



# Economic Outlook for NY Tax Revenues

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UNLEASH  
GREATNESS



# UALBANY FORECASTING MODEL

- We have developed a New York State revenue forecasting model with many predictors related to NY State, US and the adjoining states.
- It is mixed frequency model in that we forecast year-over-year growth in revenues using monthly and quarterly observations
- We pay special attention to the probability of recessions during the period
- We start predicting y-o-y revenue growth 18 months before the end of the fiscal year and the forecasts are updated on a monthly basis till March
- We use two dynamic factors for NY and US using many predictors and a variable capturing published evaluation the effect of enacted or planned future policies on tax revenues from NASBO, DOB, Ways & Means etc.
- An important feature of our model is that forecasts for a FY change in real time as new data arrives with changing uncertainty depending on the horizon, 18 months to 1 month.
- The time series dynamics of some of these variables are presented first



# OUR RECENTLY PUBLISHED PAPER

International Journal of Forecasting 38 (2022) 545–566



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Contents lists available at [ScienceDirect](#)

## International Journal of Forecasting

journal homepage: [www.elsevier.com/locate/ijforecast](http://www.elsevier.com/locate/ijforecast)



## Boosting tax revenues with mixed-frequency data in the aftermath of COVID-19: The case of New York

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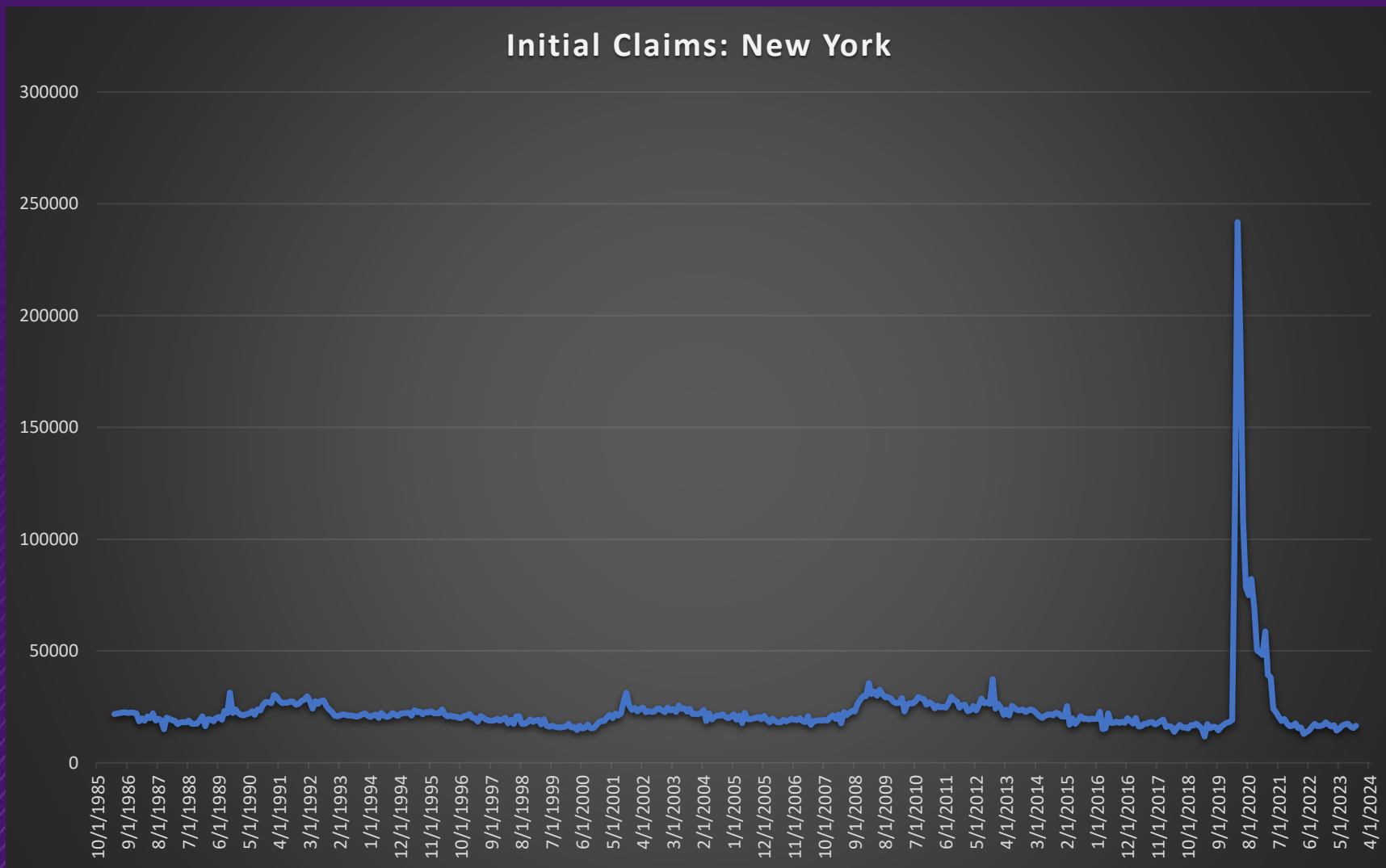
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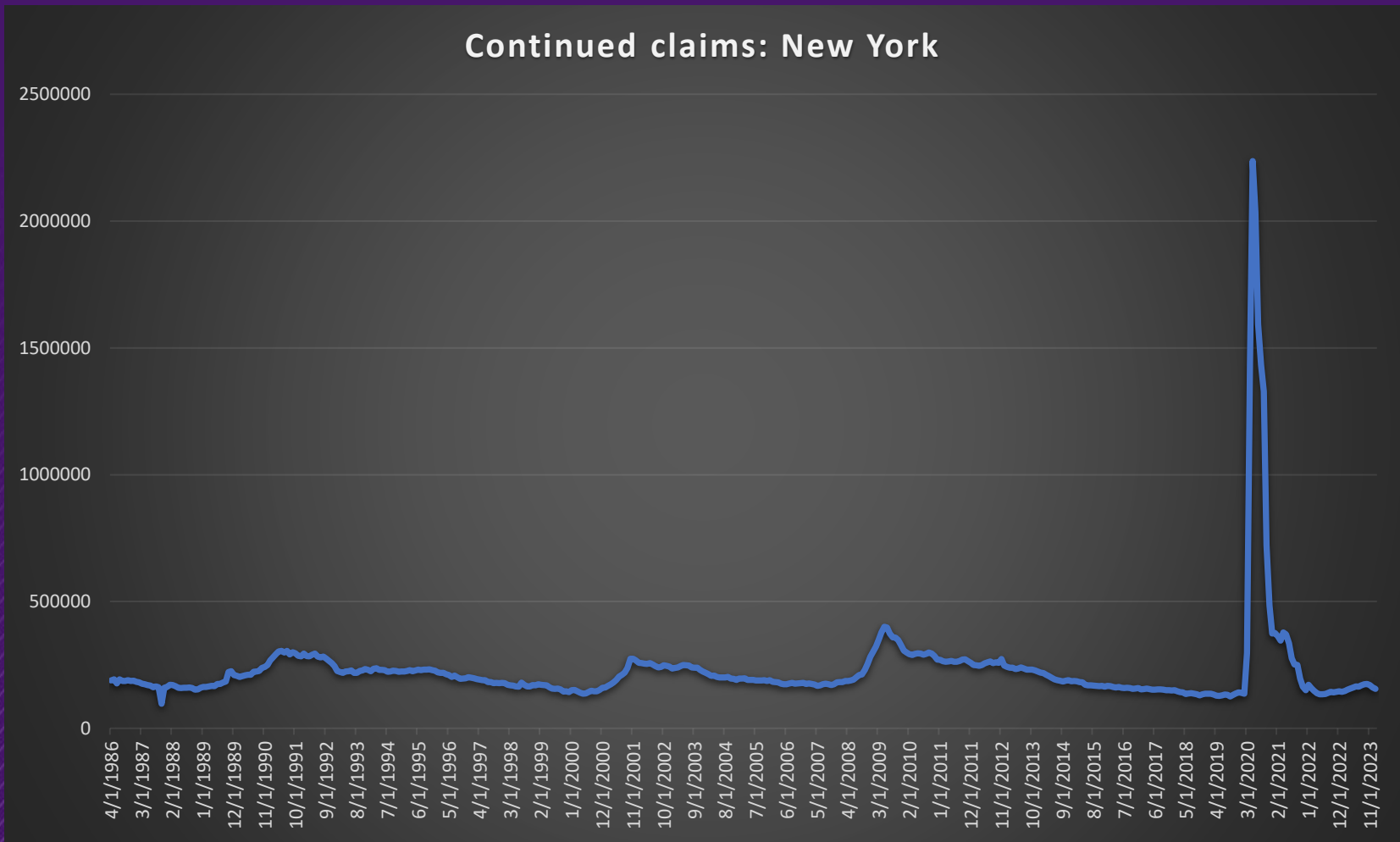


