Office for National Statistics

The Institution of Engineering and Technology

A Comparison of Approaches to Deflating Telecoms Services Output

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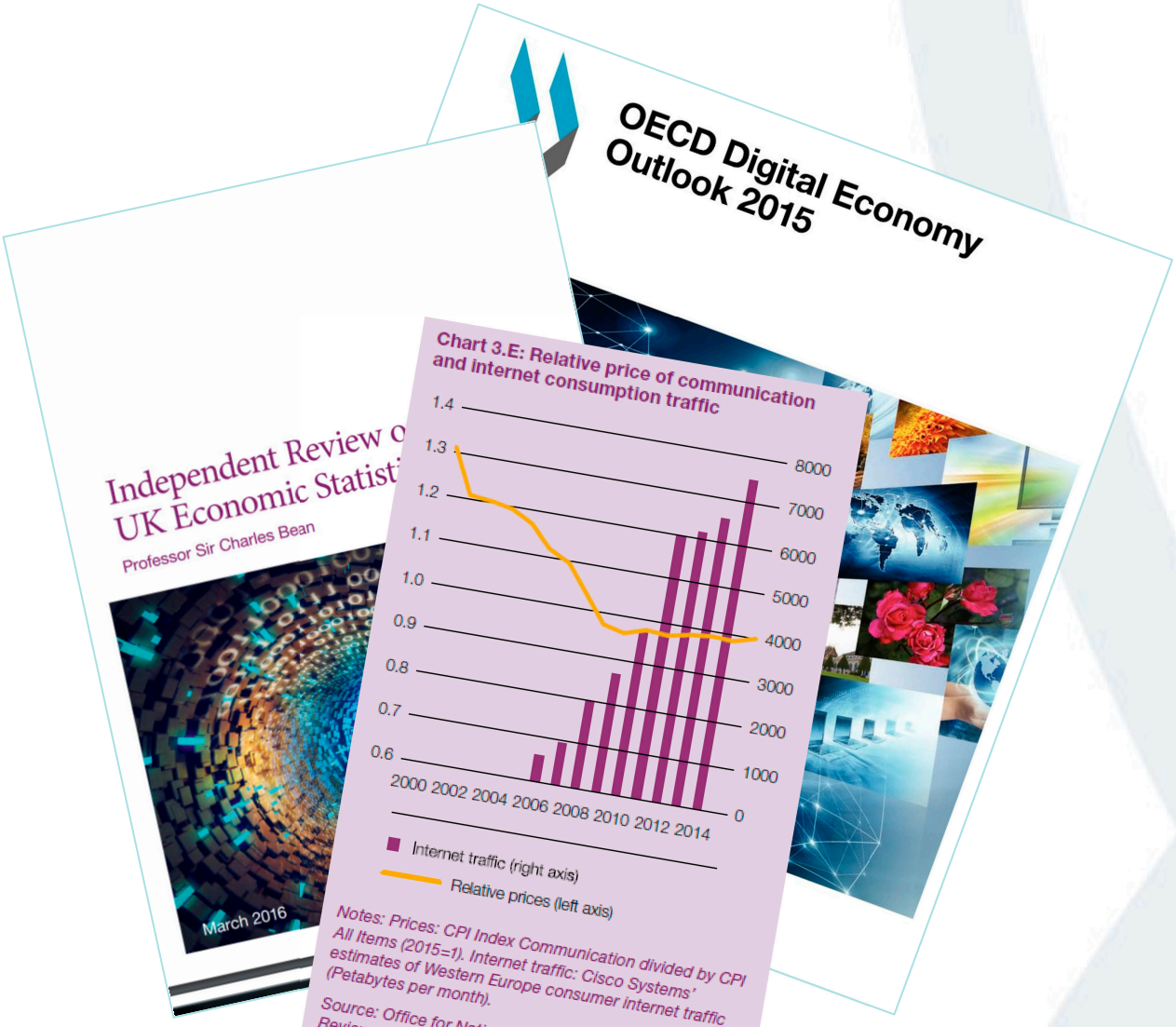
Widespread Issue



