MBTA Ridership Update FY15-FY17

Office of Performance Management and Innovation

October 23, 2017

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Ridership in a three part series

Today: Current Context

Overview of FY15-FY17 ridership trends

Part II: Input for a ridership goal (Nov 6)
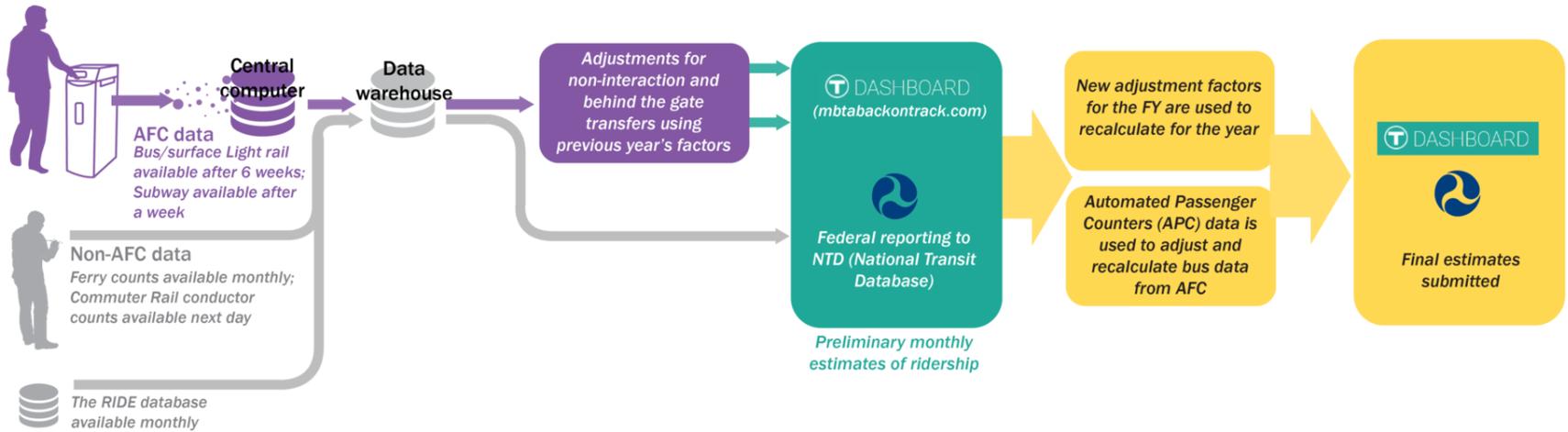
Policy considerations and changing role of competition

Part III: Turning a ridership goal into a capacity target (Dec)

Inform capital investment and service plans

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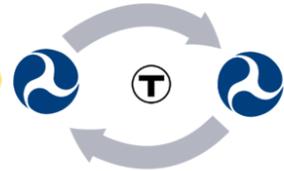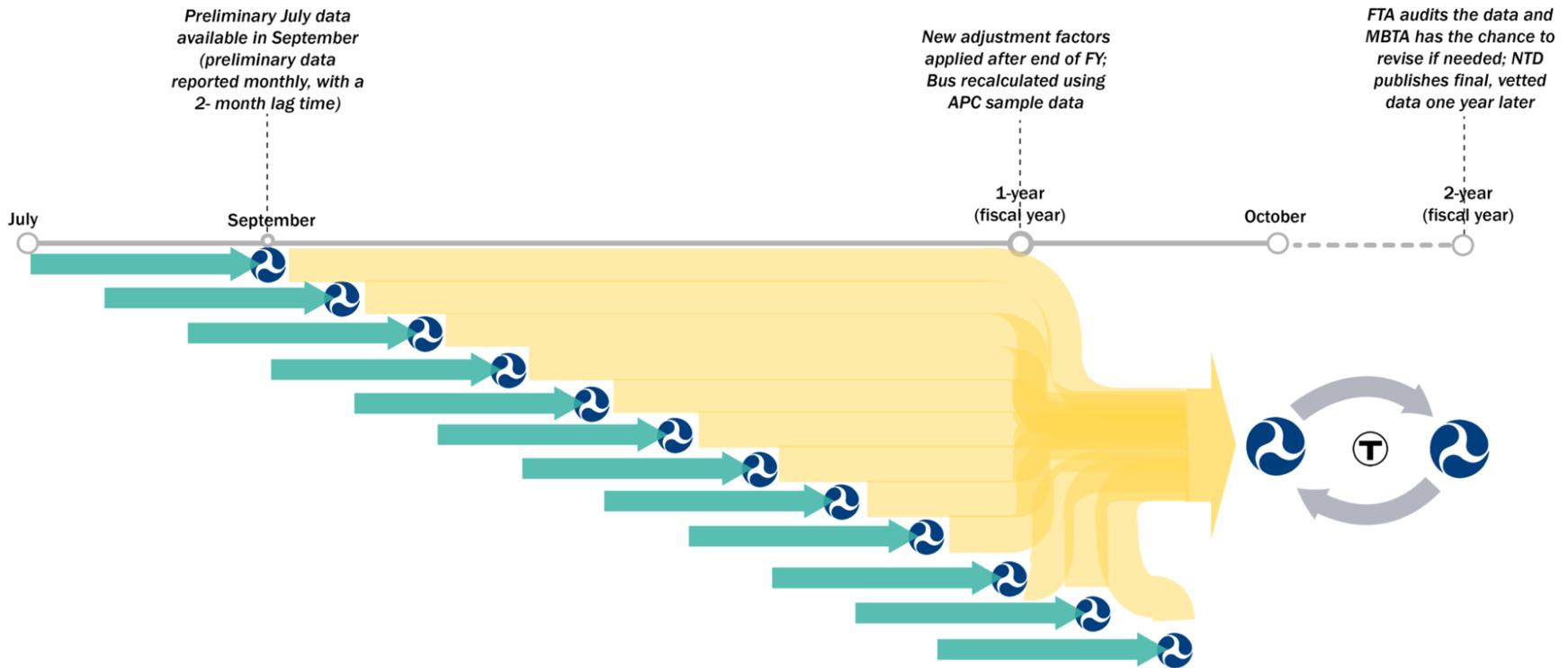Massachusetts Department of Transportation

Current Context

- Ridership data

- National trends

- MBTA trends

- Investigating contributing factors

  - Impact of fare increase

  - Competition from other modes

  - Differences in bus routes

- Next steps

Reporting Ridership Data

Reporting Ridership Data

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NATIONAL TRENDS

National trends in transit ridership

- Transit agencies are reporting ridership loss both to the NTD and in other publications and in press.

- Ridership loss appears to be more acute in bus service than on rail, though there is regional variation
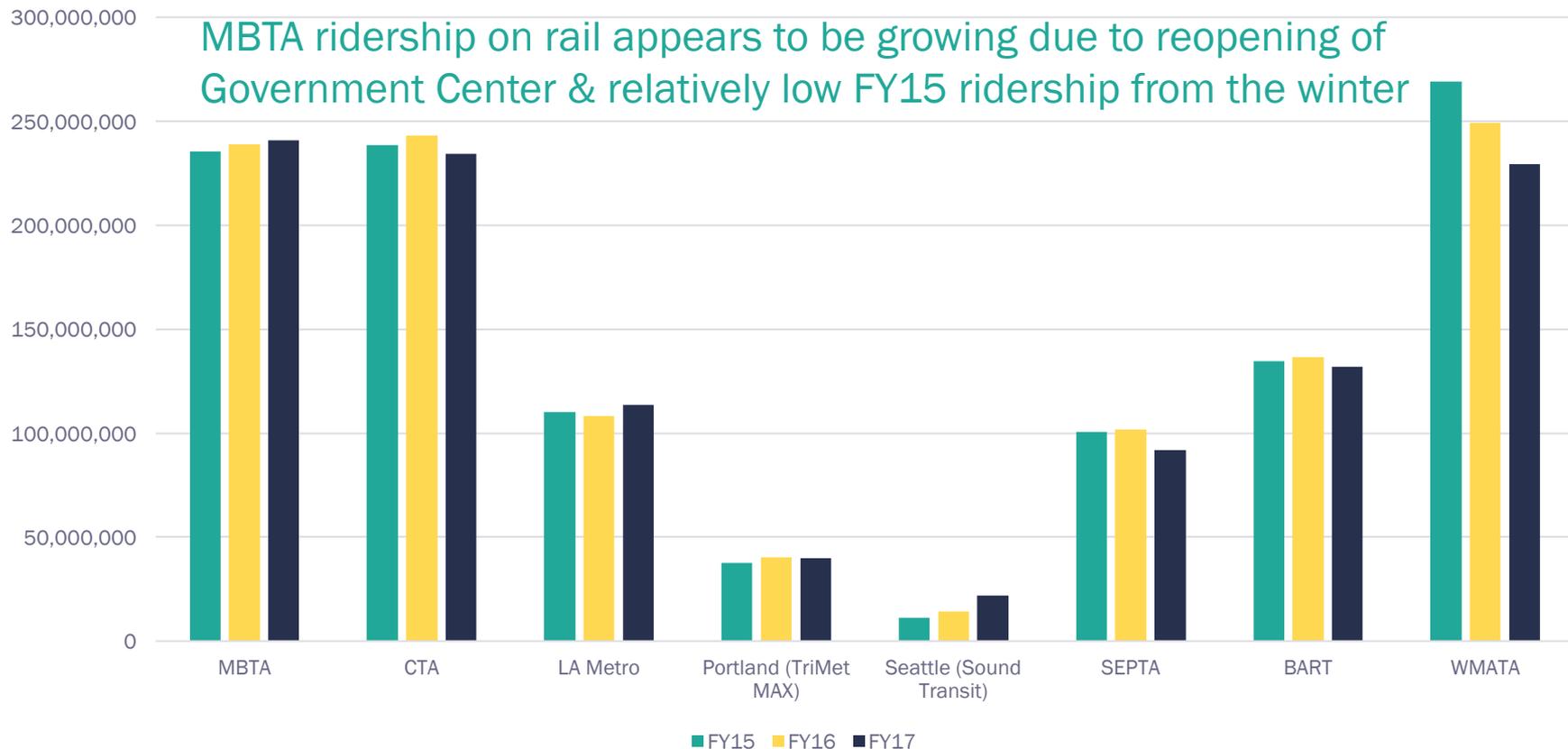
NYC MTA

