

MWCOG ActivitySim Implementation Update

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Overview

- ActivitySim 1.2 Release
- Model Calibration Updates
- Model Validation Status

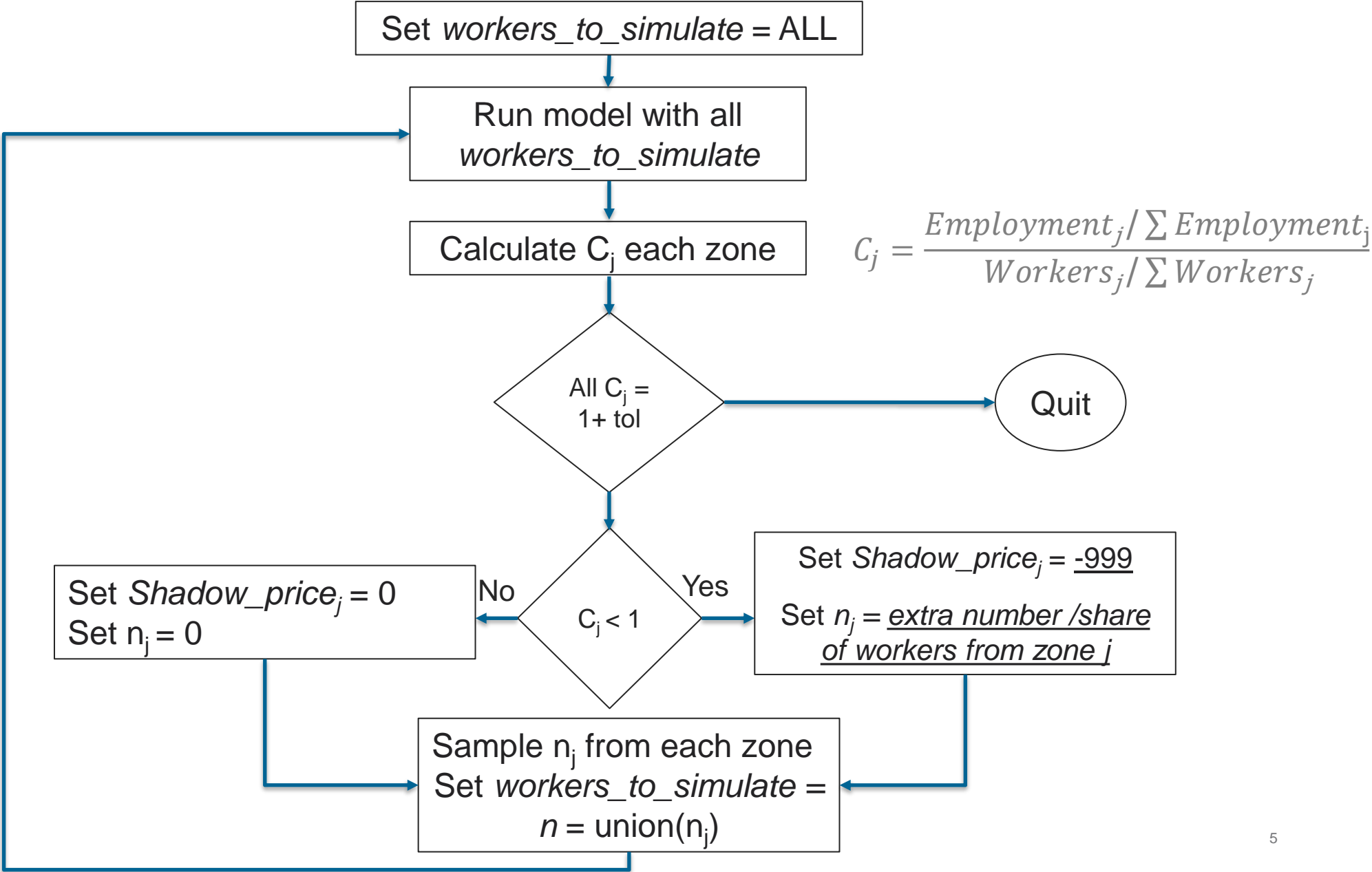
ActivitySim 1.2 Update

- **Better Runtime – 8% faster with minimal config changes**
- **Adds simulation-based constraint for work and school location choice**

Simulation-Based Constraint

- **Constrains workers' work location choice based on zonal employment**
- Destination Choice Models are Singly-constrained without Shadow Pricing
- Shadow Pricing is iterative
- Simulation-Based Constraint re-simulates choices *only where necessary*

Simulation-Based Constraint








$$C_j = \frac{\text{Employment}_j / \sum \text{Employment}_j}{\text{Workers}_j / \sum \text{Workers}_j}$$

Model Calibration Updates

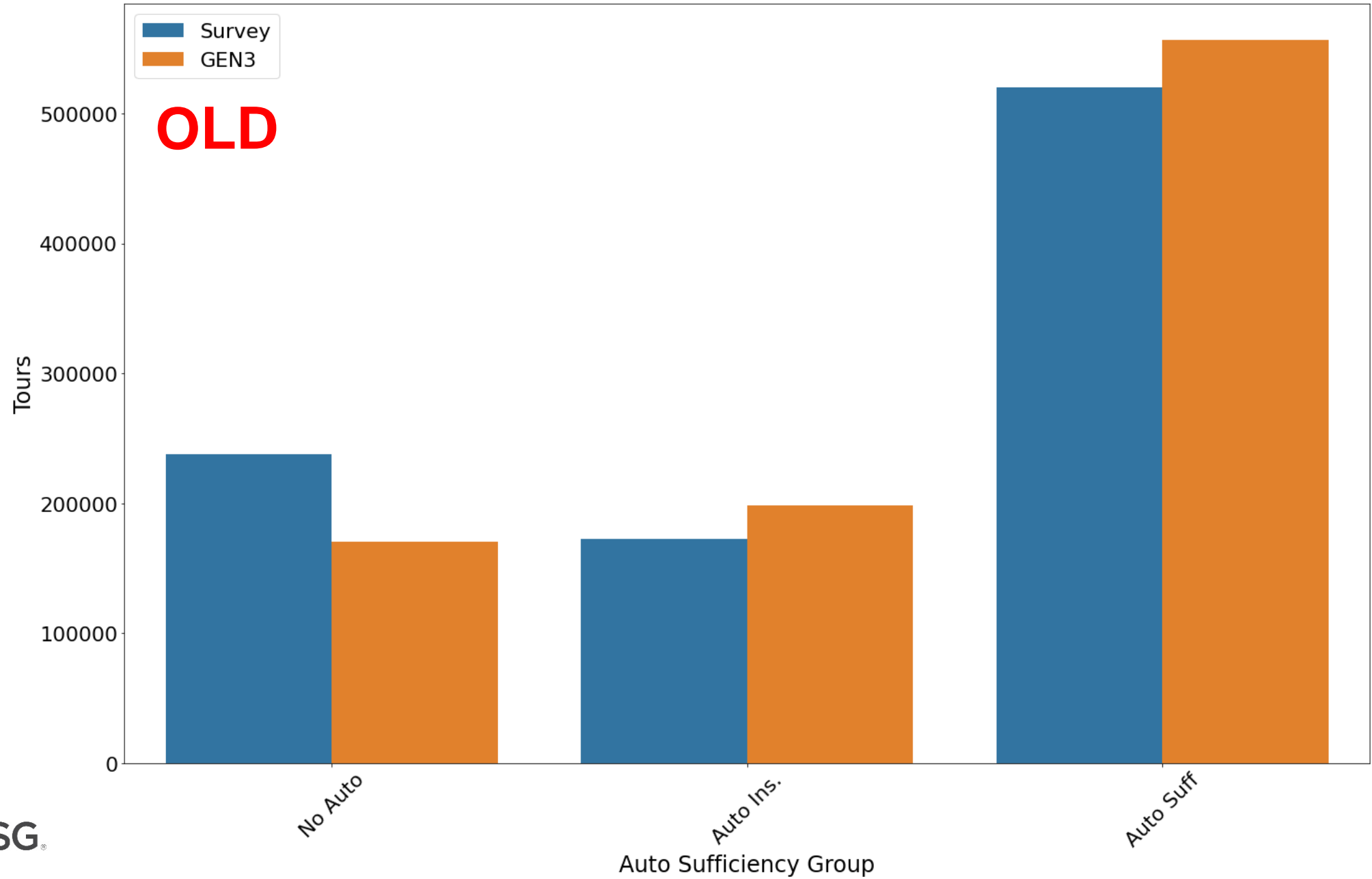


Major Calibration Updates

-  Auto Ownership Model
-  Work-From-Home Model
-  Non-Mandatory Trip Flow Model
-  Mode Choice Models
-  Stop Out-of-Direction Distance