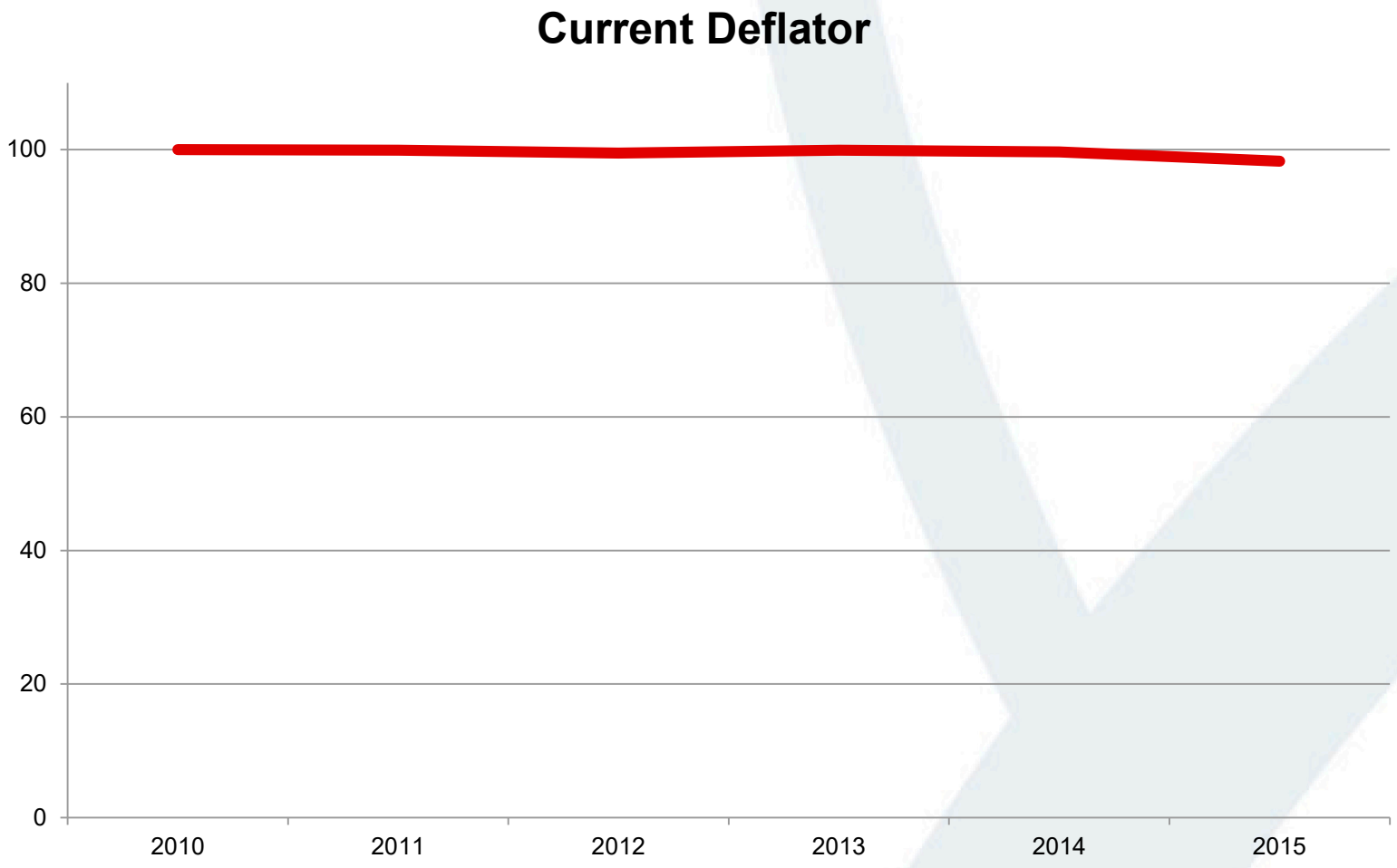
"The great irony of the information age is that… we actually know less about the sources of value in the economy than we did fifty years ago."

Brynjolfson & Mcafee (2014)

"Relatively flat prices fail to reflect the improving quality of communication services, based on vastly increasing volumes of data exchanged."

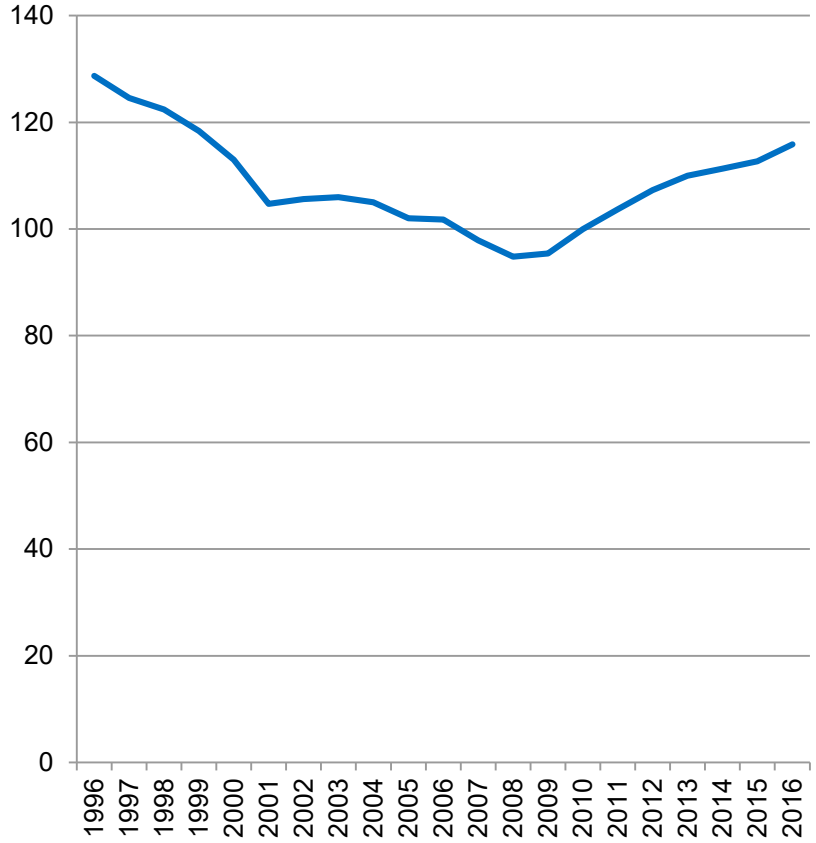
Bean (2016)

