

Disentangling Cell Phone Spending from Cellular Telephone Services



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- Over 2010-2017, most consumers purchased cell phones from wireless carriers at the time that they signed up for a service plan
- In the national accounts, the spending associated with these ***bundled*** transactions is recorded as services
- This misallocation of spending on phones to services is problematic when the respective price indexes are different

Aizcorbe, Byrne and Sichel (2019) findings



Price Deflators and Real PCE for Cellular Telephone Services

	2010- 2017
Components	
Estimated expenditure Shares	
1. Phones	0.28
2. Services	0.72
Proposed deflators (percent change)	
3. Mobile phones (Aizcorbe, Byrne and Sichel, 2019)	-16.6
4. Services (CPI Wireless Services)	-3.5
Cellular Telephone Services (percent change)	
5. Prices: Tornquist aggregate of indexes in lines 3 and 4 using shares on lines 1 and 2	-7.7
6. Nominal Spending	3.8
Real PCE Spending	
7. Proposed	11.4
8. Current	7.3
9. Difference	4.2

An estimated 28% of PCE spending on Cellular Telephone Services is spending on phones

Important because:

- Deflators for phones fall more rapidly than that for services
- Correcting the nominals and applying the appropriate deflators raises the growth of real PCE for cellular services by 4.2 percentage points, and overall real PCE growth by 4-5 basis points

The Problem



- Traditionally, most households obtained phones from carriers:
 - The carrier buys the phones for resale from OEMs (like Apple)
 - When it sells the phone, the carrier includes the phone revenue in the revenues that it reports in the Economic Census and that revenue is allocated to carriers' primary NAICS (i.e., services)

- Example: Two ways to buy a \$499 iPhone 3G with a two-year service contract in 2010

Timing of Payments	Allocation in PCE		Notes
	Phone	Service	
Purchase phone at retail outlet			
Up front	\$499		Phone/Services revenues are allocated properly
Over time		\$50 x 24=\$1200	
Purchase phone from carrier			
Up front		\$499	Phone/Services revenues bundled in PCE services
Over time		\$50 x 24=\$1200	

More realistic example

Timing of Payments	Allocation in PCE		Notes
	Phone	Service	
Purchase "subsidized" phone from carrier			
Up front		\$199	Phone/Services revenues bundled in PCE services
Over time		\$62.50 x 24=\$1500	

“Historically, wireless service providers offered customers wireless plans whereby, in exchange for the customer entering into a fixed-term service agreement, the wireless service providers significantly, and in some cases fully, subsidized the customer’s device purchase. Wireless providers **recovered those subsidies through higher service fees** as compared to those paid by customers on device installment plans. We and many other wireless providers have limited or discontinued this form of device subsidy.”

Source: Verizon’s 2016 annual report

Carriers do report equipment revenue but only include the upfront payment



Allocation of PCE for Wireless Services Between Services and Devices				2010- 2017
Service Annual Survey				
(1)	Total revenues	Bill \$		237
(2)	Reselling Services for telecomm equipment, retail	Bill \$		32
(3) = (2)/(1)	Share of total revenues	pct		13.2
(4)	Ratio of full to upfront prices	ratio		???
(5)=(4) x (3)	Adjusted share of reselling services to total revenues	pct		???

- Strategy:
 - Find data to form a ratio of the full price to the upfront price
 - Use that ratio to scale up the upfront revenues reported in the SAS survey
- Caveats:
 - This assumes that carriers recouped the full price of the phone
 - SAS coverage is broader than ideal: includes commercial (not just residential) and all types of equipment (not just phones)

IDC data on the full price



- IDC “Worldwide Quarterly Mobile Phone Tracker”, available at https://www.idc.com/getfile.dyn?containerId=IDC_P8397&attachmentId=47322790.
- IDC estimates revenue, units, and prices by model for the U.S. market using public and proprietary information from phone manufacturers, component suppliers and distribution channel companies (e.g. retailers and wholesalers)