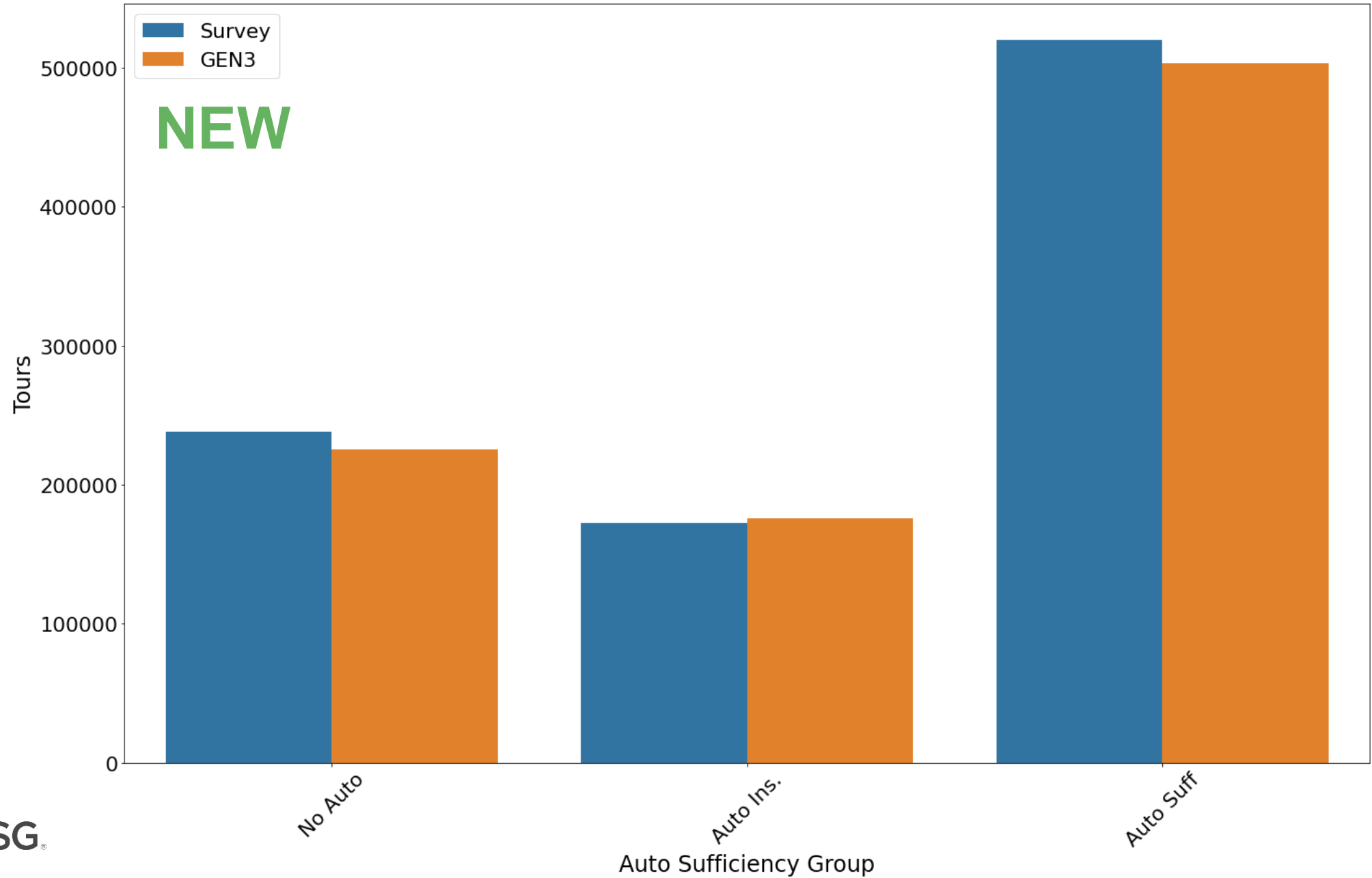


Person Tours by Auto Sufficiency, DC Origin



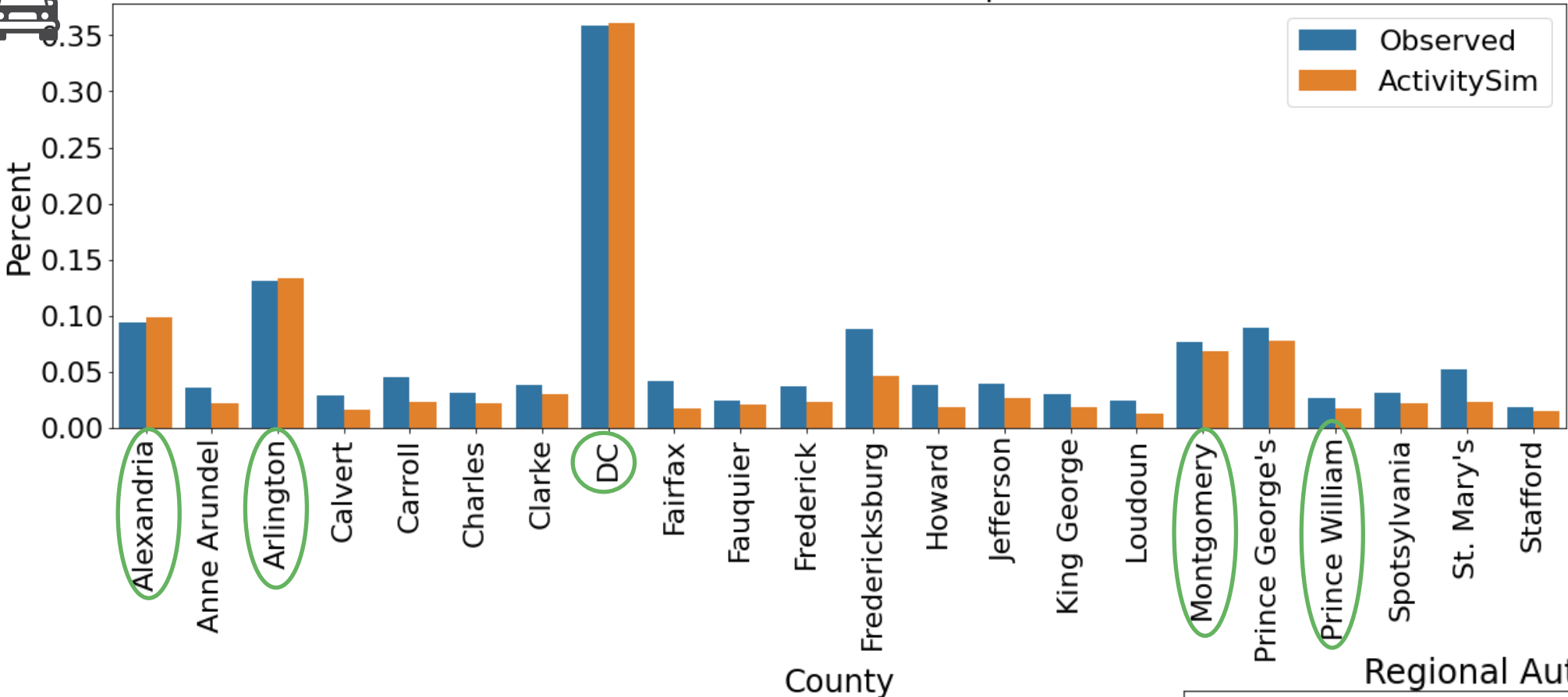


Person Tours by Auto Sufficiency, DC Origin



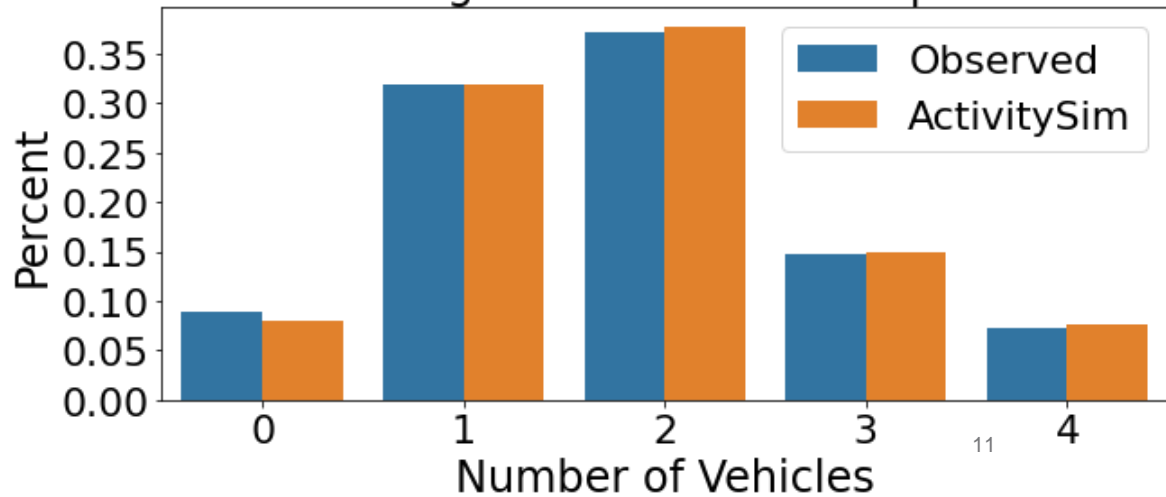


Zero Auto Ownership



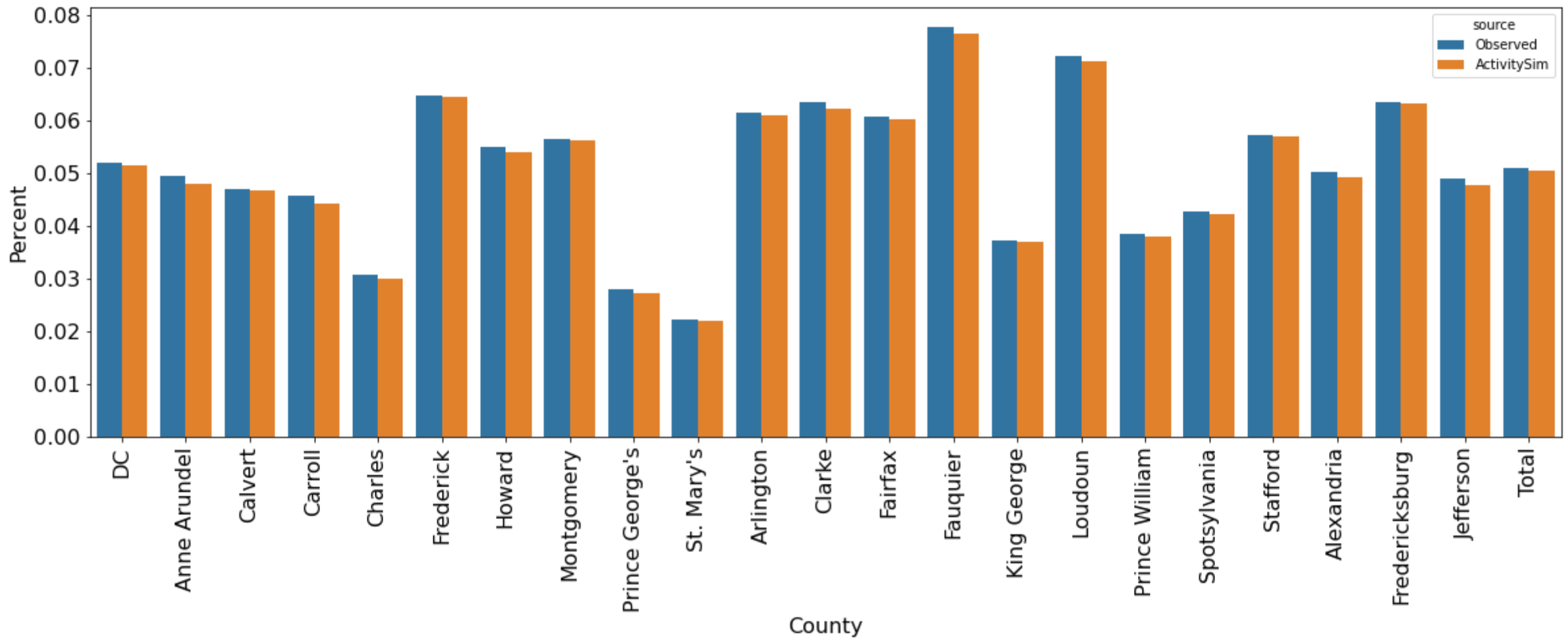
Circled jurisdictions are where zero-auto adjustments were made in the auto ownership model