Current Product Deflator broadly flat

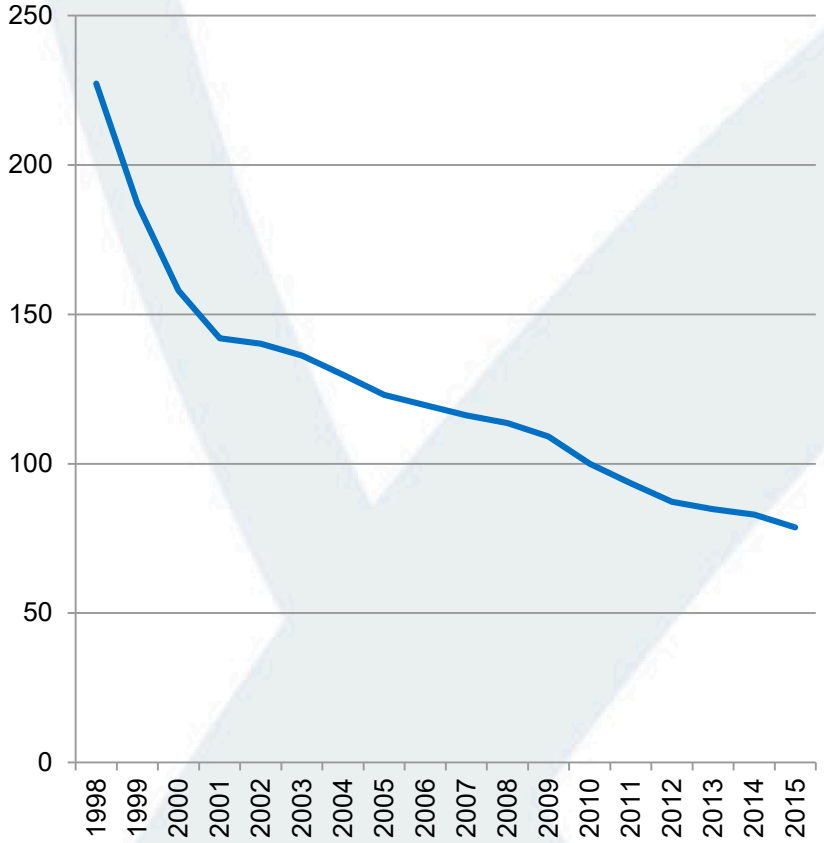


Current Method: Combination of CPI and SPPI

CPI: Telecommunication Services and Equipment (66% weight) (2010 = 100)



SPPI: Telecommunication Services (34% weight) (2010 = 100)



Issues with current deflator

1. How to set the CPI and SPPI weights
2. CPI is in consumer purchaser's prices, not producer prices.
3. CPI product level index captures both goods (X) and services (✔)
4. For the CPI the ONS obtains representative consumer profiles from Ofcom. For each profile, the ONS tracks the price for the *cheapest* available tariff from the main service providers. This misses quality gains from more expensive tariffs
5. With exception of Smartphones, none of the item level indices in the CPI: Telecommunications Equipment and Services are hedonically adjusted
6. Methods differences between product level CPI and SPPI.
7. SPPI not kept fully up to date. A notable absence from the SPPI is mobile and broadband data.

Issues with technology products more generally

Quality change and **new goods** often lead to price indices being upwardly biased

Illustrative Example:

	Voice Telephony			Skype			Total		
	Quantity	Price	Revenue	Quantity	Price	Revenue	Quantity	Revenue	Average price
Year 1	100	10	1000	10	1	10	110	1010	9.2
Year 2	10	10	100	100	1	100	110	200	1.8

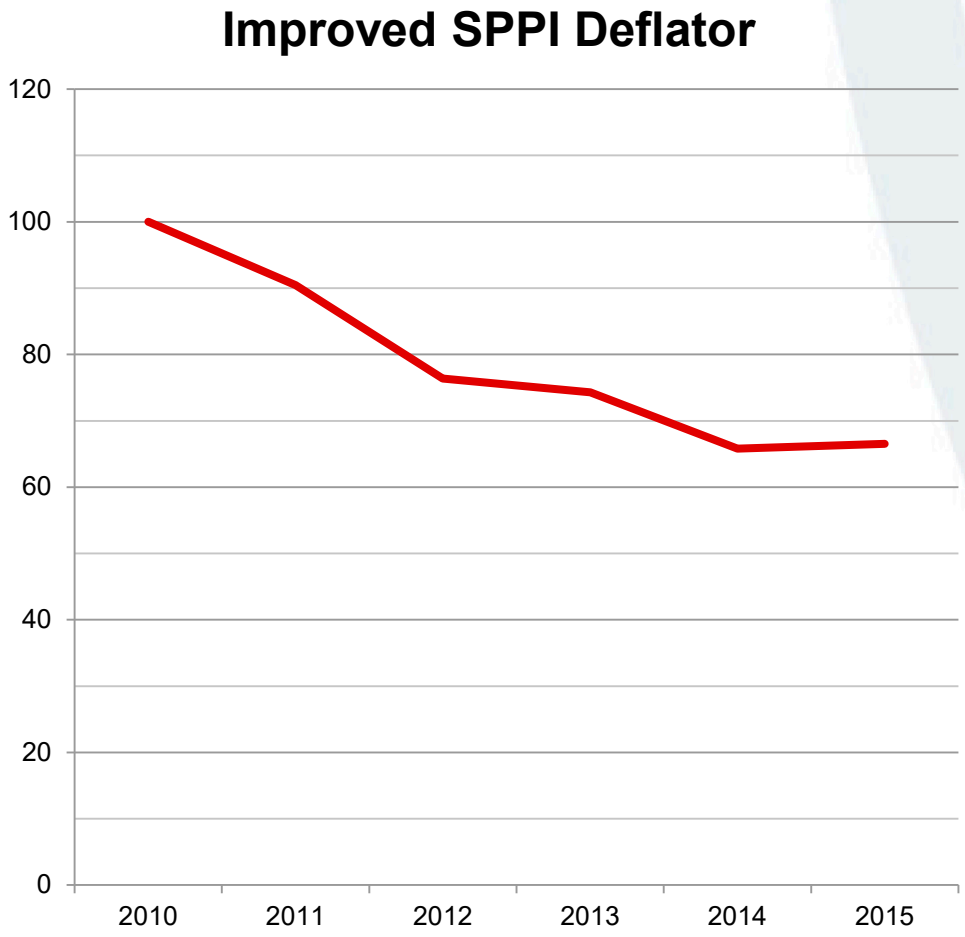
	Year 2 price index	Year 2 volume index
Laspeyres/Paasche/Fisher	100	19.8
Aggregate Unit value index (Data usage approach)	19.8	100