Bus ridership fell by approximately 1.6 percent on weekdays and 4 percent on weekends in 2016 from the previous year, part of a downward trend over the last decade. -- *Subway Ridership Declines in New York. Is Uber to Blame?*

D.C. WMATA

Metro's weekday ridership is down 6 percent compared with fiscal 2015, and weekend ridership is down 12 percent... ridership remains at levels not seen in 10 years. --Ripple effect of Metro's troubles: plummeting bus ridership across the region

Chicago CTA

The agency also has seen a drop in bus ridership in recent years and the trend is expected to continue... CTA officials say this follows national public transportation trends, as ridership locally and nationally has faced increased competition from bike-share services, ride-share services, such as Uber, and from personal cars in a time of low gas prices. --CTA's new budget keeps basic fares stable for eighth year in a row

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Heavy and light rail ridership trends

MBTA ridership on rail appears to be growing due to reopening of Government Center & relatively low FY15 ridership from the winter

Legend: ■ FY15 ■ FY16 ■ FY17

FY15-FY17 Change

MBTA	CTA	LA Metro	Portland (TriMet MAX)	Seattle (Sound Transit)	SEPTA	BART	WMATA
2.2%	-1.8%	2.7%	5.0%	+49.1%	-9.8%	-2.2%	-17.4%

National Transit Database, with preliminary monthly FY17 data

Seattle opened new service

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Bus ridership trends from peers

Chart legend: ■ FY15 ■ FY16 ■ FY17

FY15-FY17 Change

MBTA	CTA	LA Metro	NYC MTA	Portland	Seattle	WMATA
-6.8%	-8.9%	-17.46%	-4.01%	-7.7%	0.06%	-10.08%

National Transit Database, with preliminary monthly FY17 data

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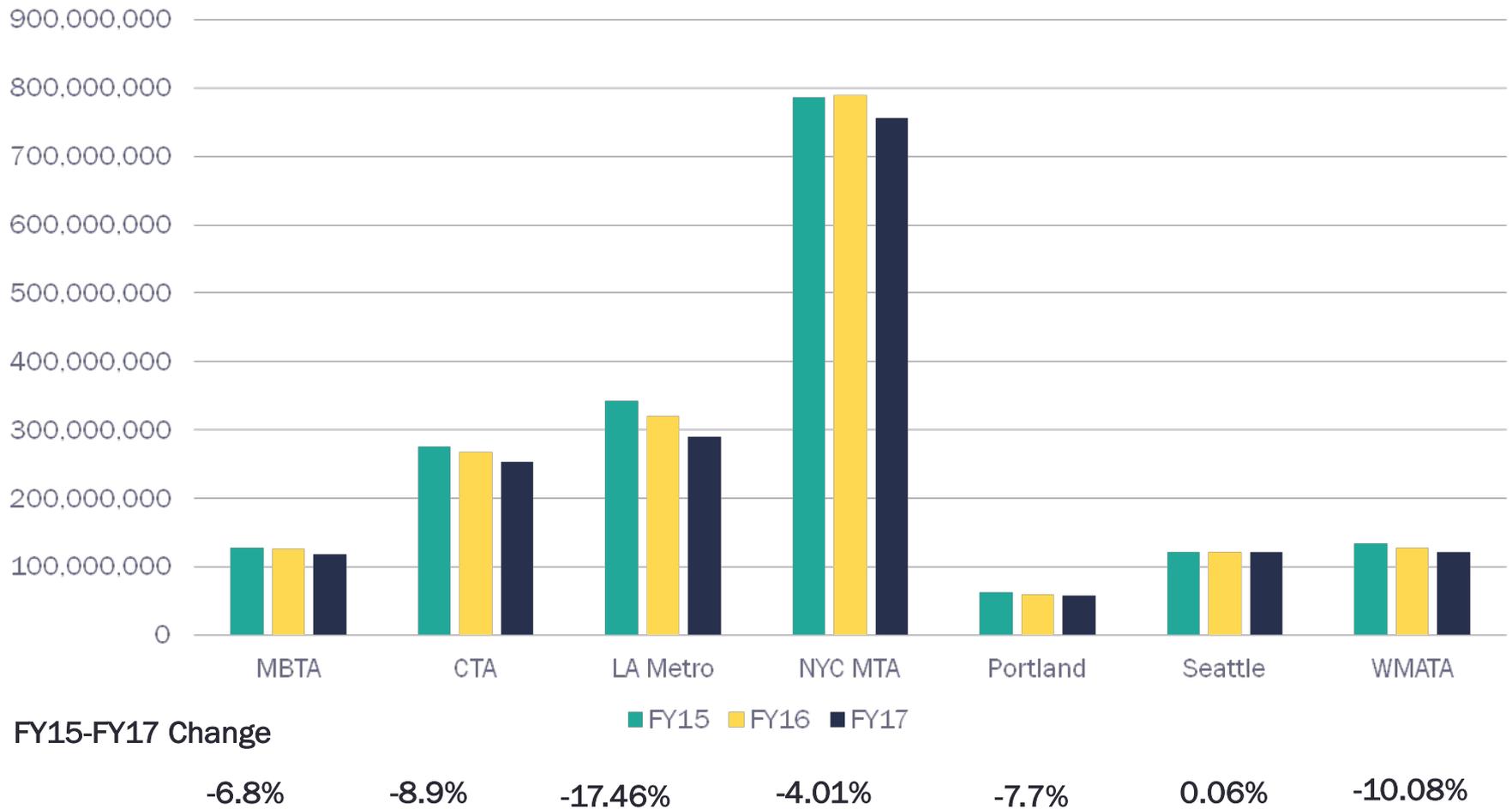
National trends

- Peer agencies report losing ridership primarily:
  - Off peak weekdays and weekends
  - On bus service
  - In urban areas
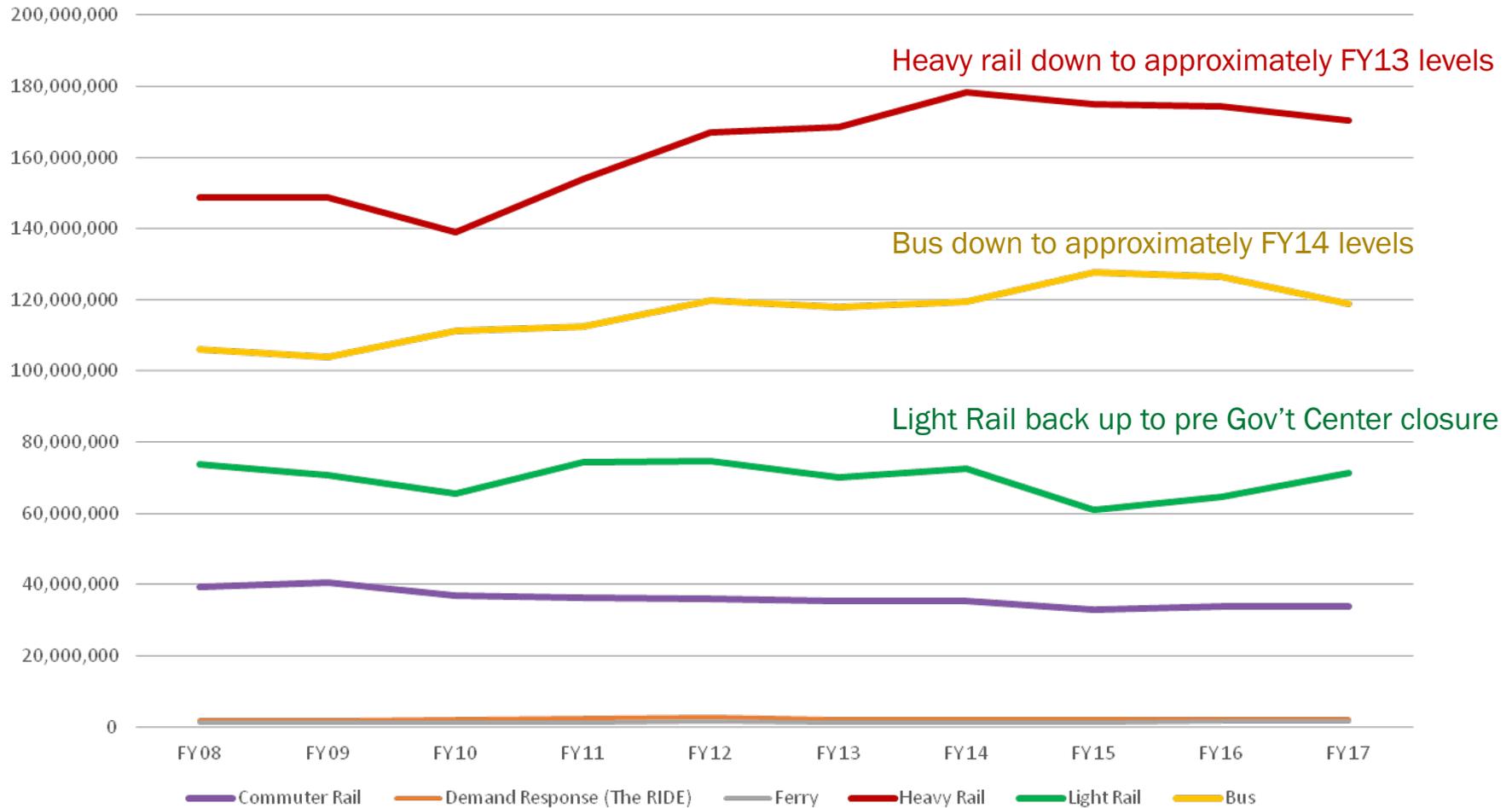- Peer agencies maintaining or increasing ridership:
  - In peak periods
  - On services with geographic constraints (under/over water)
- Causes under much debate; but include:
  - Competition from ride-hailing companies
  - Quality of transit service
  - Low gas prices