Regional Auto Ownership





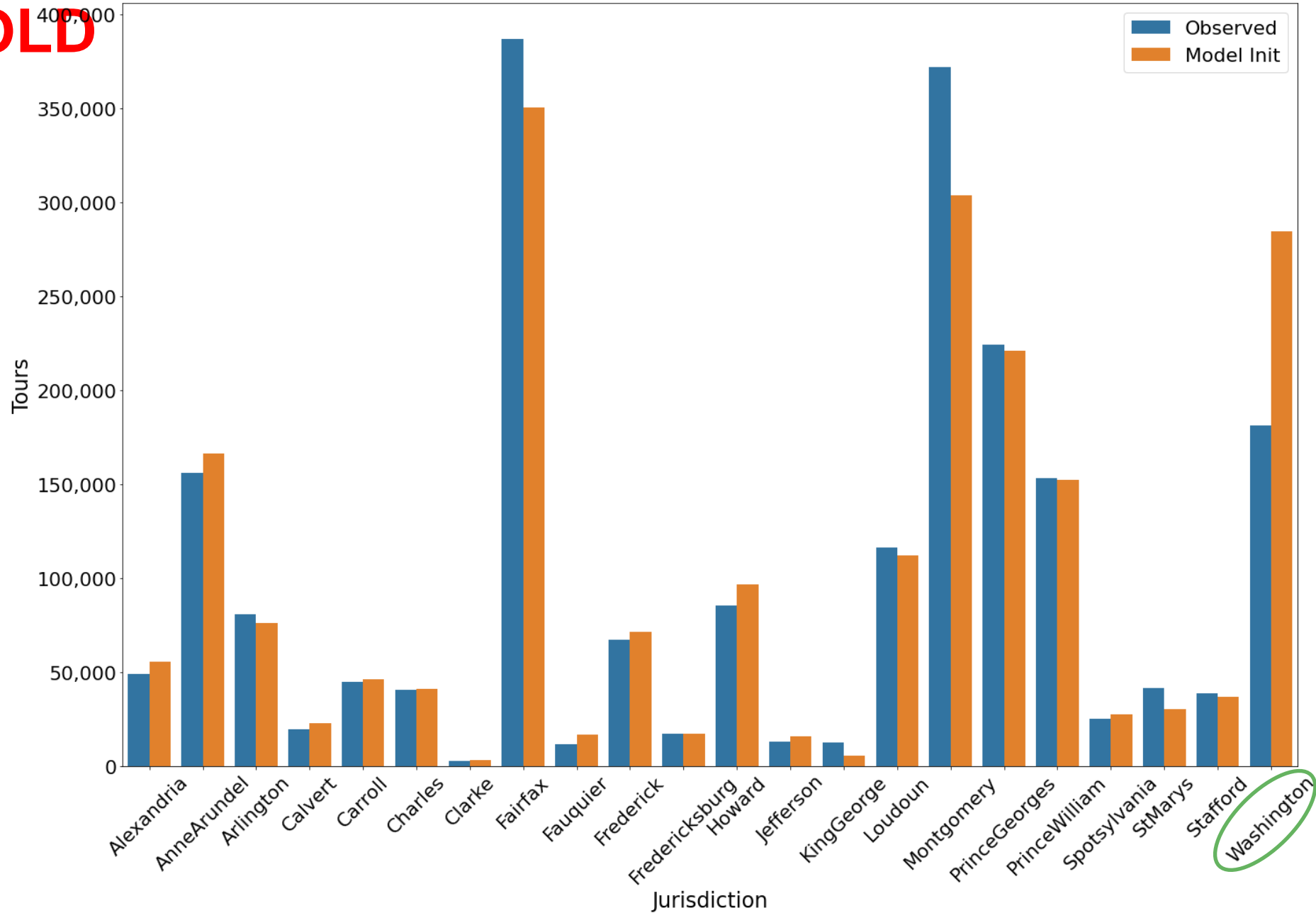
Work From Home





Maintenance Tours by Destination

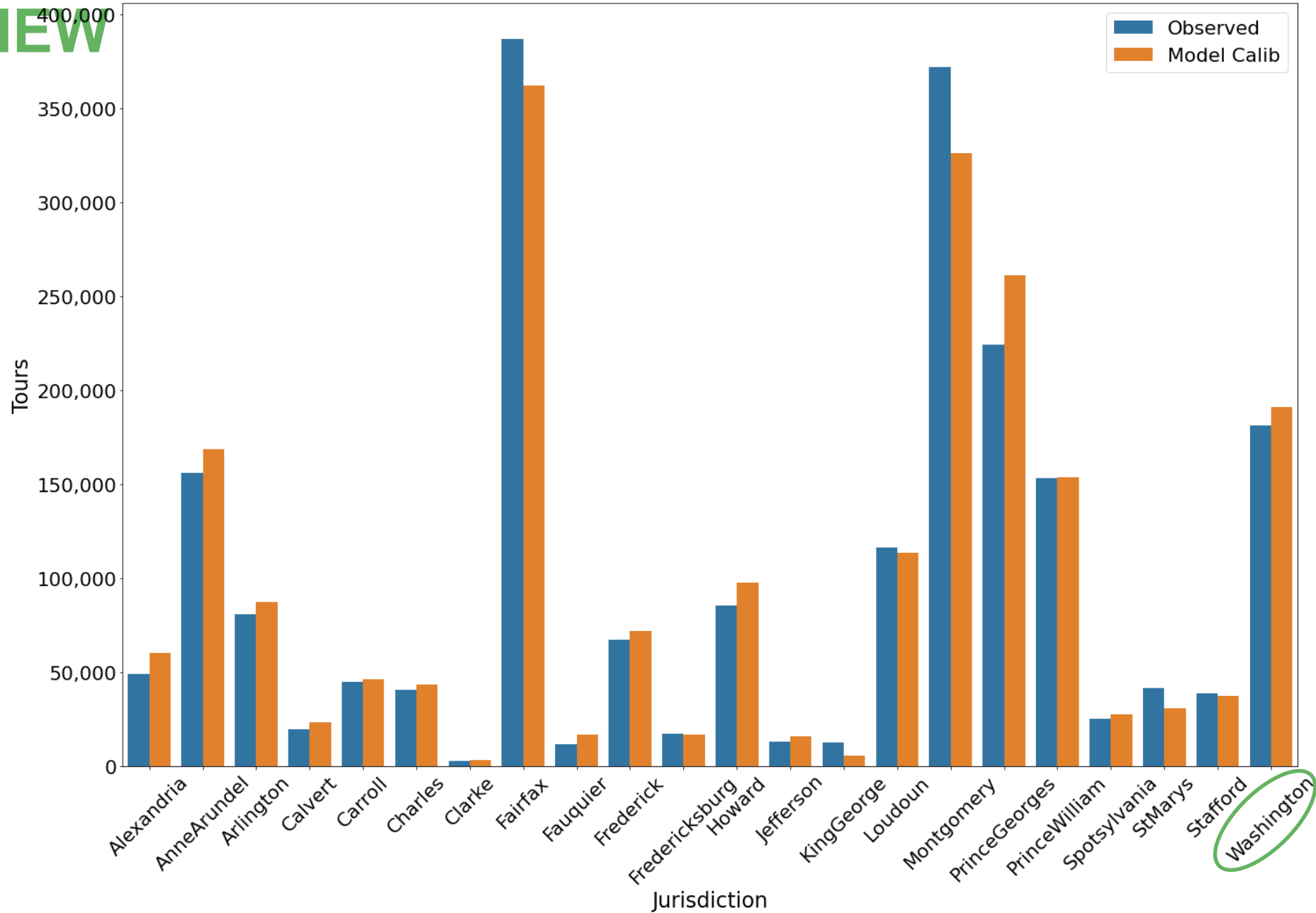
OLD





Maintenance Tours by Destination

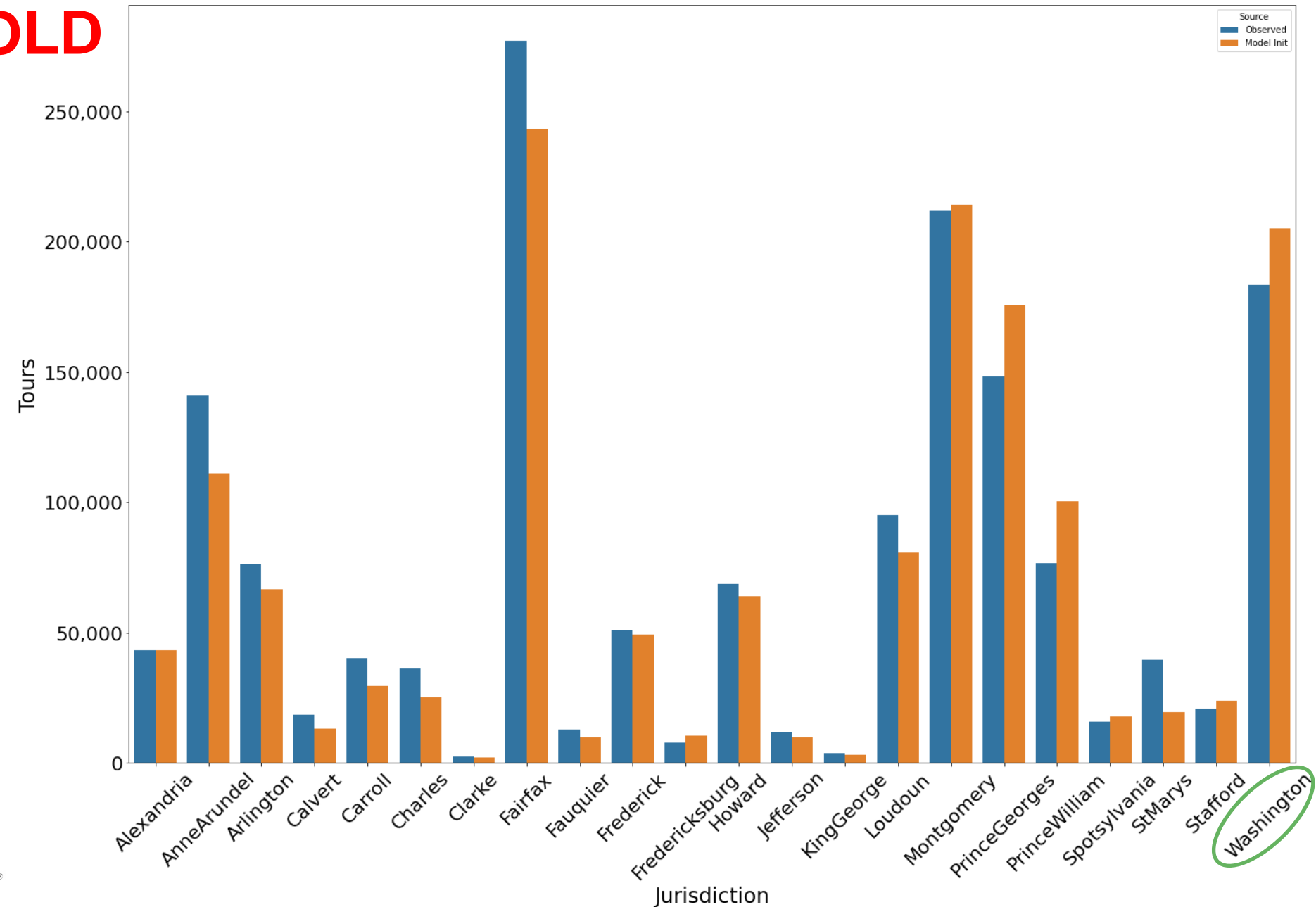
NEW





Discretionary Tours by Destination

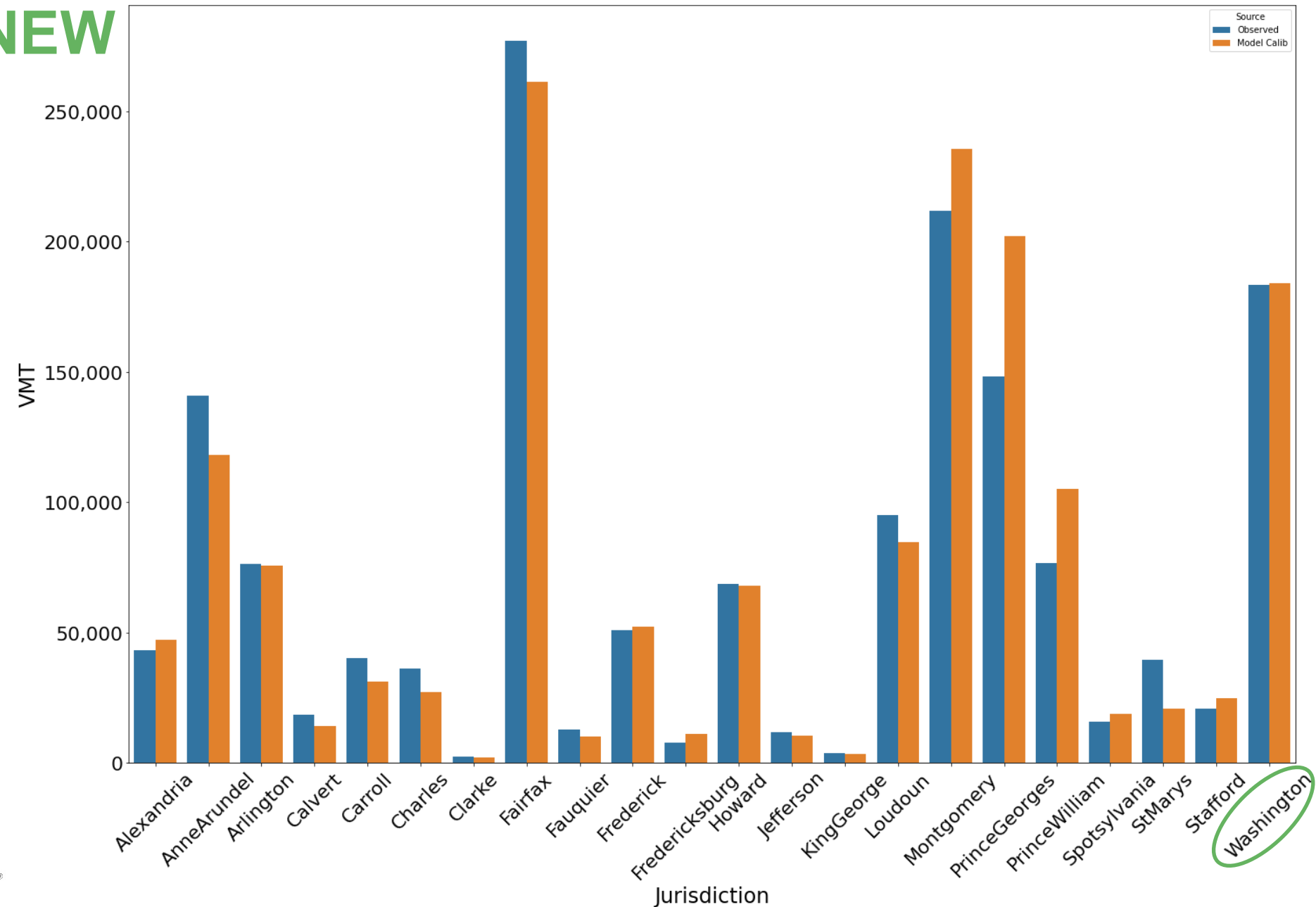
OLD





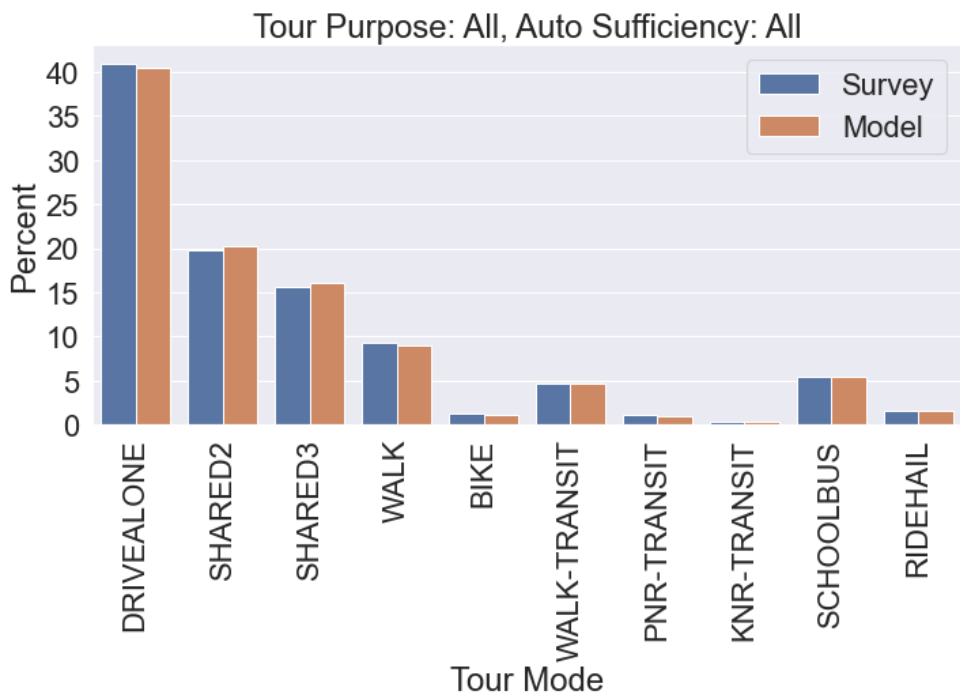
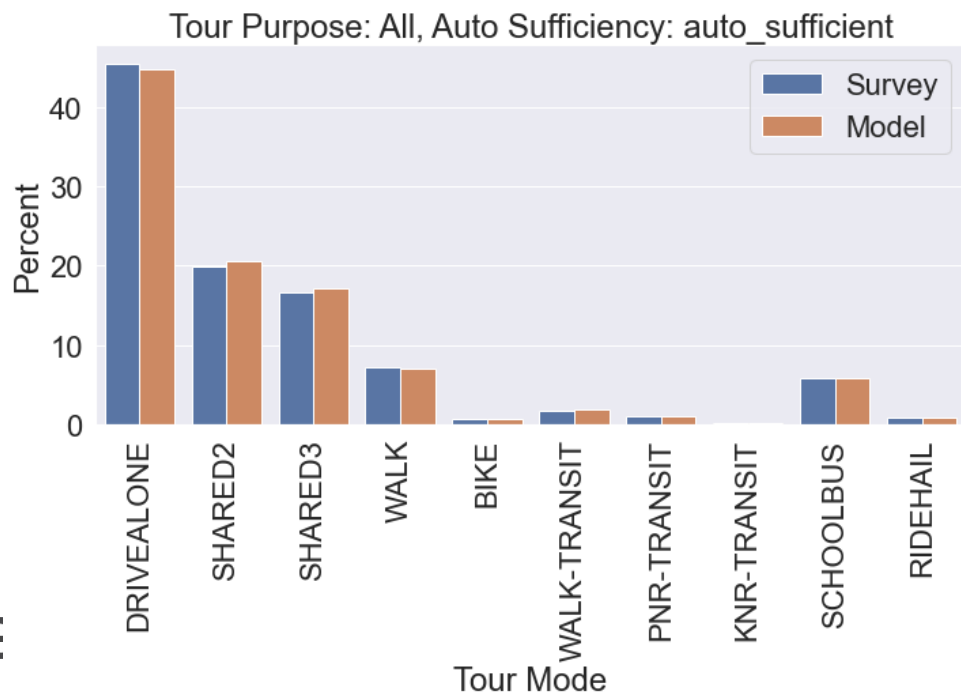
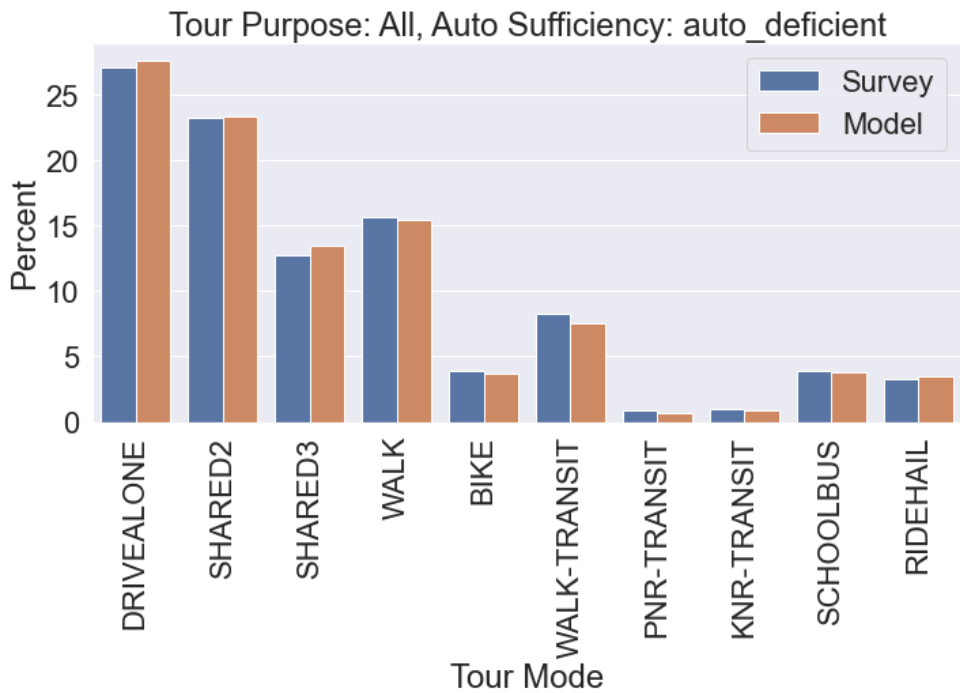
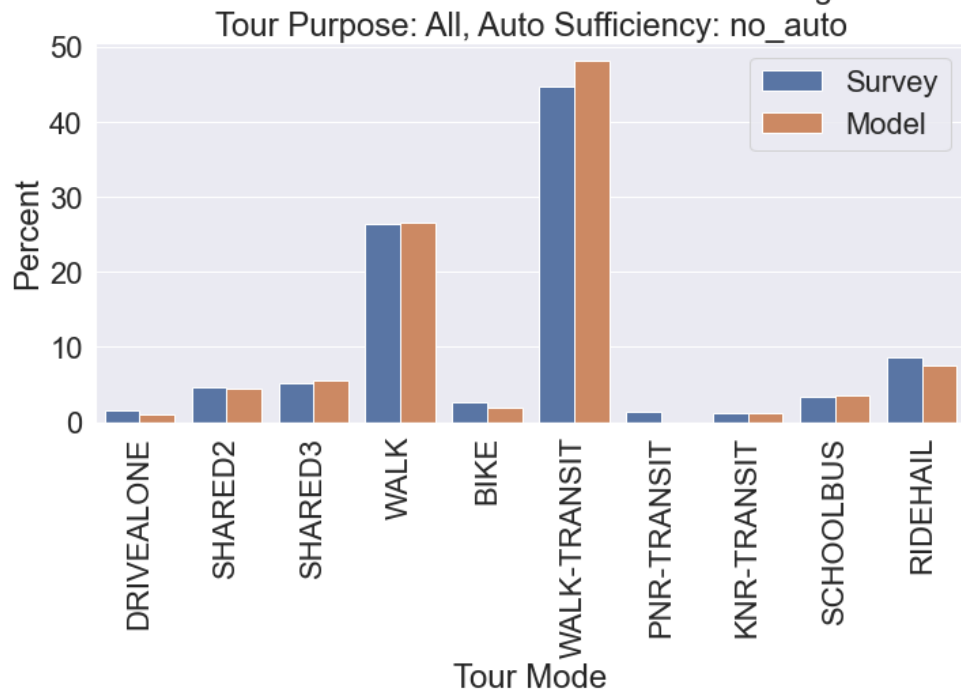
Discretionary Tours by Destination

