

Improved Annual Average Daily Traffic (AADT) Estimation Processes

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INTRODUCTION

Annual Average Daily Traffic volume (AADT) is central to many transportation performance and planning measures. It can be calculated in different manners. Objectives of this research were to examine the bias in AADT calculations for the most commonly used methods, as well as to determine if these methods can be improved.

DATA

- 496 (of 6000+ eligible) permanent traffic counting sites from the FHWA Travel Monitoring Analysis System (TMAS) with 100% complete daily reporting
- 12 current functional classifications (2 of 14 excluded for lack of data)
- Years 2000 through 2013
- 44 states (including D.C. – 7 excluded for lack of data)
- 4 AADT Volume Ranges (<1k, 1k - <10k, 10k - <100k, and ≥100k)

METHODS

AADT Estimation

1. Simple Average – Total Yearly Volume / Days
 Sensitive to missing data
2. AASHTO¹ – Average Day of Week by Month / (7*12)
 Imputes missing days with same day of week, month
3. ***NEW*** AASHTO DOW – AASHTO adjusted by # Days of Week/Month
 Weights for actual number of each weekday in each month
4. ***NEW*** Highway Policy Steven Jessberger Battelle (HPSJB)– Average Hour of Day of Week by Month Imputes missing hours with same hour, day of week, month

“True” AADT for each site from complete data is the reference

Computer Simulation (1000x per Condition)

- Randomly remove from each site’s volume data
- 1, 3, 7, 14 days per month, and all but 7 days for month
- Between 3 and 24 hours per day (avg 12 hours) in blocks:
- Midnight-6 AM; 6-9 AM; 9 AM-3 PM; 3-6 PM; 6 PM-Midnight

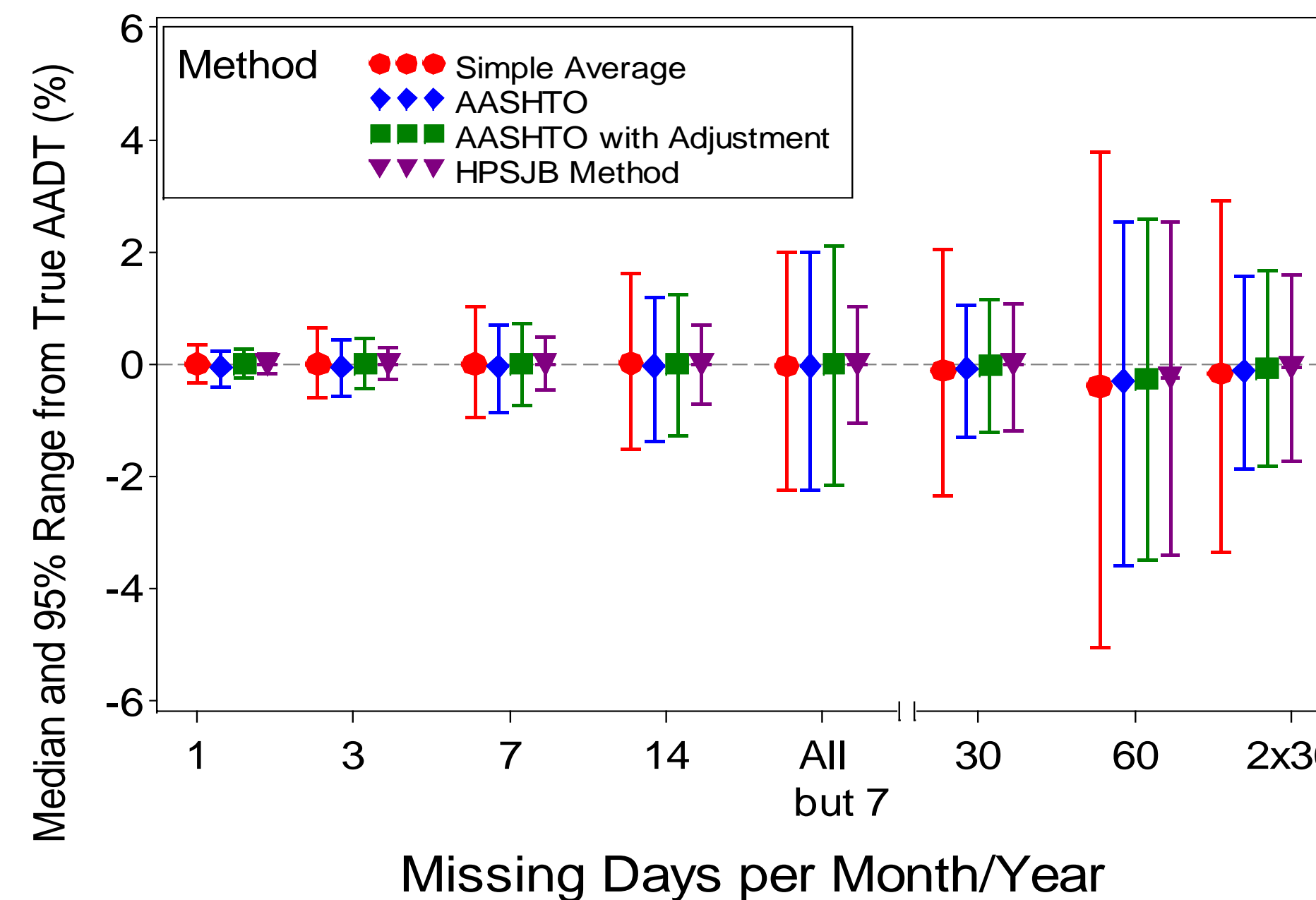
Summarize error (%Δ Between Simulated and “True” AADT distributions)

