UK and international perspectives on telecommunications price deflators

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Developing Options: A Story of Volume and Revenue Weights

Widespread Issue

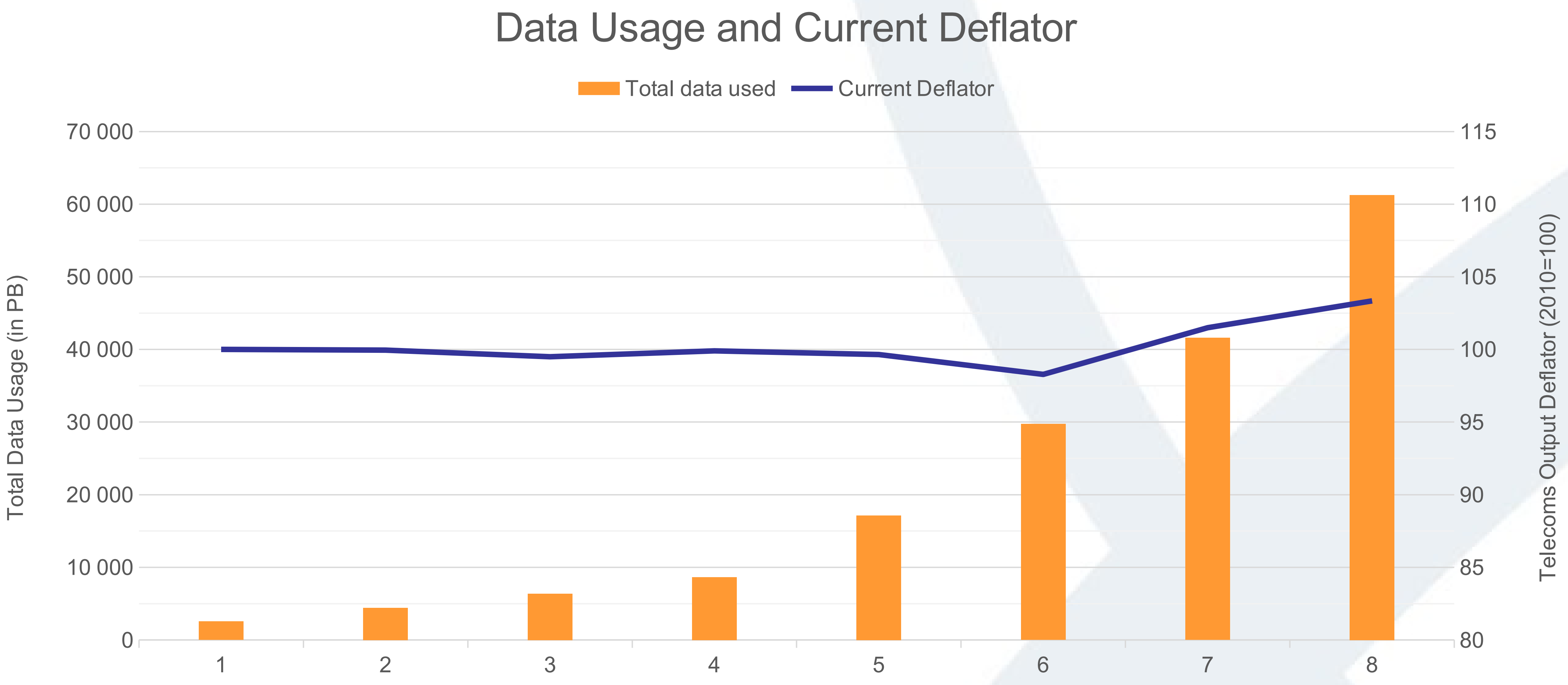
"The great irony of the information age is that… we actually know less about the sources of value in the economy than we did fifty years ago."

Brynjolfson & Mcafee (2014)

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

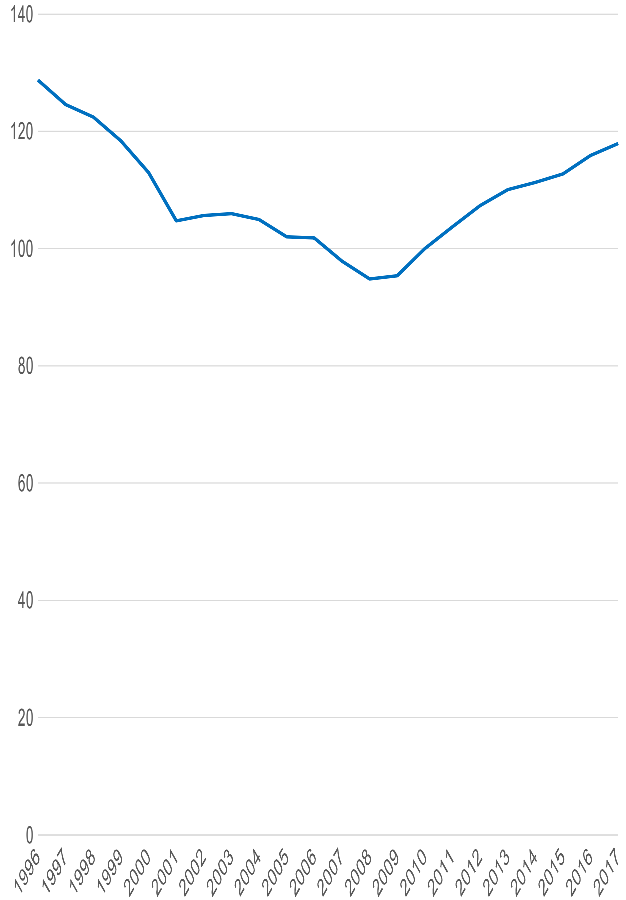
Bean (2016)