- The initial claims have come down to the pre-pandemic level after 2022



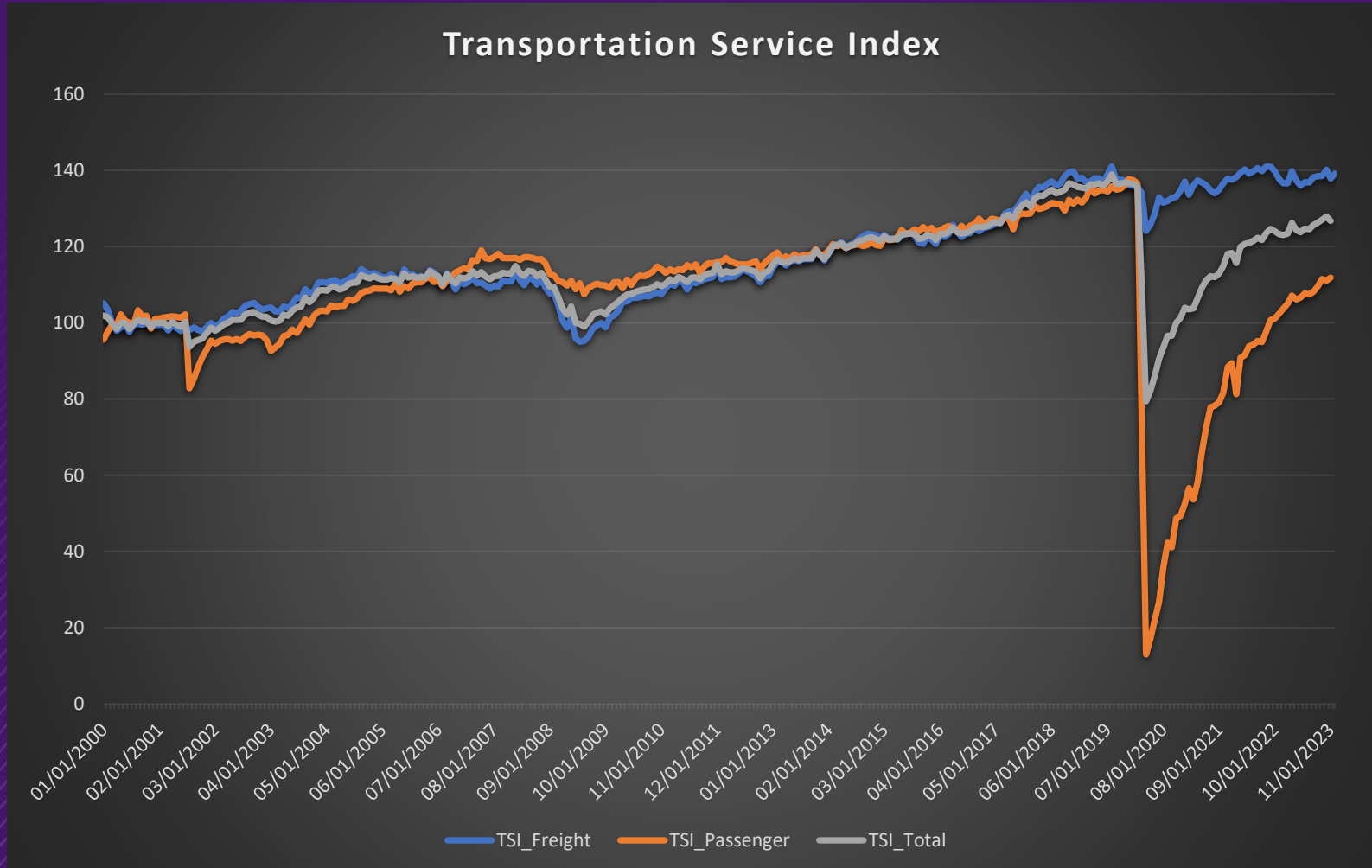


- The value of continued claims have stabilized since 2022





- The transportation service index is still not fully recovered, but the freight component is back to its normal level



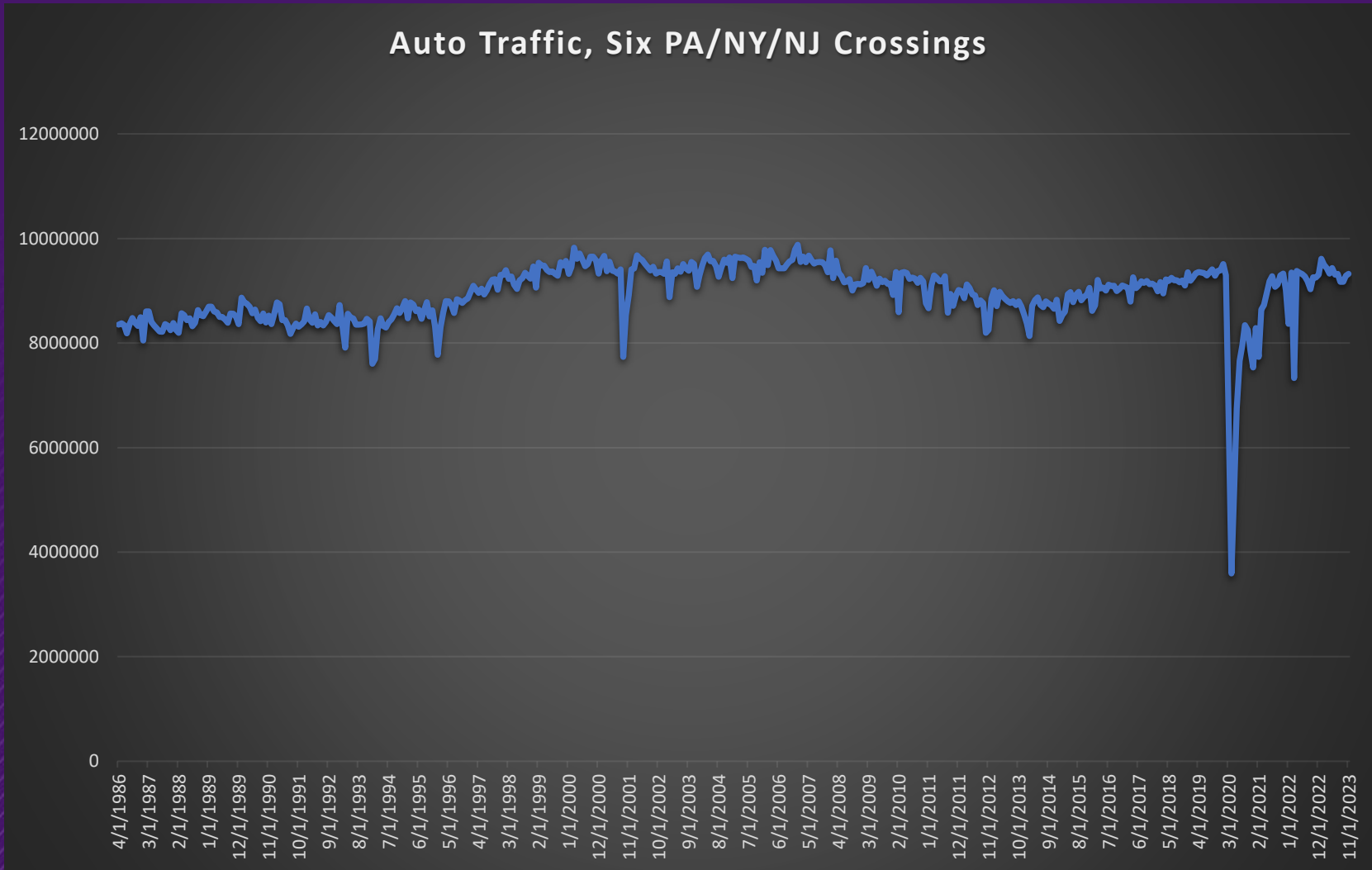


- The U.S. Leading Economic Index from the Conference Board has been dropping due to Fed's anti-inflation policies





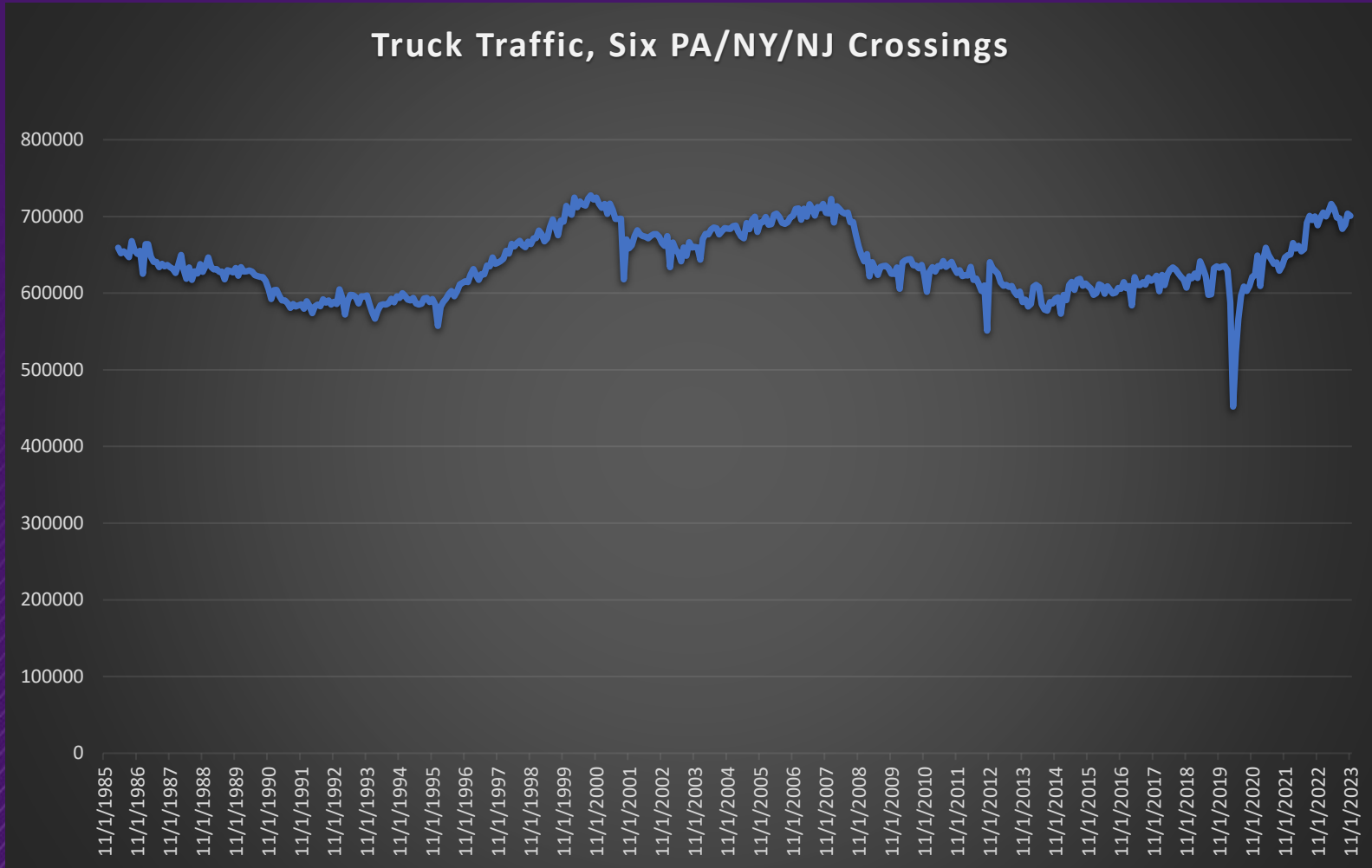
- Auto traffic around PA/NY/NJ crossings has stabilized at pre-pandemic level