NEW



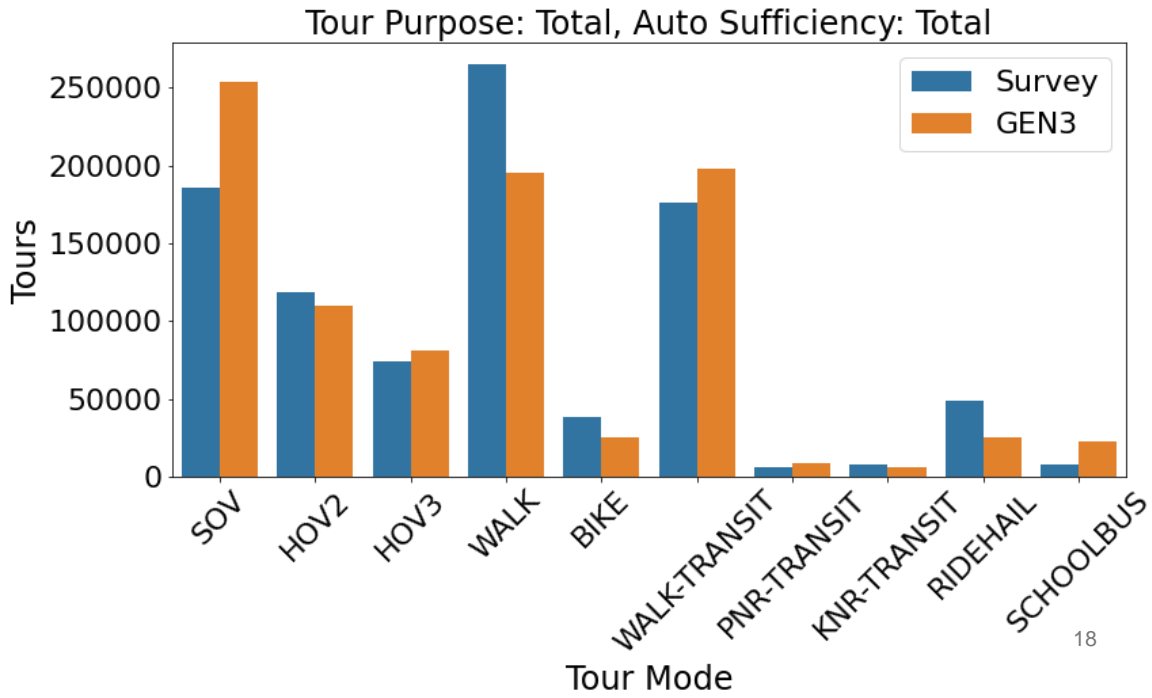
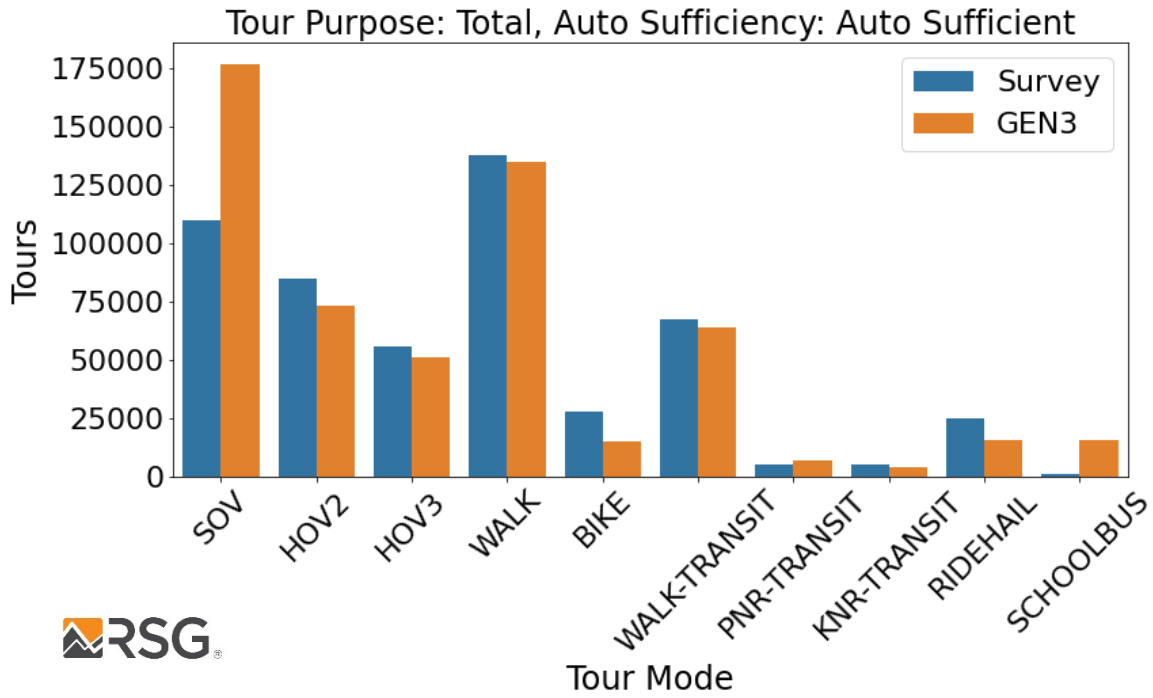
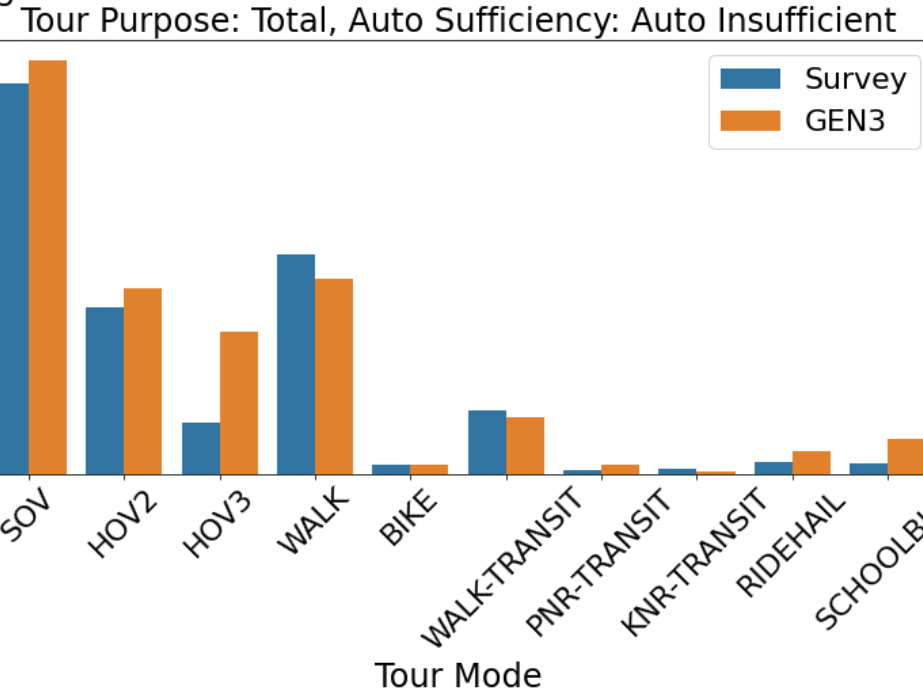
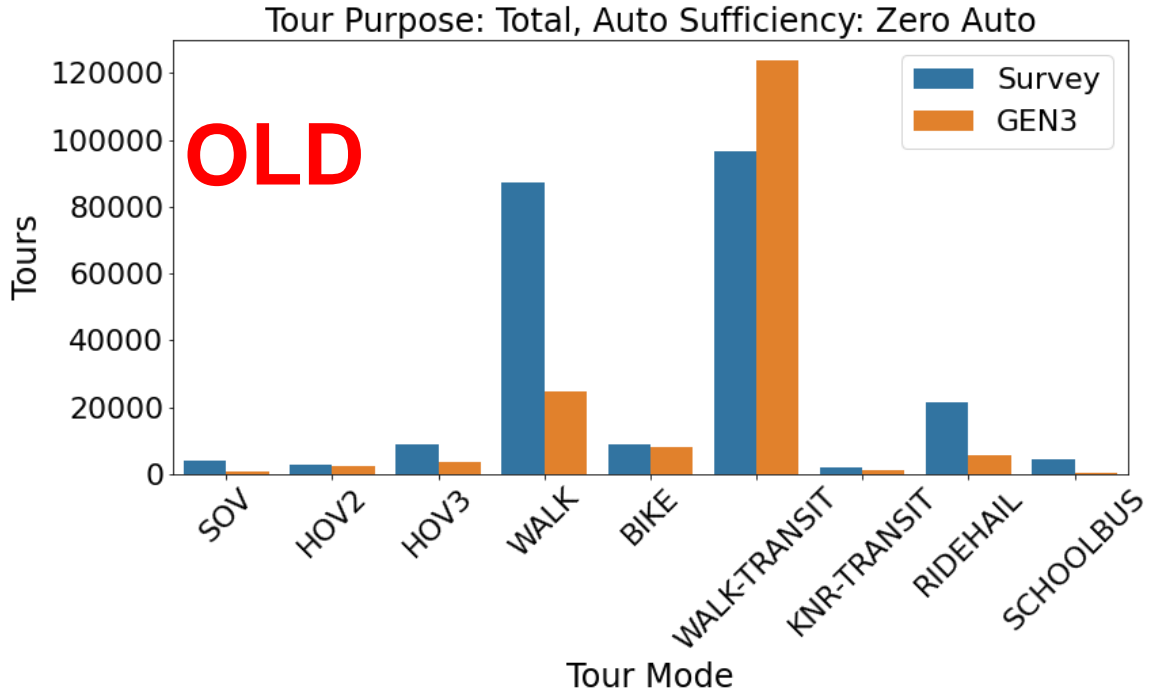