Issue has been discussed extensively and current solutions include:

- Updating index weights more frequently
- Introducing new goods into the index earlier
- Hedonics (Gold standard)

Options

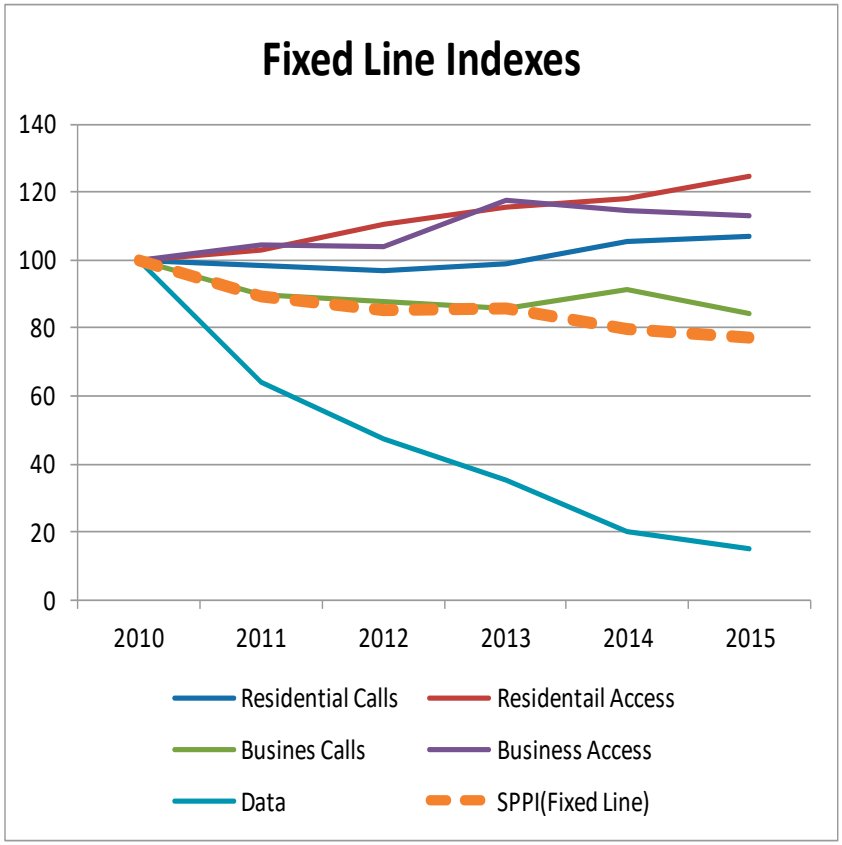
Option A: Improved SPPI Deflator shows

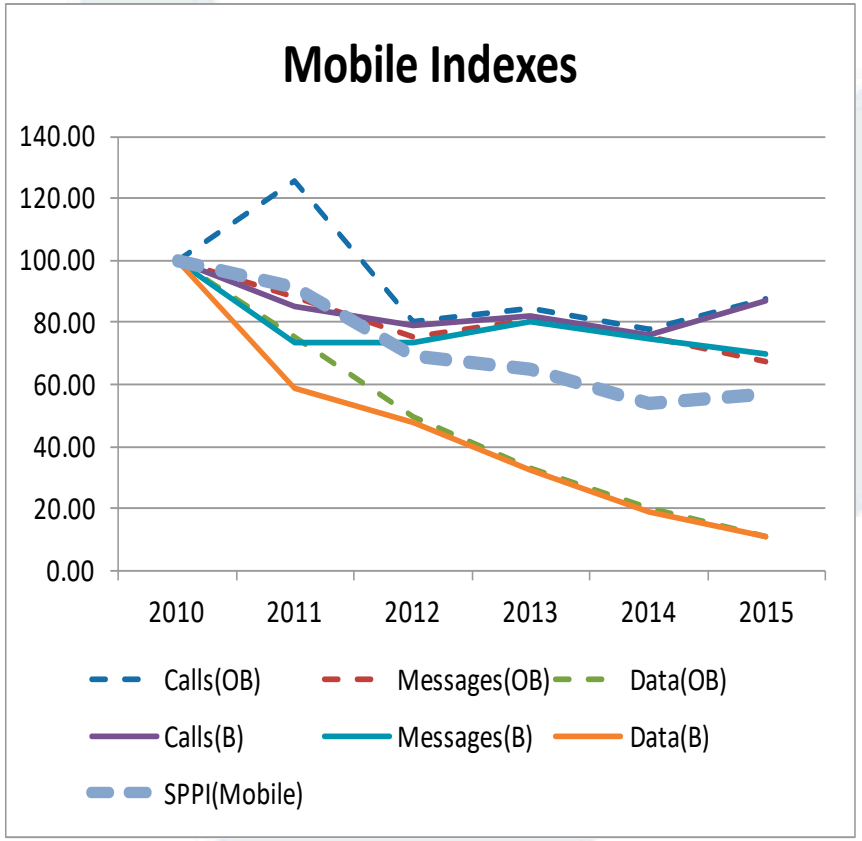


- This option would drop the CPI from the deflator and exclusively use the SPPI
- The SPPI would be improved too:
  - Expand transactions from business-to-business to business-to-all (i.e. including consumer transactions)