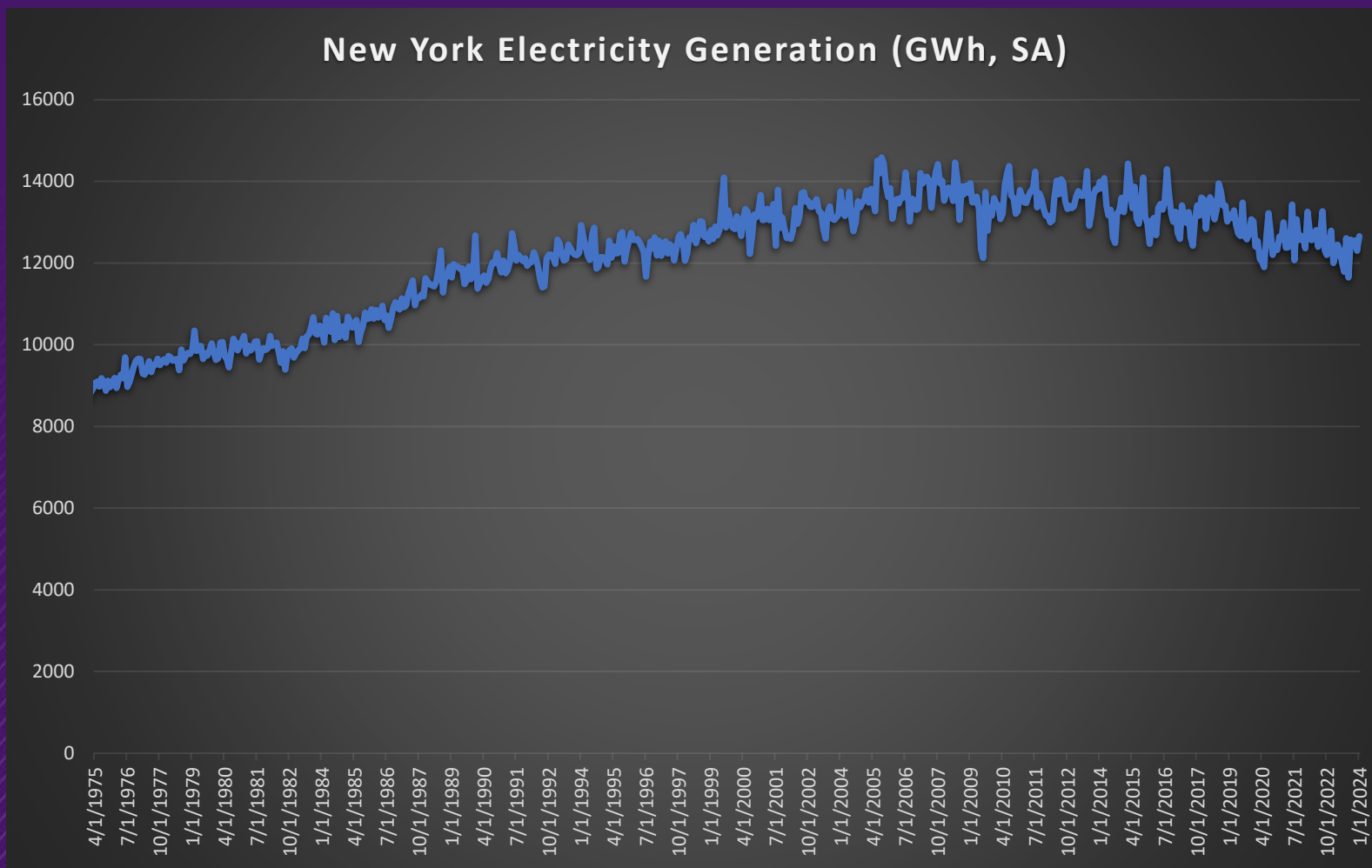


- Truck traffic keeps increasing.



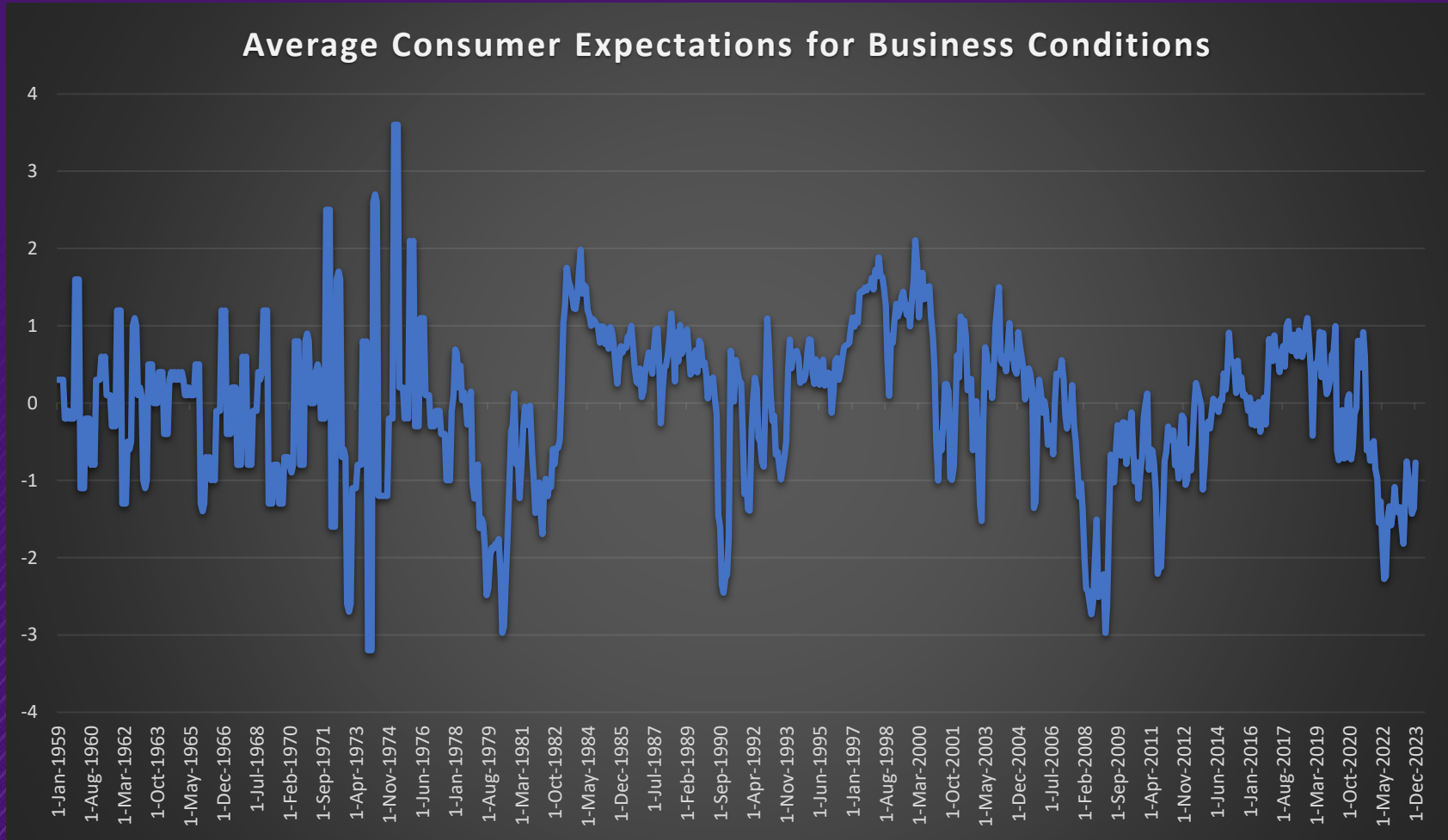


- Electricity generation is not growing





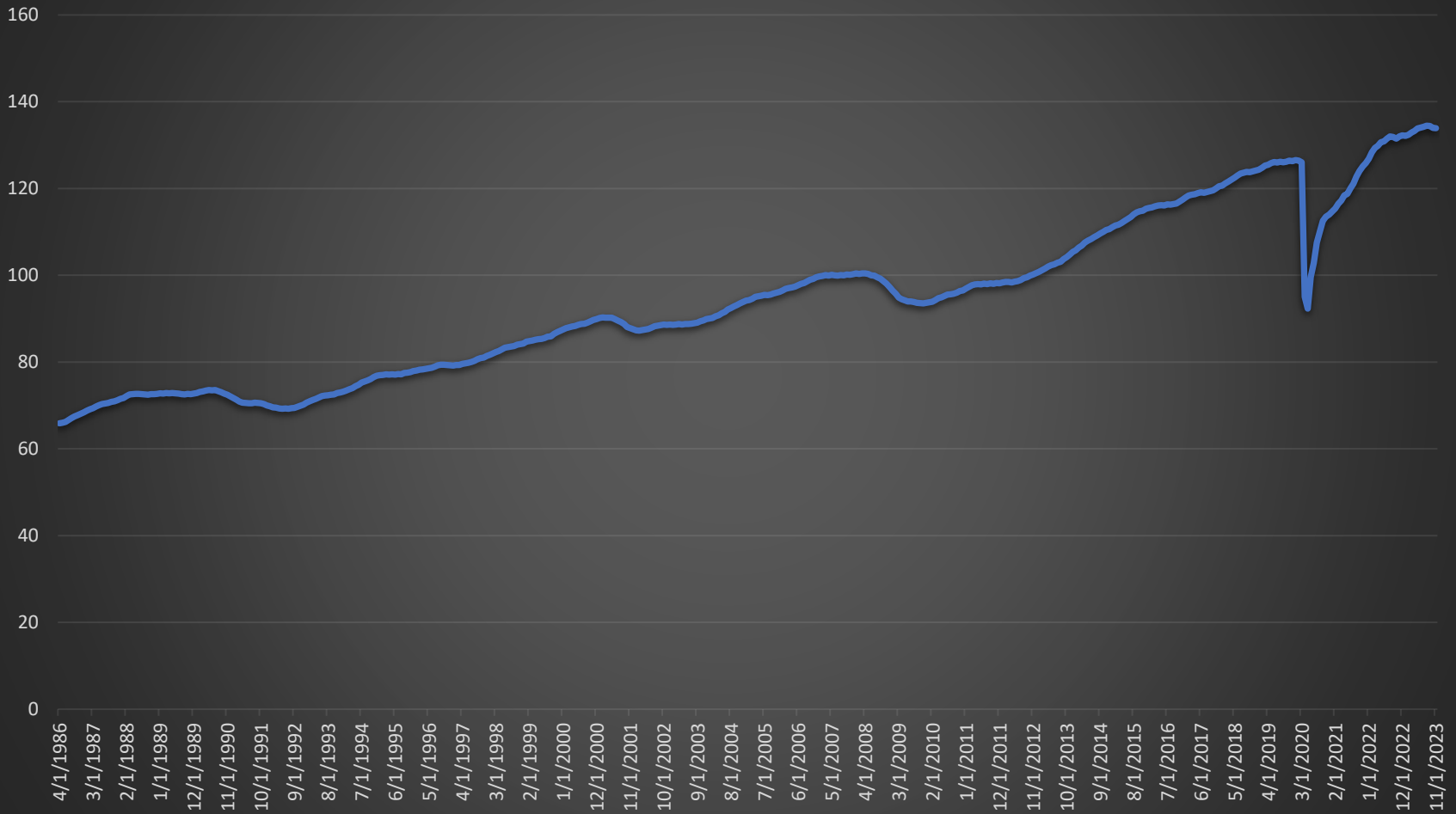
- Average consumer expectation for business conditions has not recovered





