

# IMPROVING ECONOMETRIC MODELS WITH DATA MINING

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Andrew Schaufele  
Chief  
Bureau of Revenue Estimates

# The Challenge

- Income Tax Model Complexity Growing Before Covid-19

## CAUSES:

1. Federal Tax Law Changes
2. State Tax Law Changes
3. Income Concentration
4. Age Demographic Shift
5. Taxpayer Behavior Shifts
6. Net Settlements Challenging Before New Modeling  
Zeitgeist

# Maryland Income Tax Forecasting

## Process – A Mix of Adjustments & Econometrics:

- Track & Estimate by Component (e.g., Withholding, Refunds, etc...)
- Convert From Fiscal Year to Tax Year
- Manage a Baseline Series – Set to Tax Year 1997
  - Estimate Various Law & Structural Changes
- Econometric Modeling Applied to Baseline
- Add Back Baseline Adjustments
- Fiscalize

# Summary of FY21 PIT Closeout

	Fiscal Year 2021	
	\$ Variance From Prior Estimate	% Variance From Prior Estimate
Income Tax Component		
Withholding	\$423	2.7%
Estimated Payments	\$290	10.2%
Fiduciary	\$20	14.4%
Final Payments (incl Ext)	\$446	21.2%
Refunds	(\$327)	-10.6%
Total – Net Receipts	\$1,506	8.5%

Notes: dollars in millions; amounts may not sum from rounding; Mar21 estimate adj for 2021 Session

# Refunds TY20 – Key Assumptions

- Structural Break in Refunds Post Great Recession (Lower)
- Federal TCJA Further Structurally Reduced Refunds (Only 2018 and 2019 in history)

## **Federal & State Law Changes Beginning in TY20**

- *Refundable Earned Income Credit*
  - Federal – Allowed 2019 Earned Income for 2020 Calculation
  - State – Increased REIC share of federal to 45% from 28%
  - State – Expanded EIC base to include ITIN filers
- *Federal & State – Unemployment Not Taxable For Most TPs*
- *State – Allow PTEs to make estimated pays on behalf of resident members*

# Refunds – Implementation Complications

- The federal earned income provision passed with: The Taxpayer Certainty and Disaster Tax Relief (TCDTR) Act of 2020 – Law on December 27, 2020
- State EIC and UI changes passed with Emergency Legislation – enacted on 2/15/2021
  - Tax Processing Not Enabled Until 4/15/2021
- Federal UI subtraction (\$10.2k for most) taken as “Other Income”

# UI Analysis & Scoring

- Looked at Tax Return Detail – Merged Electronically Filed Returns with their Federal Return and 1099s from Department of Labor
  - 90% of filers electronic, assume higher rate for UI filers
  - 85% of electronic filers also submit their federal return
- Decipher data nuances, simulate impact from subtraction
- Estimate assumed that all UI was subtracted, we assumed it would show in refunds
- Estimate was \$324.6 million (2/3 State Impact – 1/3 Local Impact)

# UI Analysis & Scoring - Finding

<b>AGI Bucket</b>	<b>Count</b>	<b>Count - Missing Subtraction</b>	<b>Sum - UI Not Subtracted</b>	<b>Count - No Impact</b>	<b>Count - Yes Impact</b>	<b>Sum - Total Tax Impact</b>
Less than or equal 0	3,792	3,772	48,623,072	3,726	46	26,729
Between 1 and 25,000	191,315	122,813	1,403,584,464	55,160	67,653	36,398,068
Between 25,001 and 50,000	137,446	90,133	1,184,308,549	24,810	65,323	52,400,676
Between 50,001 and 75,000	48,739	26,584	302,784,861	551	26,033	22,064,897
Between 75,001 and 100,000	31,594	16,768	183,609,032	166	16,602	14,008,494
Between 100,001 and 150,000	36,122	26,303	271,290,449	72	26,231	21,116,443
<b>Total</b>	<b>449,008</b>	<b>286,373</b>	<b>3,394,200,426</b>	<b>84,485</b>	<b>201,888</b>	<b>146,015,307</b>

- Therefore – we did not realize ~ \$146 million of the tax reduction that was expected
- Likely a large part of Refund Variance