  - Update weights annually
  - Include mobile and broadband data
- 35% price decrease between 2010 and 2015

Option A: Breakdown of Deflator

- Data components are falling much more rapidly in price
- Access charges increasing





B: Bundled OB: Out of Bundle

Option B: Data Usage Approach

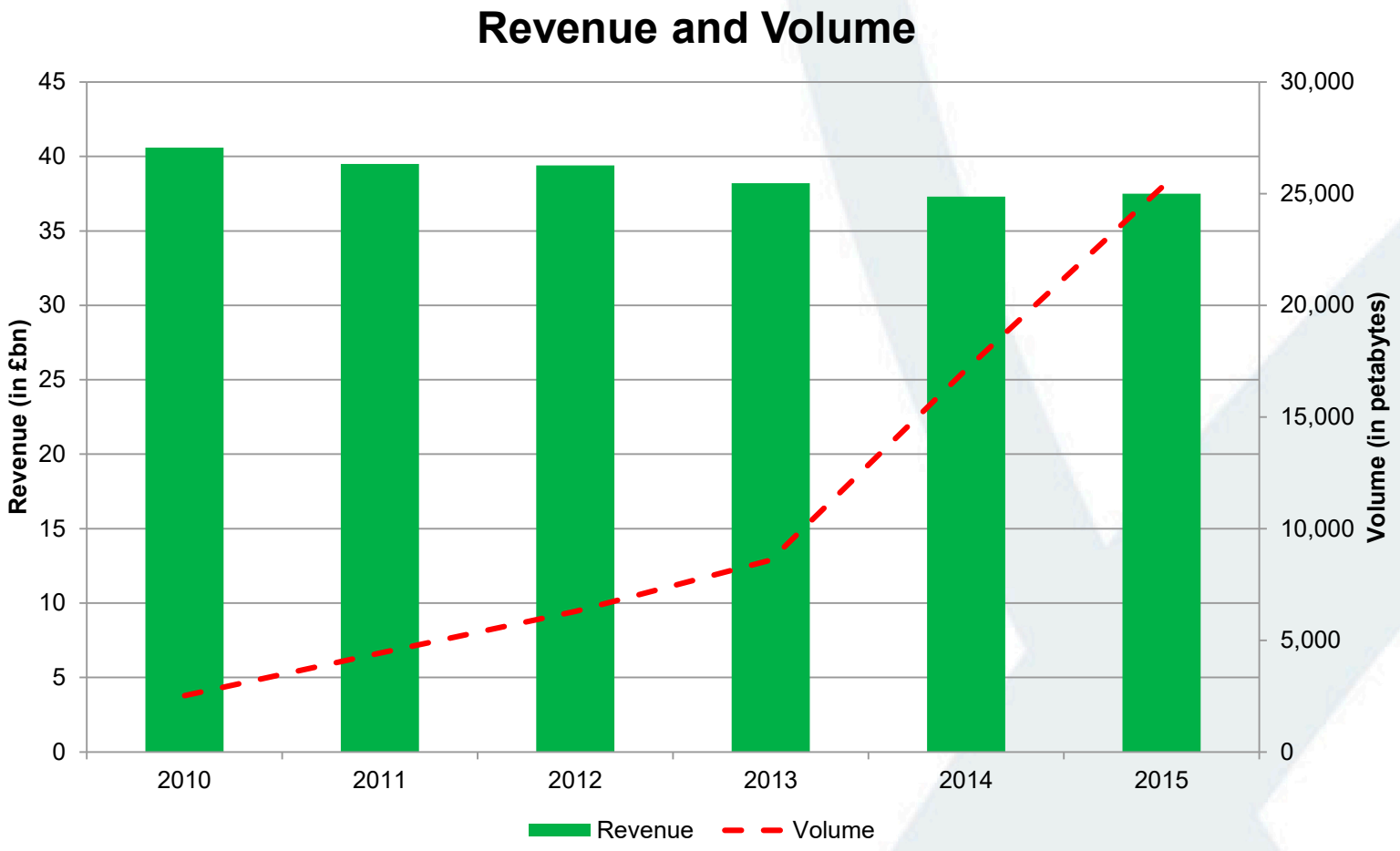
- In engineering terms, communications is essentially a bit-transport service
- The data rates achieved for the bit transport have increased at a rate of around 150% per year since 1980s