- Survey of households subscribing to wireless plans from the top four carriers (AT&T, Sprint, T-Mobile and Verizon)
- Price information is based on the question:
“How much did your current wireless phone cost, including any rebates or cash-back deals received? Your best estimate is fine.”
- We assume their responses reflect the upfront price
 - We verified this for Apple phones

Validated prices using iPhones



JDPOWER

IDC

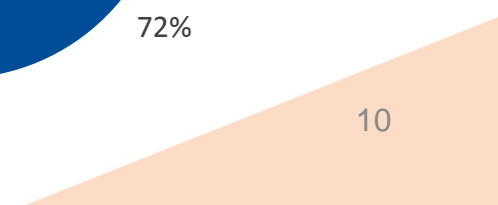
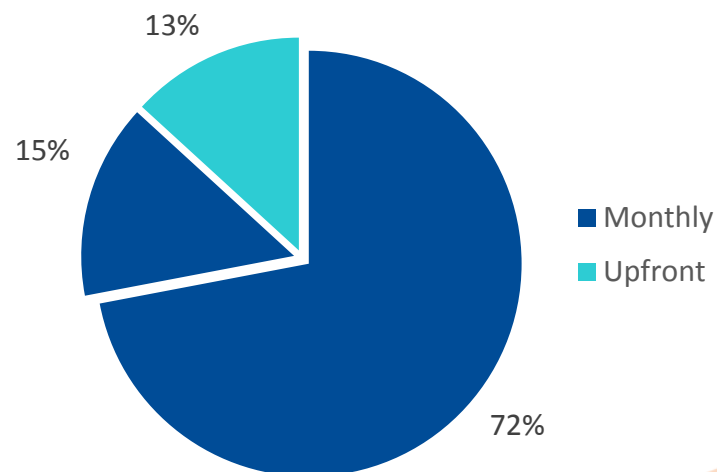
iPhone category	Dates sold	Flash capacity	Introduction price ranges	
			Contract	No commitment
3G	7/2008-6/2010	8Gb--16Gb	\$199-299	\$499-\$549
3GS	6/2009-9/2012	16Gb--32Gb	\$199-299	\$599-\$699
4	6/2010-9/2013	16Gb--32Gb	\$199-299	\$599-\$699
4S	10/2011-9/2014	16Gb--64Gb	\$199-399	\$649-\$849
5	9/2012-4/2013	16Gb--64Gb	\$199-399	\$649-\$849
5S	3/2013-3/2016	16Gb--64Gb	\$199-399	\$649-\$849
6	9/2014-9/2018	16Gb--128Gb	\$199-399	\$649-\$849
6Plus	9/2014-9/2016	16Gb--128Gb	\$299-499	\$749-\$949
6S	9/2015-9/2018	16Gb--128Gb	\$199-399	\$649-\$849
6PlusS	9/2015-9/2018	16Gb--128Gb	\$299-499	\$749-\$949
7	9/2016--	32Gb--256Gb	\$199-399	\$649-\$849
7Plus	9/2016--	32Gb-256Gb	\$319-519	\$769-\$969
8	9/2017--	64Gb – 256Gb	\$249-\$399*	\$699-\$849
8Plus	9/2017--	64Gb – 256Gb	\$349-\$499*	\$799-\$949
X	9/2017—9/2018	64Gb – 256Gb	\$549-\$699*	\$999-\$1149
Xs	Sep-18	64Gb – 512Gb	Not offered	\$999-\$1349
XR	Sep-18	64Gb – 256Gb	Not offered	\$749-\$899
*Only offered by Sprint.				