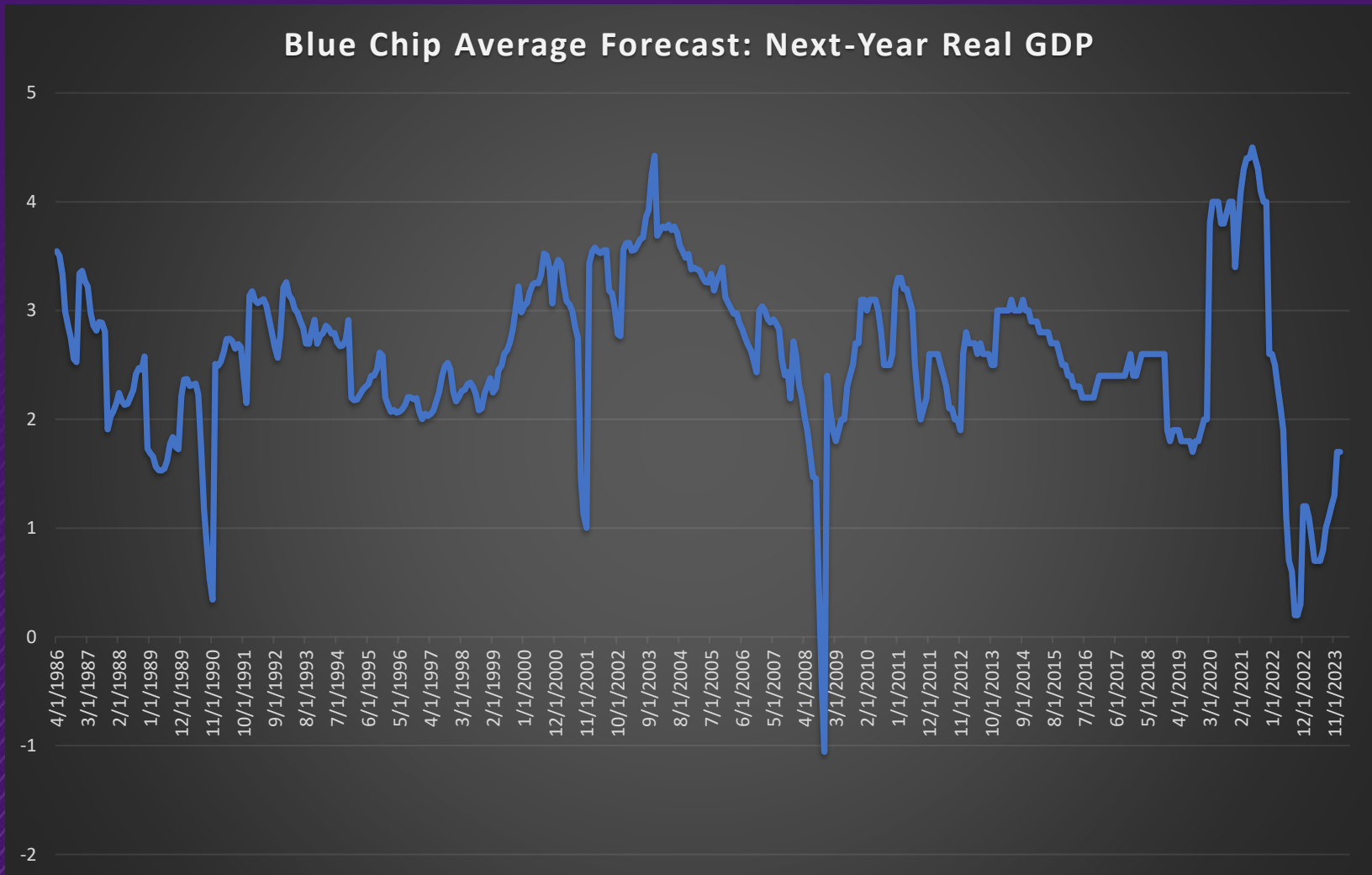
- Philly Fed's New York coincident index is at trend level.