Regional Tour Mode Choice





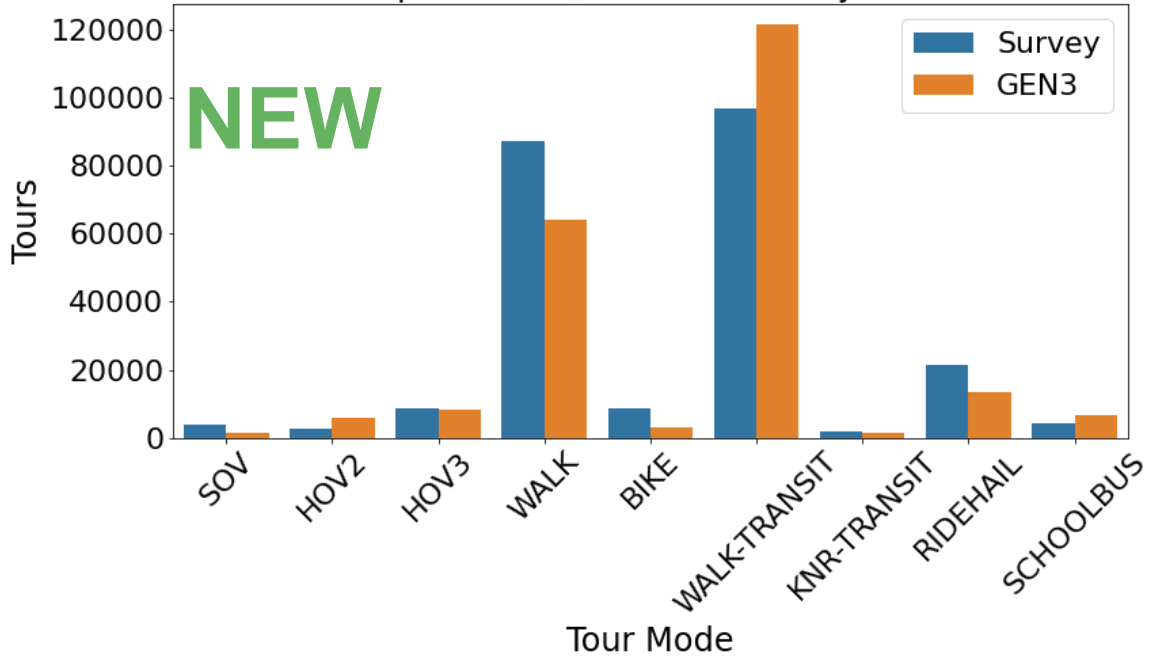
Tour Mode Choice, DC Origin



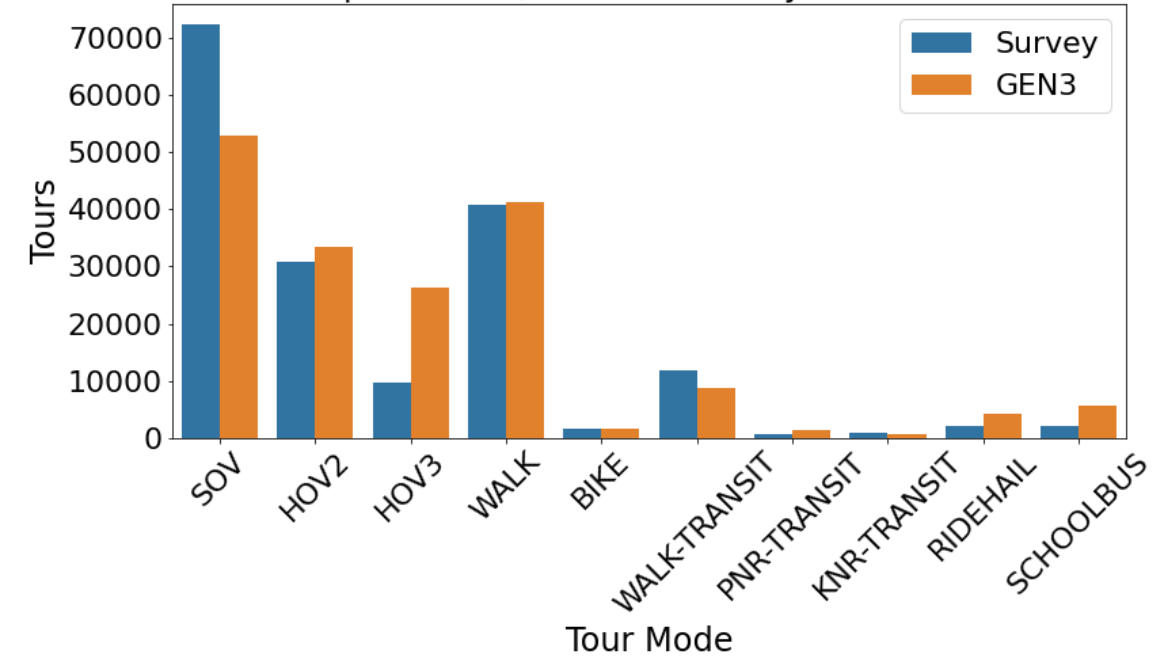


Tour Mode Choice, DC Origin

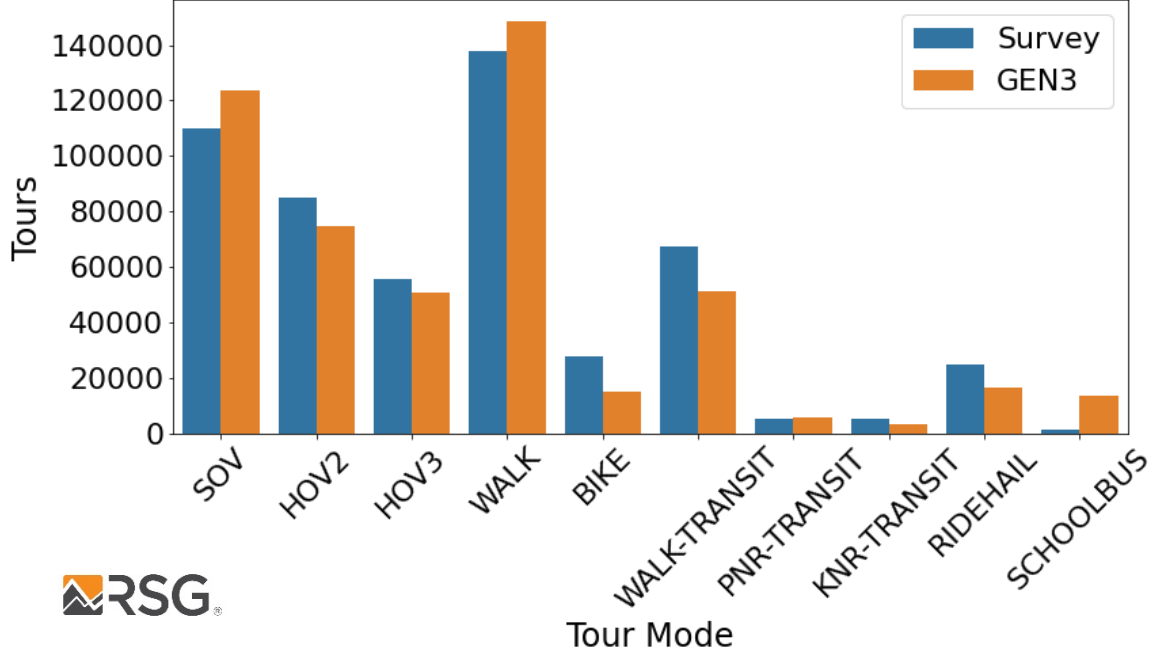
Tour Purpose: Total, Auto Sufficiency: Zero Auto



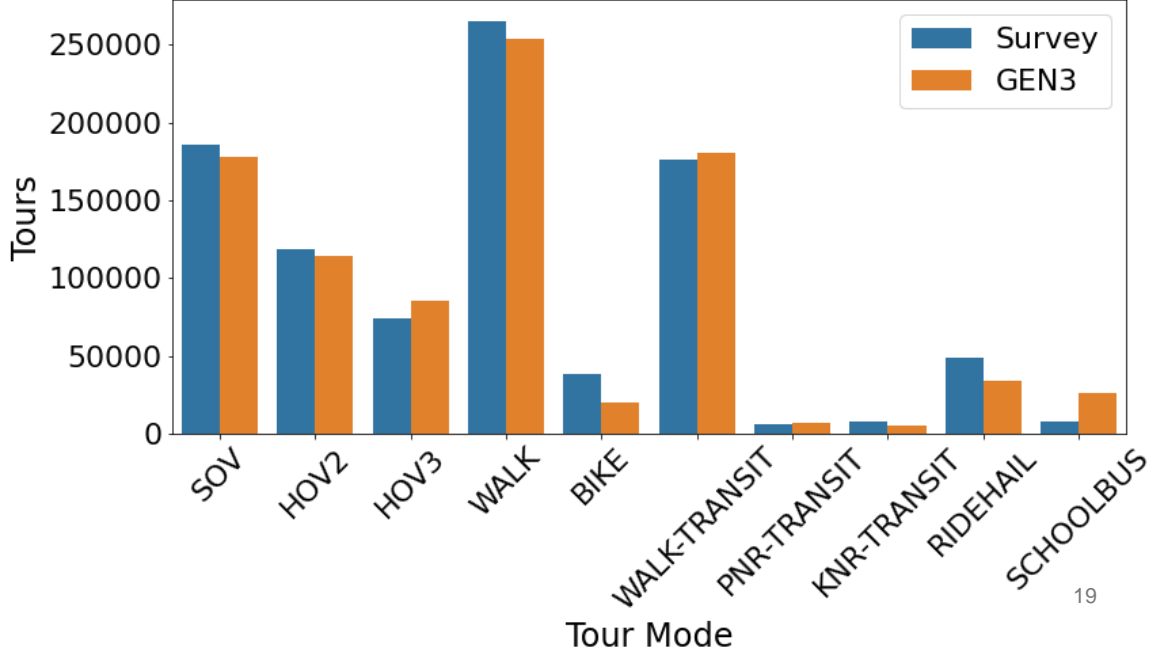
Tour Purpose: Total, Auto Sufficiency: Auto Insufficient



Tour Purpose: Total, Auto Sufficiency: Auto Sufficient

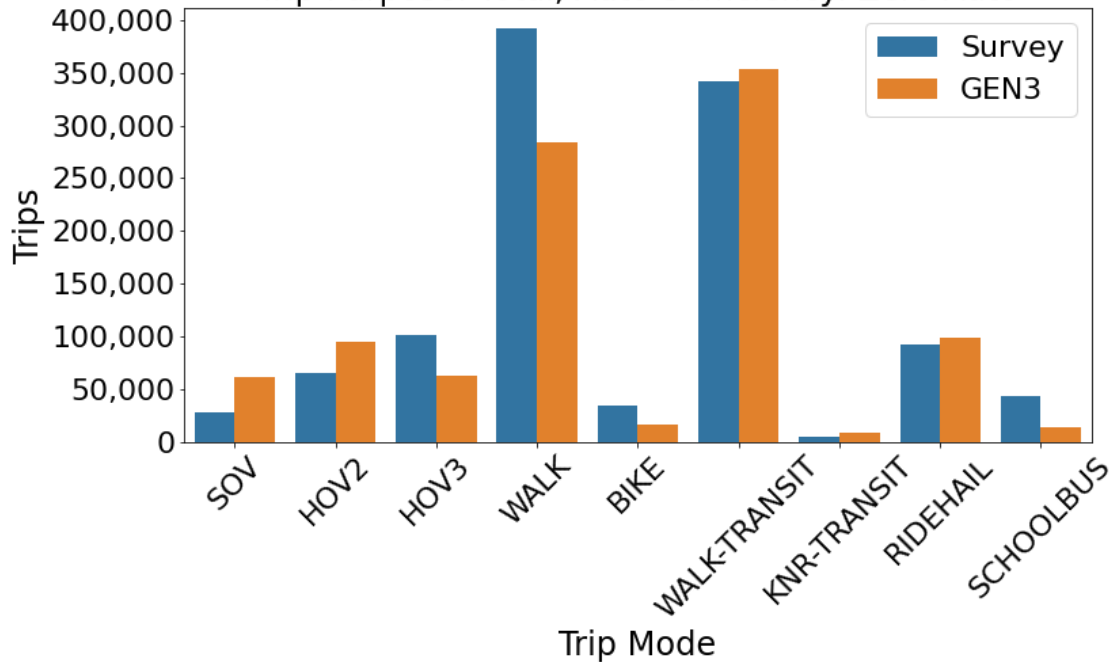


Tour Purpose: Total, Auto Sufficiency: Total

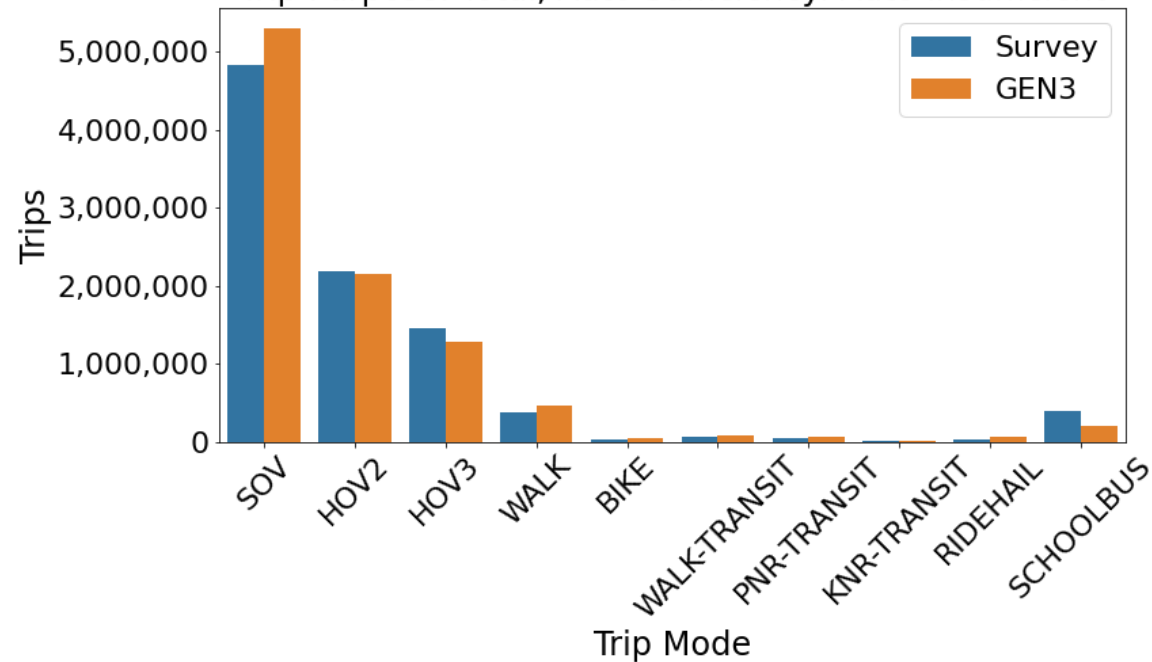




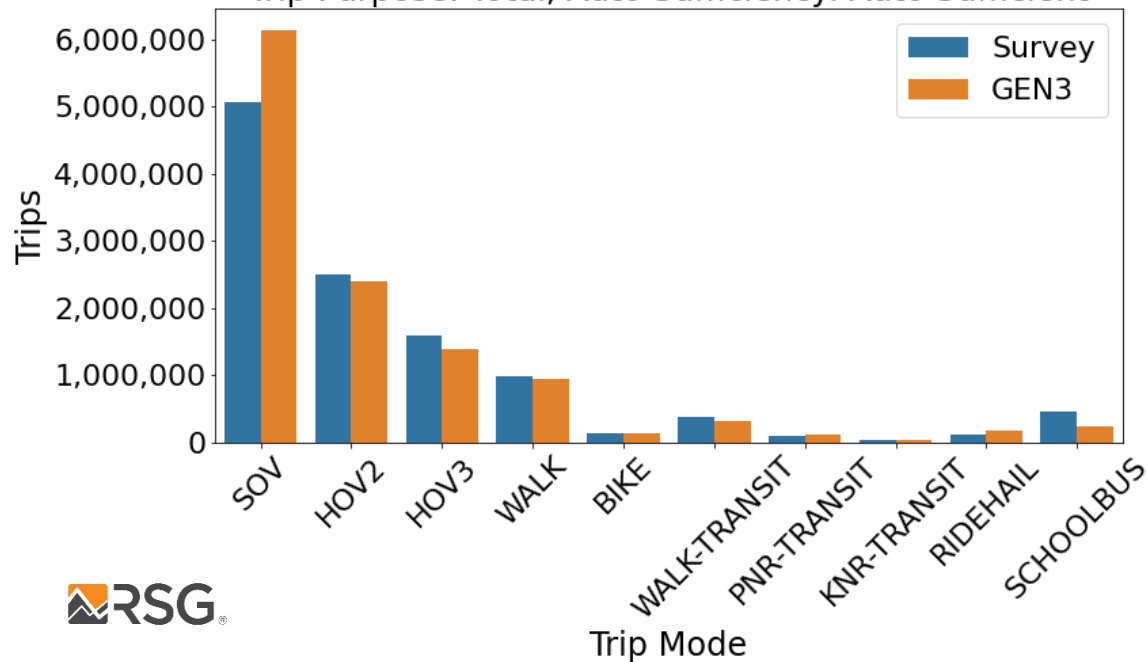
Trip Purpose: Total, Auto Sufficiency: Zero Auto