Medium	Bytes / kBytes rate	Other factors	Aggregate Bytes kBytes required
Voice	32 kBit/s each way	a) x 2 for a two-way call b) /8 to convert kBits to kBytes c) x 60 to convert seconds to minutes	480 kBytes per minute
Text	1 byte/character	a) x 140 as maximum of 140 characters per text.	140 Bytes per text

Option B: Data Usage Approach

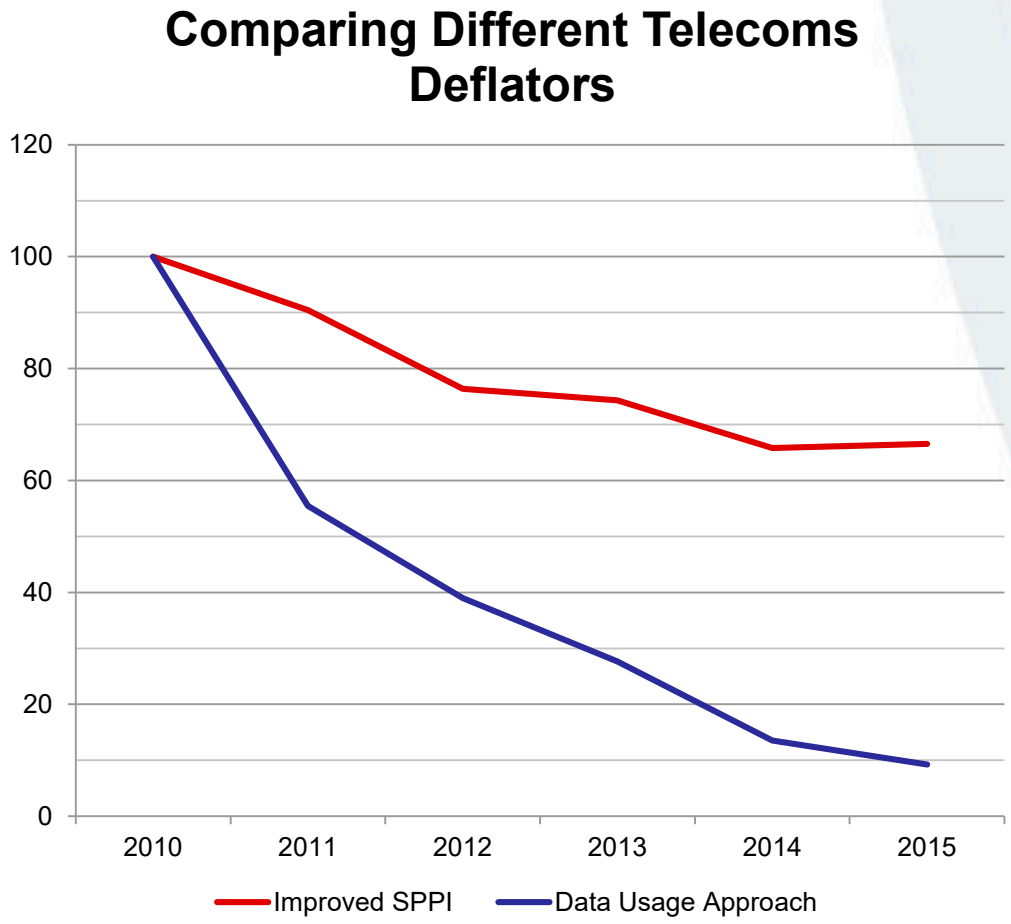
All volume is converted into data bits. Deflator based on average £/bit