New York State Coincident Index



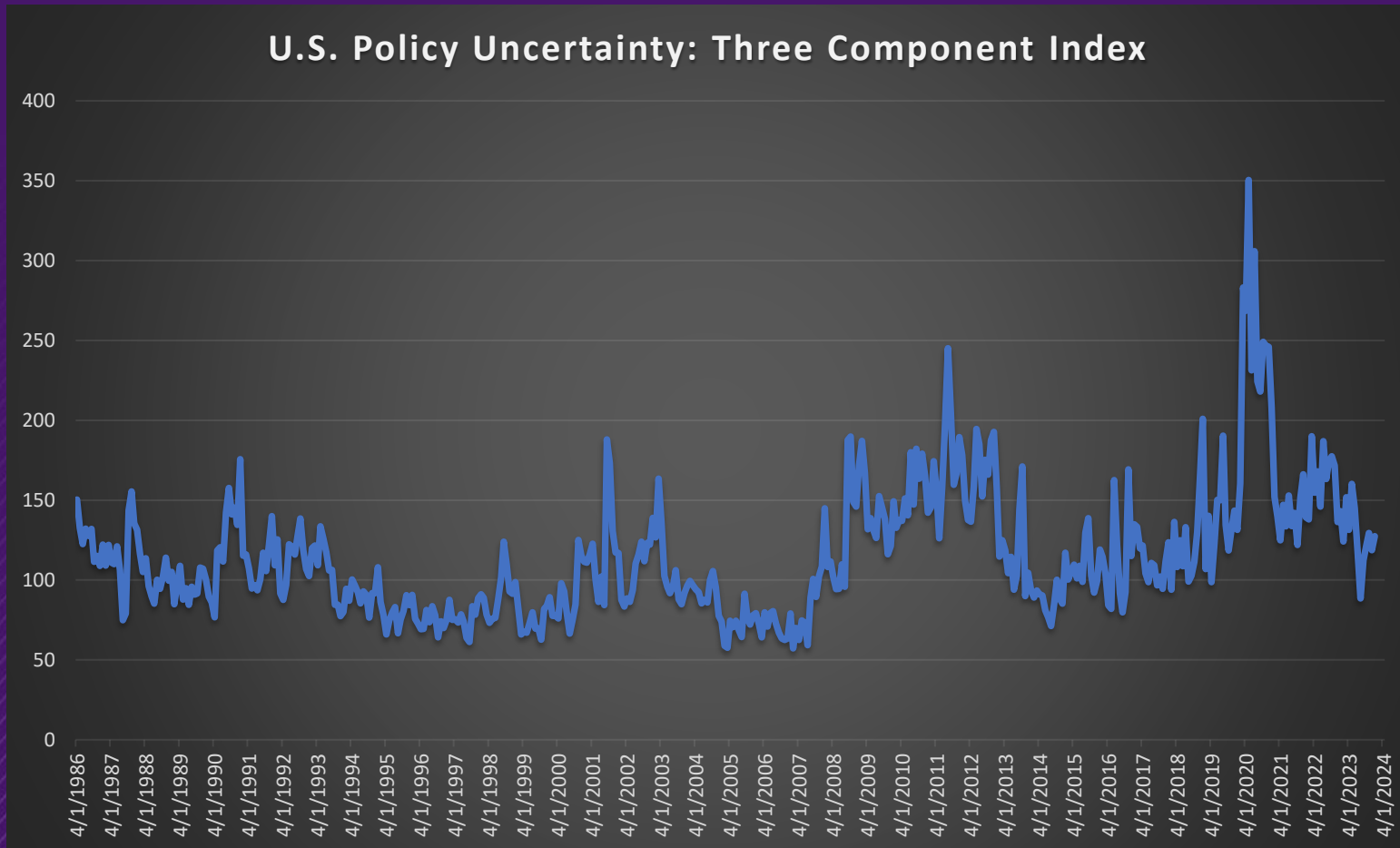


- The Blue Chip average forecast of real GDP for next year is around 1.7%





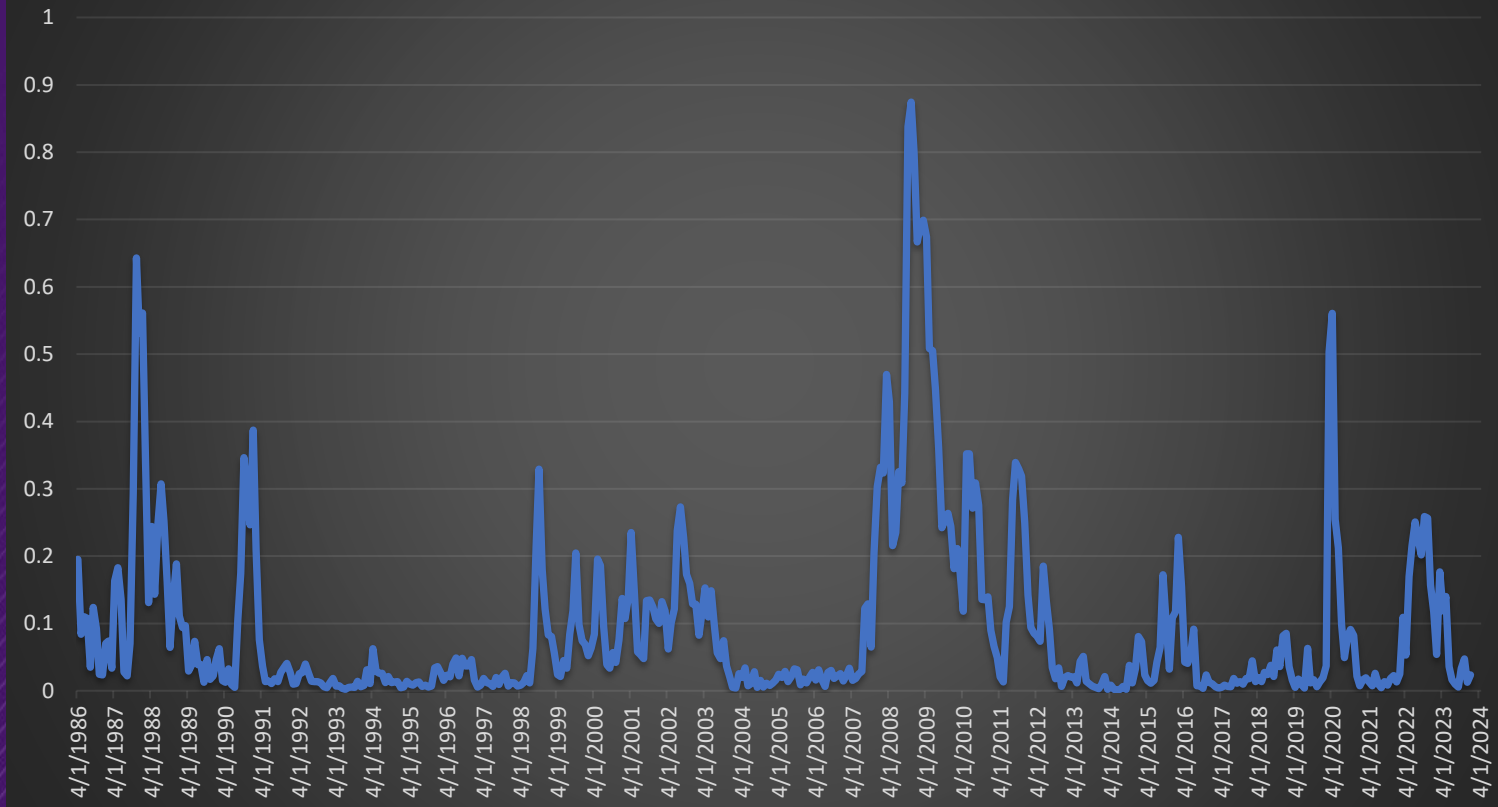
- Nick Bloom's economic policy uncertainty index is dropping and low.





- A New Macro/Financial Composite Indicator of Systemic Stress (CISS) for U.S. is low

Composite Indicator of Systemic Stress for U.S.





- The monthly taxes from New York tax department is very volatile after the pandemic – Echoes of the Pandemic

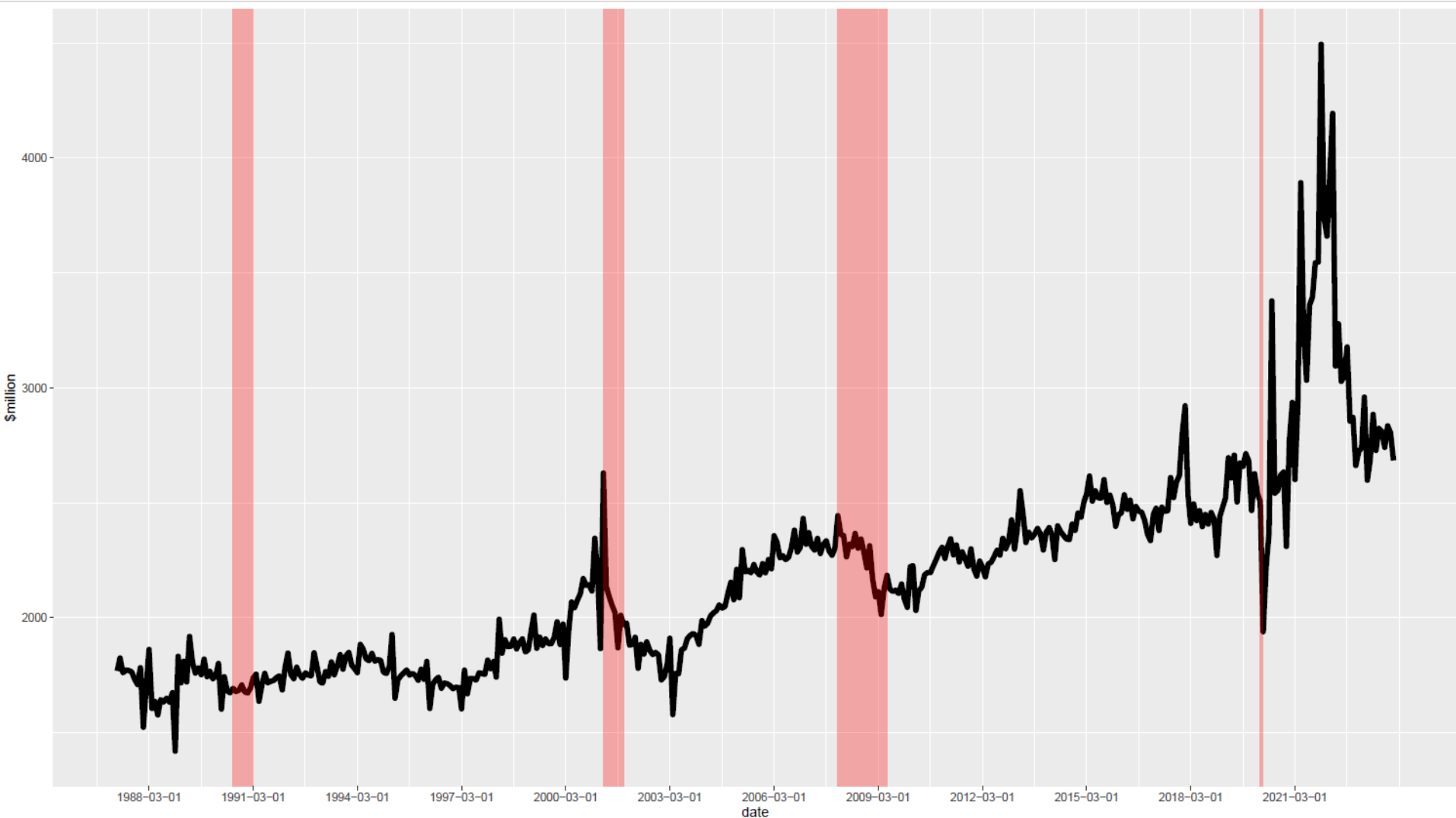






Table 1: Variable List: U.S.

Variable	Explanation	Frequency	Source
TCU	Capacity Utilization: Total Industry	Monthly	Federal Reserve Board of Governors
PersConsExpen_real	Personal Consumption Expenditures (real)	Monthly	US. Bureau of Economic Analysis
PersInc_real	Personal Income (real)	Monthly	US. Bureau of Economic Analysis
PersSaveR	Personal Saving Rate	Monthly	US. Bureau of Economic Analysis
LeadCompIndic	Leading Economic Index	Monthly	Conference Board
TSLT	Transportation Service Index_total	Monthly	Bureau of Transportation Statistics
BlueC	Blue Chip Real GDP Forecast: Current Year	Monthly	Blue Chip Economic Indicators
BlueN	Blue Chip Real GDP Forecast: Next Year	Monthly	Blue Chip Economic Indicators
RECESS2	Probability of Decline in Real GNP/GDP in next quarter	Quarterly	Federal Reserve Bank of Philadelphia
SEN	Confidence Index: U.S.	Monthly	Organisation for Economic Co-operation and Development
EPU_3C	Overall Economic Policy Uncertainty Index	Monthly	Economic Policy Uncertainty
EMP_WRO	Total Employees: Whole Sales Trade, Retail Trade and Other Services	Monthly	Bureau of Labor Statistics
AAADGS10	Moody's Seasoned Baa Corporate Bond Minus 10-Year Treasury Constant Maturity Rate	Monthly	Moody's; Board of Governors of the Federal Reserve System (US)
TVT	Travel in Millions of Vehicle Miles	Monthly	U.S. Department of Transportation
ISM_MEI	ISM Manufacturing Employment Index	Monthly	Institute for Supply Management
ISM_MII	ISM Manufacturing Inventory Index	Monthly	Institute for Supply Management
ISM_MPI	ISM Manufacturing Prices Index	Monthly	Institute for Supply Management
ISM_MNEOI	ISM Manufacturing New Export Orders Index	Monthly	Institute for Supply Management
ISM_MNIOI	ISM Manufacturing Imports Index	Monthly	Institute for Supply Management
ISM_NMNOI	ISM Non-Manufacturing New Orders Index	Monthly	Institute for Supply Management
ISM_NMEI	ISM Non-Manufacturing Employment Index	Monthly	Institute for Supply Management
FedTxWithold	Withheld Income and Employment Federal Taxes	Monthly/Daily	U.S. Treasury
CCLAIM	Continued Claims	Monthly	U.S. Employment and Training Administration