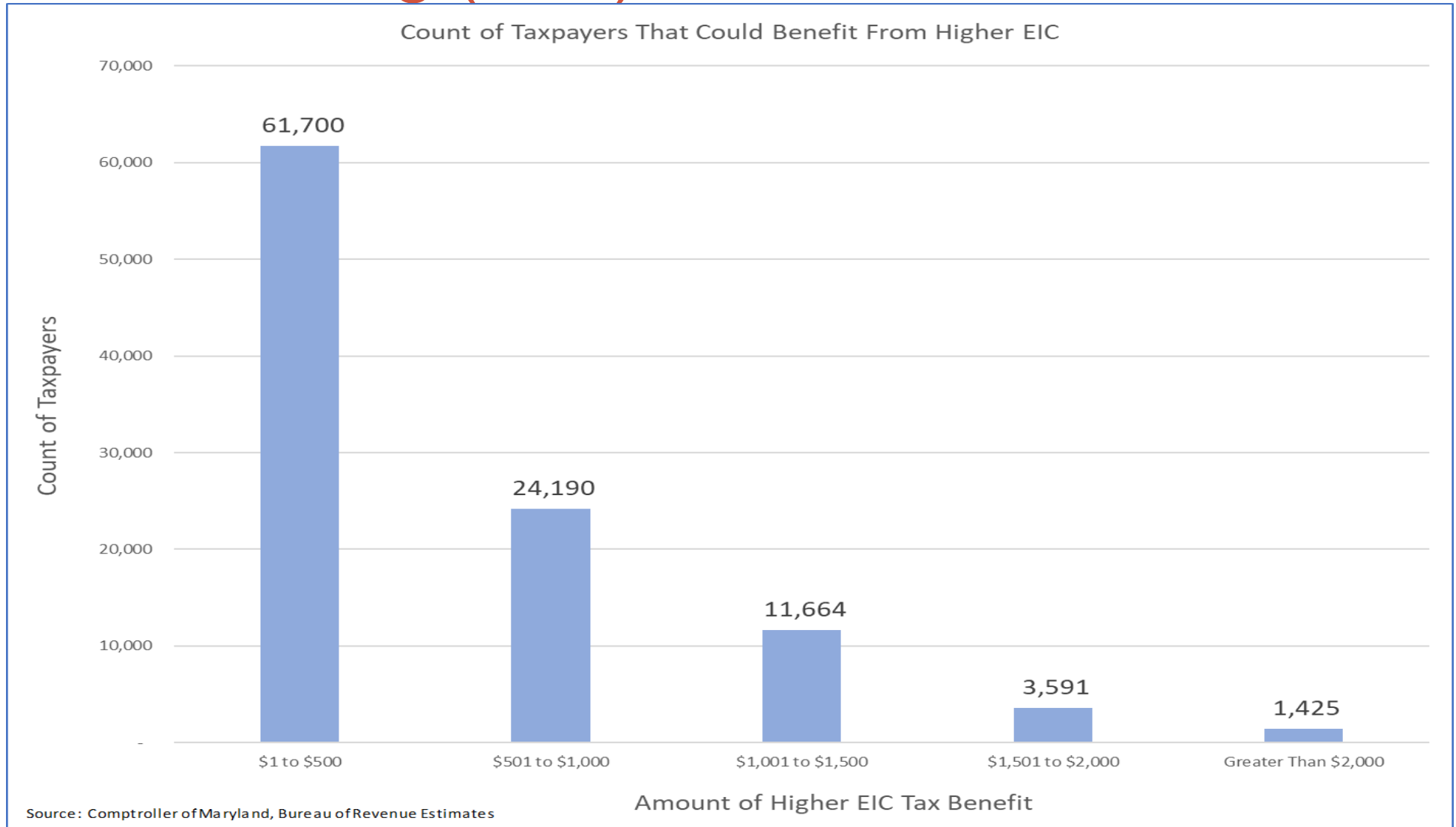


# EIC Finding

EIC Component	Estimate	Finding	Difference
Non-Refundable EIC	101	93	(8)
Refundable EIC @ 28%	164	134	(30)
Refundable EIC – Incr amount to 45%	117	81	(36)
EIC & REIC – Expansion to ITIN	66	41	(25)
Total	448	349	(99)

