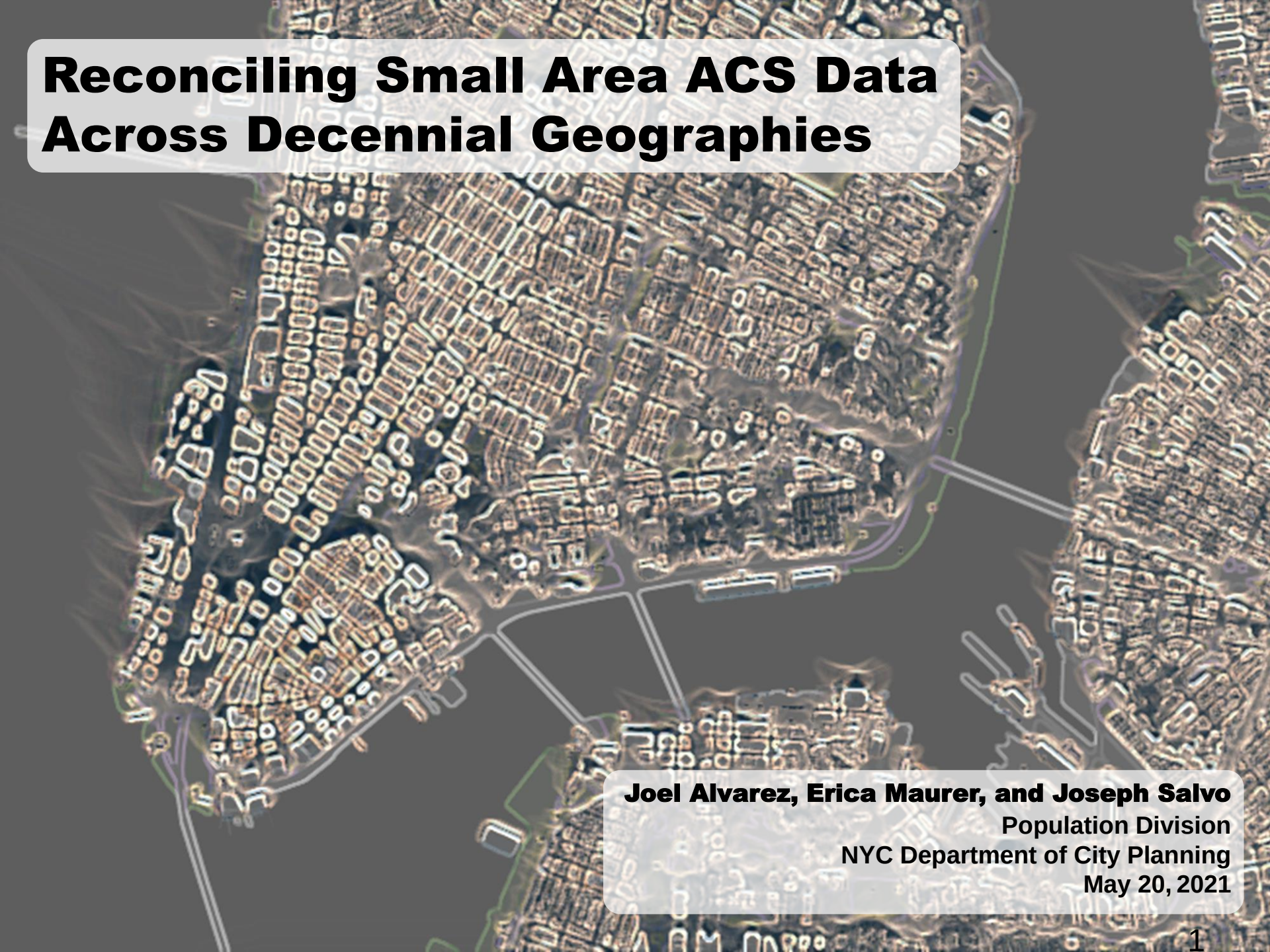
Reconciling Small Area ACS Data Across Decennial Geographies



Joel Alvarez, Erica Maurer, and Joseph Salvo
Population Division
NYC Department of City Planning
May 20, 2021

Overview

- **The Issue**
- **Reconciling Count Estimates**
- **Reconciling Margins of Error**
- **Conclusion**

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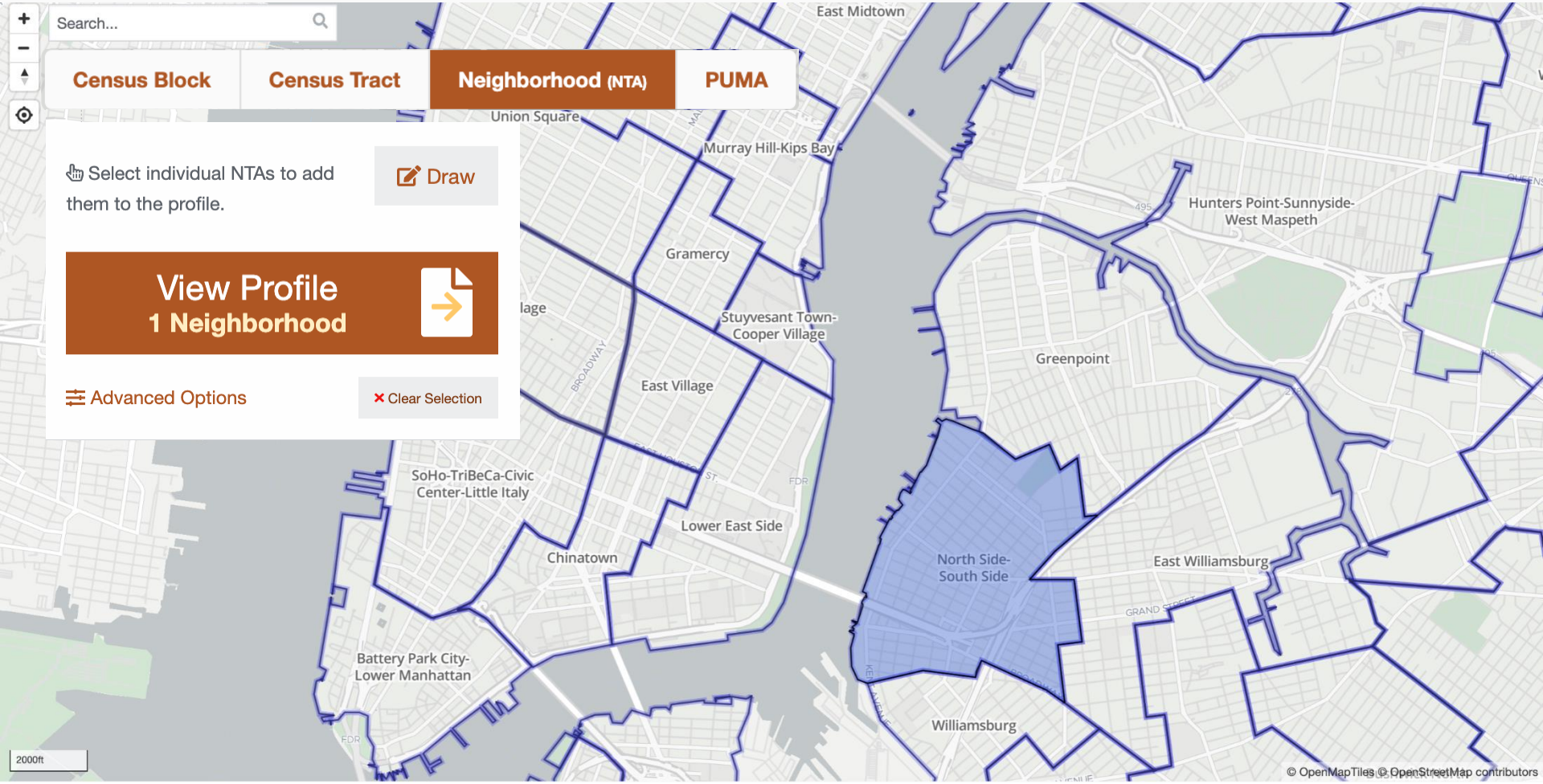
New York City Population FactFinder
(popfactfinder.planning.nyc.gov/)