Total Revenue fell while volume increased 900%



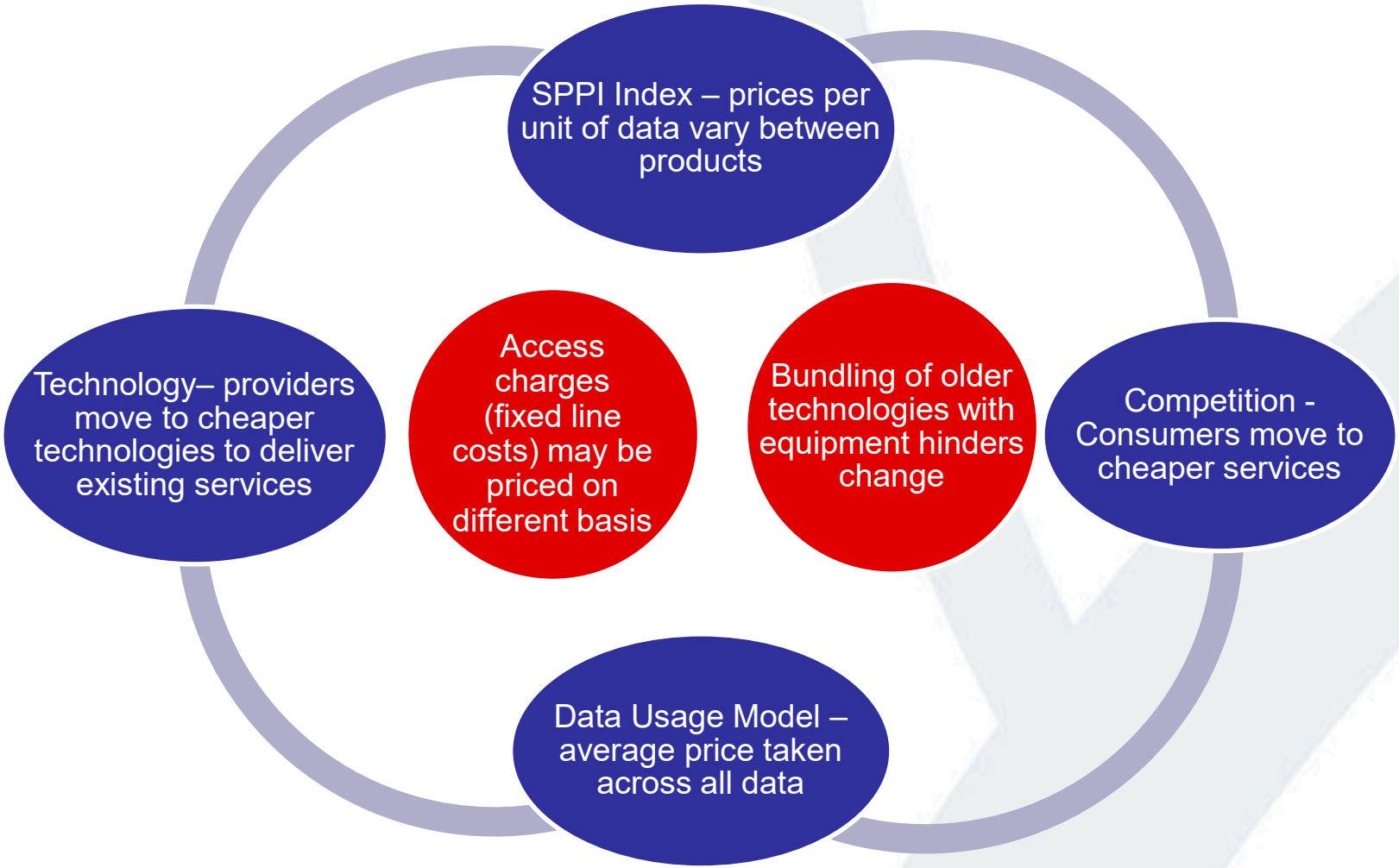
Results and Discussion

Comparing results

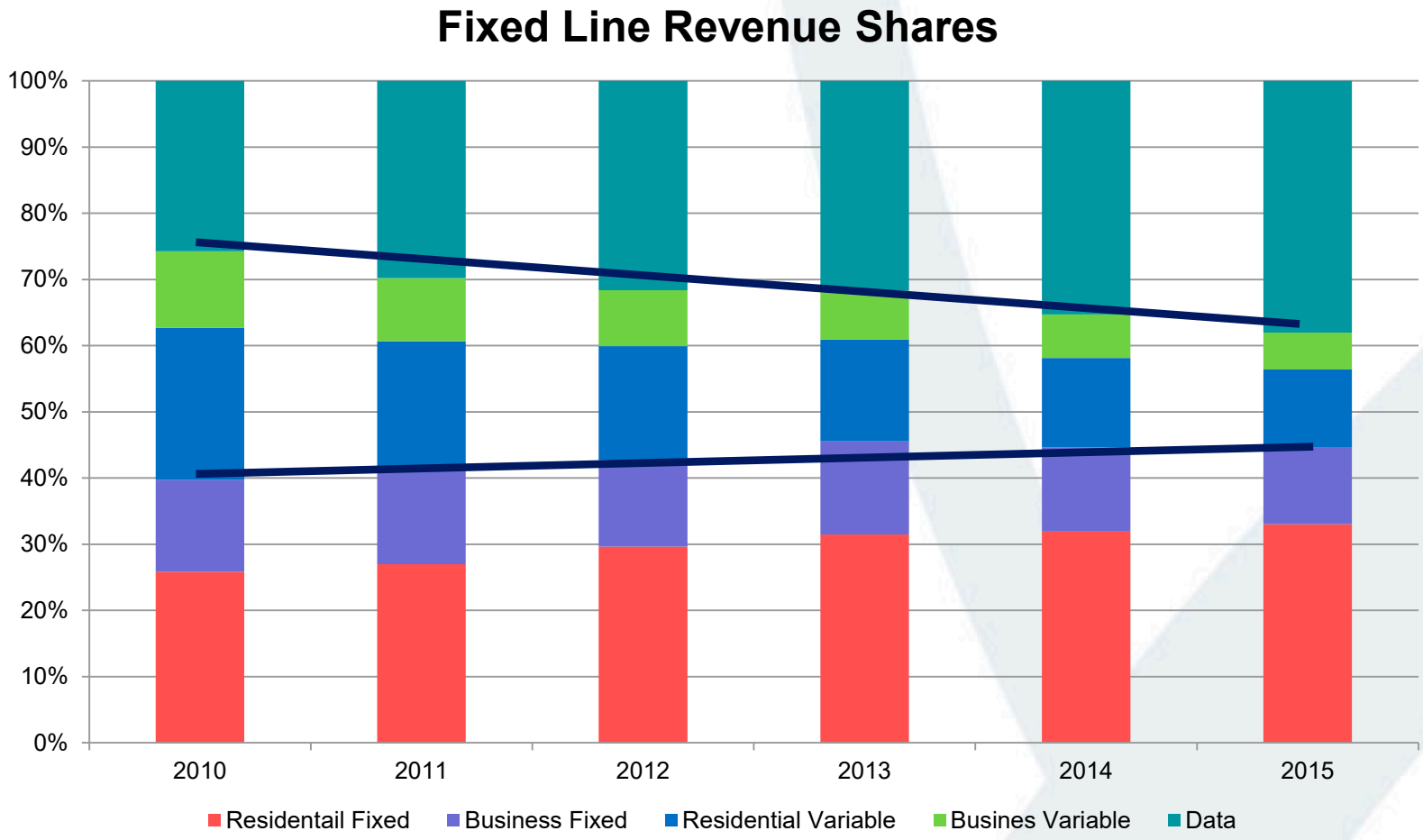


- Treatment of fixed line costs
- Data over-weight in volume / under-weight in price
- Product differentiation in imperfectly competitive markets
- Bundling of traditional services with goods
- Do consumers attach lower values to data usage?