Specific UK concerns

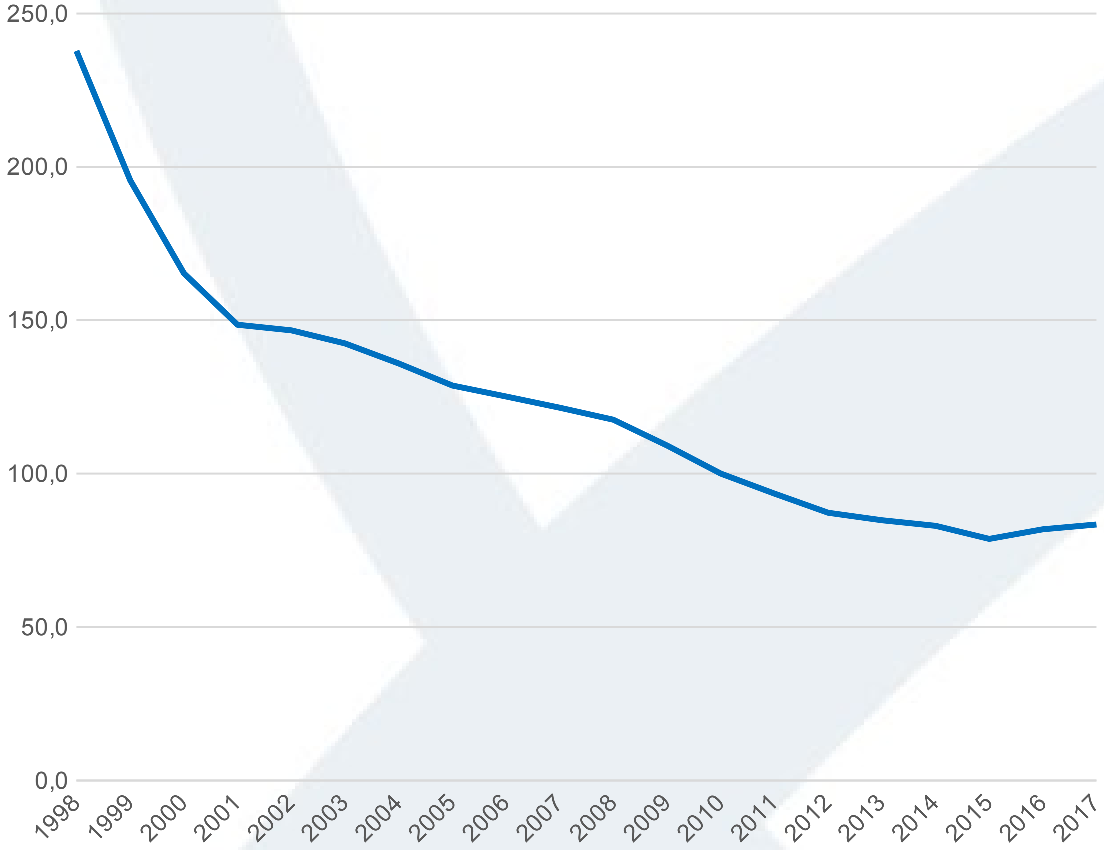


Current Method: Combination of CPI and SPPI

CPI Telecommunications Services and Equipment (2010 = 100)Weight in Deflator = 66%



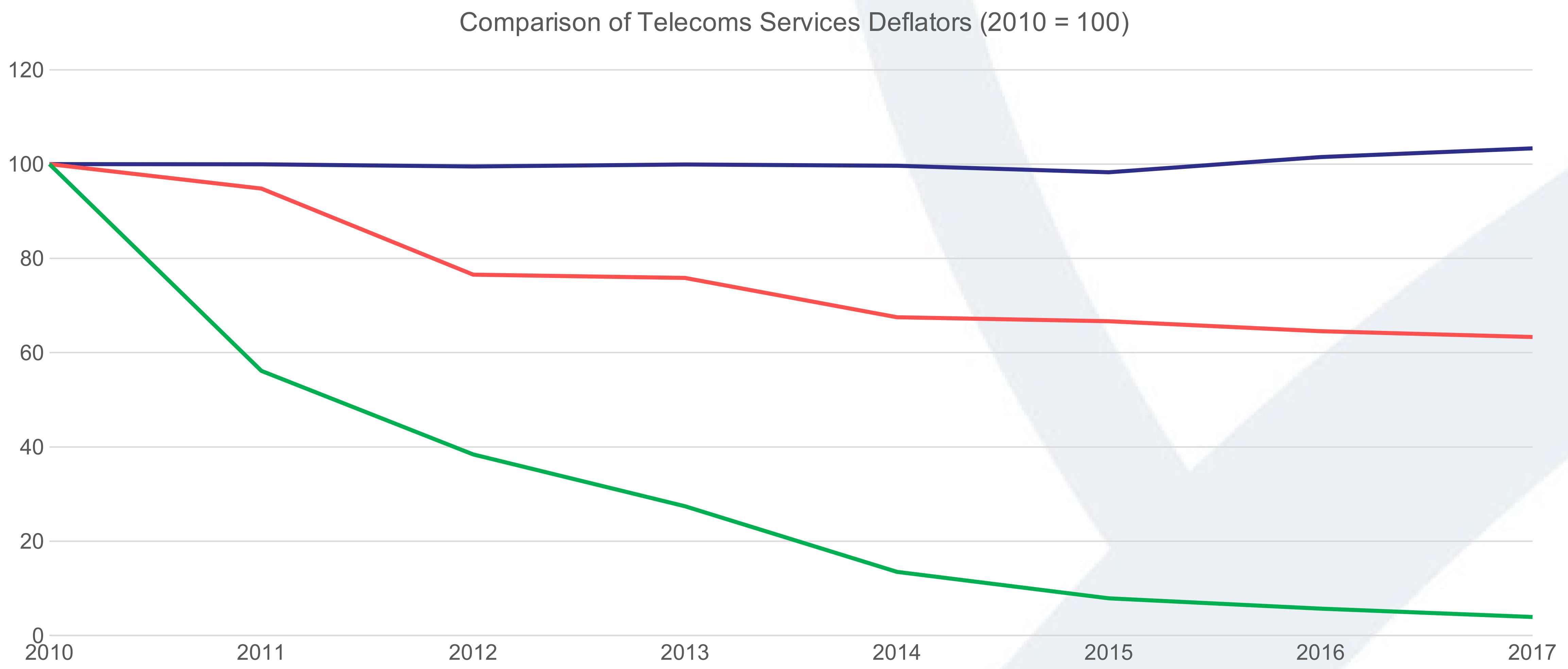
SPPI Telecommunications Services (2010 = 100)
Weight in Deflator = 34%