NYC PLANNING **Population FactFinder**



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NYC PLANNING **Population FactFinder**

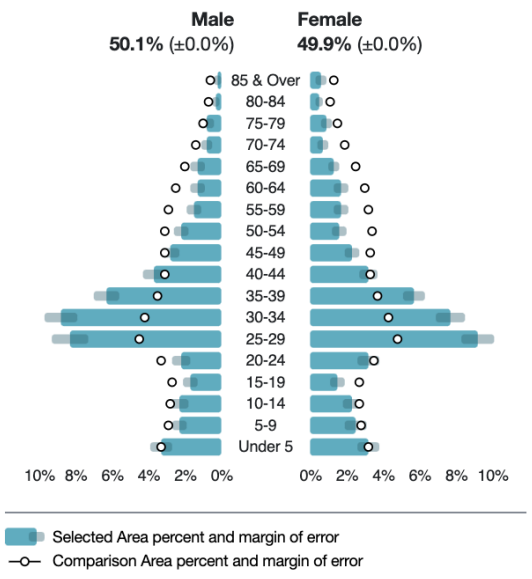
Census | Demographic (ACS) | Social (ACS) | Economic (ACS) | Housing (ACS)

Age and Sex

Copy Table to Clipboard

Show Reliability Data	Selected Area		New York City		Difference	
	Number	Percent	Number	Percent	Number	Pctg. Pt.
Total population	57,036	100.0%	8,443,713	100.0%	-8,386,677	0.0
Male	28,602	50.1%	4,025,097	47.7%	-3,996,495	2.4
Female	28,434	49.9%	4,418,616	52.3%	-4,390,182	-2.4
Under 5 years	3,754	6.6%	551,869	6.5%	-548,115	0.1
5 to 9 years	2,732	4.8%	476,567	5.6%	-473,835	-0.8
10 to 14 years	2,625	4.6%	464,704	5.5%	-462,079	-0.9
15 to 19 years	1,840	3.2%	455,674	5.4%	-453,834	-2.2
20 to 24 years	3,125	5.5%	571,401	6.8%	-568,276	-1.3
25 to 29 years	10,016	17.6%	785,805	9.3%	-775,789	8.3
30 to 34 years	9,410	16.5%	718,474	8.5%	-709,064	8.0
35 to 39 years	6,826	12.0%	610,524	7.2%	-603,698	4.8

Age/Sex Distribution



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Census | Demographic (ACS) | Social (ACS) | Economic (ACS) | Housing (ACS)

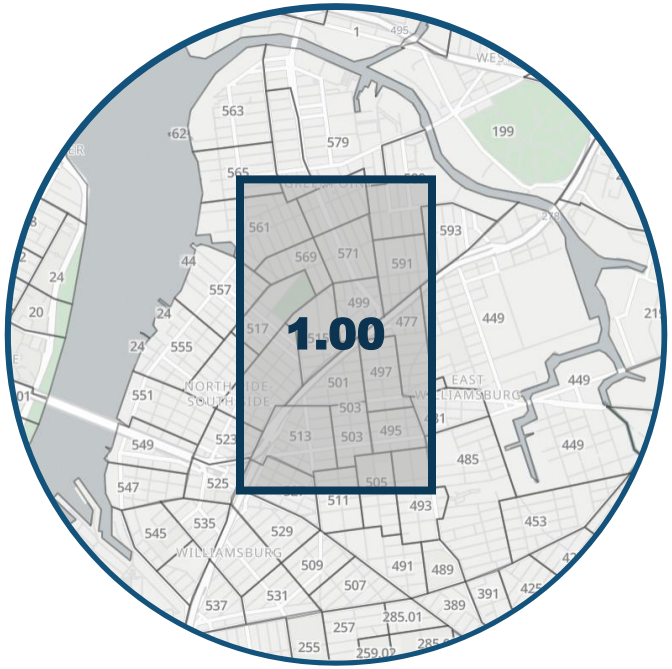
Age and Sex

☐ Show Reliability Data	2006-2010		2014-2018		Change, 2006-2010 to 2014-2018		
	Number	Percent	Number	Percent	Number	Percent	Pctg. Pt.
Total population	43,620	100.0%	57,036	100.0%	13,416	30.8%	0.0
Male	20,989	48.1%	28,602	50.1%	7,613	36.3%	2.0
Female	22,631	51.9%	28,434	49.9%	5,803	25.6%	-2.0
Under 5 years	3,007	6.9%	3,754	6.6%	747	24.8%	-0.3
5 to 9 years	2,628	6.0%	2,732	4.8%	104	4.0%	-1.2
10 to 14 years	2,242	5.1%	2,625	4.6%	383	17.1%	-0.5
15 to 19 years	2,564	5.9%	1,840	3.2%	-724	-28.2%	-2.7
20 to 24 years	3,803	8.7%	3,125	5.5%	-678	-17.8%	-3.2
25 to 29 years	7,477	17.1%	10,016	17.6%	2,539	34.0%	0.5
30 to 34 years	5,304	12.2%	9,410	16.5%	4,106	77.4%	4.3
35 to 39 years	3,630	8.3%	6,826	12.0%	3,196	88.0%	3.7

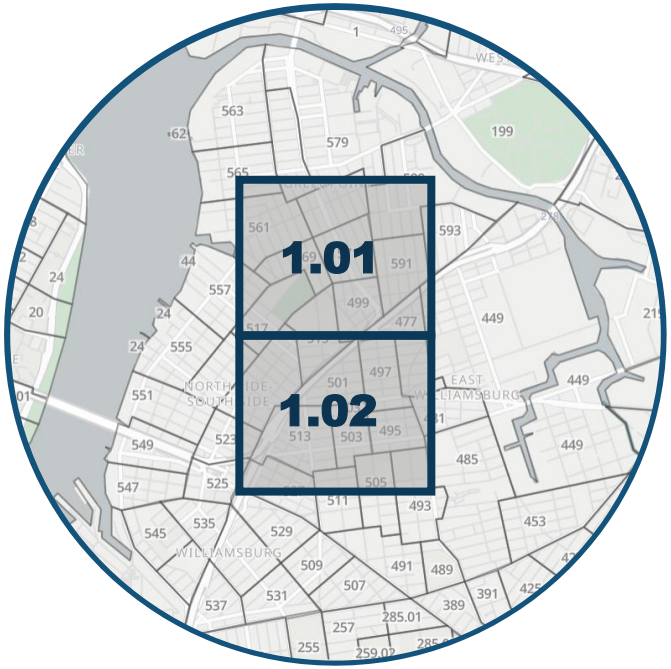
NYC PLANNING

Some 2010 census tracts will be split to create new 2020 census tracts

2010 Census Tracts



2020 Census Tracts



NYC PLANNING

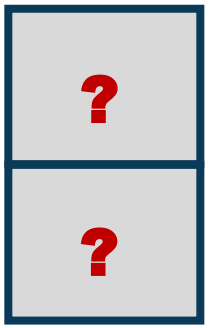
To examine change over time, ACS data in 2010 tracts will need to be converted to 2020 tracts

2010 Census Tracts

Workers 16 years and over who worked from home (2006-2010 ACS)

2020 Census Tracts

Workers 16 years and over who worked from home (2006-2010 ACS)



NYC PLANNING

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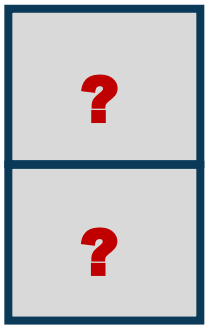


NYC PLANNING

To examine change over time, ACS data in 2010 tracts will need to be converted to 2020 tracts

2010 Census Tracts

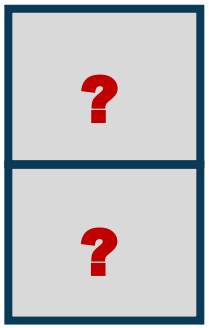
Workers 16 years and over who worked from home (2006-2010 ACS)

Total population (2010 Census)

1

2020 Census Tracts

Workers 16 years and over who worked from home (2006-2010 ACS)



NYC PLANNING

To examine change over time, ACS data in 2010 tracts will need to be converted to 2020 tracts

2010 Census Tracts

Workers 16 years and over who worked from home (2006-2010 ACS)

1,000
+/-100

2020 Census Tracts

Workers 16 years and over who worked from home (2006-2010 ACS)

?