- State
- Functional Class
- Nationally

¹ American Association of State Highway & Transportation Officials; method described in FHWA Traffic Monitoring Guide, September 2013, p.1-5

NATIONAL RESULTS (ALL 496 Sites)

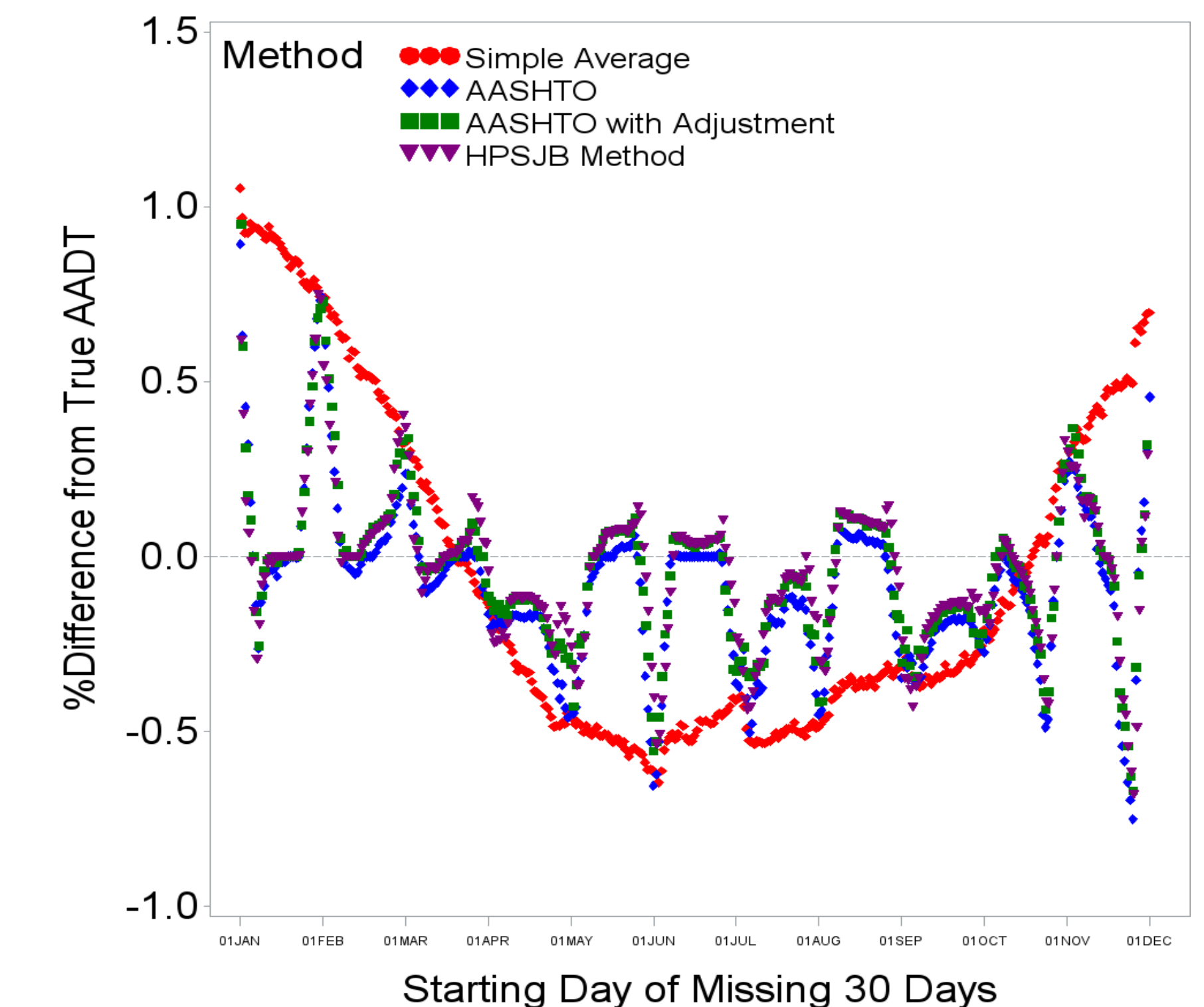
Days Excluded	Method 1 – Simple Average		Method 2 - AASHTO		Method 3 – AASHTO Adjusted		Method 4 – HPSJB	
	Median % Bias	% Increase on Method 2 % Bias CI	Median % Bias	95% CI on % Bias	Median % Bias	% Increase on Method 2 % Bias CI	Median % Bias	% Increase on Method 2 % Bias CI
1/month	0.00	3.07	-0.05	(-0.42, 0.25)	0.00	-23.86	0.00	-46.84
3/month	0.00	25.54	-0.05	(-0.57, 0.42)	0.00	-8.81	0.00	-41.65
7/month	0.00	27.44	-0.04	(-0.86, 0.68)	0.00	-5.10	0.00	-39.16
14/month	0.02	22.79	-0.04	(-1.38, 1.17)	0.00	-1.07	0.00	-44.64
All but 7 per month	-0.03	0.00	-0.03	(-2.24, 1.99)	0.00	0.74	0.00	-50.78
30 days per year	-0.11	86.75	-0.08	(-1.30, 1.06)	-0.02	1.03	-0.01	-3.41



Bias with 30 days of data removed shows the influence of the month first missing. Missing blocks at the beginning or end of the calendar year causes the simple average method to overestimate AADT by up to 1%, while removing high volume summer months underestimates AADT.

Using the more commonly used AASHTO method as a baseline (highlighted above):

- Methods 1, 3, and 4 are slightly superior to the AASHTO method from a bias perspective.
- Very little bias regardless of method or amount of data removed;
- Bigger impacts of alternative AADT calculation methods are for the precision of bias estimation.



CONCLUSIONS

The HPSJB estimation method outperforms the simple average, the AASHTO method and the AASHTO DOW modified method in regard to both bias and precision. By leveraging partial daily traffic volume information from hourly data, this method provides the best AADT estimation in the absence of data from continuous traffic monitoring sites.

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