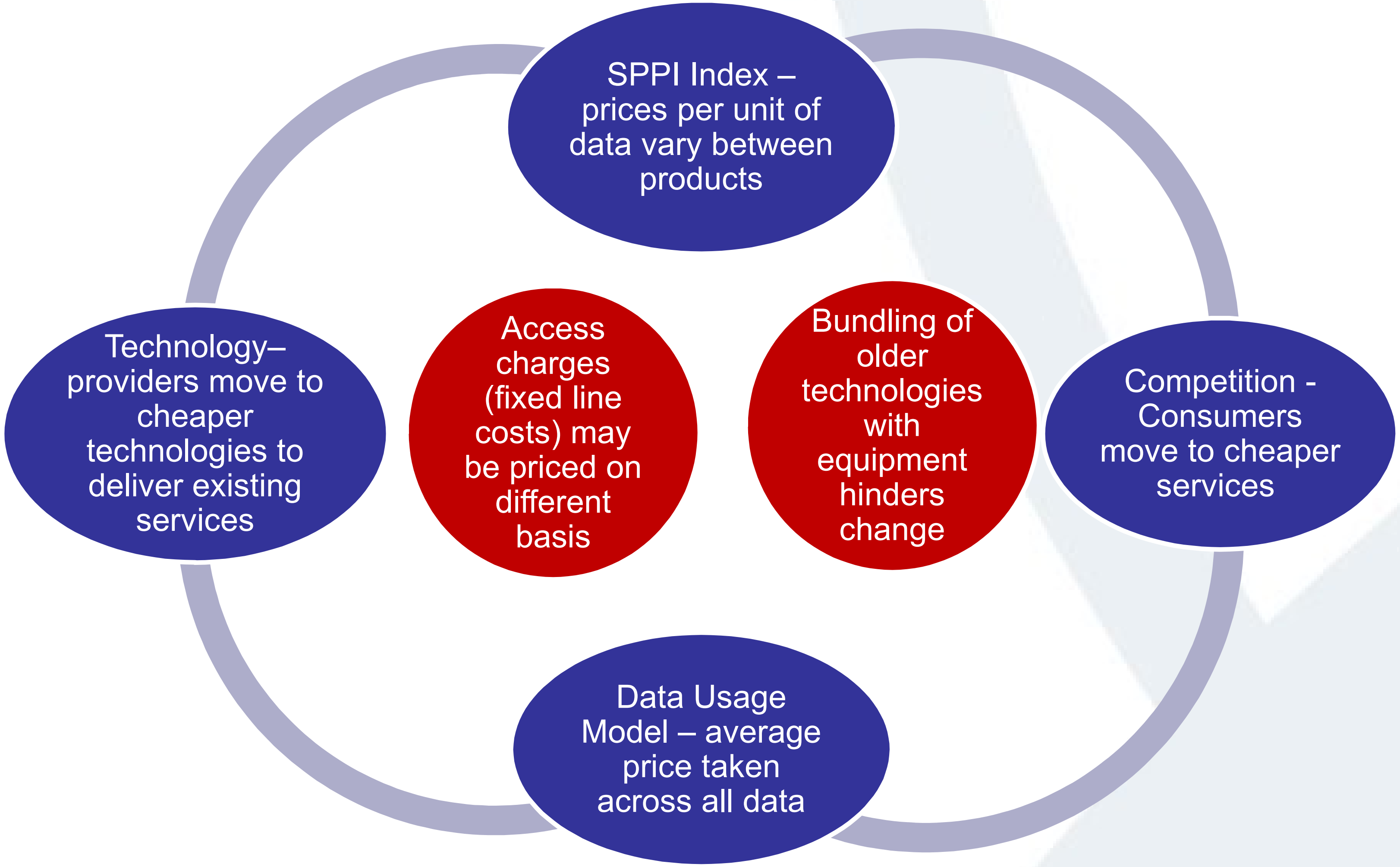
Initial work considered two options for improvements

- Abdirahman et al (2017) proposed two options to improve the deflator
- **Option A - Improved SPPI:**
  - Dropping the CPI from the output deflator
  - Expanding the SPPI from a Business-to-Business to a Business-to-All index
  - Annual Chain Linking the SPPI
  - Adding Mobile and Broadband Data to SPPI
- **Option B - Data Usage Approach:**
  - Regards all telecoms services as being essentially a bit-transport service
  - Converts all voice and text services to data bits. (480 kBytes per minute of calls and 140 bytes per text)
  - Constructs an aggregate unit value index for the cost of transporting bits of data

There are substantial differences between the initial improvement options



Facing forward or back?