Results

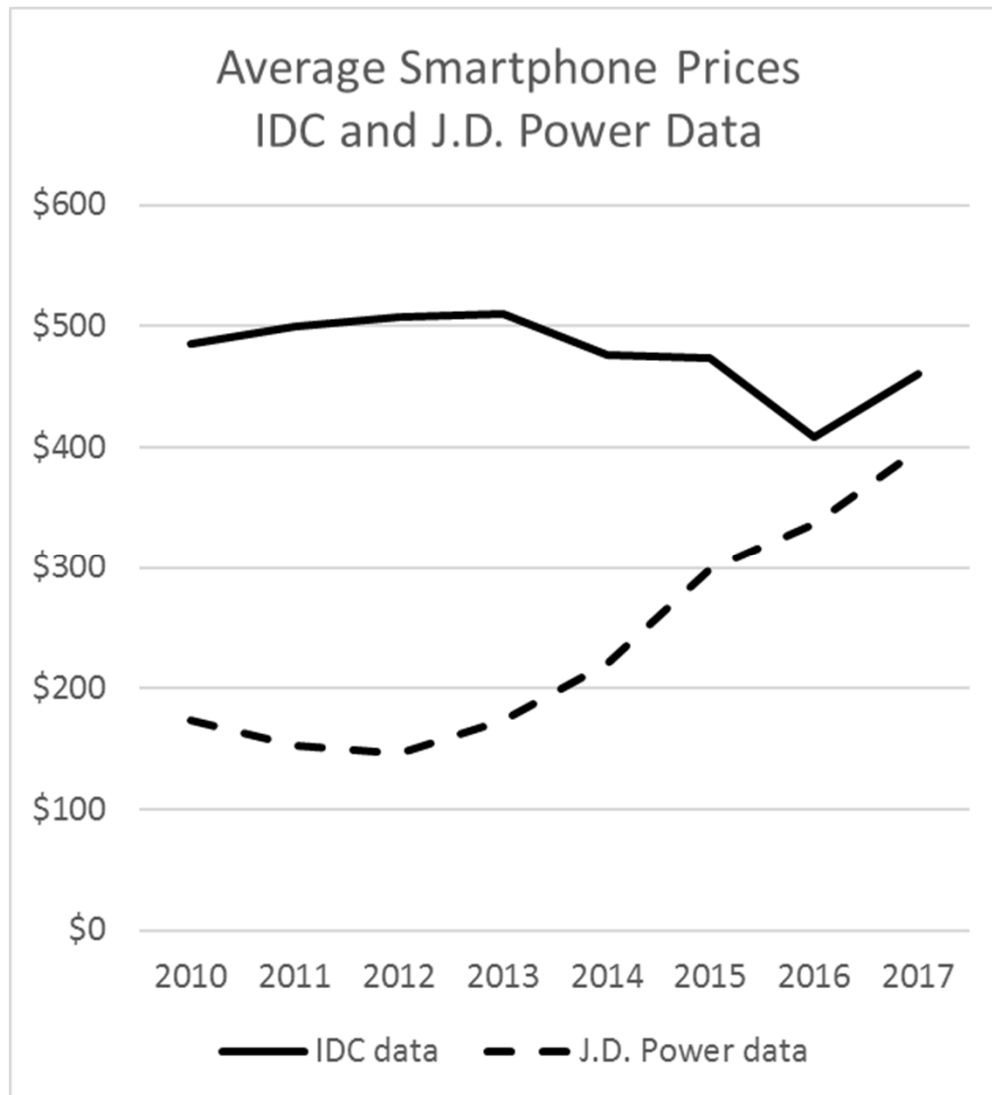


Allocation of PCE for Wireless Services Between Services and Devices			2010-2017
Service Annual Survey			
(1)	Total revenues	Bill \$	237
(2)	Reselling Services for telecomm equipment, retail	Bill \$	32
(3) = (2)/(1)	Share of total revenues	pct	13.2
(4)	Ratio of IDC and JDPOWER average prices	ratio	2.3
(5)=(4) x (3)	Adjusted share of reselling services to total revenues	pct	28.0

- For 2010-2017, 15% of total revenues represented phone payments included in the monthly “service payments”
- Adding that to the upfront revenues reported in the SAS survey brings the total to 28%