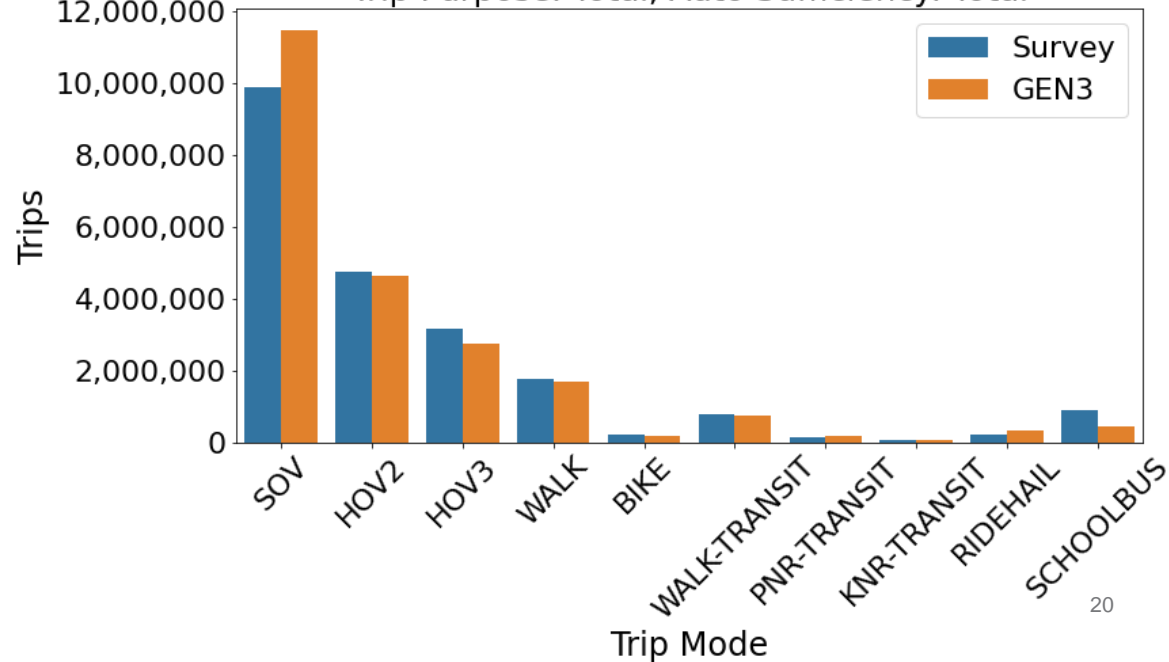
Trip Purpose: Total, Auto Sufficiency: Auto Insufficient



Trip Purpose: Total, Auto Sufficiency: Auto Sufficient

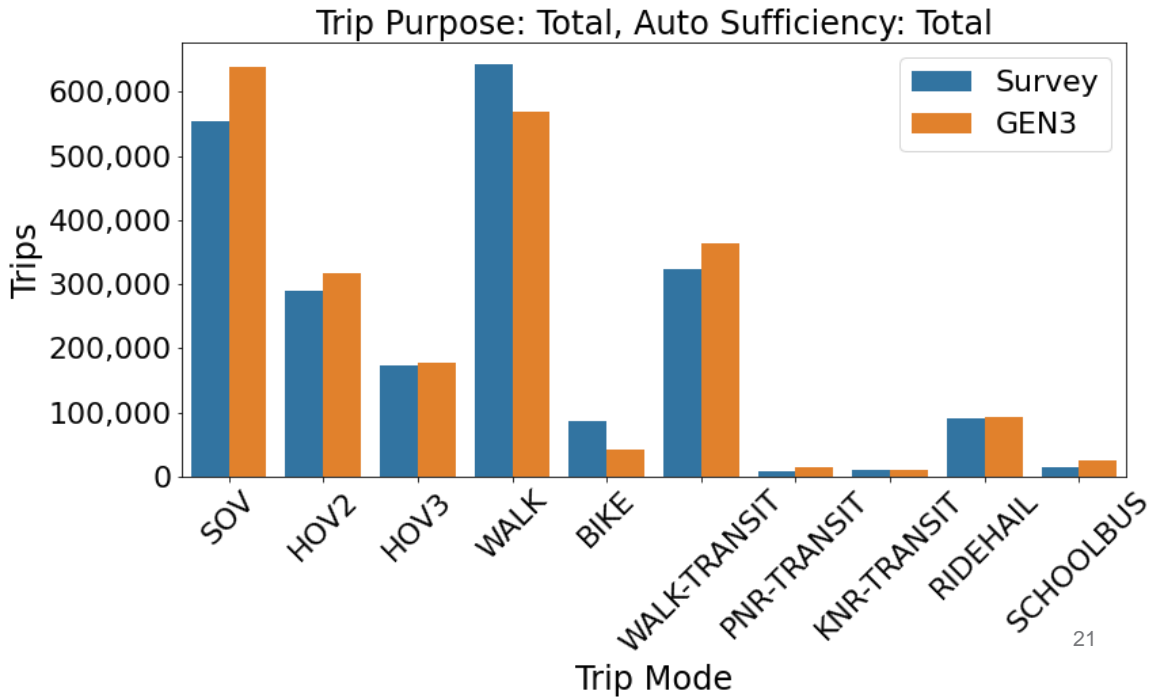
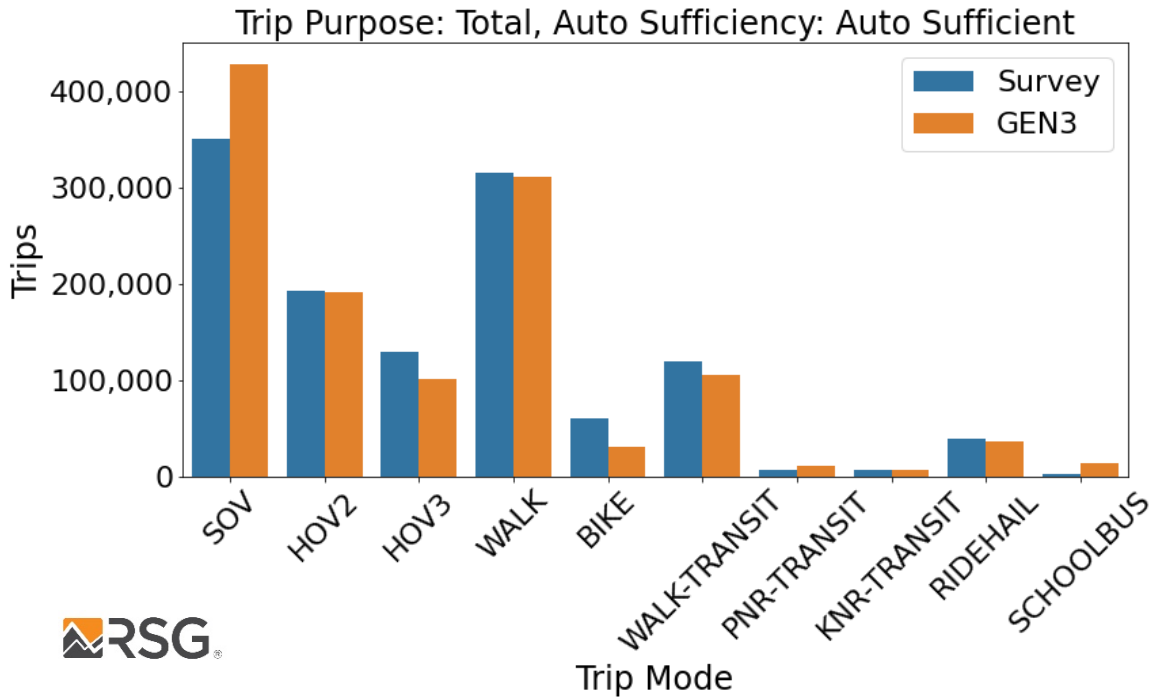
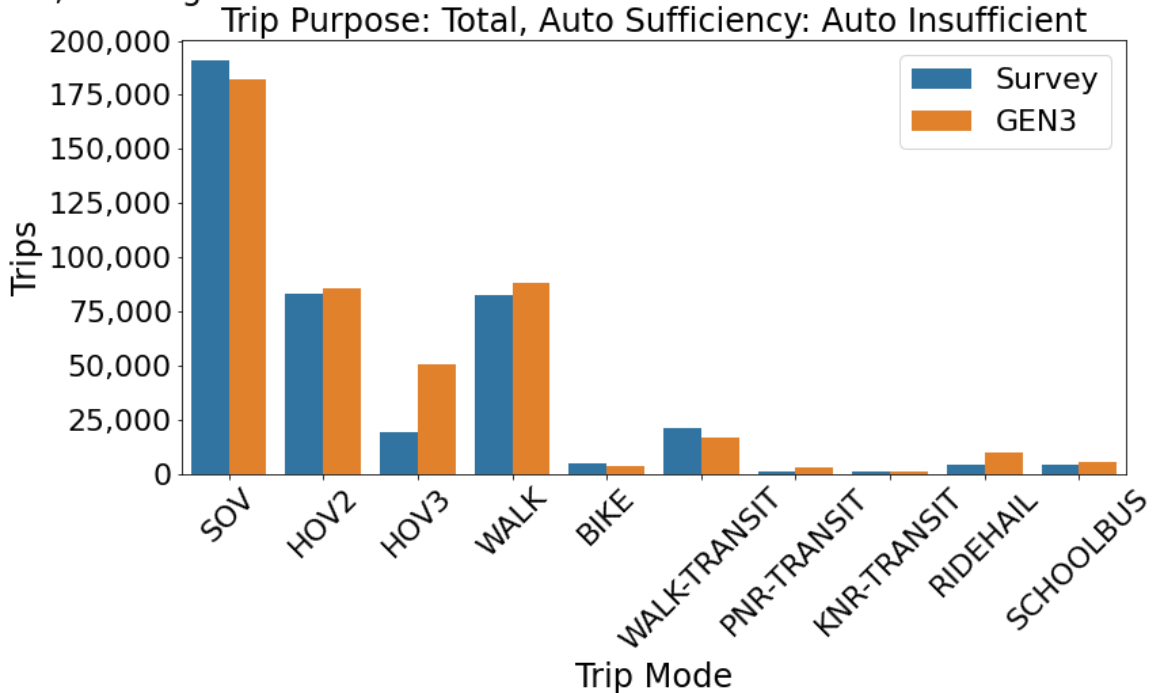
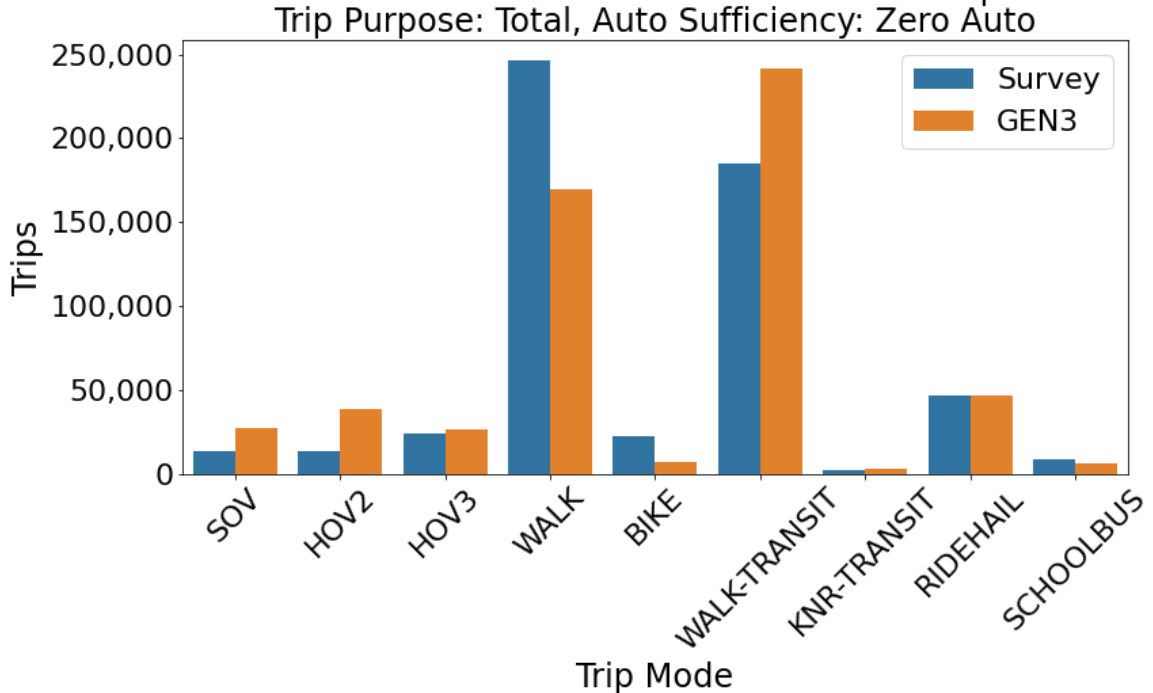