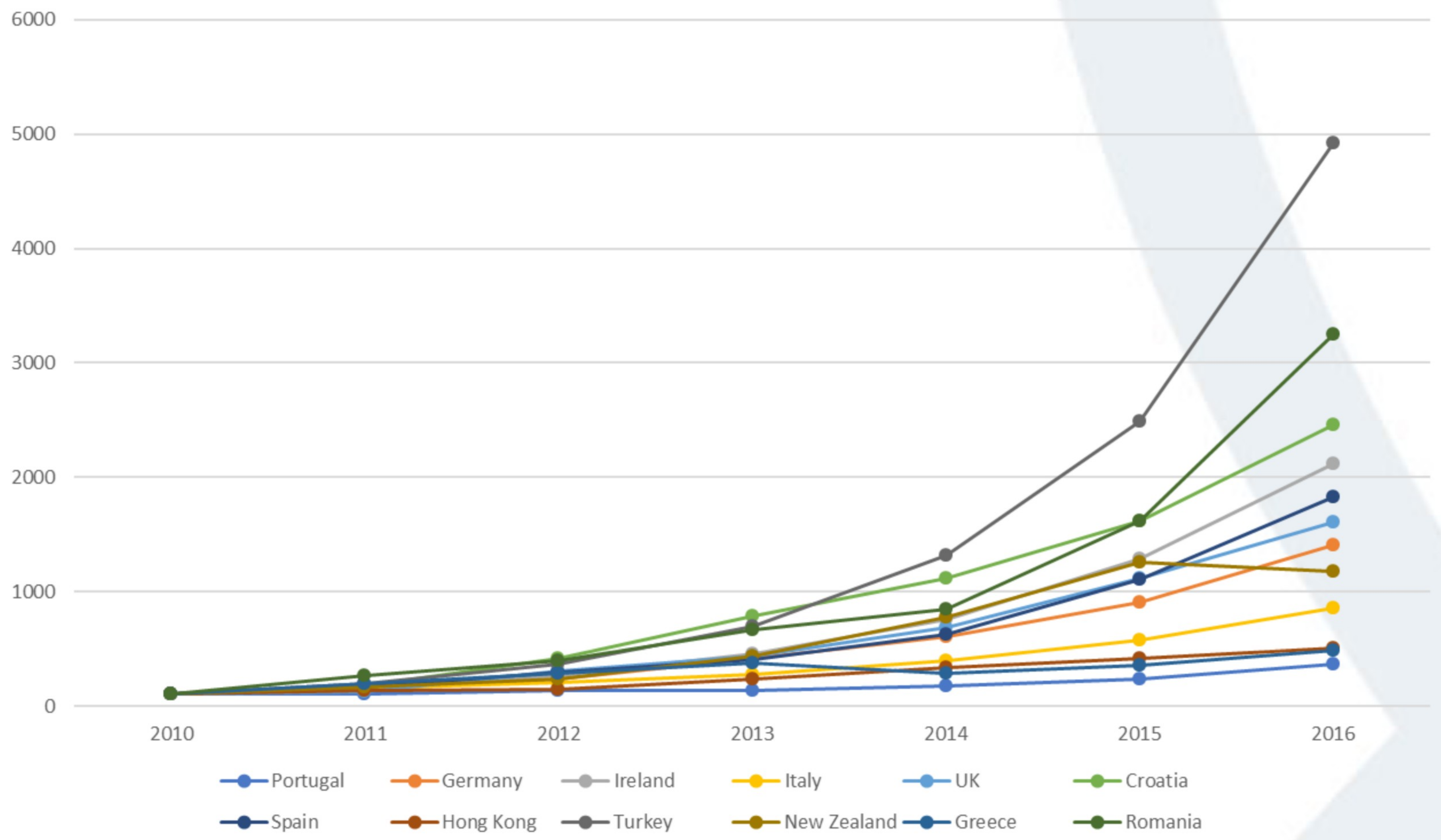


An International Application of the Data Usage Approach

International Data Usage Price Indices

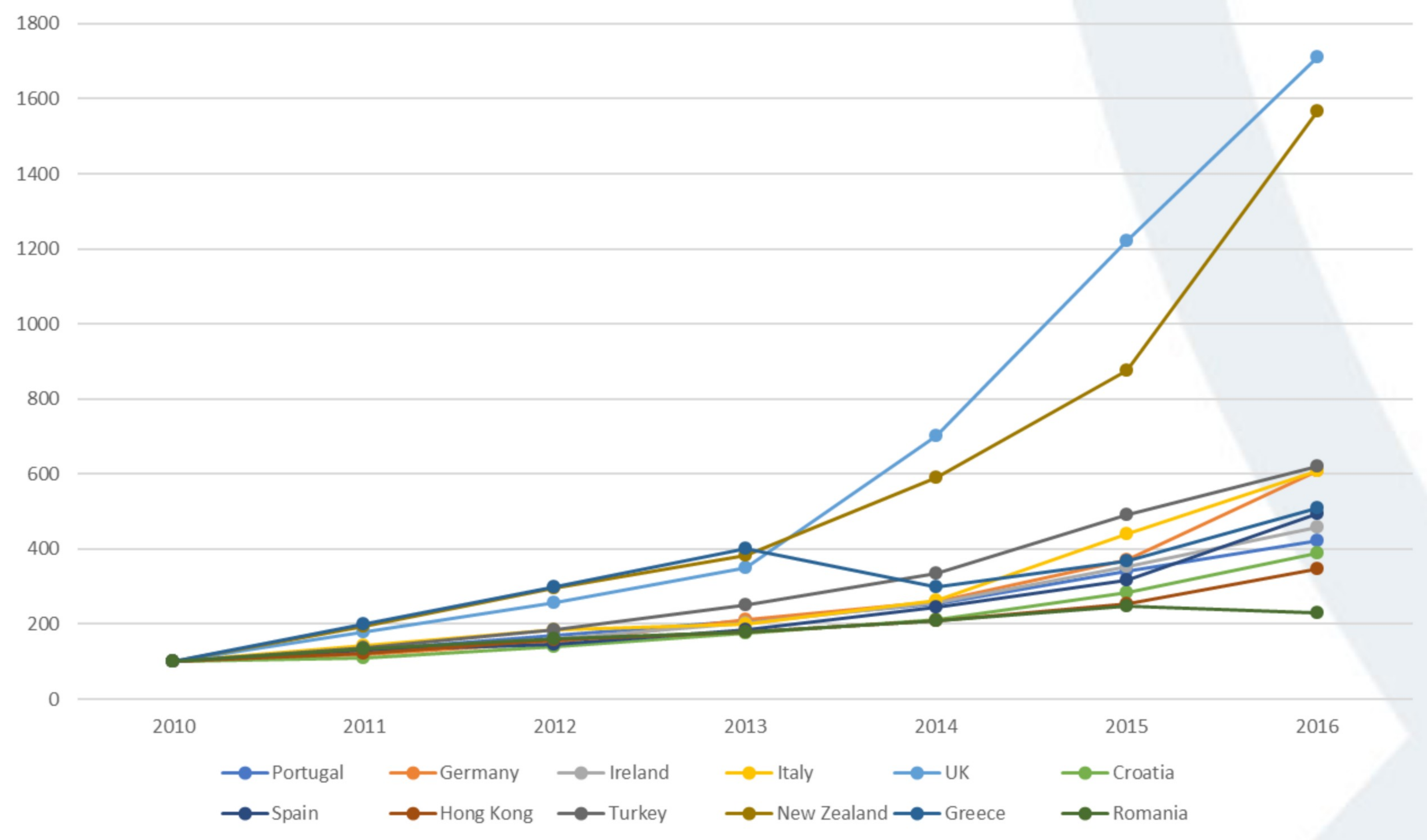
- Key Question: are the issues identified in the UK also experienced by other countries?
- Used data from the International Telecommunications Union we've constructed Data Usage (Option B) based price indices for 11 other countries:
  - Portugal
  - Germany
  - Ireland
  - Italy
  - New Zealand
  - Greece
  - Spain
  - Hong Kong
  - Croatia
  - Turkey
  - Romania