?

Total population (2010 Census)

1

4,000

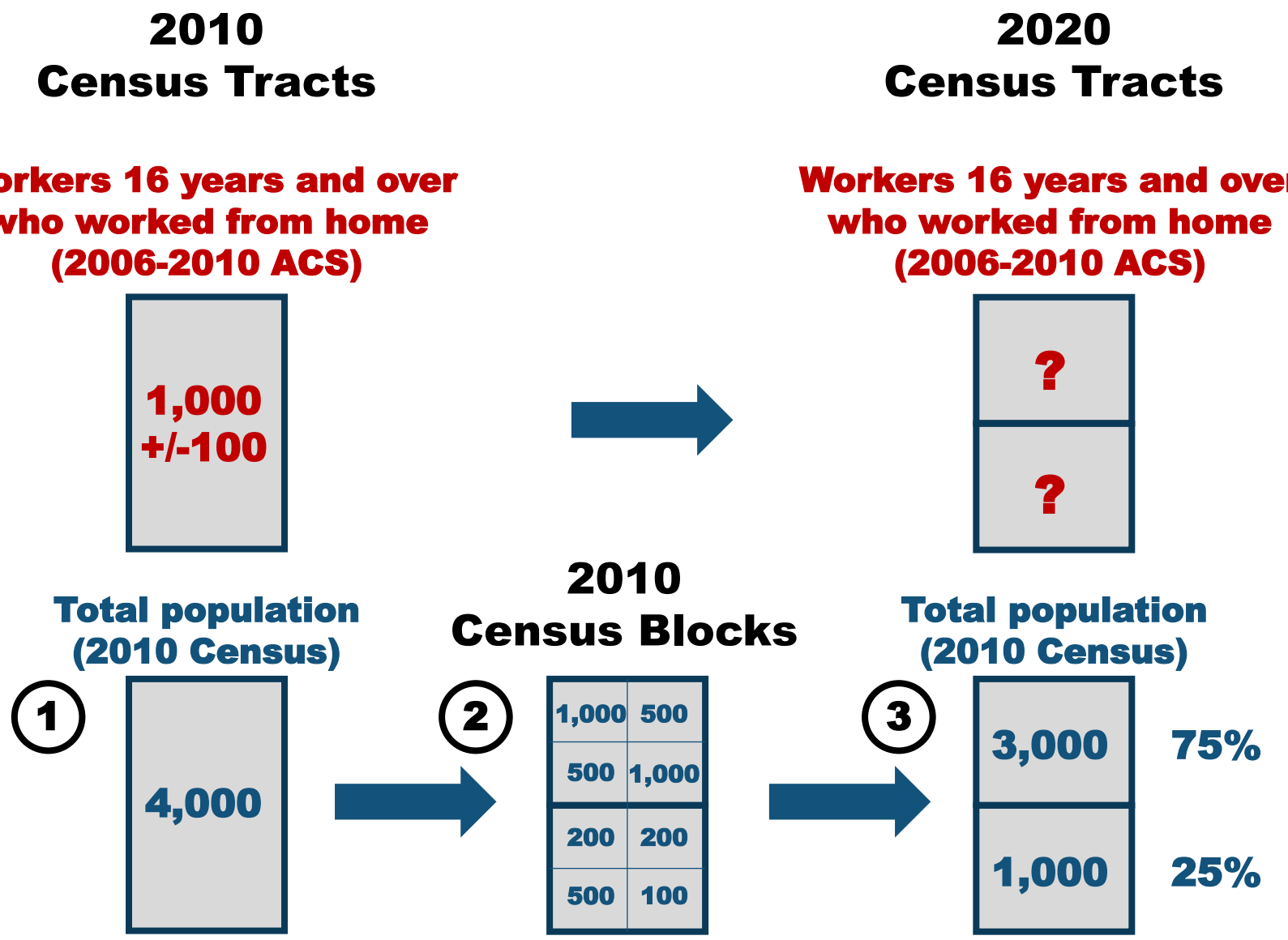
2010 Census Blocks

2

1,000	500
500	1,000
200	200
500	100

NYC PLANNING

To examine change over time, ACS data in 2010 tracts will need to be converted to 2020 tracts



