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Introductory remarks / The impact of digitalisation on inflation measurement[1]

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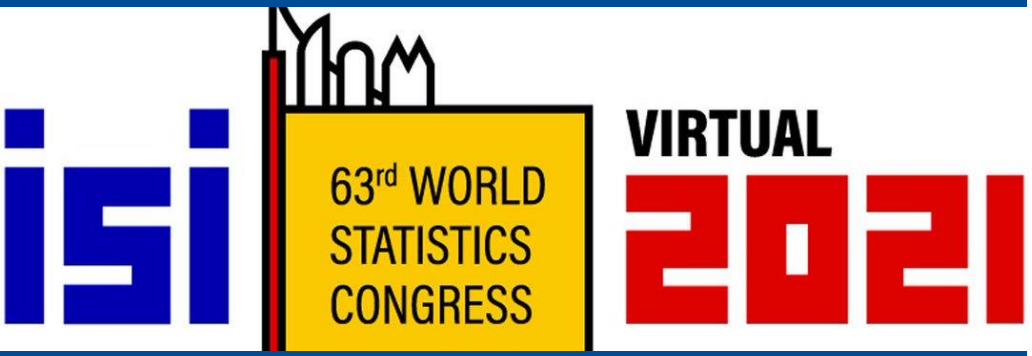
[1] This presentation was prepared for the WSC. The views expressed are those of the author and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the event.



STATISTICS

The Impact of Digitalization on Inflation Measurement

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Digitalization and Measurement of Inflation

- Some longstanding challenges for price statistics of keeping up with a changing economy and capturing quality change have been amplified by digitalization.
- Whether estimates of CPIs still provide a good measure of inflation in a digitalized economy has become a topic of debate.
- The claims that prices of household consumption are being mis-measured largely revolve around incomplete adjustment for quality change in products or distribution channels, i.e.,
  - the treatment of new, and often improved, varieties of existing digital products (e.g., computers);
  - the treatment of new digital products that replace existing non-digital products (e.g., streaming services replacing CDs); and
  - improved variety selection of digital and non-digital products (e.g., clothing, books).

Quality Change in Existing Product Lines

- Reinsdorf and Schreyer (2019) calculate upper-bound impacts on the deflator (price index) for household consumption in OECD countries.
- In terms of the simulated effects of possible measurement errors based on 2015 weights,
  - the upper bound correction to the index's growth rate for overlooked quality change is –0.41 percentage point, largely driven by the 0.24 percentage point overestimation of the deflator for telecommunication services;
  - the potentially unmeasured savings from digital replacements is –0.11 percentage point; and
  - the upper bound correction for improved variety selection is –0.05 percentage point.
- Combining all the effects, Reinsdorf and Schreyer end up with an upper bound for the potential mismeasurement of digital products of –0.57 percentage point.