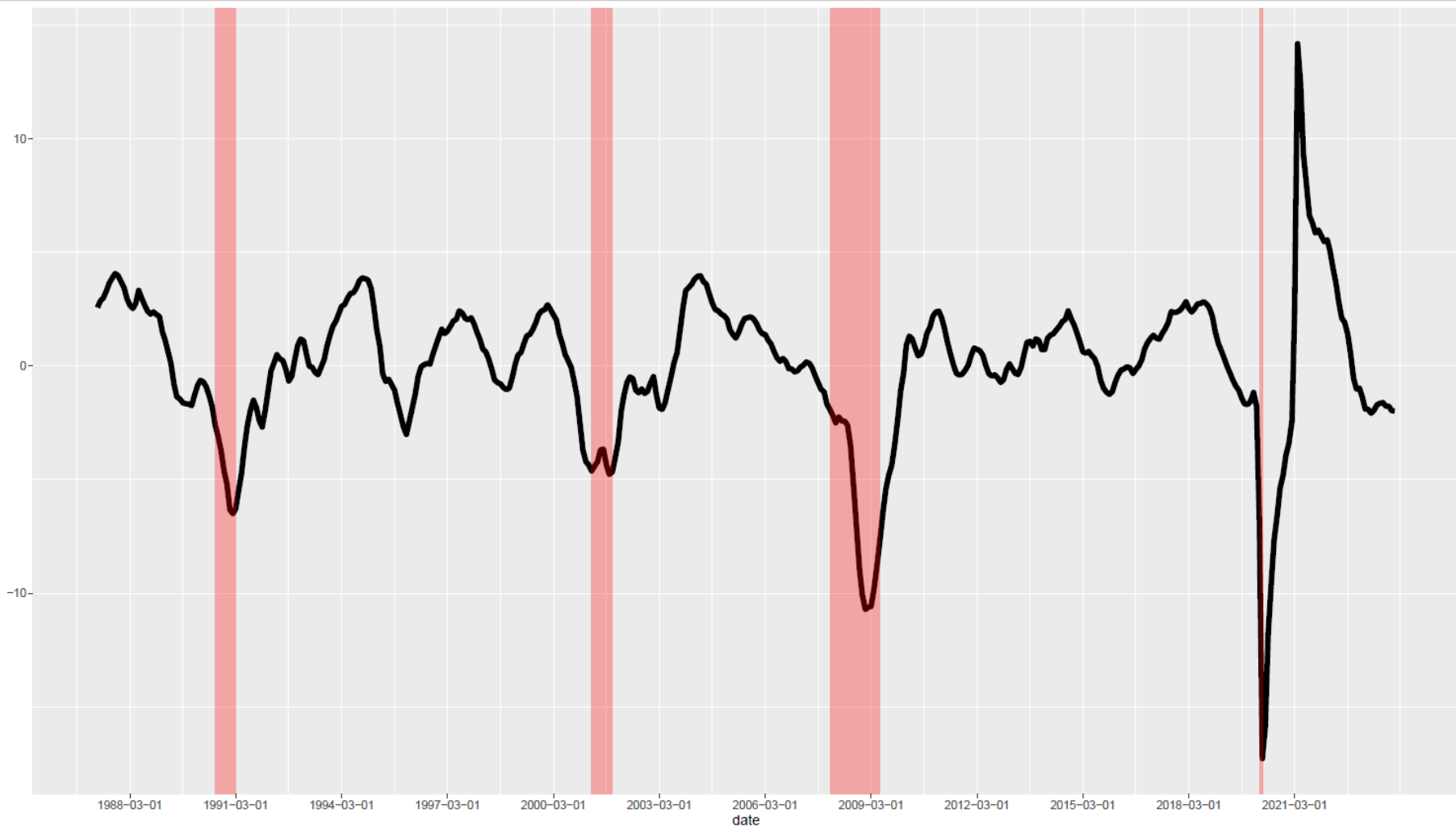


Table 2: Variable List: New York

Variable	Explanation	Frequency	Source
HX1M.CNER	Existing Home Sales: Single-Family Northeast Census Region	Monthly	National Association of Realtors
HX1MEDM.CNER_real	Median Sales Price Single Family Homes: Northeast Census Region (real)	Monthly	National Association of Realtors
HOFHOPIQ.NY	FHFA House Price Index, Existing Single-Family Homes: New York	Quarterly	U.S. Federal Housing Finance Agency
ELEC.NY	New York State Total Electric Generation	Monthly	New York Independent System Operator
NYOTOT_PC1_real	Personal Income (real): New York	Quarterly	U.S. Bureau of Economic Analysis
autotraf	Truck Traffic, Six PANYNJ Crossings	Monthly	New York State Port Authority
trucktraf	Auto Traffic, Six PANYNJ Crossings	Monthly	New York State Port Authority
SCLNY	State coincident Index: New York	Monthly	Federal Reserve Bank of Philadelphia
RHPNRM.NY	Total Housing Permits: New York	Monthly	U.S. Census Bureau
NYICLAIMS	Initial Claims in New York	Monthly	U.S. Employment and Training Administration
BAFDINA	Business Leaders Survey: Future Business Activity	Monthly	Federal Reserve Bank of New York
NY_Bench	Early Benchmarked Employment: New York State	Monthly	Federal Reserve Bank of New York
ret_rec_work_NY	Community Mobility: Average of Retail/Recreation and Workplace-New York	Monthly/Daily	Google