Mobile Data Traffic Index (2010 = 100)



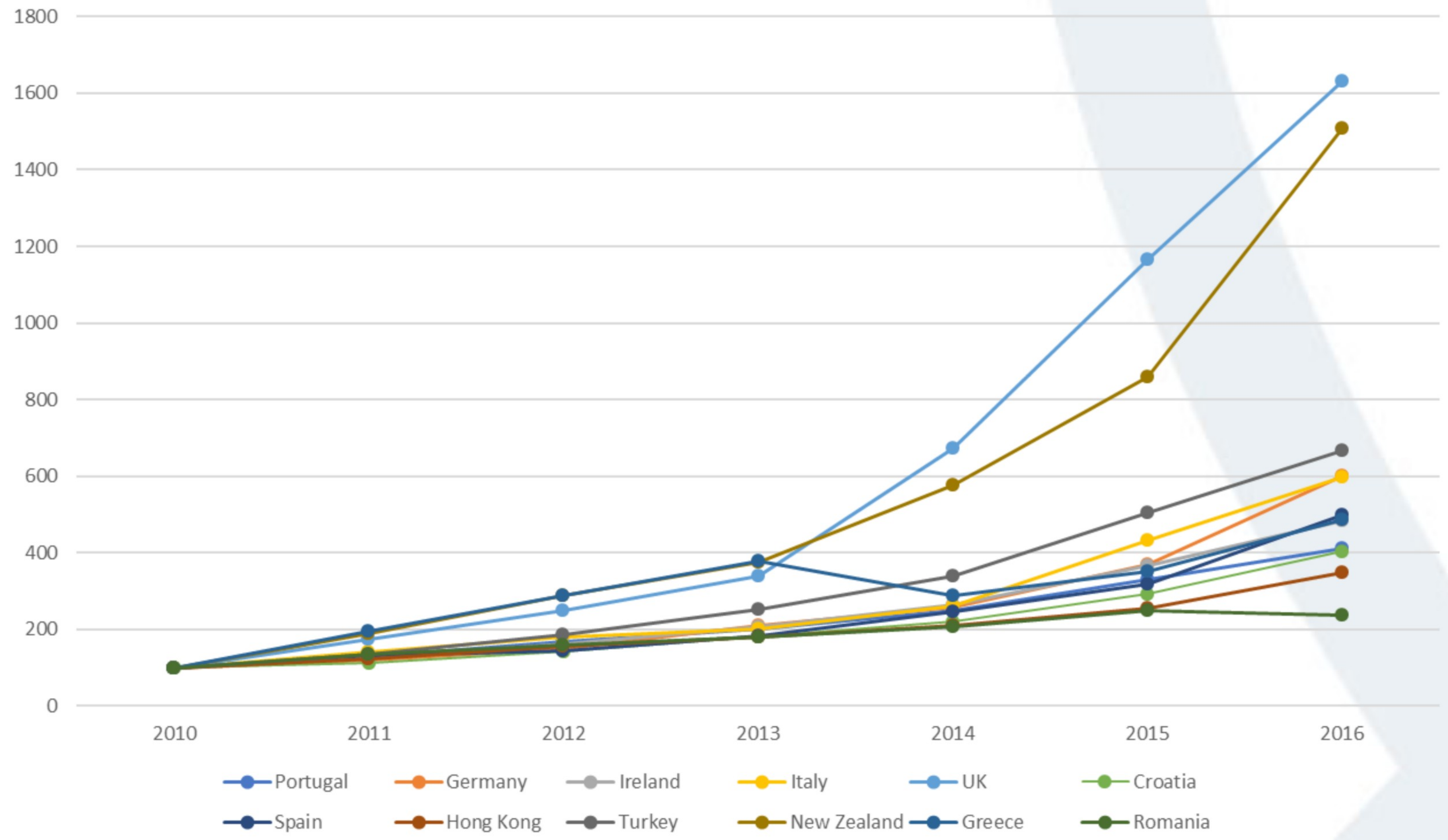
- Turkey, Romania and Croatia show the largest increases in mobile traffic
- New Zealand show a slight decline in 2016
- UK quite average.