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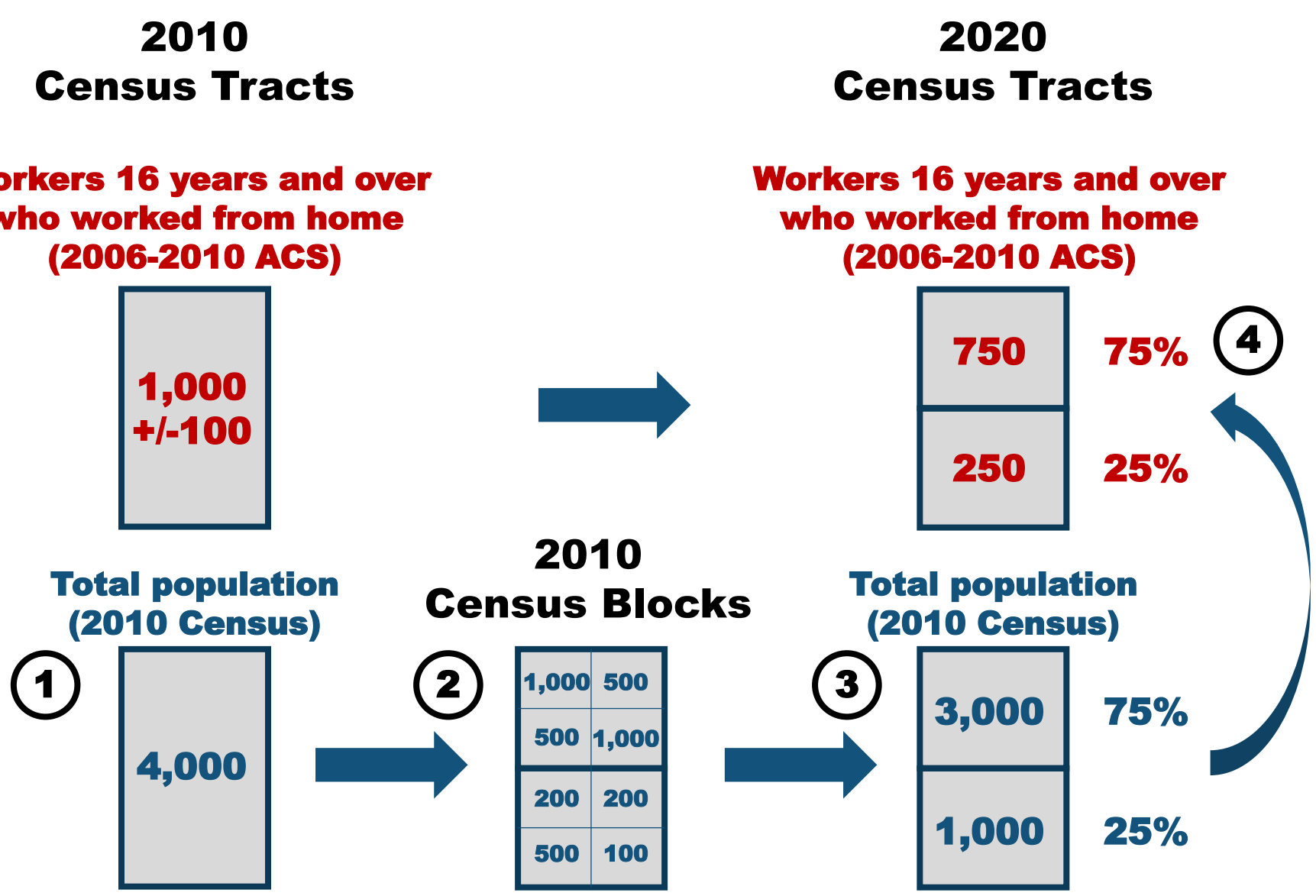
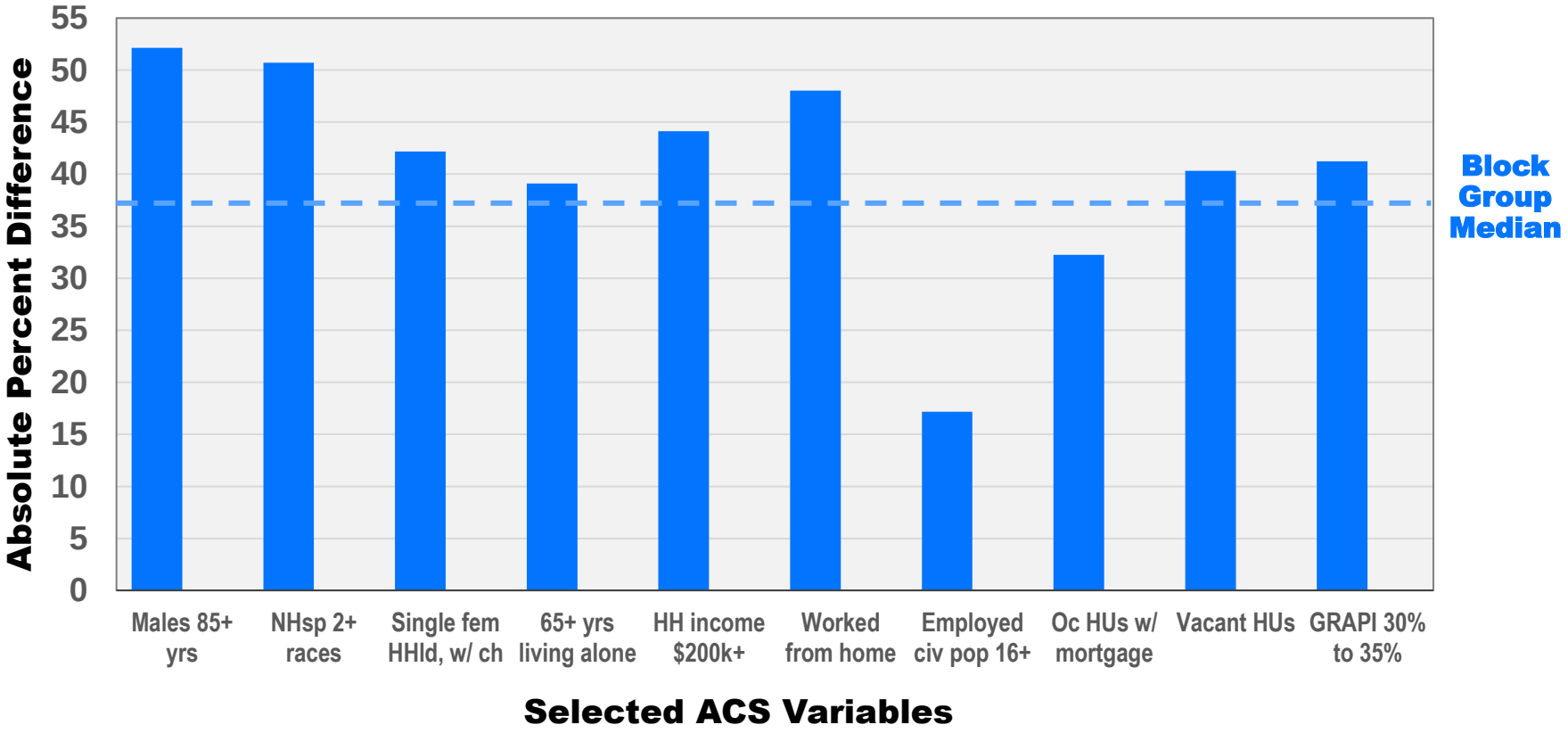


ACS variables selected for evaluation

Demographic	1)	Males 85 years and older
	2)	Nonhispanic of 2 or more races
Social	3)	Single female household with children
	4)	65 years and older living alone
Economic	5)	Household income $200,000 or more
	6)	Worked from home
	7)	Employed civilians 16 years and older
Housing	8)	Occupied housing with a mortgage
	9)	Vacant housing units
	10)	GRAPI 30% to 34.9%