Trip Purpose: Total, Auto Sufficiency: Total



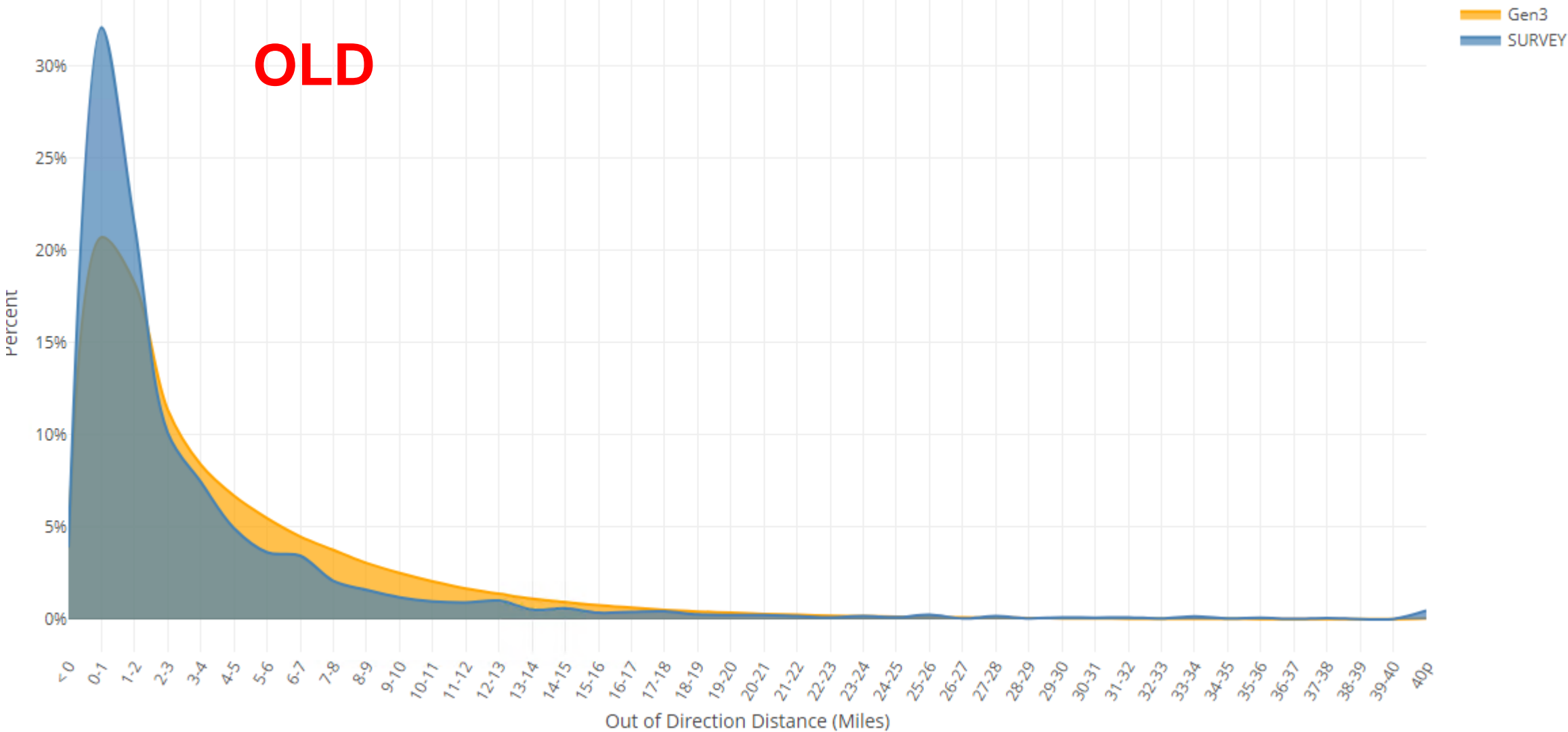


Trip Mode Choice, DC Origin



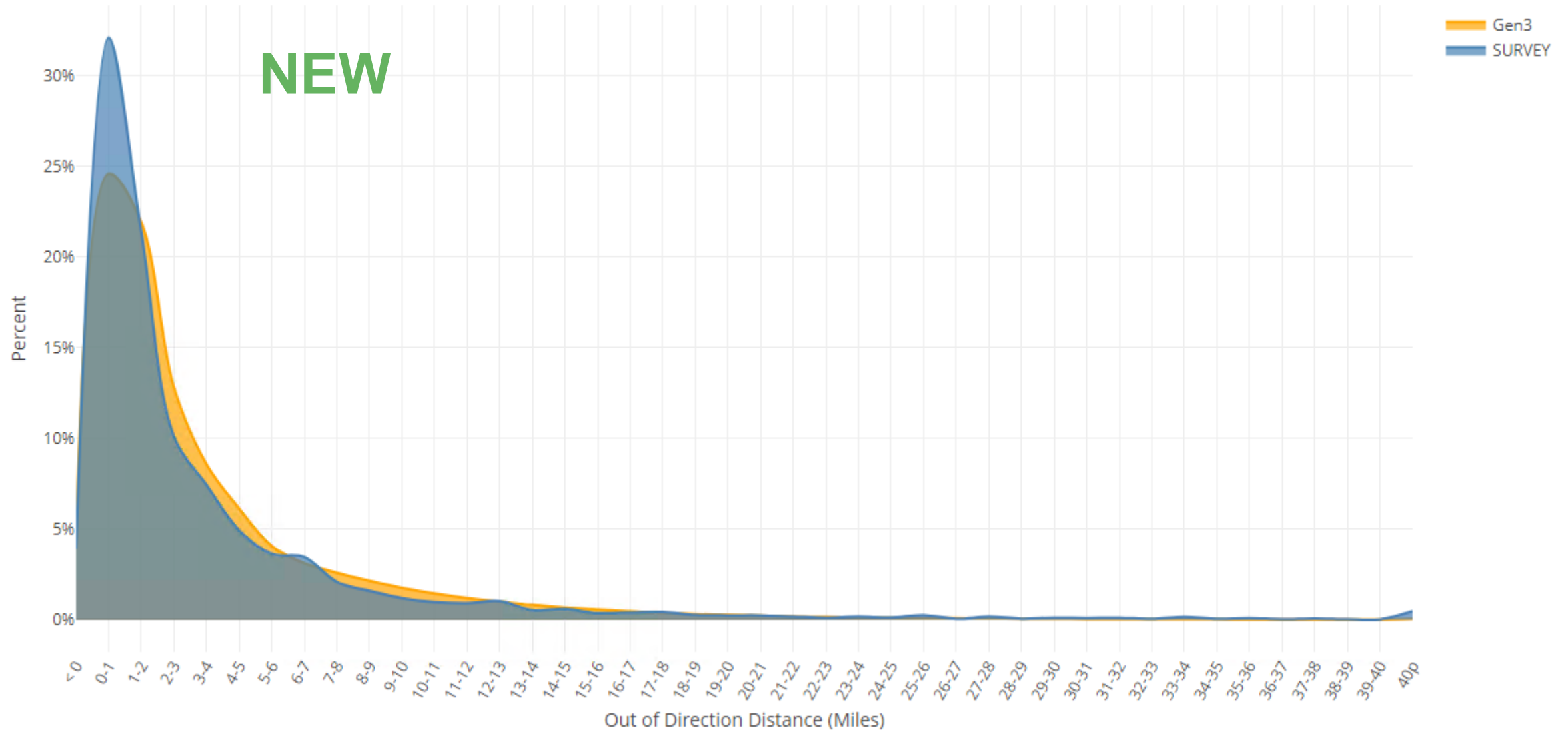


Stop Out-of-Direction Distance





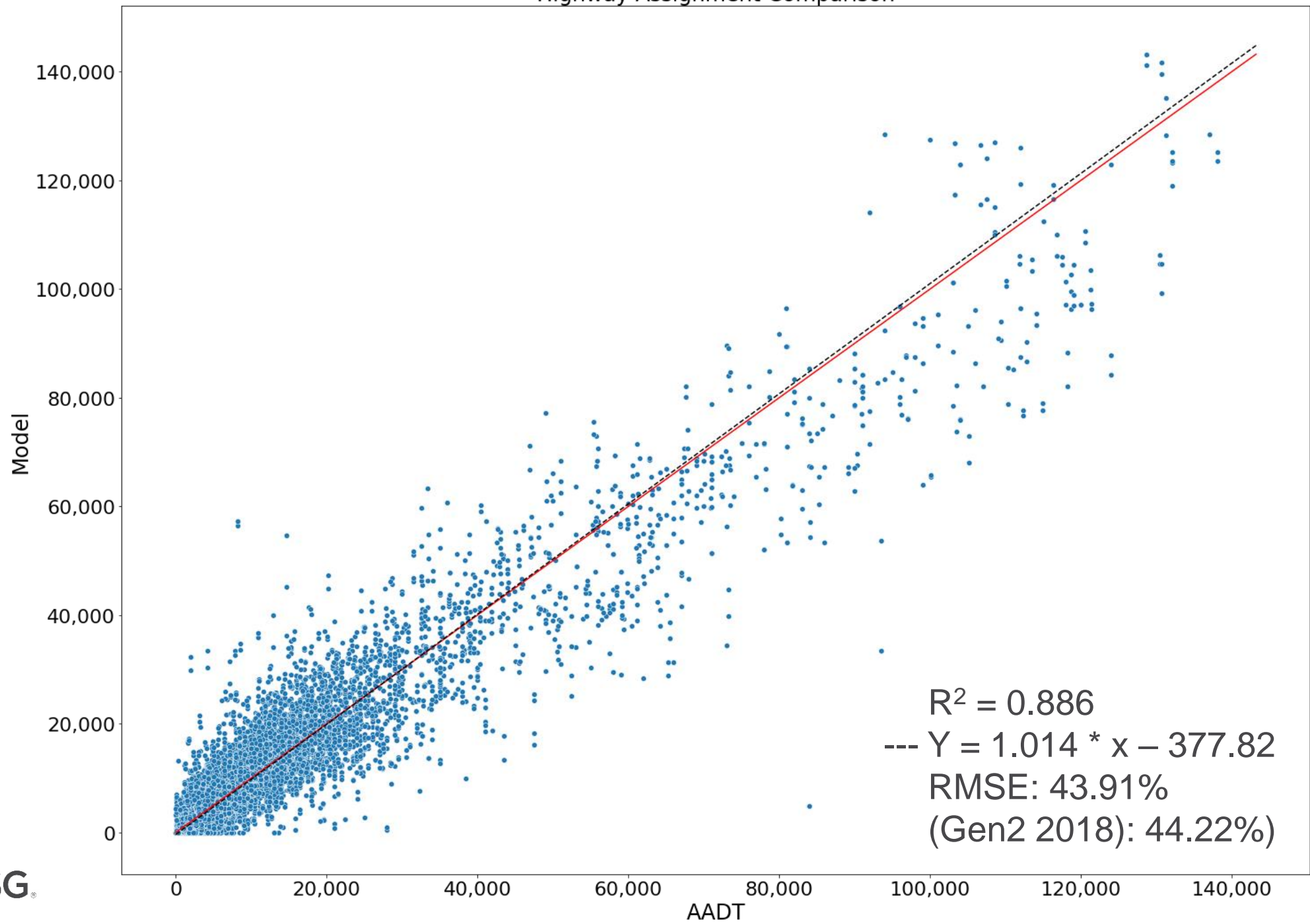
Stop Out-of-Direction Distance



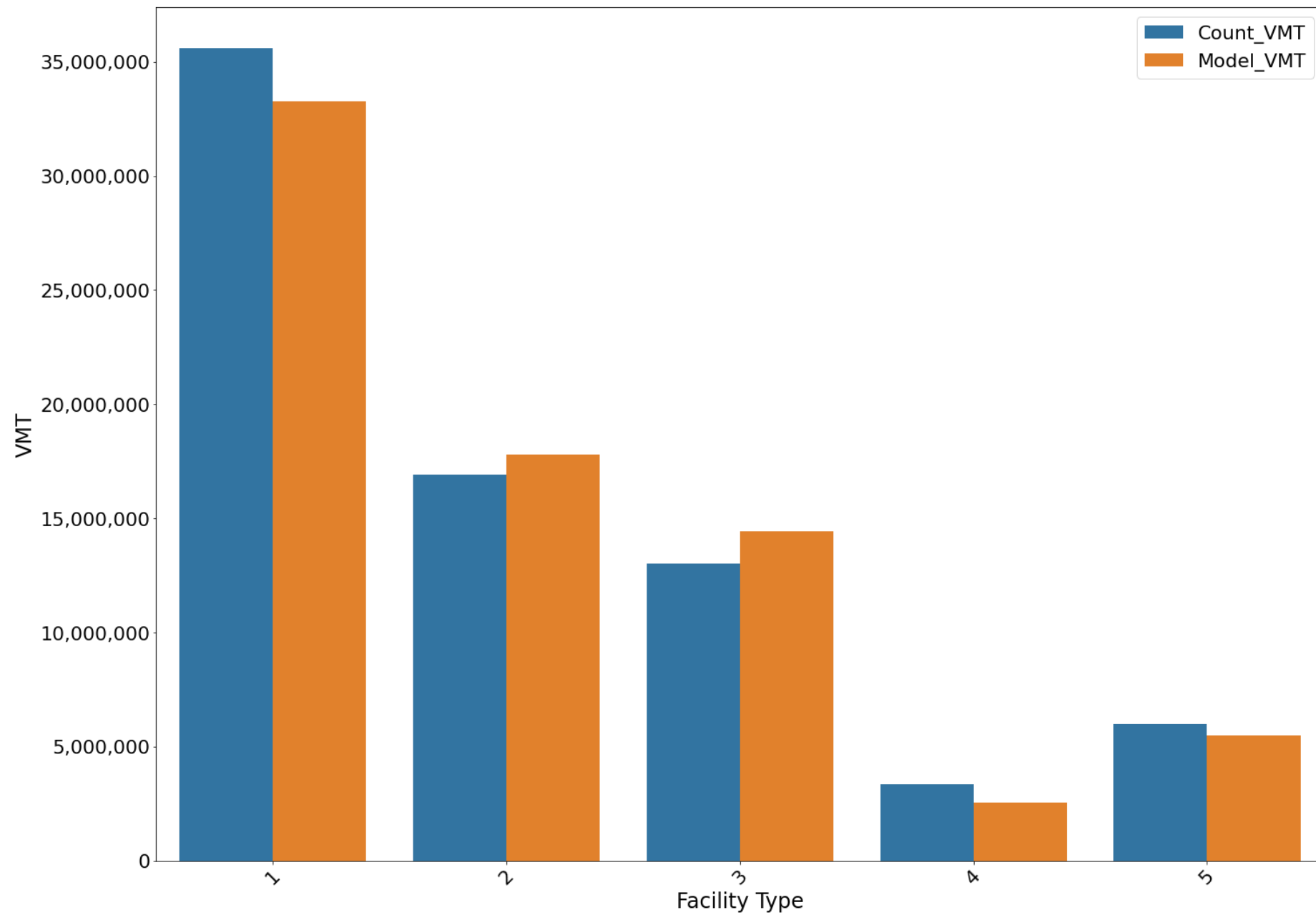
Current Validation Status



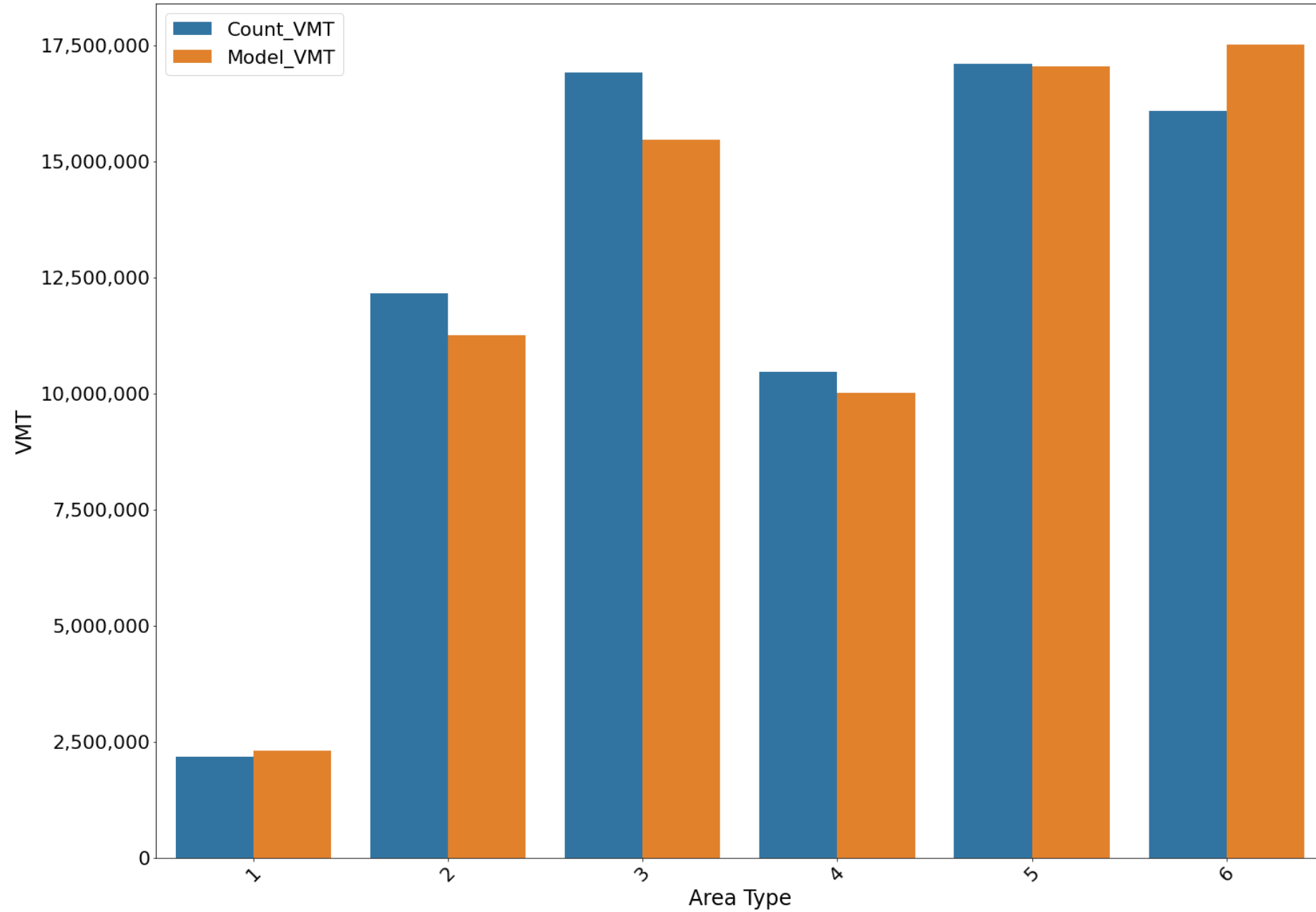
Highway Assignment Comparison



VMT by Facility Type

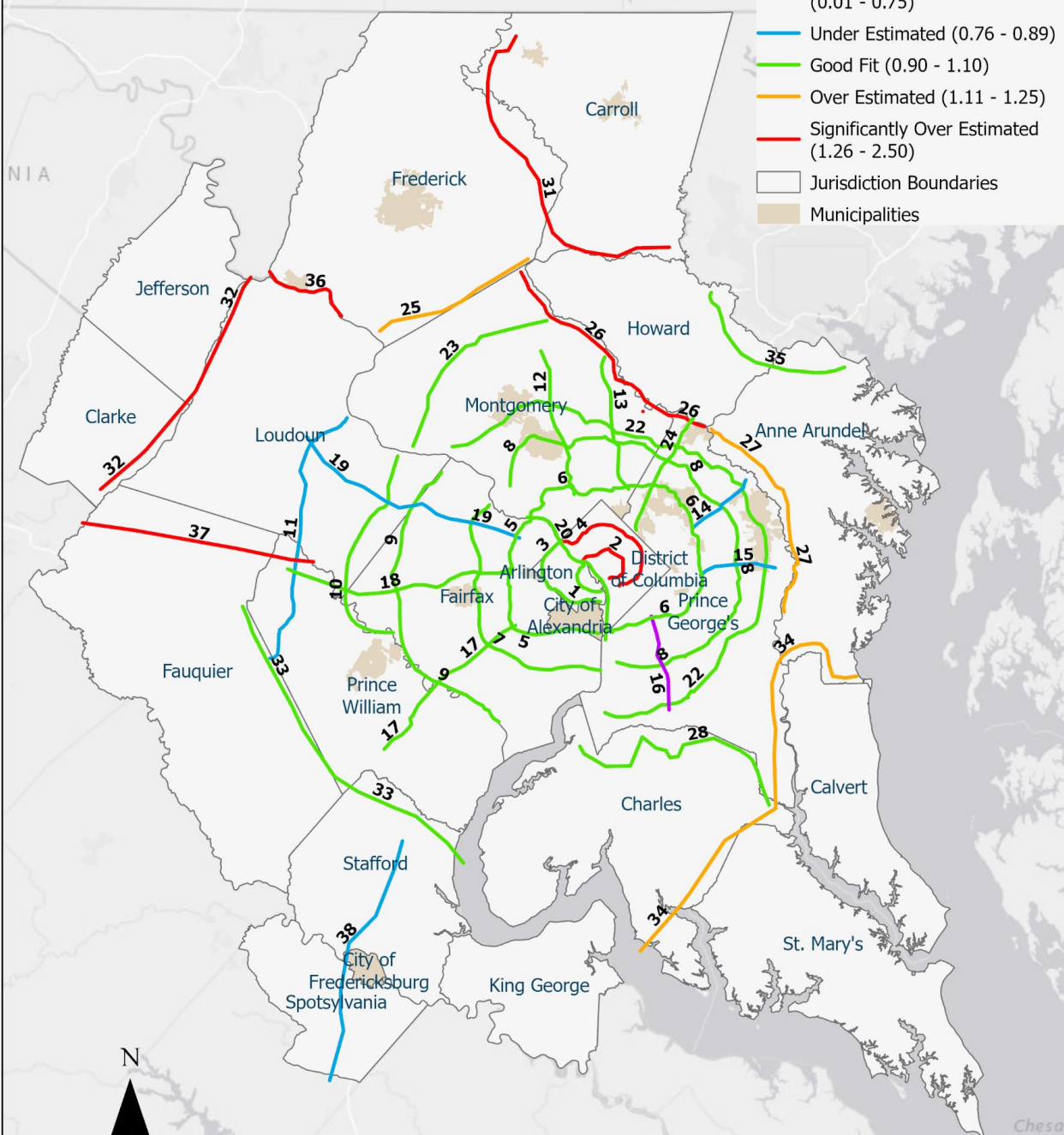


VMT by Area Type



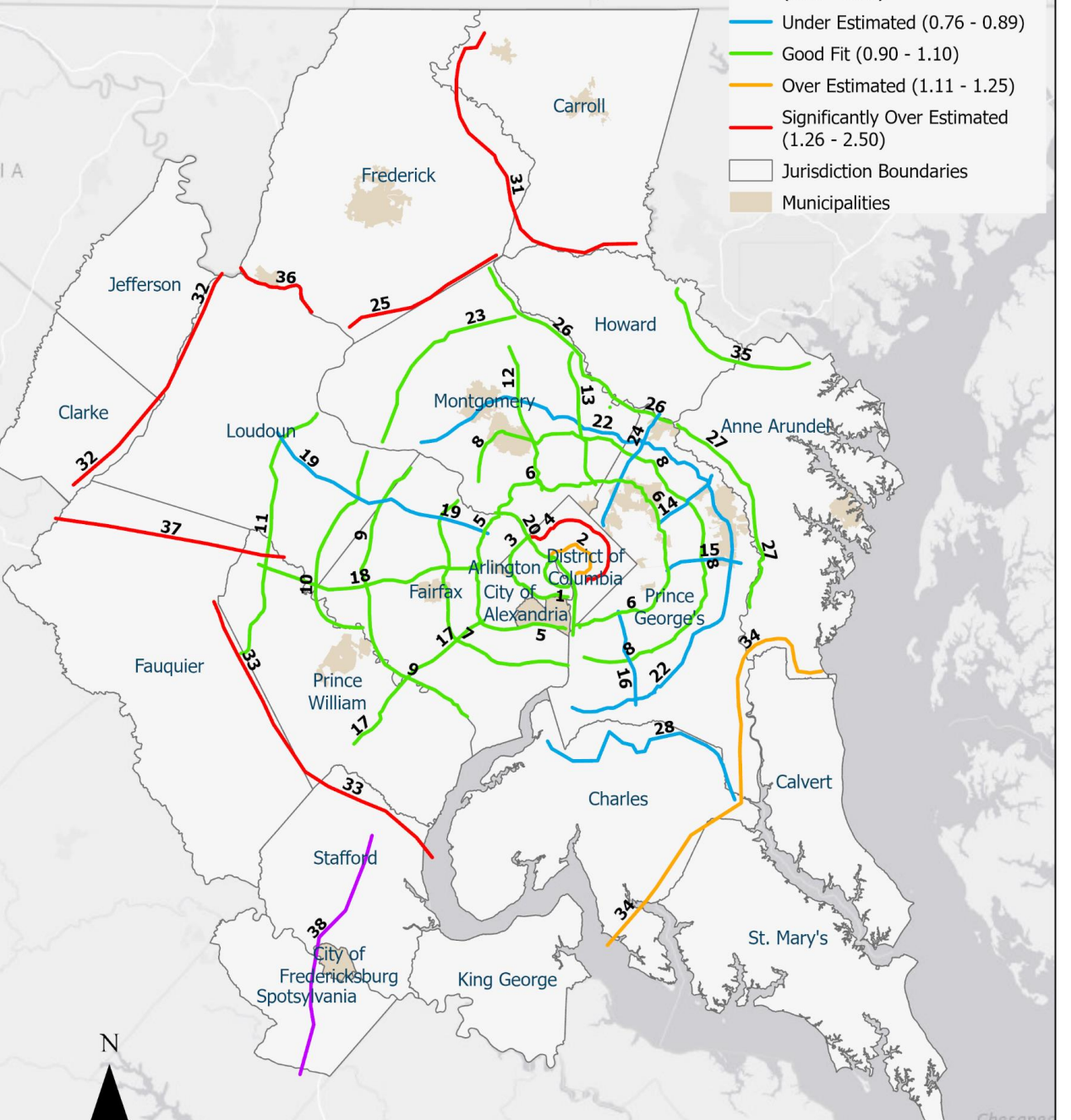
Gen3 Phase 2 - 03/21/2023

- Significantly Under Estimated (0.01 - 0.75)
- Under Estimated (0.76 - 0.89)
- Good Fit (0.90 - 1.10)
- Over Estimated (1.11 - 1.25)
- Significantly Over Estimated (1.26 - 2.50)
- Jurisdiction Boundaries
- Municipalities



Gen2 TPB V 2.4

- Significantly Under Estimated (0.01 - 0.75)
- Under Estimated (0.76 - 0.89)
- Good Fit (0.90 - 1.10)
- Over Estimated (1.11 - 1.25)
- Significantly Over Estimated (1.26 - 2.50)
- Jurisdiction Boundaries
- Municipalities



VMT by Jurisdiction

	Observed	Gen3		Model 2.4	
Jurisdiction Name	VMT	VMT	Ratio	VMT	Ratio
District of Columbia	8,410,547	9,112,412	1.08	8,160,131	0.97
Montgomery County	20,844,658	20,758,965	1.00	20,794,264	1.00
Prince George's County	25,320,822	23,386,465	0.92	22,659,440	0.89
Arlington County	4,115,600	4,206,575	1.02	4,109,213	1.00
City of Alexandria	1,851,663	2,318,749	1.25	2,140,651	1.16
Fairfax County	28,284,350	27,055,595	0.96	28,111,767	0.99