Fixed Line Data Traffic (2010 = 100)



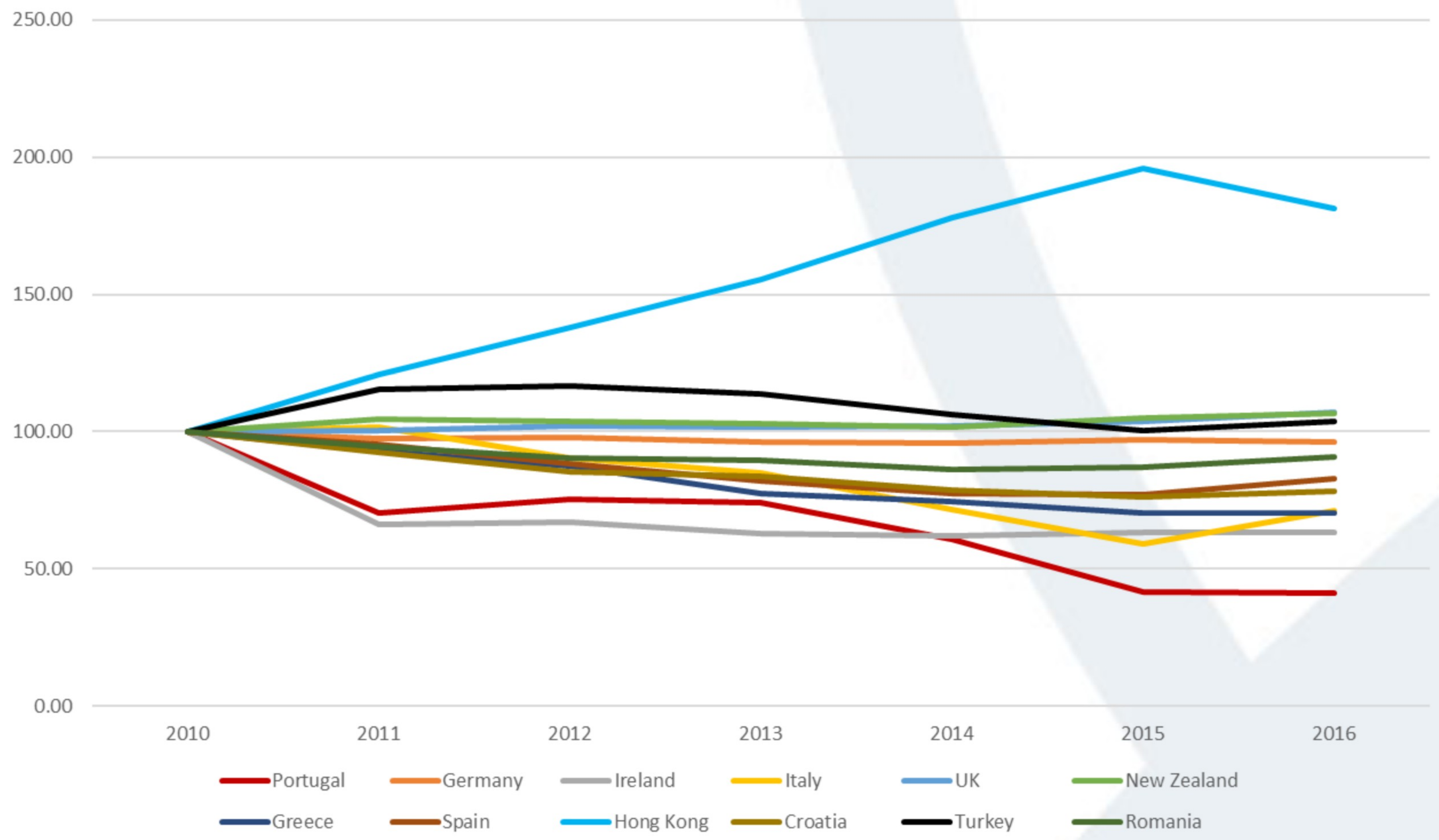
- Fixed Line data traffic still represents the largest share in total traffic
- UK and New Zealand show fastest growth (wifi preference over mobile contract data?)
- Romania exhibits slight decline in 2016 (suggesting replacement with mobile telephony).

Total Data Traffic Index (2010 = 100)