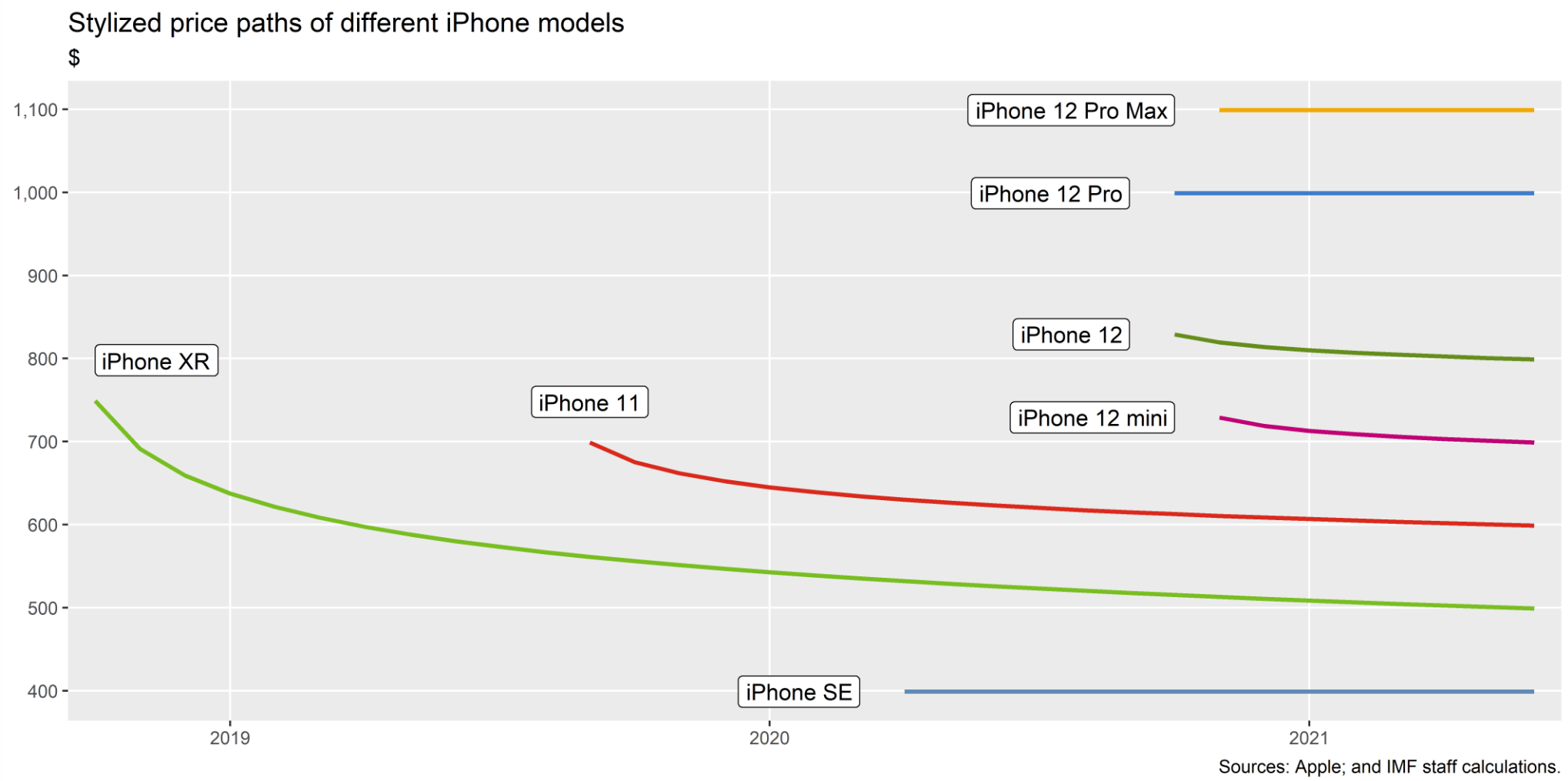
New Varieties of Digital Products

- Using price changes of continuing products (matched-model approach) to approximate price changes of new varieties typically leads to an over-estimation of inflation for digital products.
- Sample refreshments help to keep the sample representative and are also occasions for bringing in *new products and product varieties*. In a sample refreshment, a newly selected sample is 'linked in', and the old sample is 'linked out'. The first period the new sample comes in is also the last period for which the old sample is used.
- First, in the case of a product undergoing significant quality improvement, the failure to adjust for the higher average quality of the items in the sample being linked in may cause the index to overstate the product's price change.
- Second, late introduction can lead to price declines early in the life cycle being missed, a problem that is particularly relevant for digital products.