Gas Prices in Boston MSA

- Research suggests losing trips, not riders (e.g. riders taking fewer trips per rider)
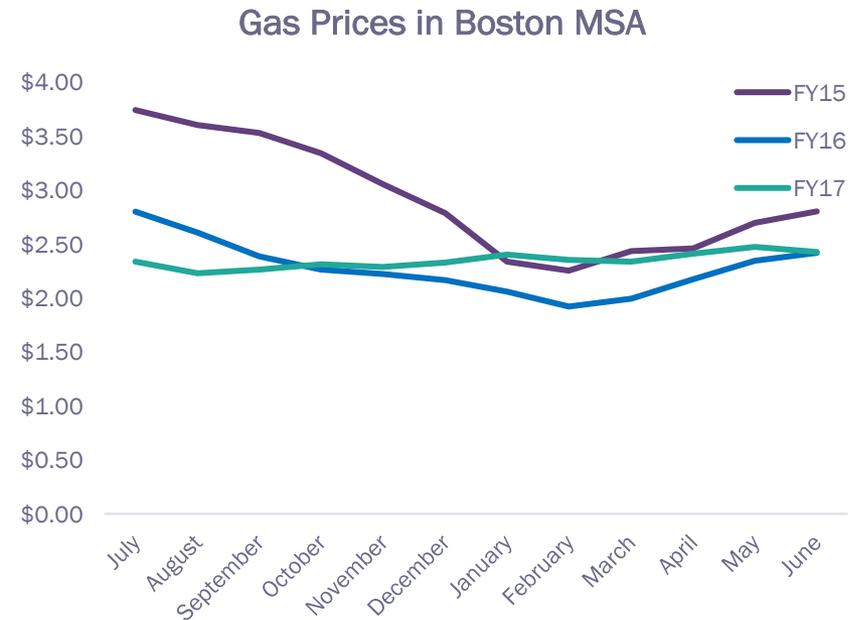
U.S. Energy Information Administration: http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_ybos_m.htm

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MBTA RIDERSHIP TRENDS

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Ridership reported to National Transit Database by mode since CharlieCard implementation

Heavy rail down to approximately FY13 levels

Bus down to approximately FY14 levels

Light Rail back up to pre Gov't Center closure

Legend: Commuter Rail — Demand Response (The RIDE) — Ferry — Heavy Rail — Light Rail — Bus

National Transit Database

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Automated Fare Collection (AFC) taps illuminate FY16 to FY17 trends

- Heavy rail down approximately 2%
  - Down 5% on Saturdays
  - Gains in peak offset by losses off-peak on weekdays
    - Up peak weekdays 1-2%
    - Down off-peak weekdays 3-4%
- Bus lost approximately 6%
  - Weekends down 9-10%
  - Not uniform by bus route
- Ridership up on Light Rail due to reopening of Government Center
- No noticeable change in commuter rail ridership reported to NTD (based on conductor counts, not AFC)

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Changes in AFC taps between FY15 and FY17

Avg. day	FY 2015	FY 2016	FY 2017	2015-16 change	2016-17 change	16-17 change
Subway						
Weekday	499,588	507,126	494,773	1.5%	-2.4%	-12,353
Saturday	292,696	285,588	270,745	-2.4%	-5.2%	-14,843
Sunday	208,120	204,843	198,919	-1.6%	-2.9%	-5,925
Bus (excluding SL*)						
Weekday	335,459	342,900	323,850	2.2%	-5.6%	-19,050
Saturday	178,674	177,533	159,988	-0.6%	-9.9%	-17,545
Sunday	112,956	112,497	102,258	-0.4%	-9.1%	-10,239
CR NTD FY total (monthly module)	32,869,875	33,830,904	33,796,706	2.9%	-0.1%	-94 (avg. all days)

Silver Line APC down average of 7.3%, AFC data not reliable for Silver Line for this period
No surface Green Line data included

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POSSIBLE CONTRIBUTING FACTORS TO RIDERSHIP CHANGES
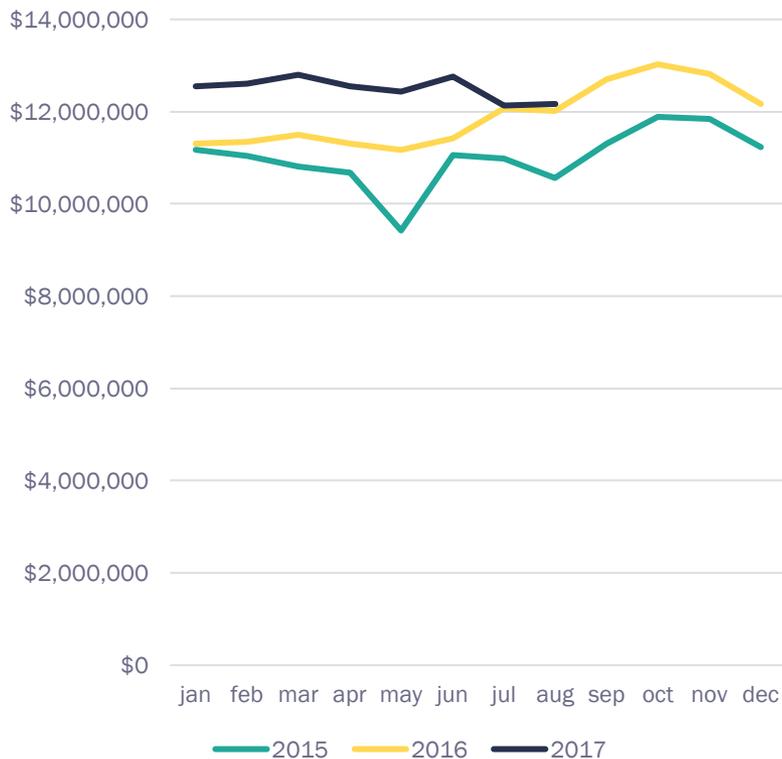
Possible factors

- It is likely many factors are interacting and we are limited by our data sources

- We are testing multiple hypotheses to explain ridership changes

- Analysis begun on:
  - Fare increase, including change in the LinkPass multiple
  - Competition with ride-hailing companies
  - Bus route differences

- Additional research needed on:
  - Spatial changes in the region
  - Competition from other modes

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FARE CHANGES PRELIMINARY RESEARCH

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Revenue – Commuter Rail & Boat

Passes

Single-Ride and Ten-Ride

MBTA accounting

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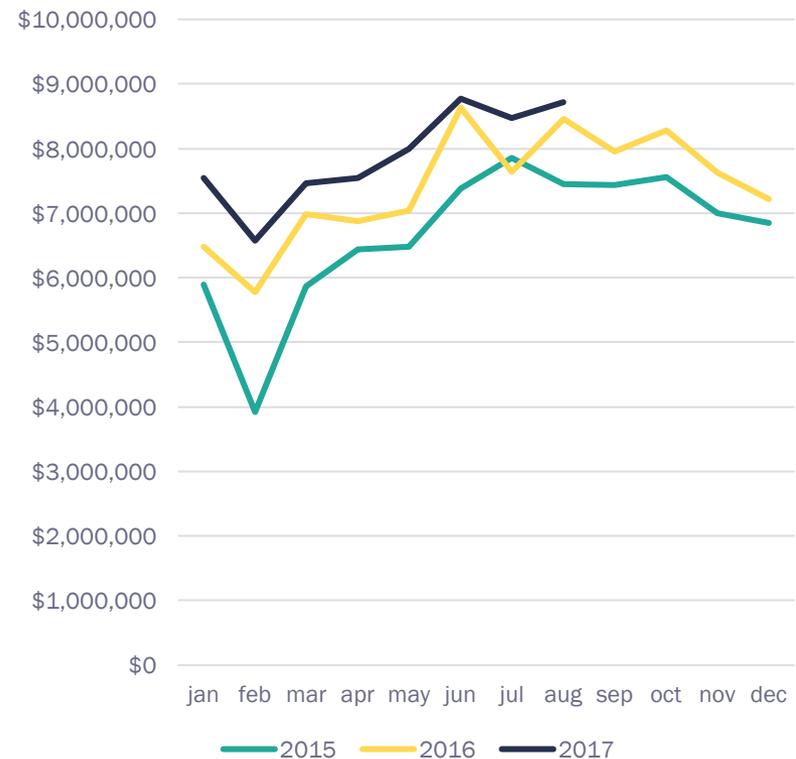
Subway and Bus Revenue .