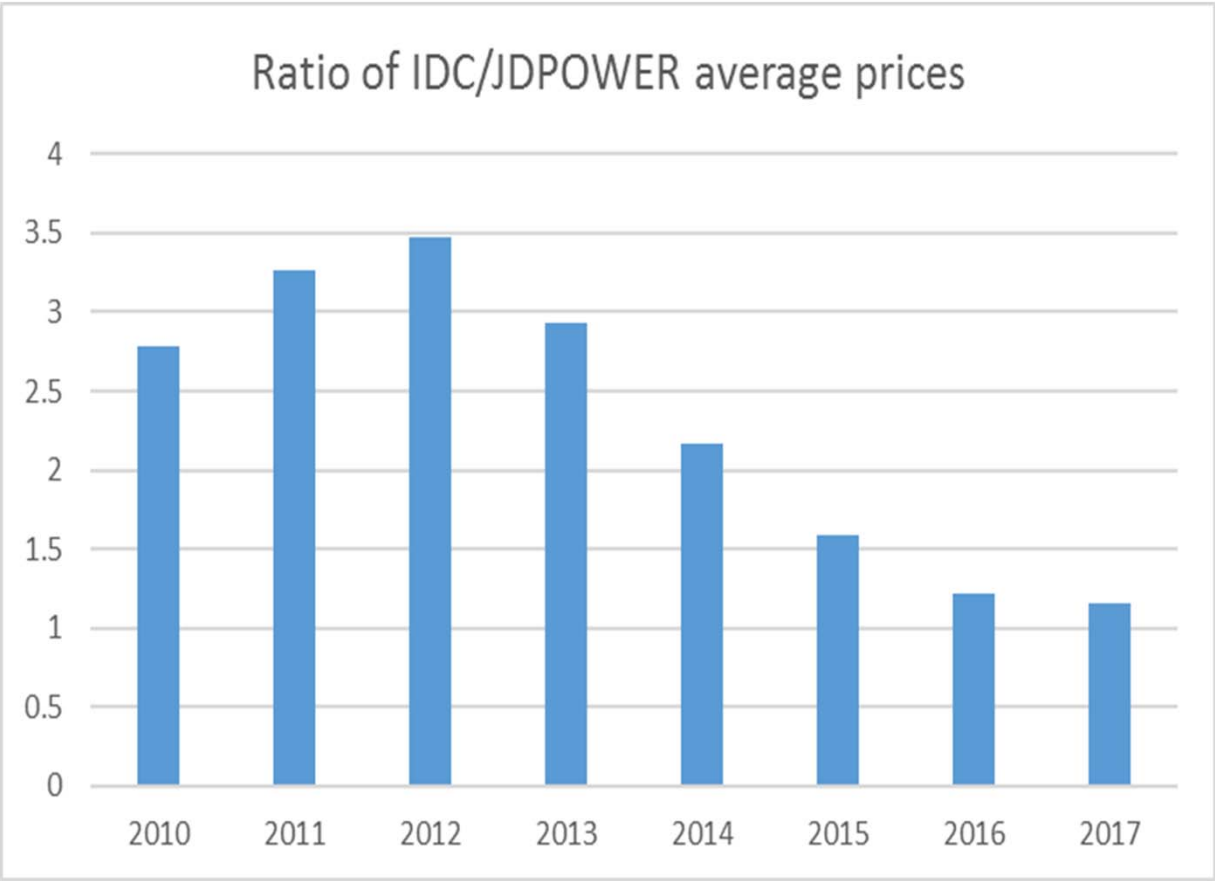
Full and upfront prices are converging...



- In 2014, FASB announced that all carriers must recognize the full price of the phone as revenue when ownership changes hands (i.e., up front) by 2018
- Carriers began moving in this direction in 2014
- Since then, the JDPOWER price has risen as subscribers increasingly pay the full price up front

... which simplifies the adjustment going forward

- By 2018, we expect the ratio of full/upfront price will go to 1 and the SAS survey will provide a solid estimate of the full price of phones included in carriers' reported revenues



BEA is on track to implement the following changes at this summer's annual update:

- PCE for Cellular Telephone Services
 - Separate out phone vs service revenues
- Price deflators for cell phones
 - For 2018 and beyond, use the new BLS index for cell phones that was introduced with the January 2018 CPI release.
 - Over history, use the Aizcorbe, Byrne and Sichel indexes

- Continue
 - collaborations with the BLS to improve measures of communication services
 - ongoing work on cloud services and on-demand platforms (like Uber)
- Looking ahead, set priorities and target areas for future price index work



Thank you

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