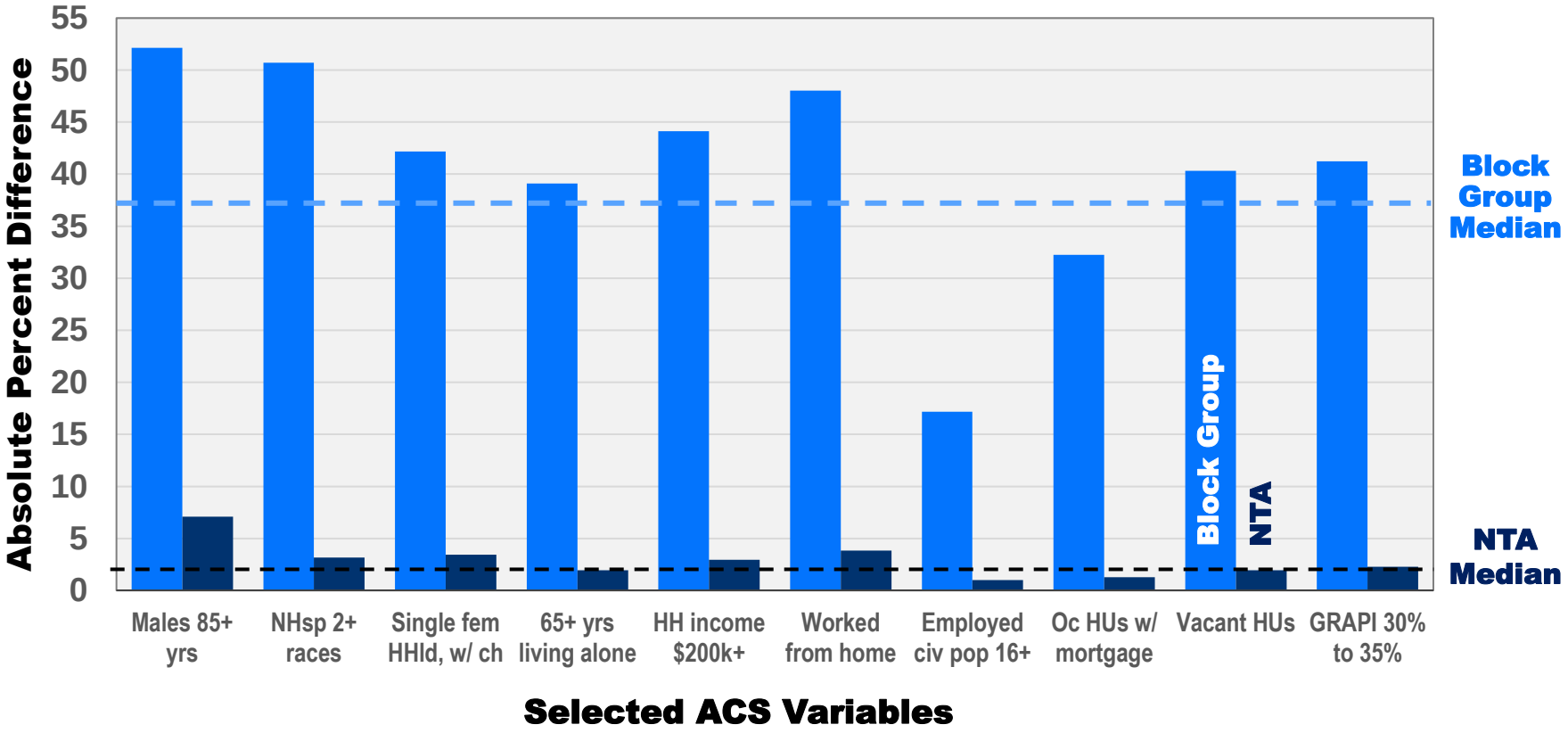
NYC PLANNING

Median absolute percent difference between modeled and actual estimates for selected ACS variables, ACS 2006-2010 NYC block groups in split tracts



NYC PLANNING

Median absolute percent difference between modeled and actual estimates for selected ACS variables, ACS 2006-2010 NYC block groups in split tracts & NTAs with boundary-crossing splits



NYC PLANNING

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How can we model new MOEs for ACS data in 2010 tracts that are split into new 2020 tracts?

2010 Census Tracts

Workers 16 years and over who worked from home (2006-2010 ACS)

1,000 +/-100

2020 Census Tracts

Workers 16 years and over who worked from home (2006-2010 ACS)

750 +/-?

250 +/-?

NYC PLANNING

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1,000 +/-100

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Workers 16 years and over who worked from home (2006-2010 ACS)

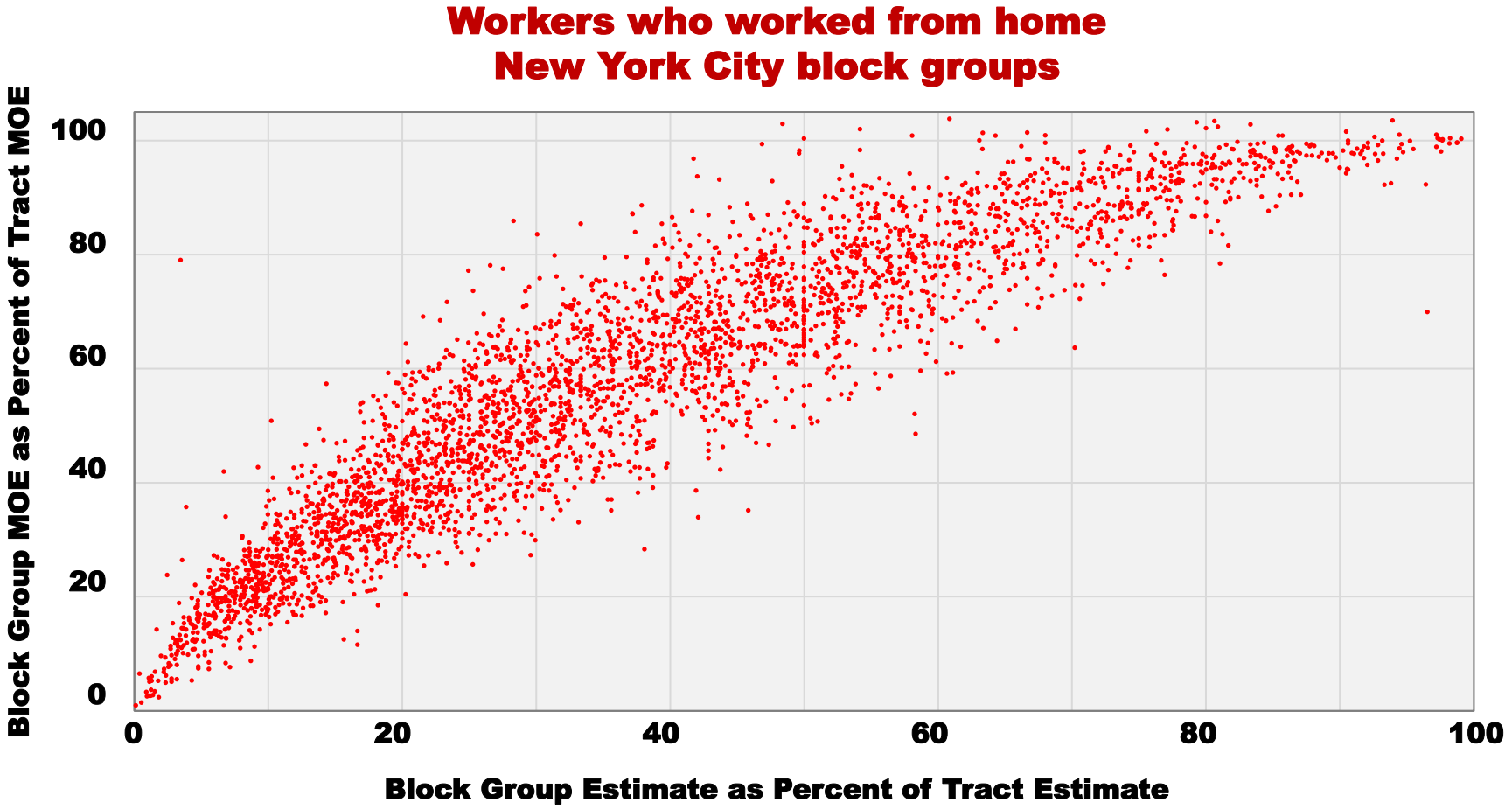
750 +/-?

250 +/-?

75% moe%=? ①

NYC PLANNING

Relationship between block group estimate as percent of tract estimate and block group MOE as percent of tract MOE for worked from home variable NYC block groups, 2015-2019 ACS Variance Replicate Tables (VRT)