LinkPass Monthly

Stored Value and Cash

MBTA accounting

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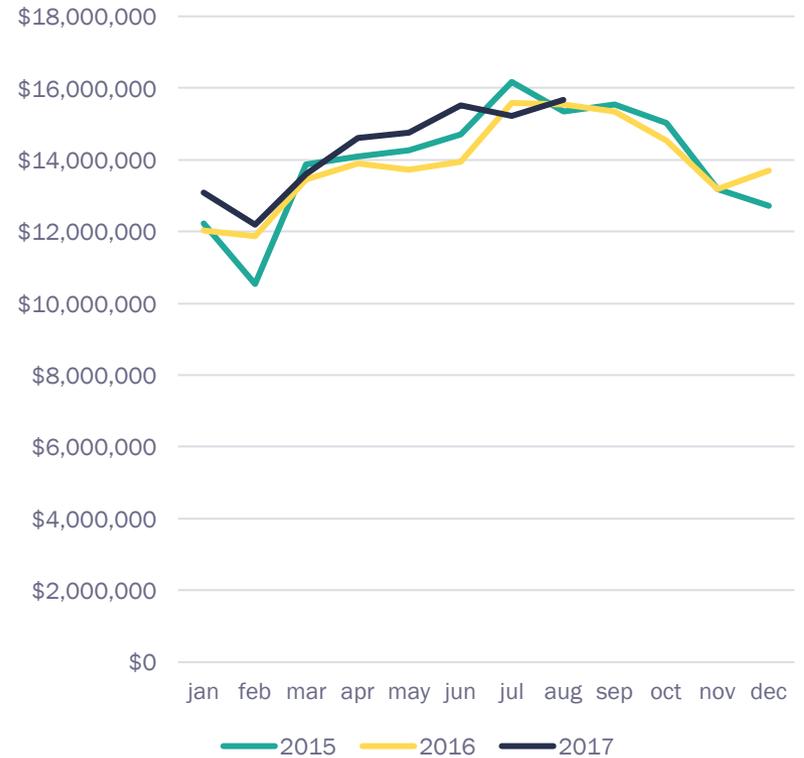
Change in LinkPass multiple

	FY16 multiple	FY17 multiple
Monthly LinkPass	$75/2.10= 35.7	$84.50/2.25= 37.5
Monthly Local bus pass	$50/1.60= 31.25	$55/1.70= 32.4
Senior pass	$29/1.05= 27.6	$30/1.10= 27.2

- In FY17 we increased the LinkPass multiple by 2 linked trips a month, the bus pass by 1 trip, and the senior pass stayed the same
- Sales of non-corporate LinkPasses fell, local bus passes remain consistent and senior passes rise slightly from FY16

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Non-Corporate Pass Sales FY15-FY17

- Non-corporate LinkPass sales dropped approximately 10,000 a month

Adult Rapid Transit LinkPass Unit Sales, Monthly

Legend: FY15 Corporate, FY15 Other, FY16 Corporate, FY16 Other, FY17 Corporate, FY17 Other

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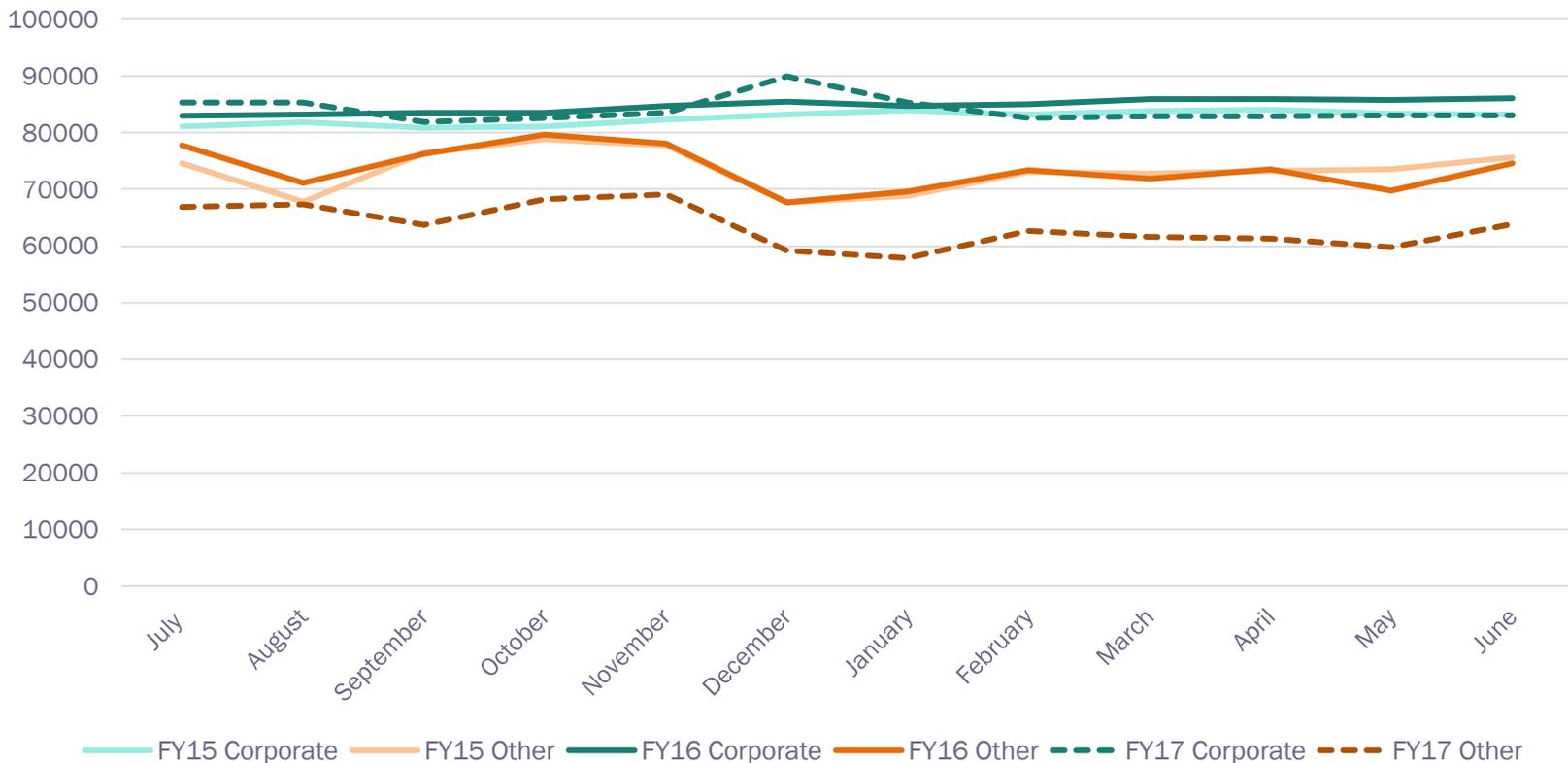
Fare change initial conclusions

- It appears MBTA lost some elastic trips, including some trips by reduced fare riders

- Preliminary analysis suggests fewer non-corporate LinkPass sales contributed to fewer bus trips

- Revenue didn't decrease and the revenue projection for FY17 was accurate

- Commuter Rail revenue saw an increase due to the fare increase

- Bus/Subway saw more shifting from passes to stored value and less of an increase