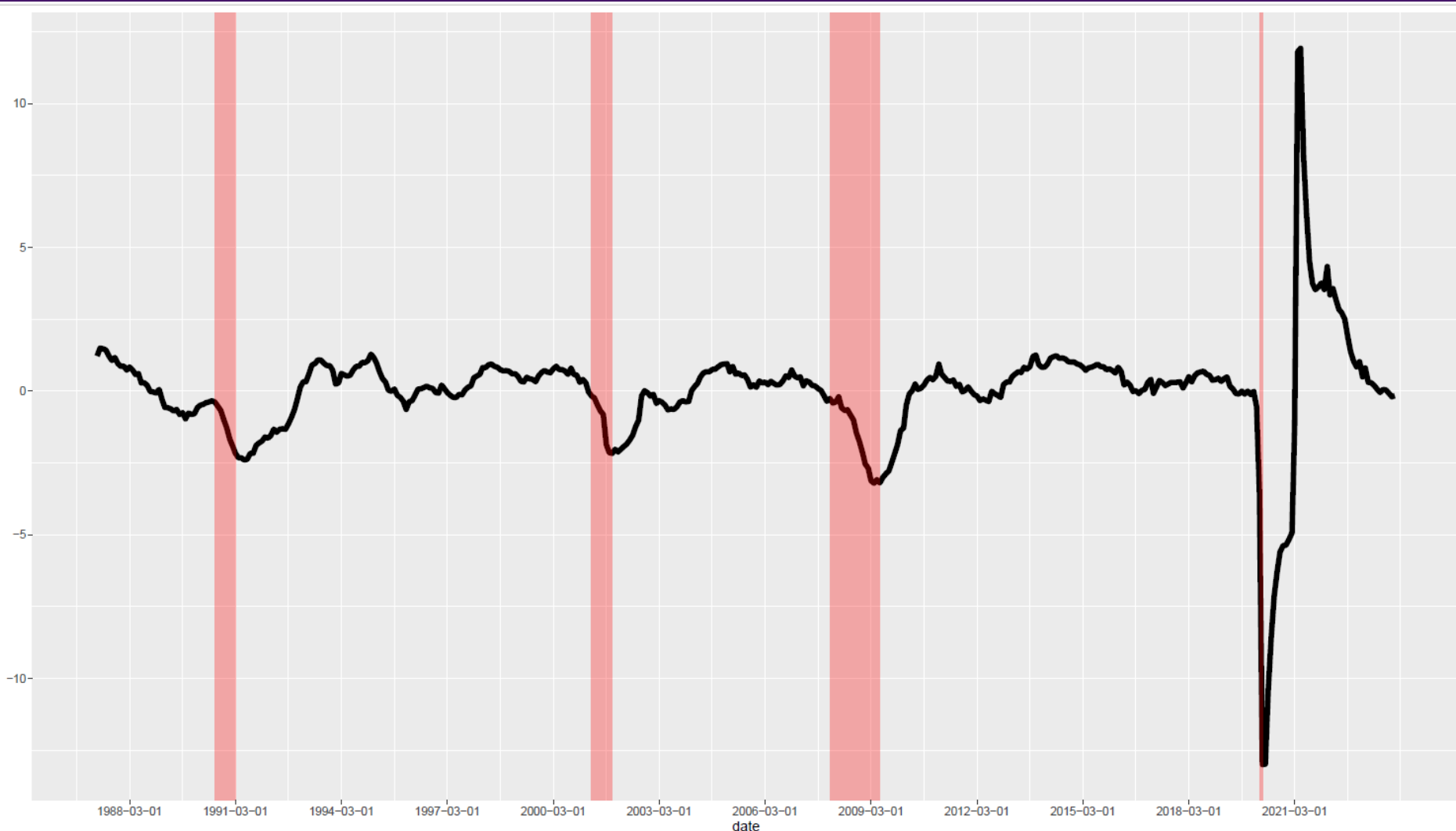


## US Composite Factor has fallen since 2022



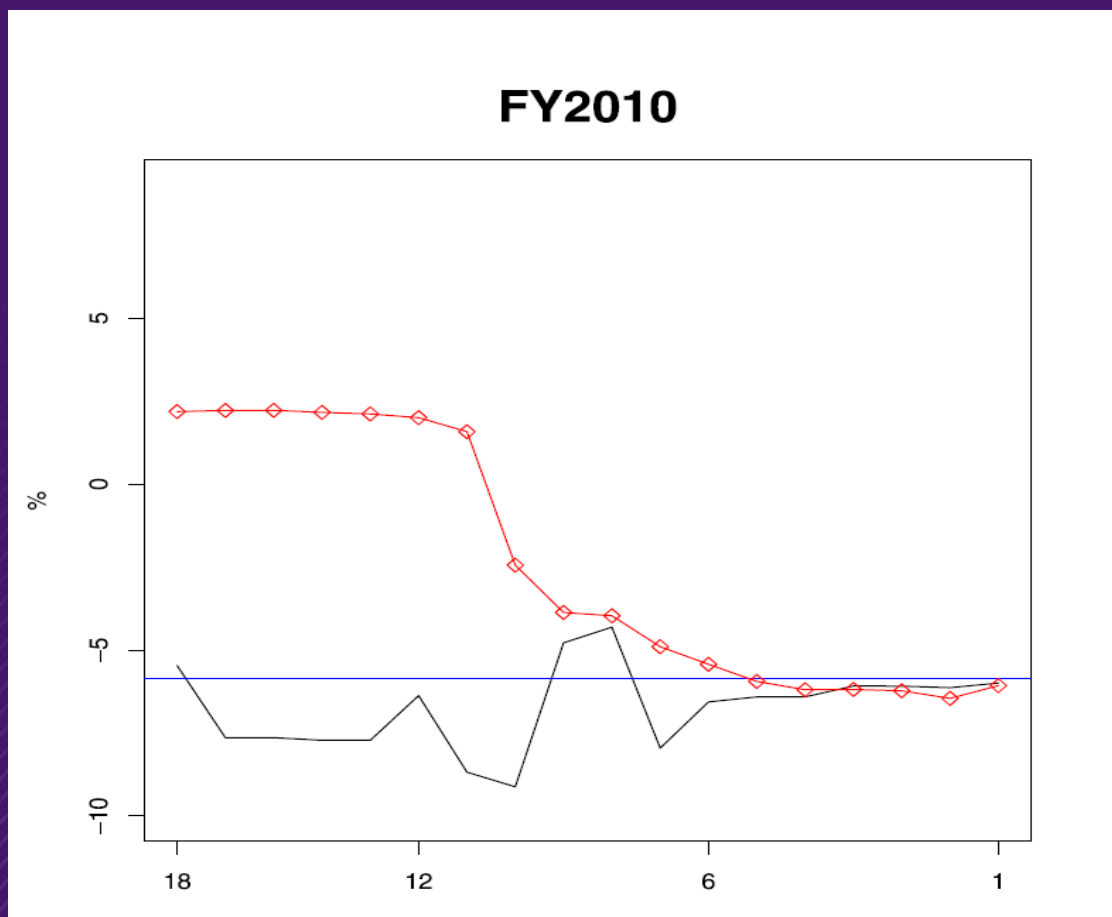


# New York Composite Factor has fallen like US factor





- Our model used many leading indicators, and was able to reduce forecast errors during recessions at longer horizons



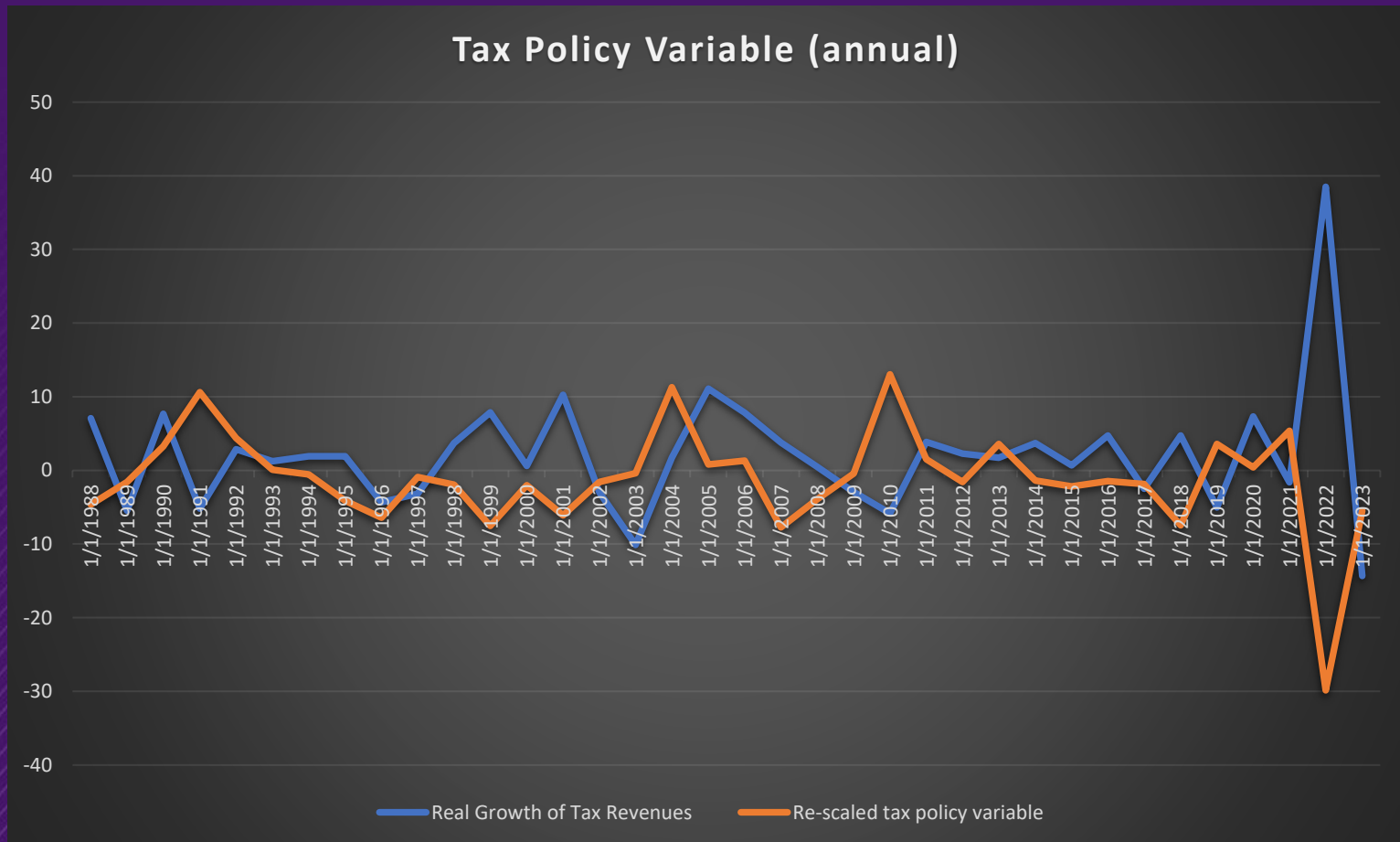
Source: Lahiri and Yang (2022). Black line represents our forecasts; Red line with square represents forecasts of a benchmark model without the leading indicators; Blue line is the actual value.



- Three ADL-MIDAS models: one with monthly tax variable as predictor, one with US factor, one with NY factor. All three models have lagged dependent variable and the tax policy variable on the right-hand side as predictors.
- Building on multiple sources (NASBO, DOB, Ways and Means etc.), we created an additional “policy change” variable that captures experts’ judgements on the **anticipated** effects of recent tax policy changes on tax revenues for the next fiscal year and used it as one of the predictors in our model.
- We also estimate the forecast uncertainty using bootstrap.



- Our tax policy variable





## Our Model

- The ADL-MIDAS model is defined as

$$y_{t+h} = \alpha + \sum_{j=0}^{n_y} \gamma_j y_{t-t_0-j} + \Phi(L; \beta, \theta) z_{t+\omega+1} + b_1 p_{t+\omega} + \epsilon_{t+h}, t$$

= 12,24,36, ...

- $y_{t+h}$  is annual tax revenue growth;  $z_{t+\omega+1}$  is one of the three monthly predictors with information available until  $t + \omega + 1$ , which is aggregated by  $\Phi(L; \beta, \theta)$ , a lag distribution with parameters  $\theta$  and coefficient  $\beta$ ;  $p_{t+\omega}$  is our tax policy variable.





## Our Model

- At each time  $t + \omega$ , forecast combination weights are computed:

$$\begin{aligned} \mathbf{w}_{+\omega t}^{h-\omega} &= \underset{\mathbf{w}}{\operatorname{argmin}} \mathbf{w}' \widehat{\Omega}_{t+\omega}^{\{h-\omega\}} \mathbf{w} \\ \text{s. t. } \sum_{i=1}^3 w_i &= 1 \\ w_i &\geq 0, \forall i \end{aligned}$$

$\widehat{\Omega}_{t+\omega}^{h-\omega}$  is estimated variance-covariance matrix of forecast errors of the three models.

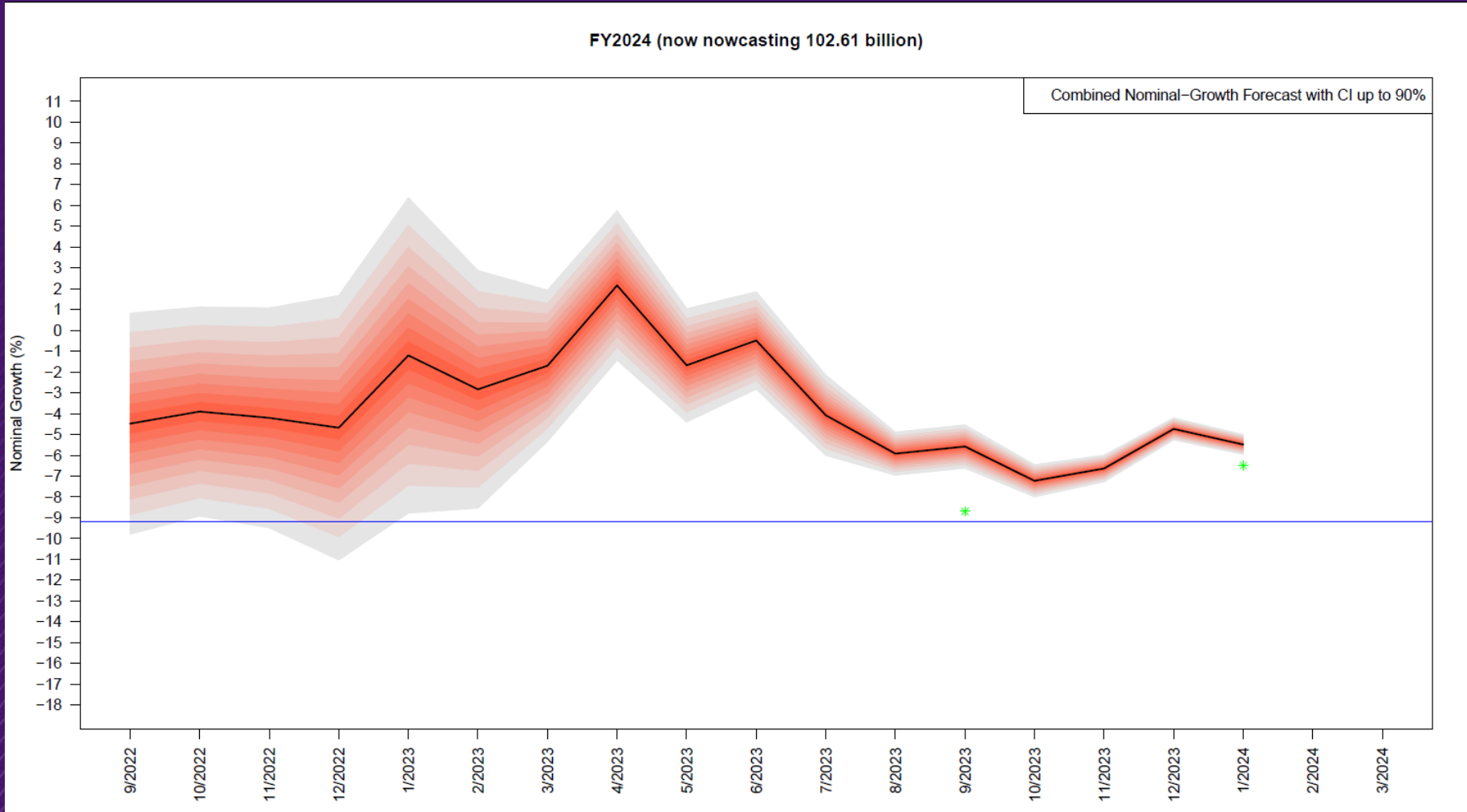
- The three models are combined:

$$\tilde{y}_{t+h|t+\omega} = \sum_{i=1}^3 \omega_{i,t+\omega}^{\{h-\omega\}} \hat{y}_{i,t+h|t+\omega}$$