Notes: Dollars in Millions; Rounded Amounts May Not Sum to Total

# EIC Finding (cont)



- Total of 405k TPs received EIC – 25% were shorted

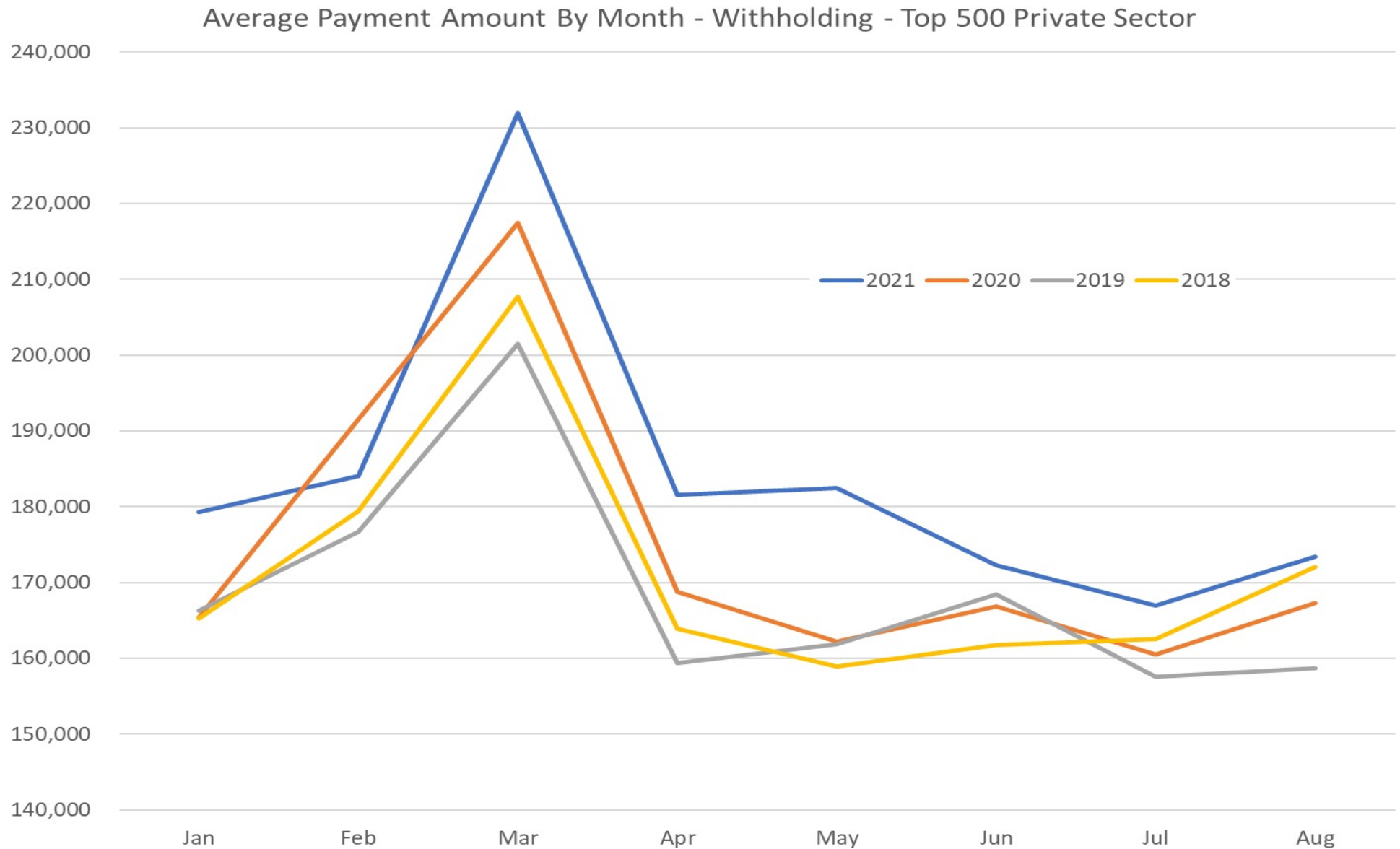
# Conclusions

- Tax year 20 refund variance largely attributable to missed estimates of law changes
- Further, those misses were not bad legislative estimates, rather tied to implementation issues
  - Many taxpayers filed federal & State before the UI subtraction was enabled
  - Tax preparers and software providers failed clients by not enabling use of 2019 earned income
    - Majority used same preparer or software as in prior year
- We're right to adjust our baseline for these amounts that we can't accommodate in modeling except with dummies