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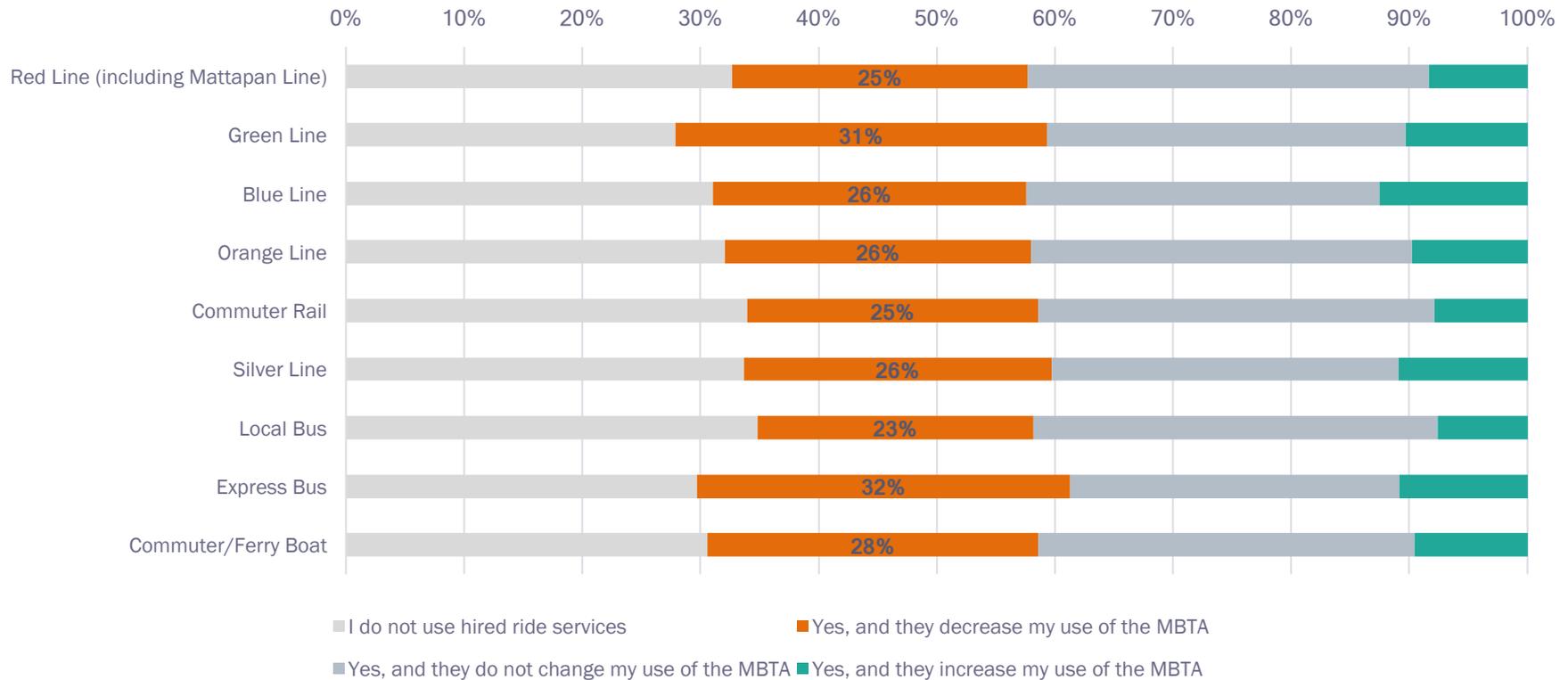# COMPETITION FROM OTHER MODES - PRELIMINARY RESEARCH

Competition from other modes

- Increase in usage of Ride-Hailing apps and bicycling
- Study of Ride-Hailing apps in 7 major cities in the US (including Boston) match national transit ridership trends of where/when losing ridership[1]
- Other modes less competitive for cross-harbor trips where MBTA not losing ridership
- Apps like Transit provide a real-time comparison between MBTA and Uber

[1]Clewlow, R., & Laberteaux, K. L. (2016, January). Shared-use mobility in the United States: current adoption and potential impacts on travel behavior. In *Annual Meetings of the Transportation Research Board, Washington DC.*

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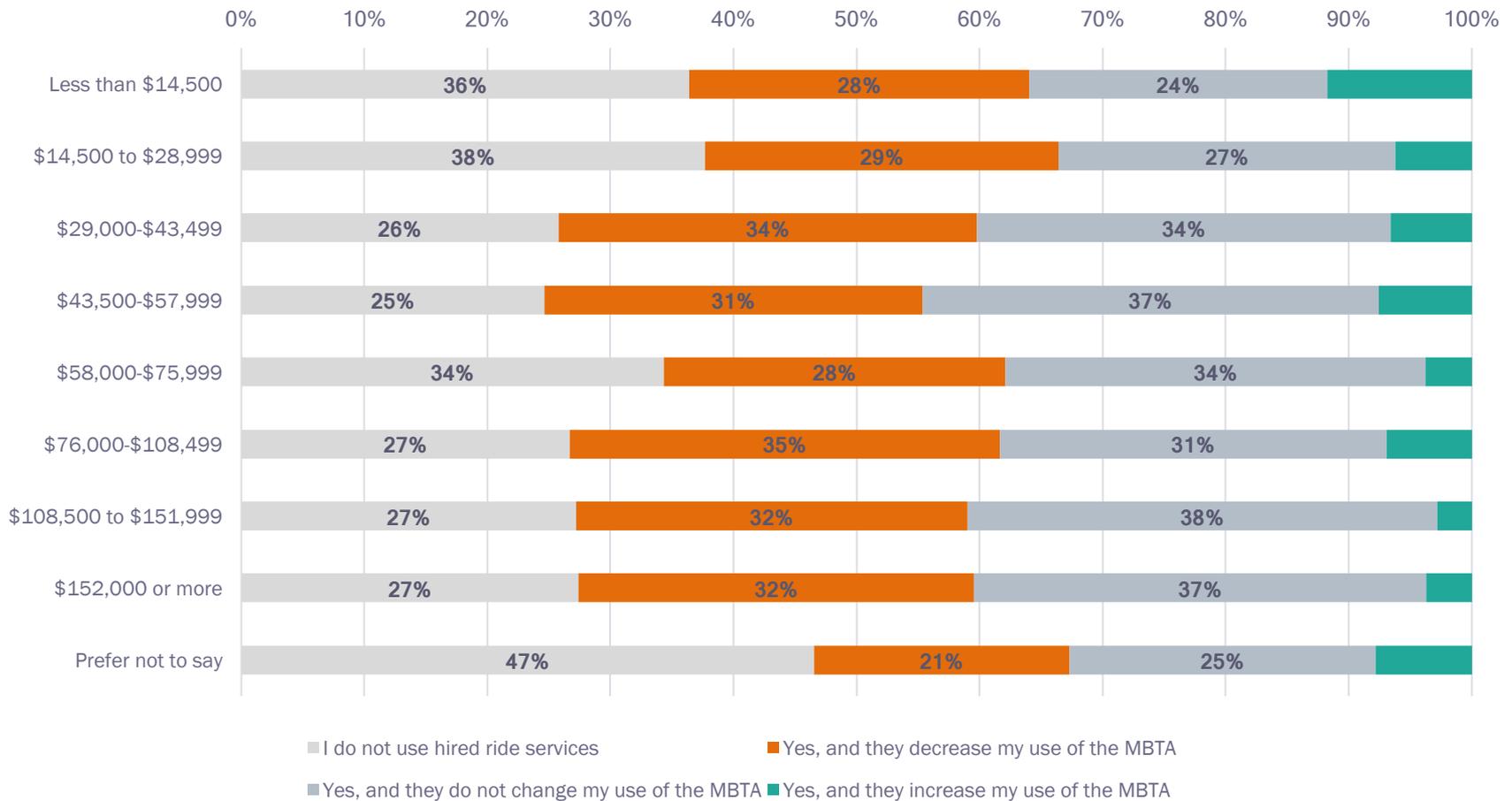Massachusetts Department of Transportation

Do passengers use Ride-Hailing services?

Approximately 30% of passengers across all modes report that using these services reduces their use of the MBTA
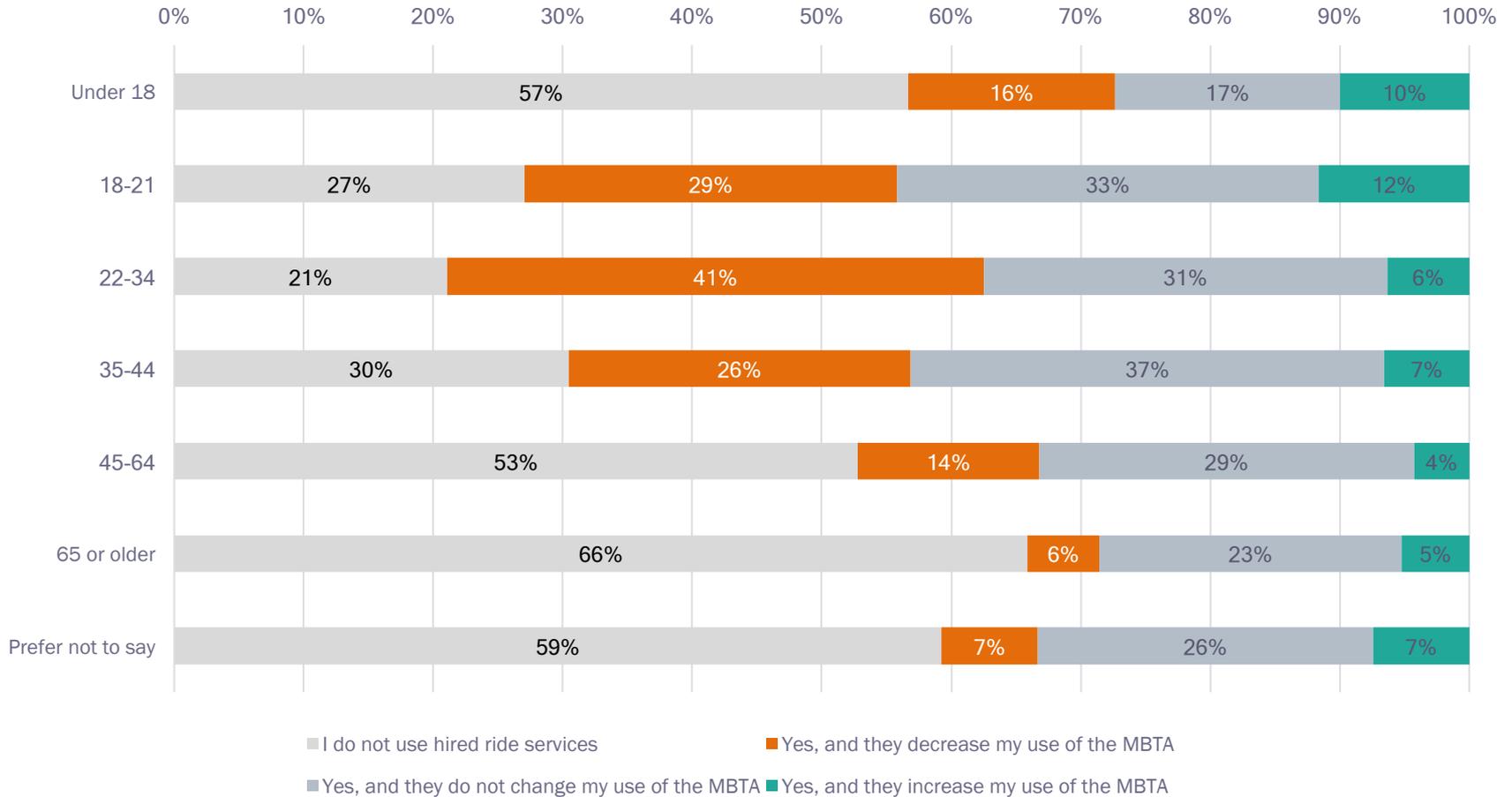