Could our options converge?

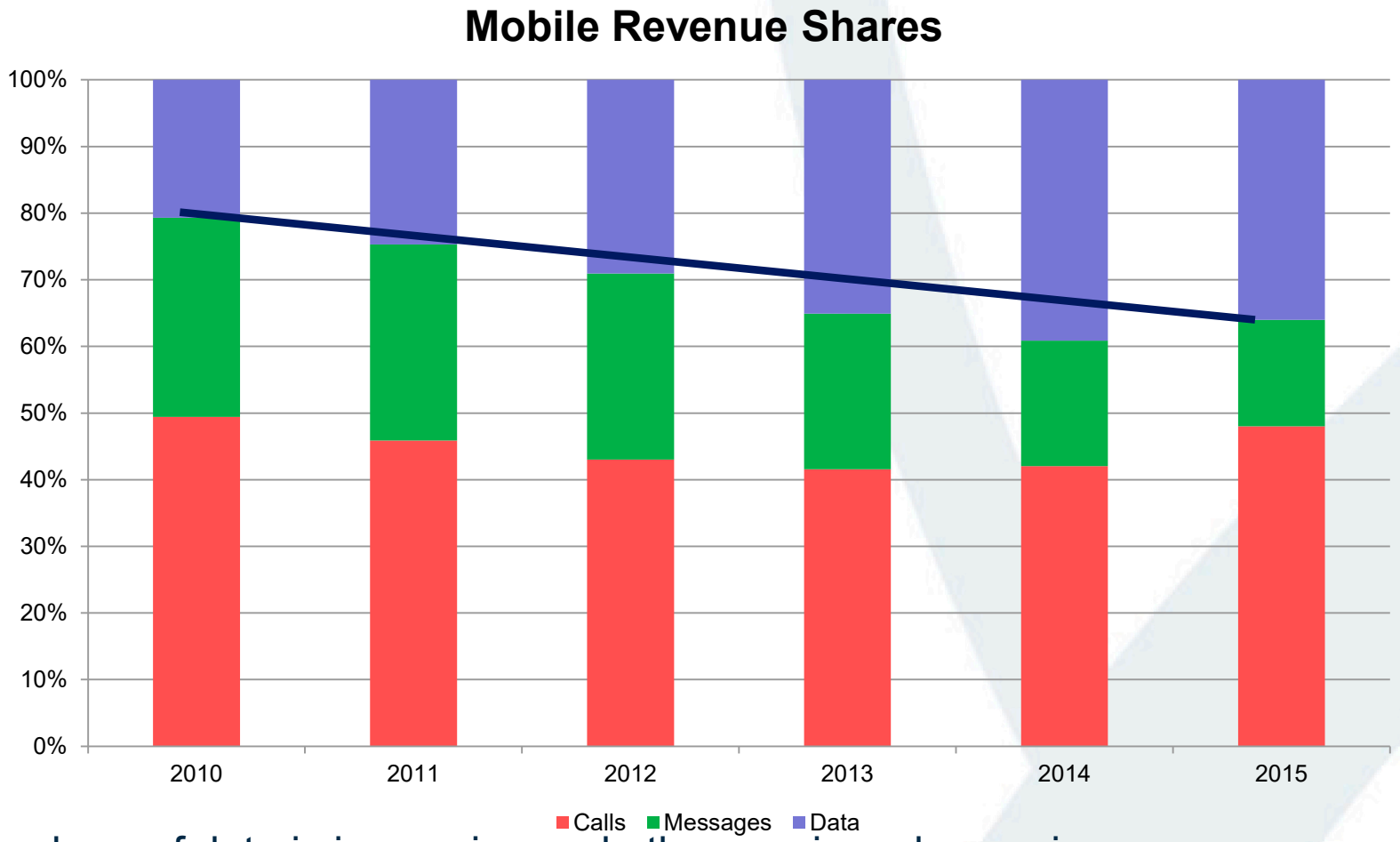


Are the services converging? (1)



- The share of variable costs (voice calls) is decreasing and that of data increasing, but fixed elements also increasing.

Are the services converging? (2)



- The share of data is increasing and other services decreasing.
- Latest increase in calls could be a statistical artefact. Bundled revenue increased, alongside the increased share of calls in out of bundled revenues. The result is that the imputed bundled calls revenue increases.

Conclusions

- Preliminary analysis suggests that even small improvements to current methods result in deflators that declines substantially more than currently.
- In all options, likely that real output of telecoms services could be higher than currently estimated – in line with literature.
- **Key issue 1** is scale of impact: A data usage approach yields much larger impacts, but this ignores price differentials and growing fixed line charges and is therefore downward biased.
- **Key issue 2** is whether behaviour in the market will cause methods to converge in time as weights/prices come into line.
- Data usage approach informative about supply side efficiency