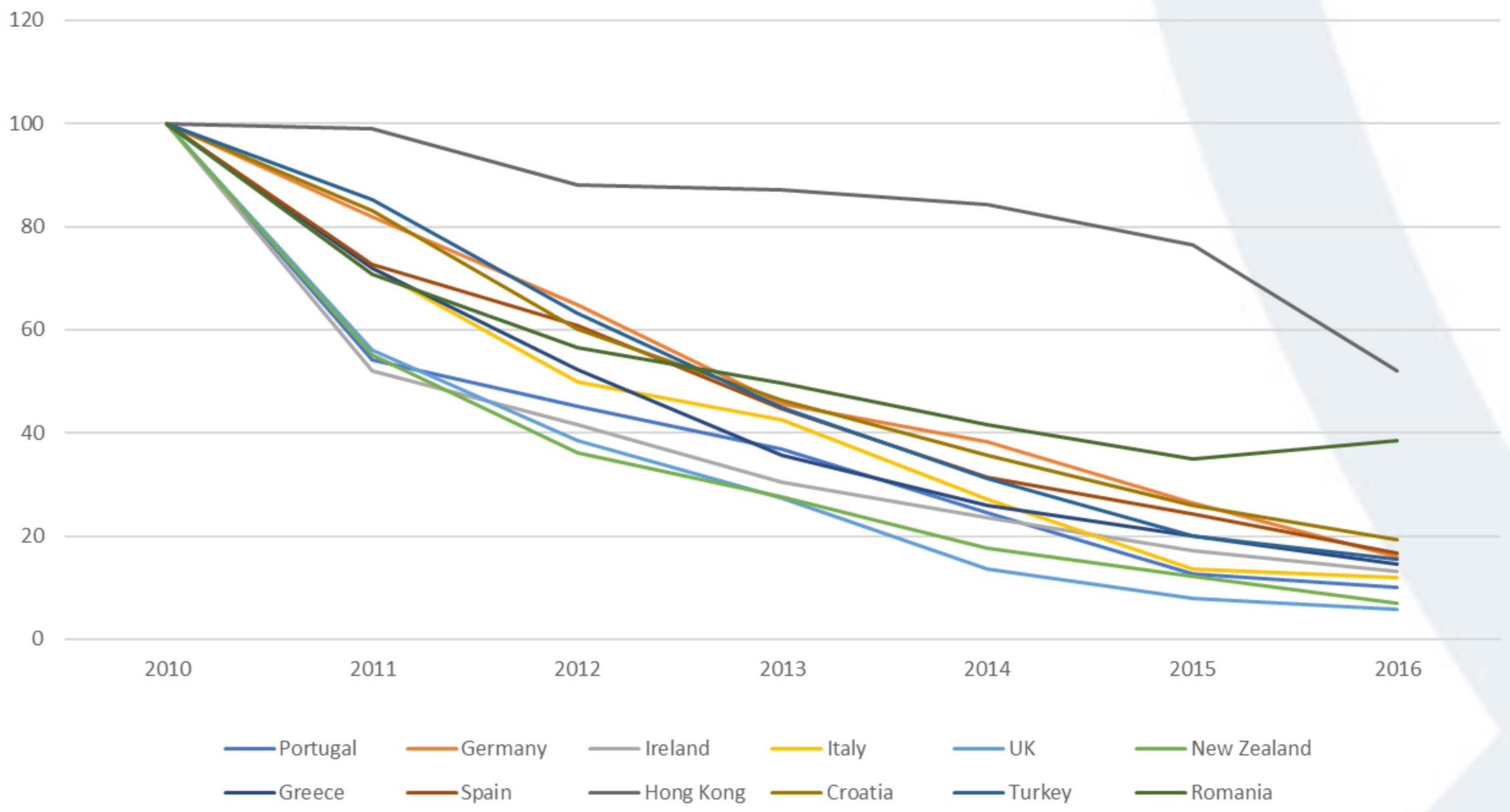


- The UK and New Zealand show the strongest total growth in data traffic
- Greece shows 25% decline between 2013 and 2014 before recovery.
- Even the countries with the lowest growth more than doubled data traffic in a 6 year period.

Total Revenue Indices (2010 = 100)



International Data Usage Price Indices (2010 = 100)



- The UK and New Zealand show the steepest unit price declines, driven by strongest total growth in data traffic
- Hong Kong an outlier, possibly driven by more advanced tech in 2010.
- General trend clear.

Refining the options

Problems with Option A – Improved SPPI:

Fixed Line Access Charges

- Are Fixed Line Access Charges (line rental, etc) a separate service or a cost component (e.g Network Rail charge in a train ticket?)
- Many operators only break down the revenue to meet regulatory requirements
- We have explored re-allocating the fixed line access charge revenues back to voice and data services

Bundled Mobile Charges

- Without a breakdown of bundled mobile charges into its different components (calls, texts, data), we use out-of-bundle revenue weights to estimate in-bundle revenues
- Assumes in-bundle and out-of-bundle usage follow the same pattern
- An alternative approach would be to use volume weights to break down the bundled revenues for mobile services

Option A.1: Fixed line access charges are broken down using revenue weights for fixed line voice and data services

Option A.2: Similar to A.1 but access charges broken down using volume weights for fixed line voice and data services

Option A.3: Same as A.2 for fixed-line. For mobiles, bundled revenues broken down using volume weights for mobile calls, texts and data

Options A1 & A2

Option A1: Revenue weights for breaking down fixed line access charges

Year	Calls	Data
2010	57%	43%
2011	50%	50%
2012	45%	55%
2013	42%	58%
2014	36%	64%
2015	31%	69%
2016	27%	73%
2017	23%	77%

Same as Option A (Improved SPPI) except Fixed Line Access charges broken down using revenue weights

This does not represent usage. Reported revenues by activity a result of accounting exercises to meet regulatory requirements

Option A2: Volume weights for breaking down fixed line access charges

Year	Calls	Data
2010	2.59%	97.41%
2011	1.26%	98.74%
2012	0.82%	99.18%
2013	0.53%	99.47%
2014	0.24%	99.76%
2015	0.12%	99.88%
2016	0.08%	99.92%
2017	0.04%	99.96%

Based on Option A but Fixed Line Access charges are broken down using volume weights, using Option B conversions into data to create weights.

Enables a break down of Fixed Line Access Charges based on the usage of the different services

Option A3

- This option is the same as A2, with the exception that bundled mobile charges are broken down using volume weights, as opposed to out-of-bundle revenue weights
- Out-of-bundle revenue weights are not appropriate to break down bundled revenue since usage patterns could differ within and outside the bundle
- In addition, as more data keeps getting added to mobile tariff bundles, this approach leads to an even greater bias in the resulting index
- A volume weighted approach would allow the bundled revenue to be broken down based on usage.