MBTA 2017 Intercept Customer Satisfaction Survey

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Ride-Hailing usage varies slightly by income level

Income	I do not use hired ride services	Yes, and they decrease my use of the MBTA	Yes, and they do not change my use of the MBTA	Yes, and they increase my use of the MBTA
Less than $14,500	36%	28%	24%	
$14,500 to $28,999	38%	29%	27%	
$29,000-$43,499	26%	34%	34%	
$43,500-$57,999	25%	31%	37%	
$58,000-$75,999	34%	28%	34%	
$76,000-$108,499	27%	35%	31%	
$108,500 to $151,999	27%	32%	38%	
$152,000 or more	27%	32%	37%	
Prefer not to say	47%	21%	25%	

Legend:
- ■ I do not use hired ride services
- ■ Yes, and they decrease my use of the MBTA
- ■ Yes, and they do not change my use of the MBTA
- ■ Yes, and they increase my use of the MBTA

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Ride-Hailing usage varies by age

Age	I do not use hired ride services	Yes, and they decrease my use of the MBTA	Yes, and they do not change my use of the MBTA	Yes, and they increase my use of the MBTA
Under 18	57%	16%	17%	10%
18-21	27%	29%	33%	12%
22-34	21%	41%	31%	6%
35-44	30%	26%	37%	7%
45-64	53%	14%	29%	4%
65 or older	66%	6%	23%	5%
Prefer not to say	59%	7%	26%	7%

MBTA 2017 Intercept Customer Satisfaction Survey

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Ride-Hailing usage initial conclusions

- A large proportion (approximately 2/3) of MBTA's transit users report also using ride-hailing companies

- About half of those people report that use of ride-hailing companies reduces their use of MBTA while very few report that it increases their use of the MBTA

- We do not know **how often** use of ride-hailing services reduces or increases transit use, so we cannot yet estimate the number of trips lost
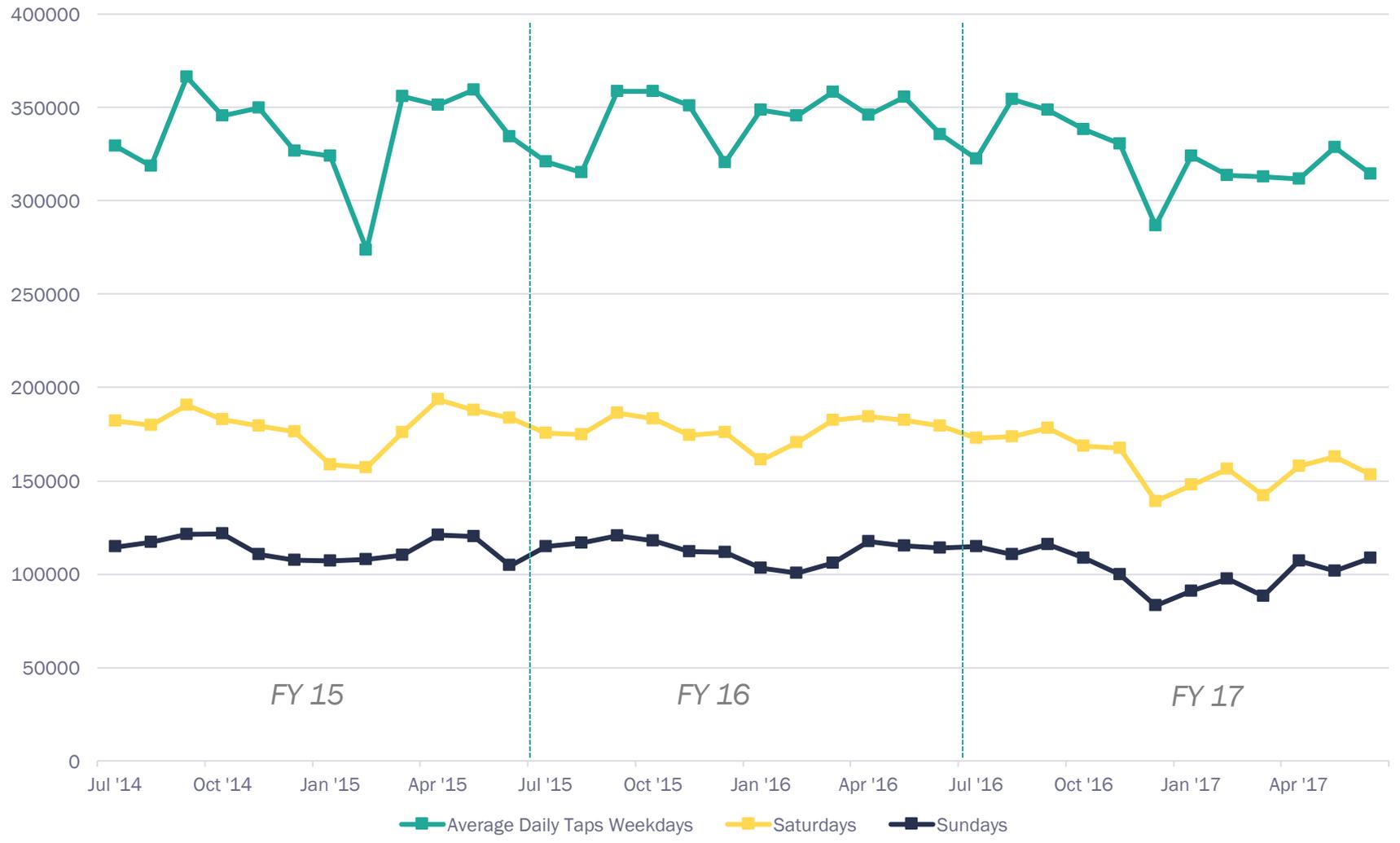
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DIFFERENCES AMONG BUS ROUTES

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Bus ridership trend

National Transit Database monthly bus ridership

Average MBTA AFC validations / payments on bus fareboxes

AFC, monthly average by day type

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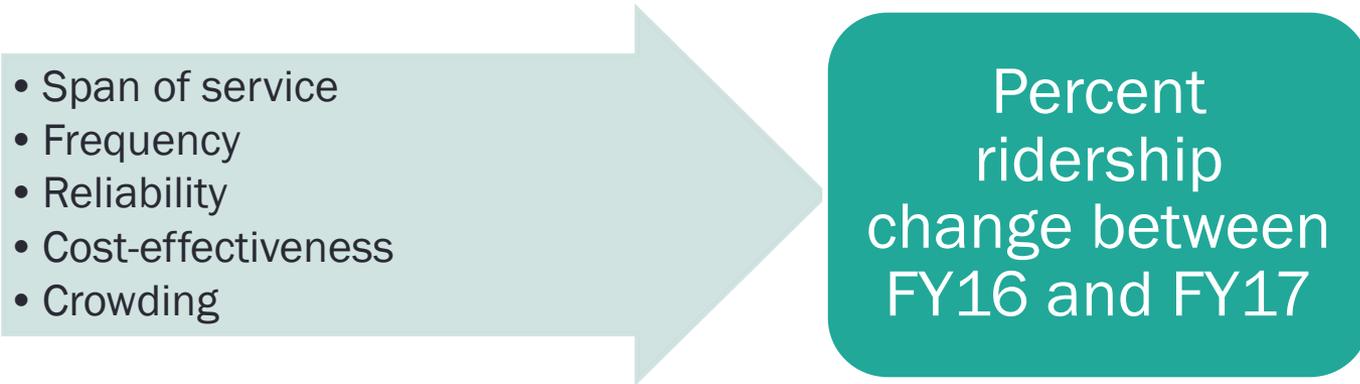Massachusetts Department of Transportation

Ridership changes on bus routes

- Bus ridership drops were not across all routes, some routes gained riders

- Potentially many conflicting reasons/trends that will be masked by each other

- Regression models can incorporate multiple explanatory variables

- Tested two of the route-level aspects that might explain differences between bus routes: service quality and rider characteristics

- 80+ routes had sufficient data for analysis

route	ridership change FY17 vs FY16
57	-11%
15	-10%
28	-9%
39	-9%
23	-9%
22	-8%
1	-8%
9	-7%
7	-6%
66	-3%
77	-3%
32	-1%
71	1%
111	2%
116	7%
117	9%

AFC

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Results of regression models for bus routes: Service quality model

- Span of service
- Frequency
- Reliability
- Cost-effectiveness
- Crowding

Percent ridership change between FY16 and FY17

- The model is not very predictive of ridership changes; only about 7% of the variance between routes in ridership change is predicted by the quality of service
- The only significant variable is **reliability**; more reliable routes are associated with higher ridership improvements/less ridership loss
- A 10% increase in reliability corresponds with a 1.5% increase in ridership change

AFC and AVL

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Results of regression models for bus routes: Rider characteristics model

- Percent of trips conducted for work
- Percent of riders transferring to or from another service
- Percent of riders paying reduced fare

Percent ridership change between FY16 and FY17

- This model is more predictive, explaining 18.5% of the variance between routes in ridership change

- The only significant variable is **percent of riders paying a reduced fare**; higher proportions of reduced fare riders are associated with higher ridership losses

- A 10% increase in percent of riders paying a reduced fare corresponds with a 2.4% decrease in ridership change

AFC and AVL

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Results of regression models for bus routes: Combined model

- The combined model (with variables from both service quality and rider characteristics) maintains the two predictive aspects: **reliability** and **percentage of riders paying reduced fare**.