*Estimates s constituting 100%, or 0%, of summed estimates omitted from graph

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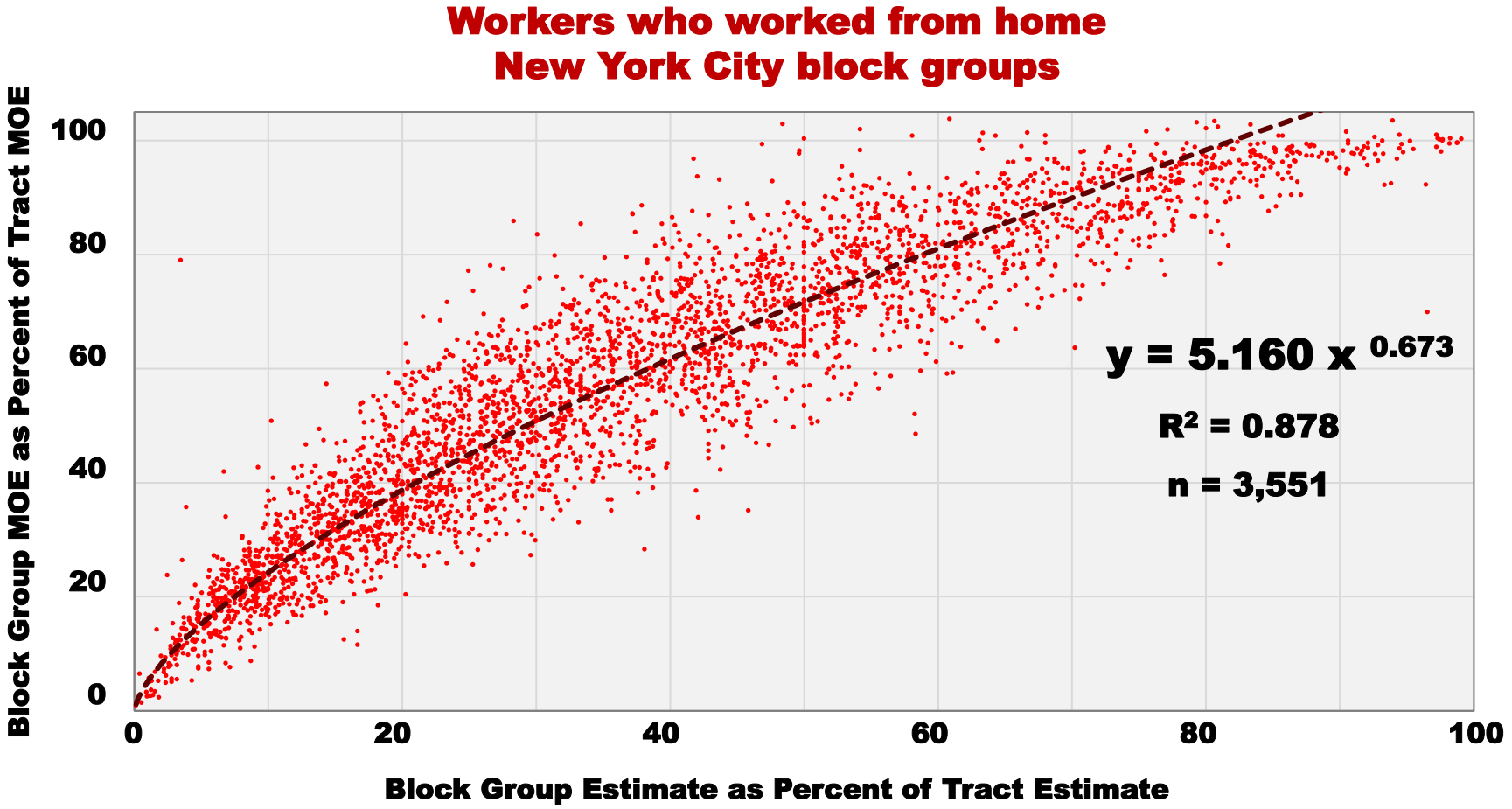

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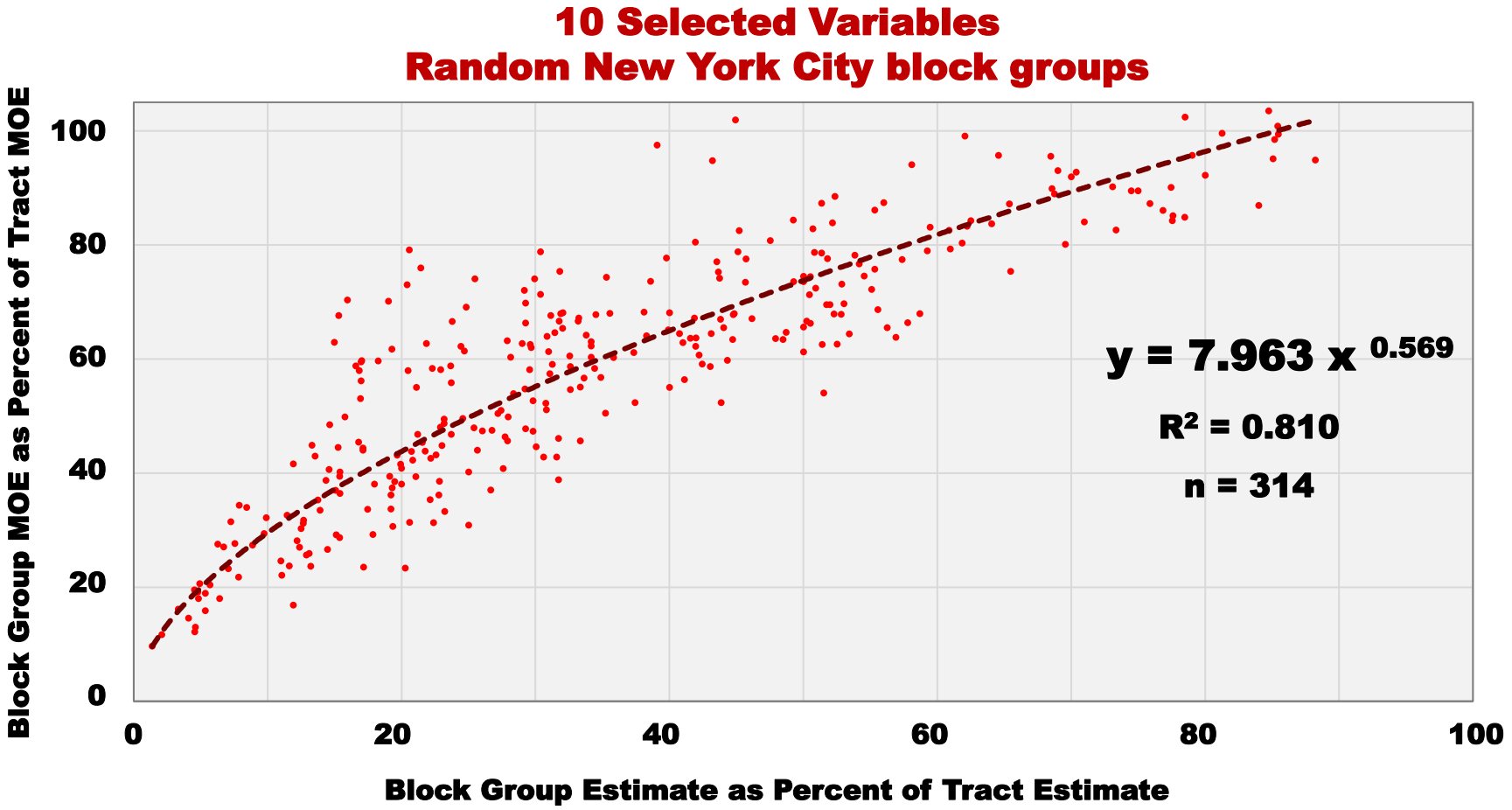
NYC PLANNING

Relationship between block group estimate as percent of tract estimate and block group MOE as percent of tract MOE for selected variables
Random NYC block groups, 2015-2019 ACS Variance Replicate Tables (VRT)