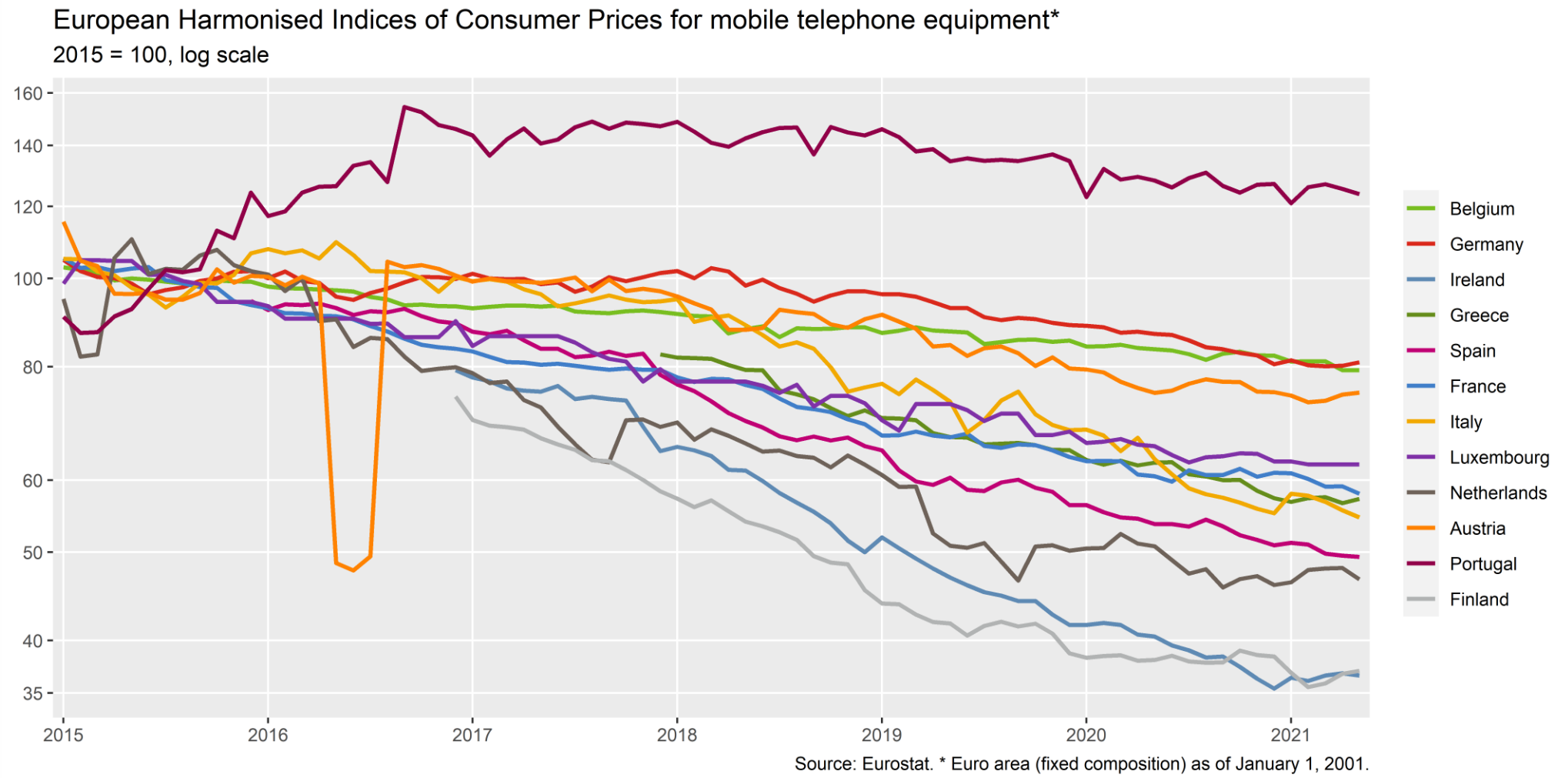
Simultaneous Price and Quality Changes

- However, often quality increases are higher than price differences between old and new varieties.
- Much less investigated, but not to be overlooked, is whether quality change of some digital products may systematically be *overstated*. Examples of quality declines that are not captured in price measures include the requirement to purchase new models of cell phones and computers in the absence of backwards compatibility of new software with older hardware.
- To summarize, quality adjustment of replacements for existing products within a sample, and of new products coming in during sample refreshments, may miss some quality change. The overlooked quality change and cost of living effects could be in either direction, but for digital products benefitting from new technology, insufficient capture of quality improvements is more likely.

Do Higher Prices Reflect Quality Growth or Inflation?



Quality Adjustment is as Much an Art as a Science…



…and a Matter of Debate and Personal Perception

- Have prices for smart phones in six years (from 2015 to 2021 May) risen by 24% (Portugal), or fallen by 63% (Ireland and Finland)?
  - If we assume today's average smart phone would have cost €1,000 in 2015, it will now cost €370 in Ireland and Finland, or €1,240 in Portugal; a trade margin of €870 – per smart phone!
- Several academic and business economists have suggested that digital products are conceptually relevant for understanding consumer inflation as measured by the CPI.
  - Using matched models or implicit methods that fail to adjust for the higher average quality of new varieties (comparable replacement, overlap pricing, etc.) may cause the index to overstate the product's price change.
  - Errors in capturing digital products in the price measures for household consumption could potentially play a role in mismeasurement of real GDP.