- The proportion of reduced fares being significant doesn't mean loss of reduced fare trips from this model, although further analysis suggests that reduced fare trips did decrease relative to full-fare trips.

- Proportion of reduced fares is likely reflecting some other aspect of bus service (e.g. spatial distribution of bus routes or number of discretionary trips).

AFC and AVL

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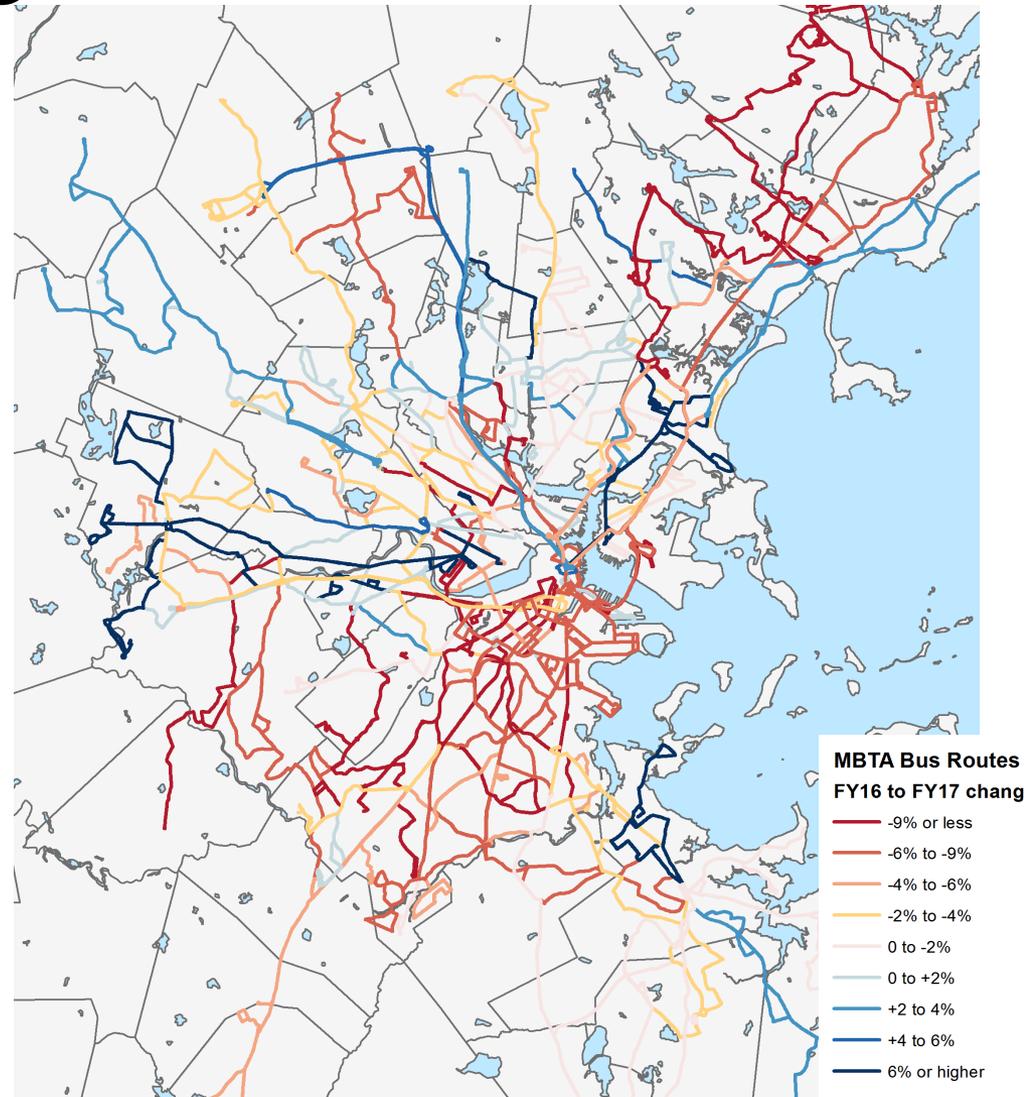Massachusetts Department of Transportation

Additional hypotheses tested

- **Percent minority riders on a route:** once reduced fares are accounted for, percent minority has no further correlation with ridership gains or losses

- **Long trips/short trips:** no evidence that some trip lengths are more likely to be missing than others

- **Bus only trips vs transfer trips:** no evidence that "feeder" bus routes are more or less susceptible to ridership loss

AFC and AVL

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Spatial differences

- Ridership still going up on bus routes serving East Boston, Chelsea, Revere
  - Blue Line subway ridership up ~3%
- Will require more analysis to match ridership changes to population growth
- Possible geographic impact of the harbor as a physical barrier- harder to bike and more expensive to take other modes

AFC and AVL

MBTA Bus Routes
FY16 to FY17 change

- -9% or less
- -6% to -9%
- -4% to -6%
- -2% to -4%
- 0 to -2%
- 0 to +2%
- +2 to 4%
- +4 to 6%
- 6% or higher

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Initial conclusions from analyses: Multiple factors impacting ridership

- Likely the increase of the pass multiple at the same time as growing competition contributed to the decrease in bus ridership

- No decrease in peak periods on subway

- Public transit is most competitive when it has dedicated Right of Way in congestion and in geographies that raise the costs of competing modes

- These services can be the most capital intensive and expensive to operate

- More on-street priority can help bus service be more reliable and competitive

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Summary

- MBTA ridership trends are in line with peer agencies
- National concern because losses in a time of job and population growth, indicates a loss of market share
- For the MBTA bus, important factors include increase of the pass multiple, less reliable service, and growing competition
- Commuter Rail was relatively inelastic in this fare increase, but bus/subway riders changed their fare usage and trip-making patterns

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Next steps

Continue analysis and discussions with peer agencies

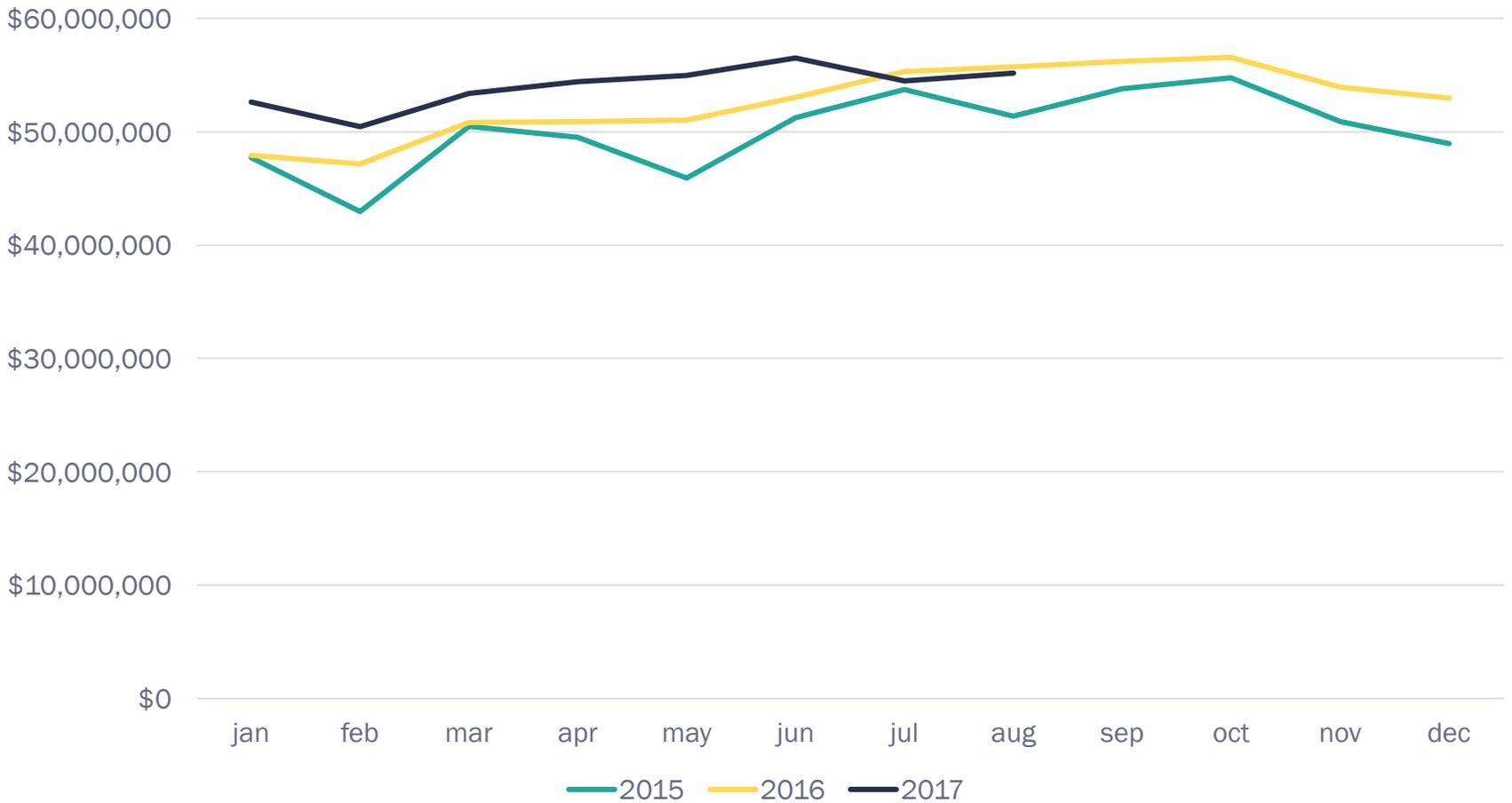Part II: Input for a ridership goal (Nov 6)