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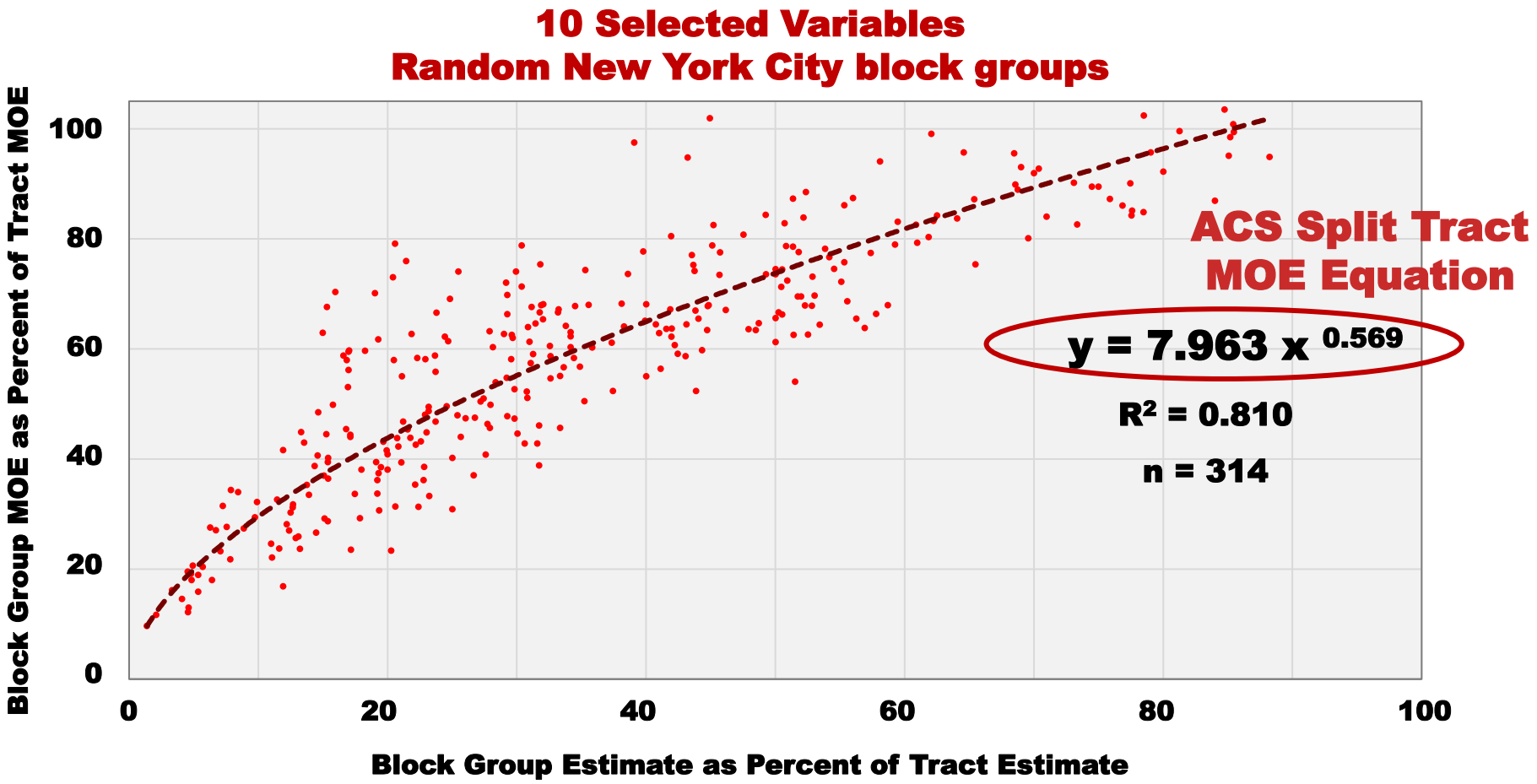
Relationship between block group estimate as percent of tract estimate and block group MOE as percent of tract MOE for selected variables Random NYC block groups, 2015-2019 ACS Variance Replicate Tables (VRT)



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NYC PLANNING

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Workers 16 years and over who worked from home (2006-2010 ACS)

750 +/-?

250 +/-?

(1) **75% moe%=?**

(2) $y = 7.963 * x^{0.569}$

*ACS Split Tract MOE formula results are capped at 100%

NYC PLANNING

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1,000 +/-100

2020 Census Tracts

Workers 16 years and over who worked from home (2006-2010 ACS)

750 +/-?

250 +/-?

① **75% moe%=?**

② $y = 7.963 * (75\%)^{0.569} = 93\%$

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NYC PLANNING

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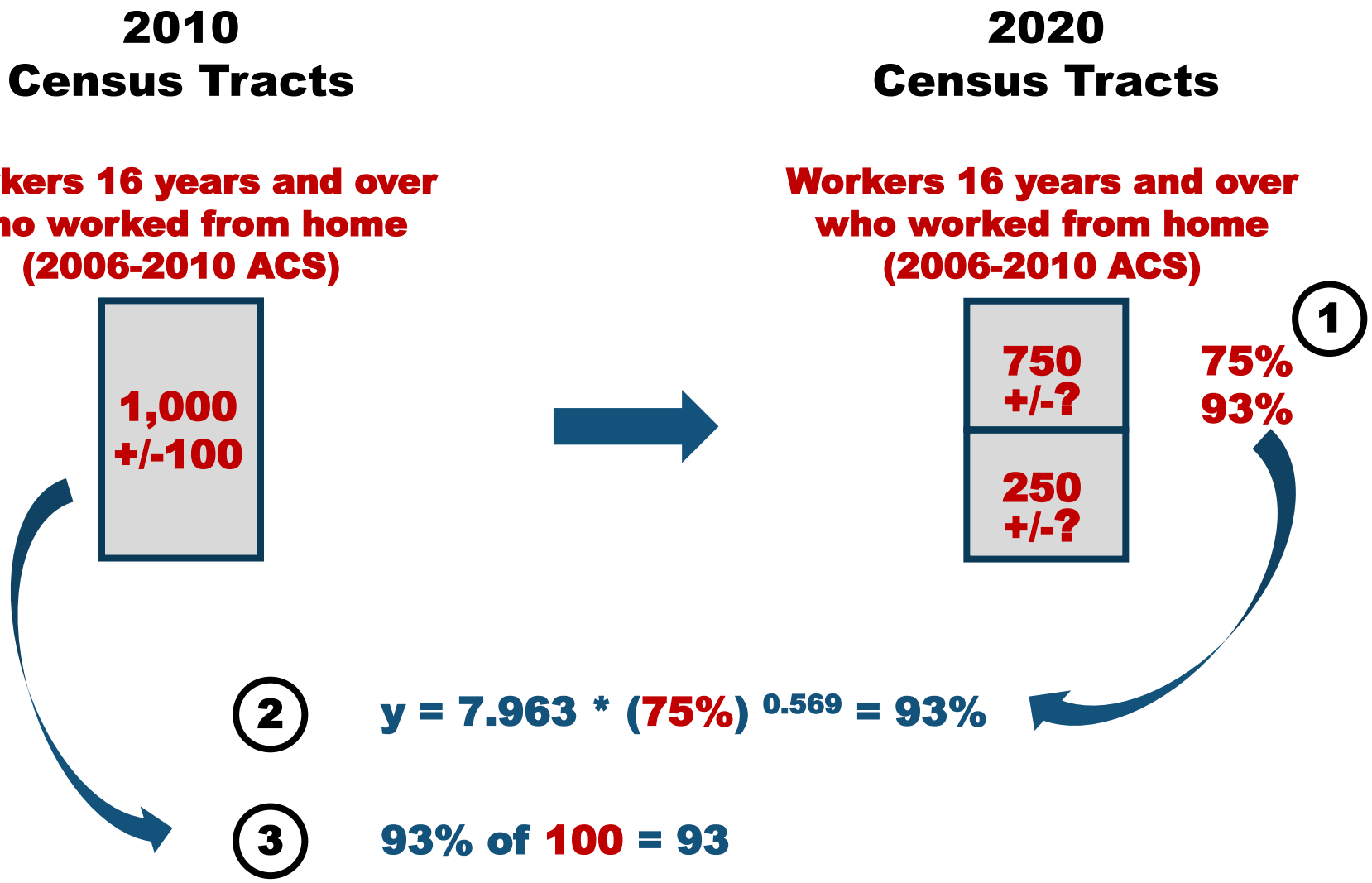

