prices rose more than the CPI in all parts of the world and were under-weighted

- ▣ Low-income households' budgets were particularly vulnerable to rising food prices, so their inflation experience may have been particularly understated by the CPI

Falling transport prices (which had too much weight in the CPI) also contributed

Concerned data users can check the sensitivity of the CPI to upward adjustments to weight on food and housing and downward adjustments to weights on transport, clothing and other items

But at least a partial return to pre-pandemic purchasing patterns will be likely as conditions improve, as shown in the latest data on the COVID-19 index of Canada

Recommendations for Data Users

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, clothing

But at least a partial return to pre-pandemic purchasing patterns will be likely as conditions improve