## Next Question

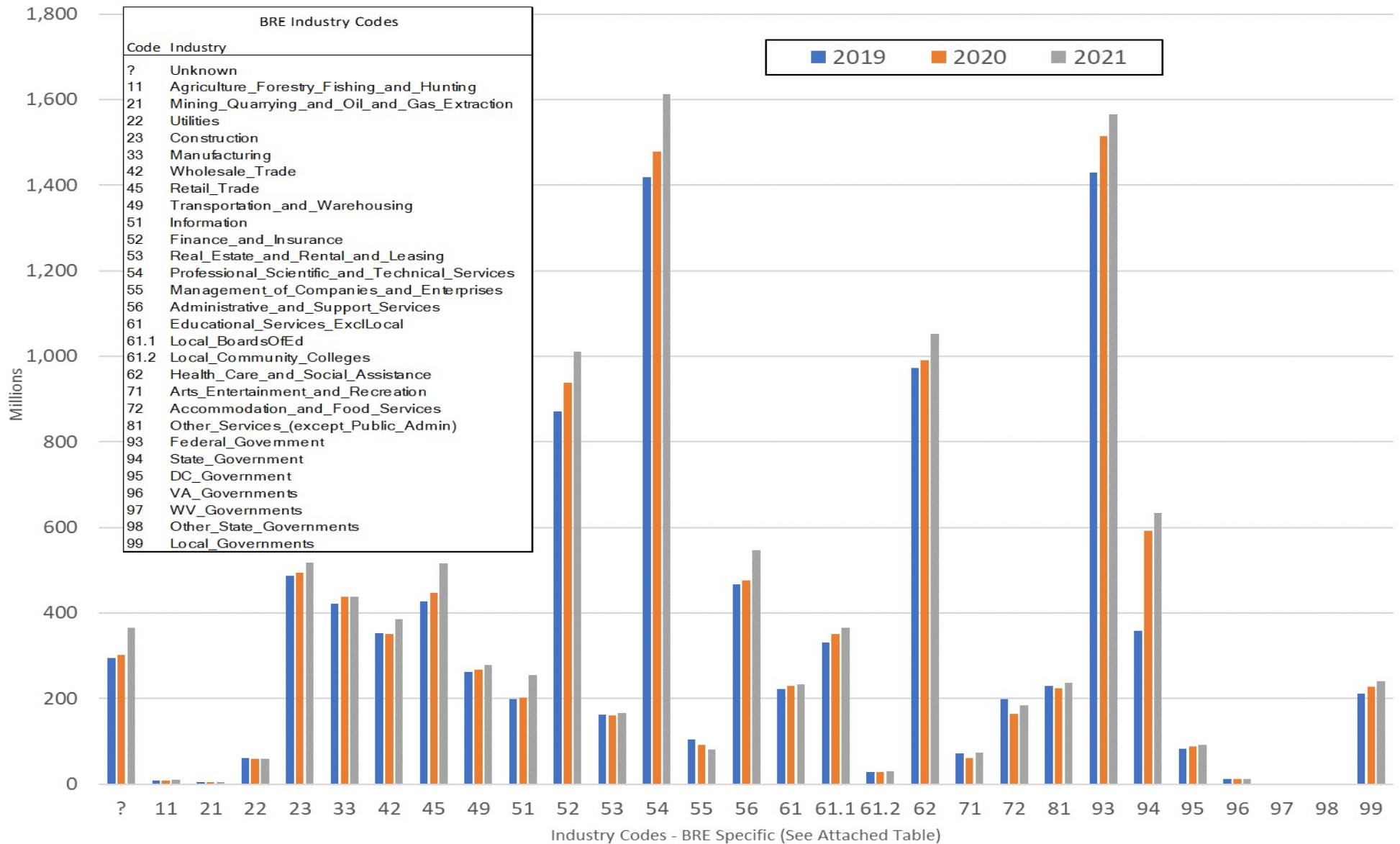
- What does this mean for tax year 2021?
- We currently assume all UI will be subtracted and that all will get legally allowed EIC amounts

# Bonus Slides on Withholding



# Bonus Slides on Withholding

January to August Cash Withholding By Industry



# Thank You

Andrew Schaufele

Comptroller of Maryland

Chief, Bureau of Revenue Estimates

[aschaufele@comp.state.md.us](mailto:aschaufele@comp.state.md.us)