NYC PLANNING

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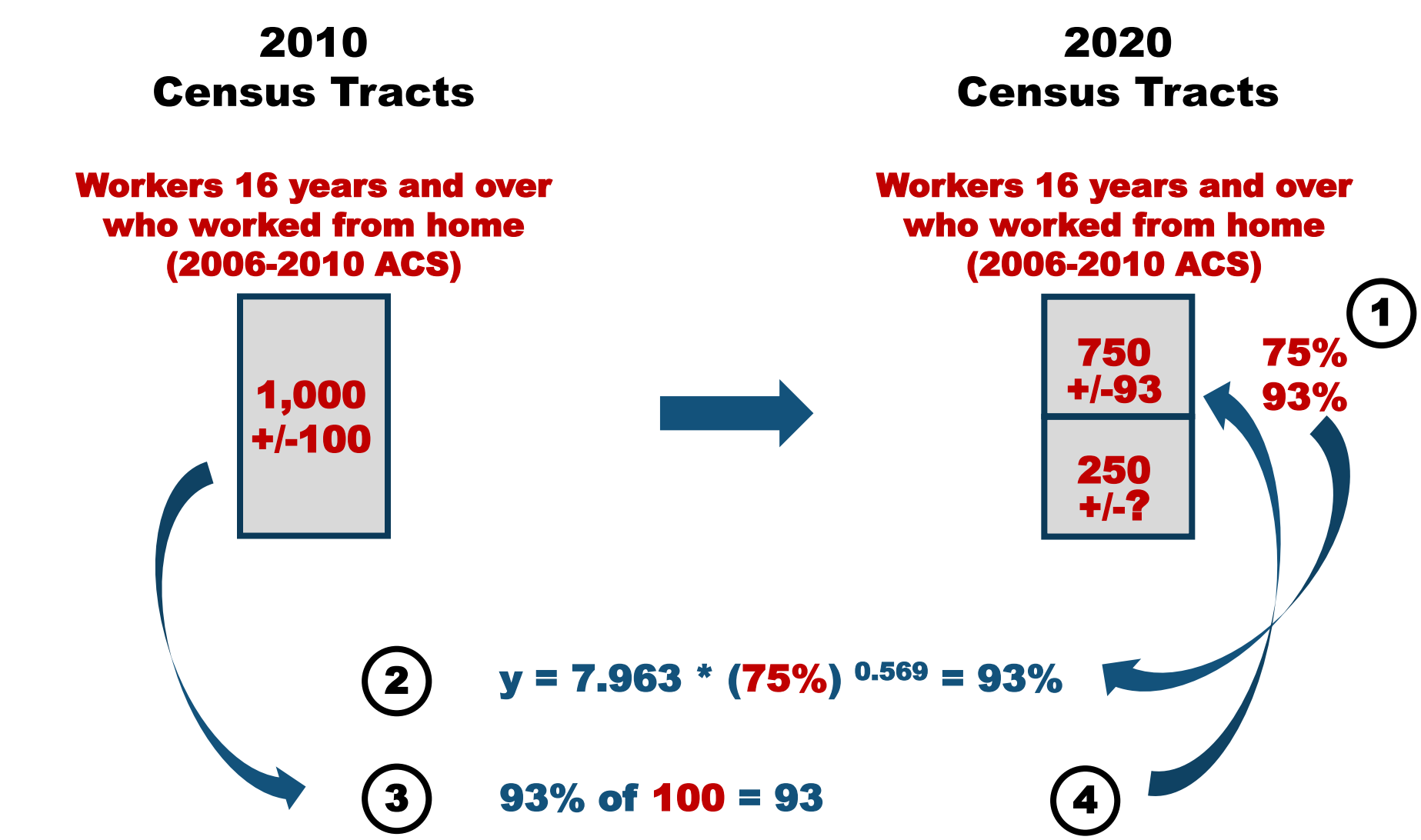

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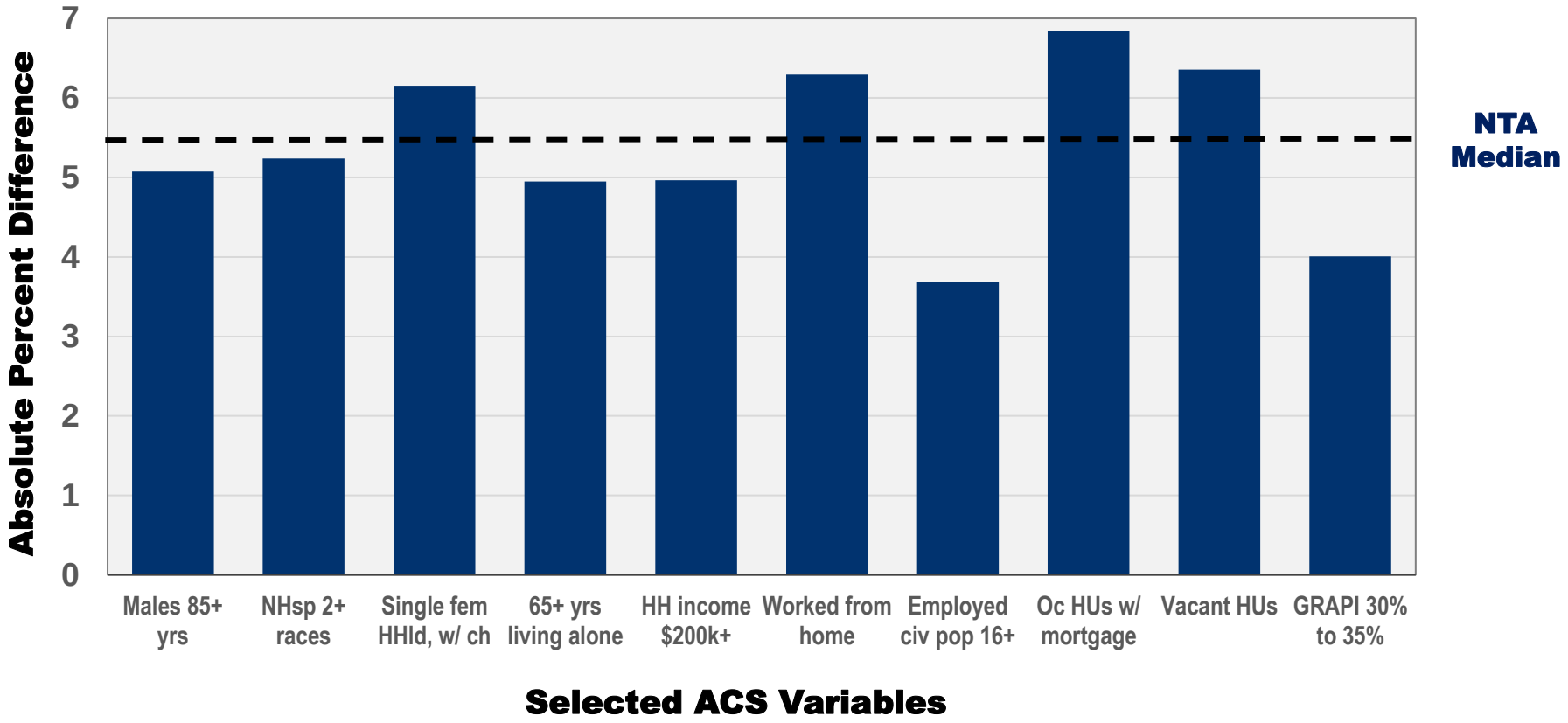
Median absolute percent difference between modeled and actual MOEs for selected ACS variables, ACS 2015-2019 (VRT) New York City NTAs with boundary-crossing split tracts



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Conclusions

1. **Sufficient reliability for count estimates**
2. **Sufficient reliability for Margins of Error**
3. **Both approaches are simple and easy to use**
4. **Need further research & to explore alternatives**