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APPENDIX

Revenue data – all revenue

MBTA accounting

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Unemployment

Boston-Cambridge-Nashua MSA
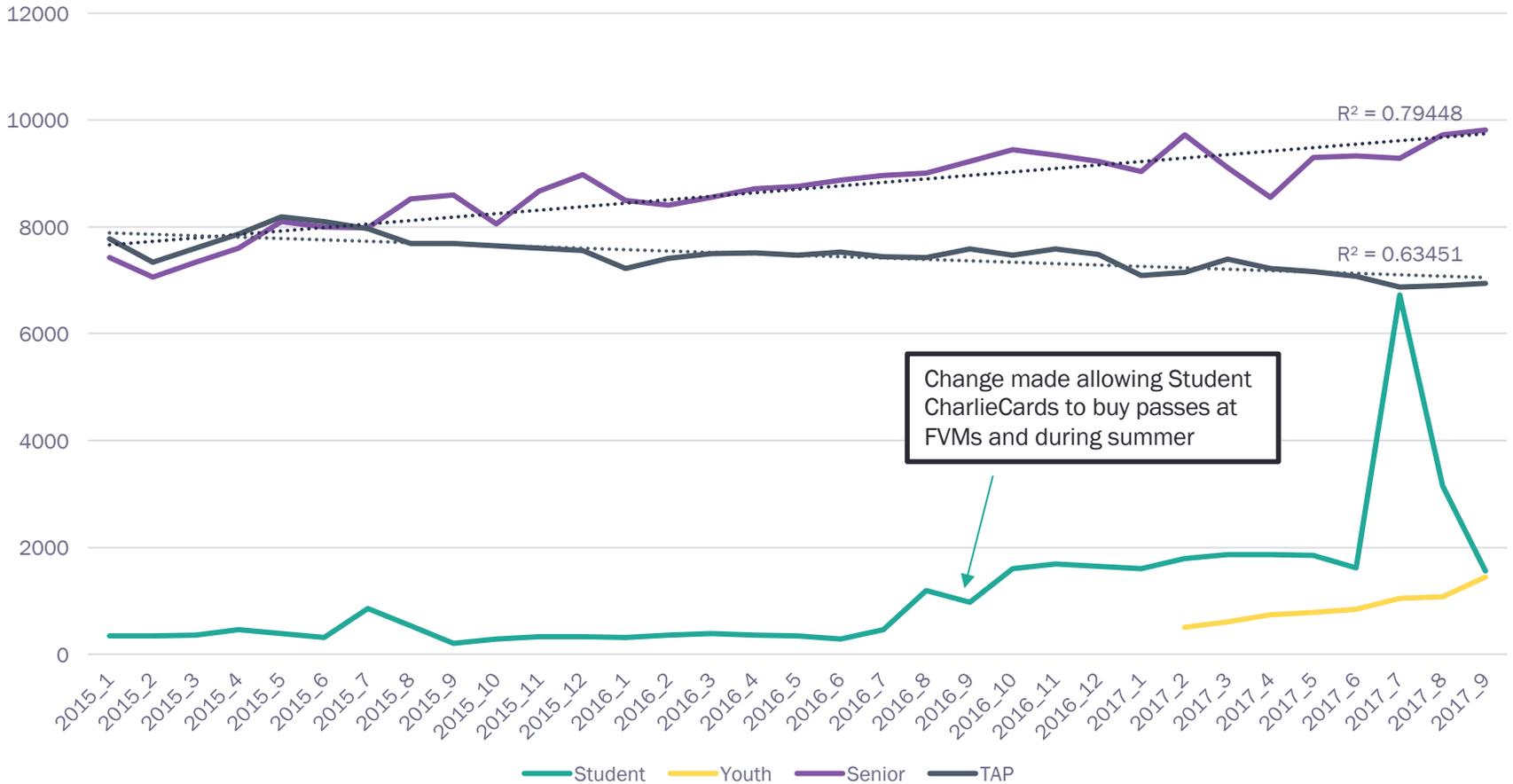Unemployment Rate

Bureau of Labor Statistics

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7-Day passes sold by month

AFC

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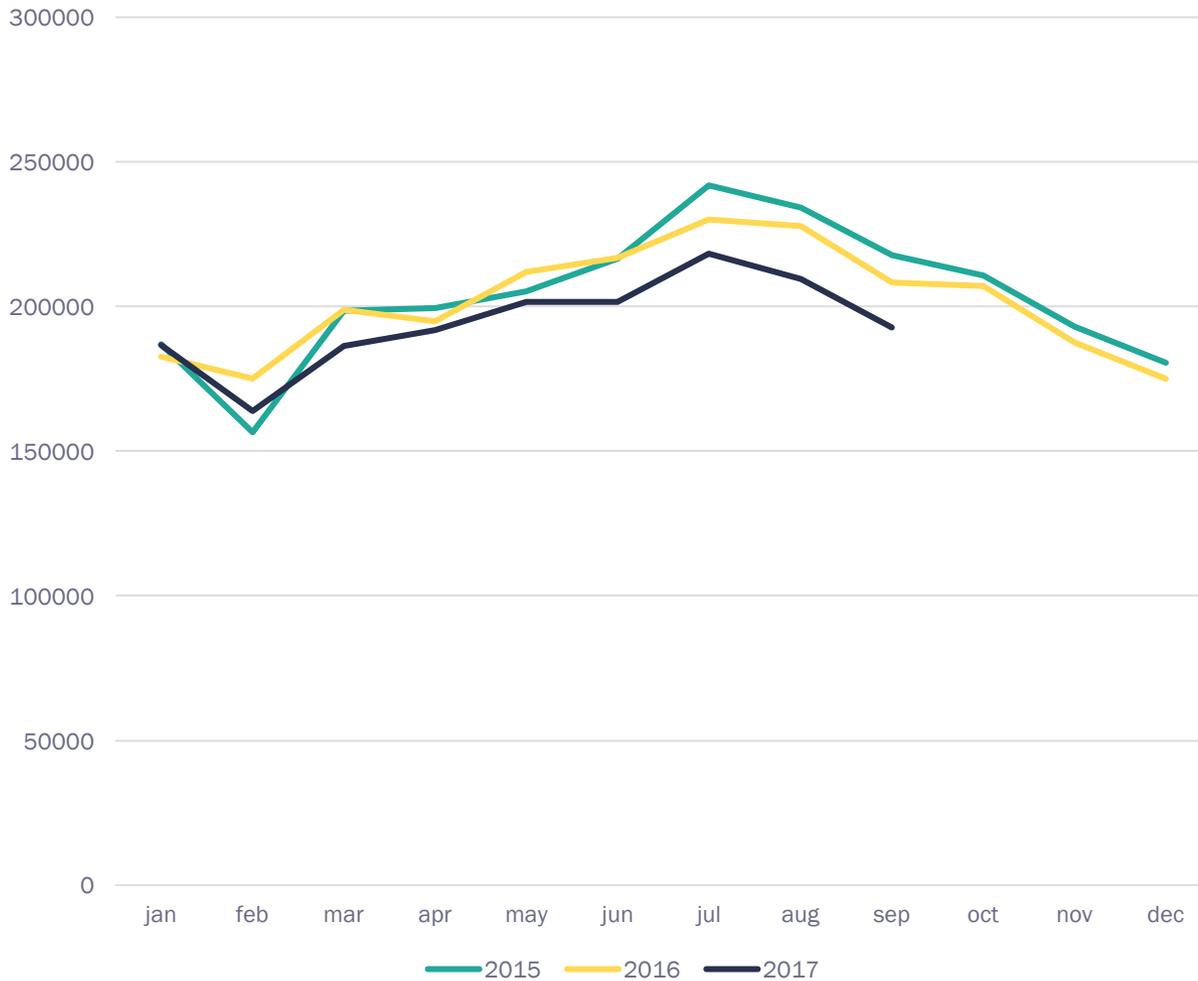
Reduced fare passes

Non-Adult Monthly Passes
Sales per month

$R^2 = 0.79448$

$R^2 = 0.63451$

Change made allowing Student CharlieCards to buy passes at FVMs and during summer

Student — Youth — Senior — TAP

AFC data

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