Loudoun County	7,342,782	7,734,713	1.05	7,449,609	1.01
Prince William County	10,300,396	9,453,304	0.92	10,162,646	0.99
Frederick County	8,391,370	8,012,362	0.95	9,066,690	1.08
Howard County	11,526,986	11,485,890	1.00	11,426,554	0.99
Anne Arundel County	16,518,082	15,953,639	0.97	16,058,595	0.97
Charles County	3,426,164	3,204,727	0.94	3,237,059	0.94
Carrol County	3,408,904	4,232,987	1.24	4,381,657	1.29
Calvert County	2,019,452	1,519,360	0.75	1,652,935	0.82
St. Mary's County	2,367,534	1,968,352	0.83	2,134,629	0.90
King George County	932,207	674,506	0.72	835,845	0.90
City of Fredericksburg	990,749	833,058	0.84	894,269	0.90
Stafford County	4,358,421	3,644,751	0.84	4,716,562	1.08
Spotsylvania County	3,774,287	2,393,719	0.63	2,376,420	0.63
Fauquier County	3,686,566	3,250,114	0.88	3,802,460	1.03
Clarke County	827,733	1,042,966	1.26	1,082,114	1.31
Jefferson County	1,069,310	1,416,352	1.32	1,505,290	1.41
Total	169,768,582	163,659,561	0.96	166,758,800	0.98

Bus Loadings

Mode Name	Model	2018 Observed BOARDINGS	Ratio	2.4 Ratio
Metrobus Total	316,882	360,000	0.88	
Other Bus in WMATA Area	153,909	141,390	1.09	
Other Bus not in WMATA Area	76,208	74,252	1.03	
All Bus	546,999	575,642	0.95	1.09

Rail Loadings

Operator Name	Model	2018 Observed Station ENTRIES	Ratio	2.4 Ratio
Metrorail	742,339	641,227	1.16	1.01
VRE	15,245	18,331	0.84	0.64
MARC	46,562	38,249	1.22	0.86
Total CR	61,808	56,580	1.09	0.76
Total Rail	804,147	697,807	1.15	0.98



Contacts



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