Option A3 Impact on In-Bundle Revenue Estimates

Table 3: Out of Bundle Mobile Revenues and Weights by Service Type

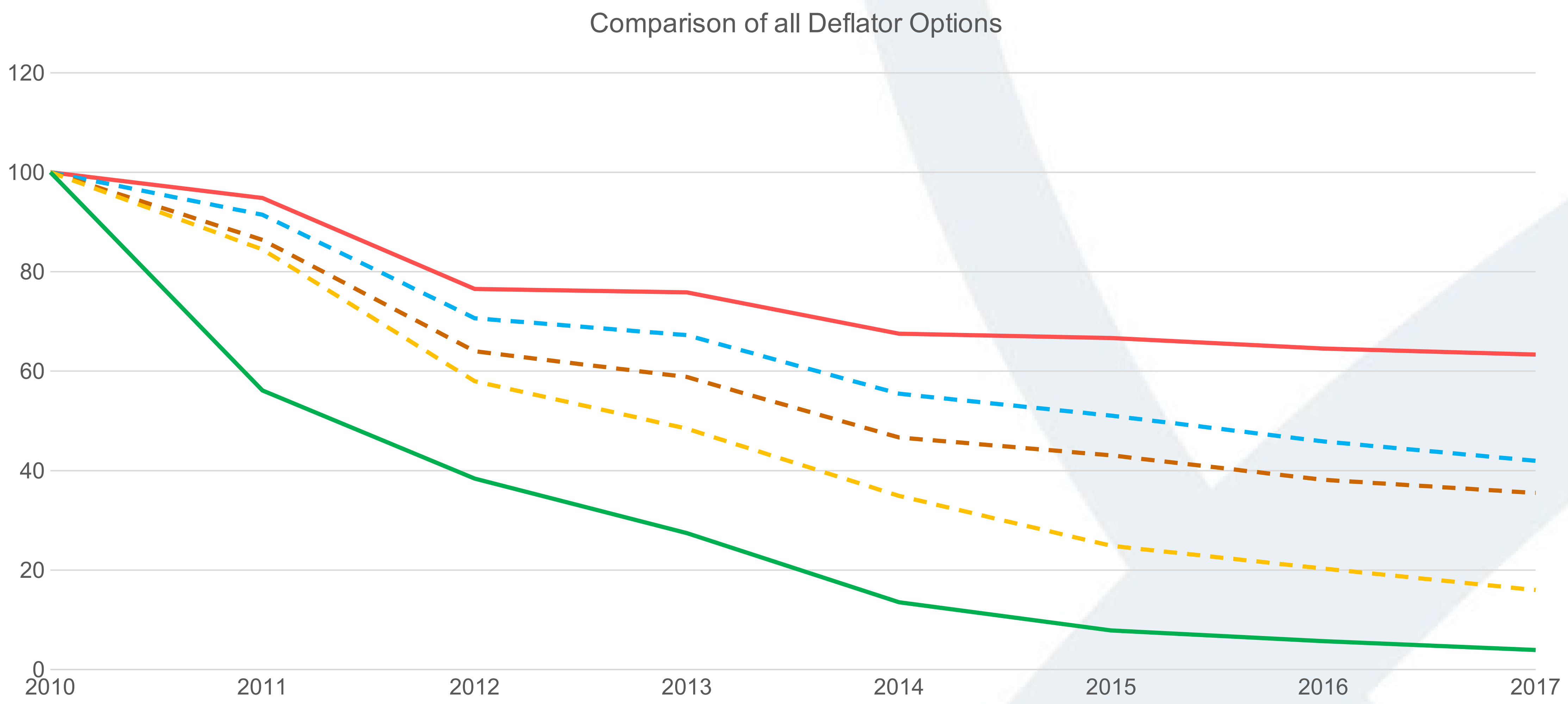
Out of Bundle	Revenues (£millions)			Weights		
	Calls	Texts	Data	Calls	Texts	Data
2010	4,181	2,578	1,731	49%	30%	20%
2011	4,863	2,573	2,247	50%	27%	23%
2012	3,670	2,420	2,506	43%	28%	29%
2013	3,213	1,807	2,651	42%	24%	35%
2014	2,878	1,298	2,734	42%	19%	40%
2015	2,352	773	1,758	48%	16%	36%
2016	1,996	713	1,772	45%	16%	40%
2017	1,644	642	1,731	41%	16%	43%

Table 4: Estimated Bundled Mobile Revenues and Weights by Service Type for Option A3

Estimated Bundle	Revenues (£millions)			Weights		
	Calls	Texts	Data	Calls	Texts	Data
2010	2,768	0.83	3,646	43%	0.01%	57%
2011	2,289	0.78	3,637	39%	0.01%	61%
2012	1,533	0.58	5,778	21%	0.01%	79%
2013	1,221	0.34	6,605	16%	0.00%	84%
2014	904	0.21	7,428	11%	0.00%	89%
2015	748	0.15	9,589	7%	0.00%	93%
2016	588	0.10	10,295	5%	0.00%	95%
2017	423	0.06	11,127	4%	0.00%	96%

- Using out-of bundle weights, OFCOM reports out of bundle revenue for the industry from texts of £640m in 2017
- However, applying the volume weights to break down the bundle, the estimated revenue for text messages is only £60k for the entire industry
- How far does this reflect real changes in behaviour?

The more we make use of volume weights, the narrower the gap between the improved SPPI and the Data Usage Approach



Conclusions

- All options appear improvements over current methods
- We are testing options to decide which to recommend for inclusion in Blue Book 2020.
- Preliminary analysis suggests we now understand the difference between the Improved SPPI and the Data Usage Approach can mainly be explained through the use of volume and revenue weights
- Using volume weights in the Improved SPPI allows better representation of usage, but suggest that the implied revenues from traditional telecoms services are negligible
- This is something that we have to test with the industry further before making any recommendation for use in official statistics