- The uncertainty of the combined forecast,  $\operatorname{Var}(\tilde{y}_{t+h|t+\omega})$ , is estimated by bootstrap following Hounyo and Lahiri (2023)

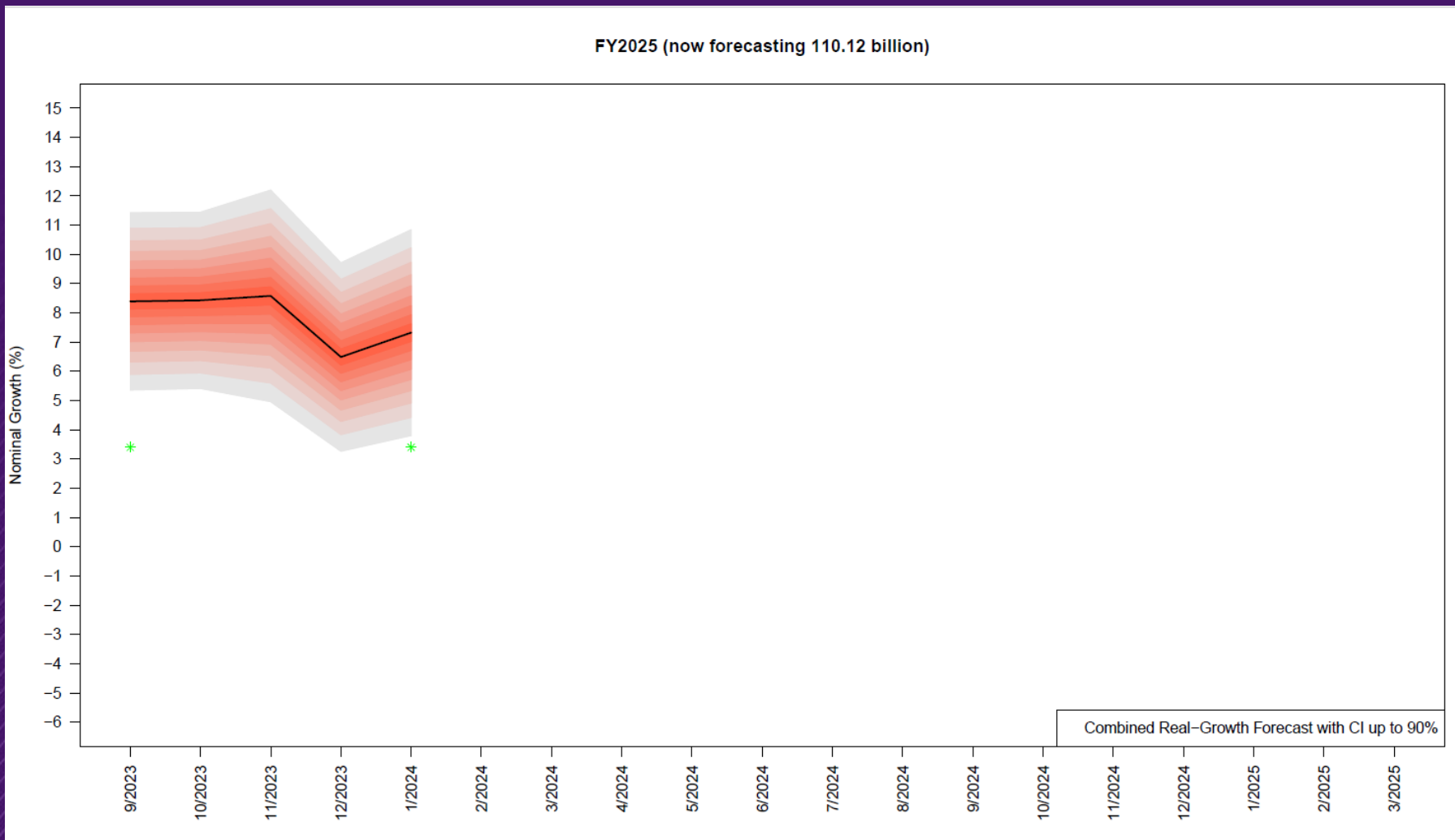


- Our nominal-growth nowcast of tax revenues for FY2024 is currently -5,49% (or \$102.61 billion, including PTET (Pass Through Entity Tax))



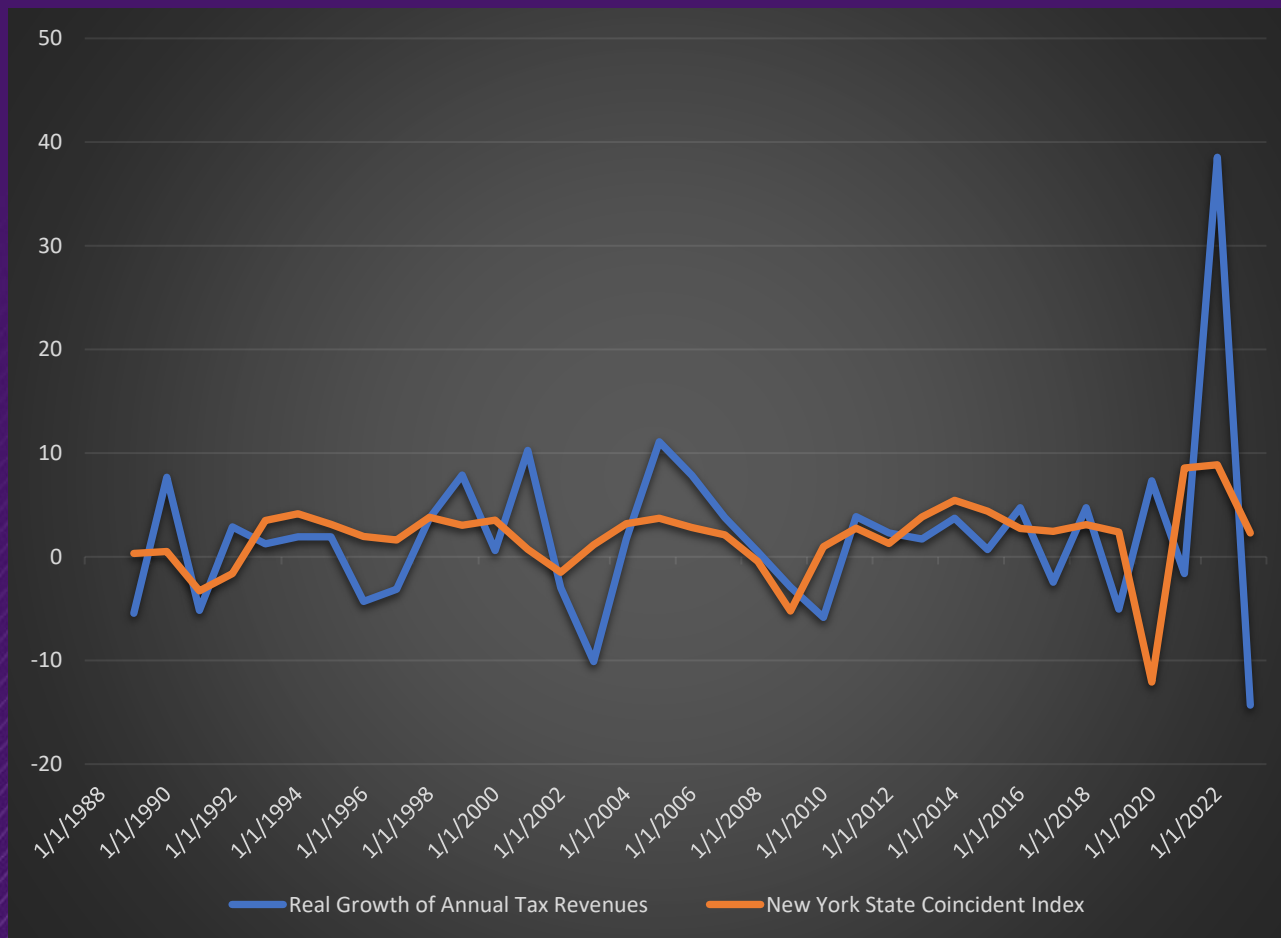


- Our nominal growth forecast of tax revenues for FY2025 is currently 7.32% (or 110.12 billion, including PTET).





# Tax growth **looking like a Bad EKG Report**, and the NY coincident index growth





- Although not increasing significantly, the leading indicators are not signaling recessions.
- We forecast and nowcast tax revenues with mixed-frequency-data models and forecast combination, utilizing many economic leading indicators, together with a tax policy variable we build.
- Our current 14-month-ahead forecast for FY 2025 is slightly more **optimistic** (relative to DOB's) at 7.32% (nominal), or \$110.12 billion based on the \$102.61 billion nowcast for FY 2024 (using tax department data that includes PTET).
- Admirably, DOB has set aside \$6.2 billion as Rainy-Day reserve balance for current and future years. Following California, the target should be around ten percent of total tax revenues, i.e., close to \$10 billion.