# Forecasting of Nebraska Individual Income Tax

Presented by:

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# Outline

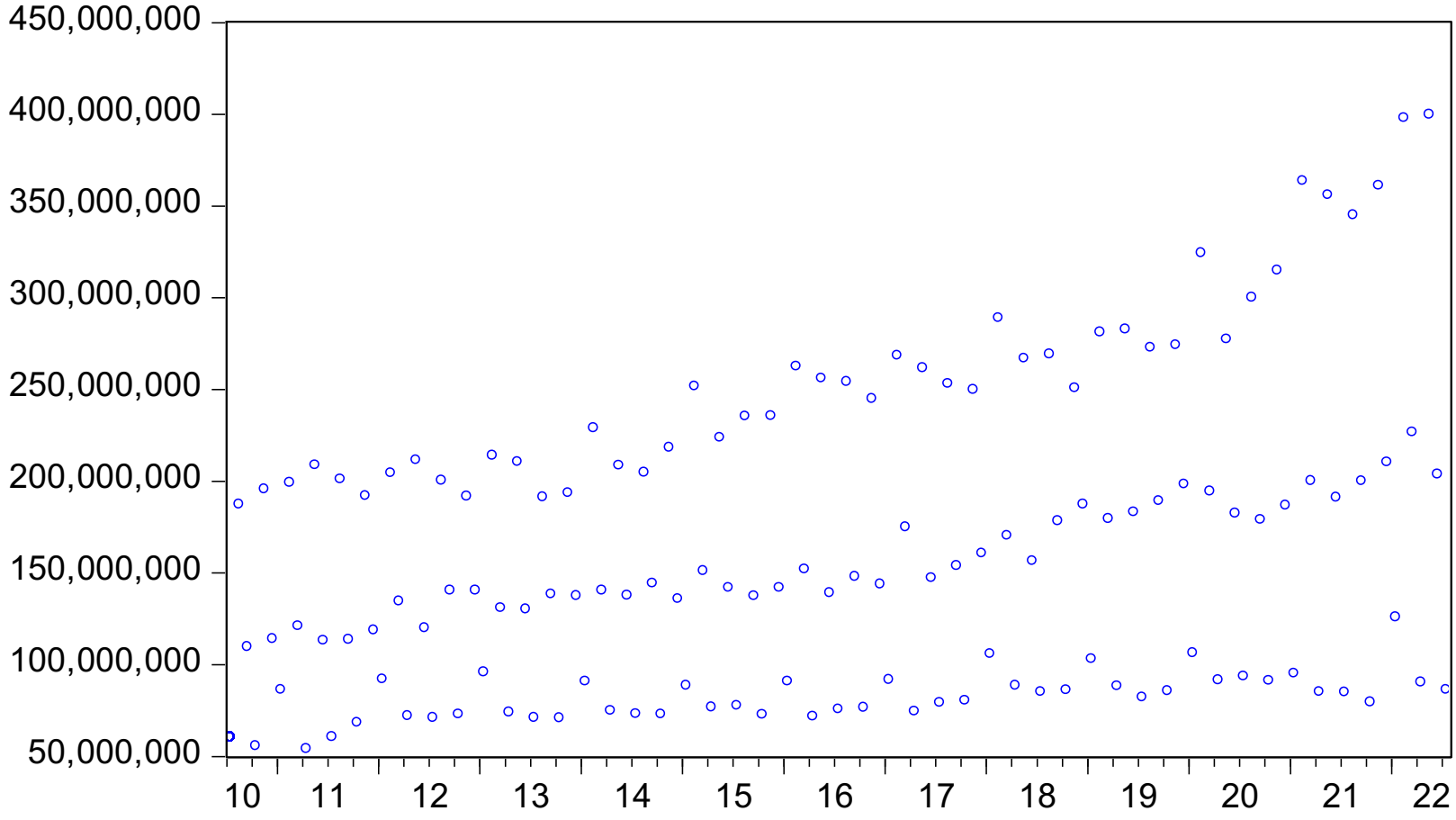
- Nebraska Individual Income Tax Structure
- Data Visualization
- Model Specification and Result (Science)
- Adjustment (Art)

# Nebraska Individual Income Tax Structure

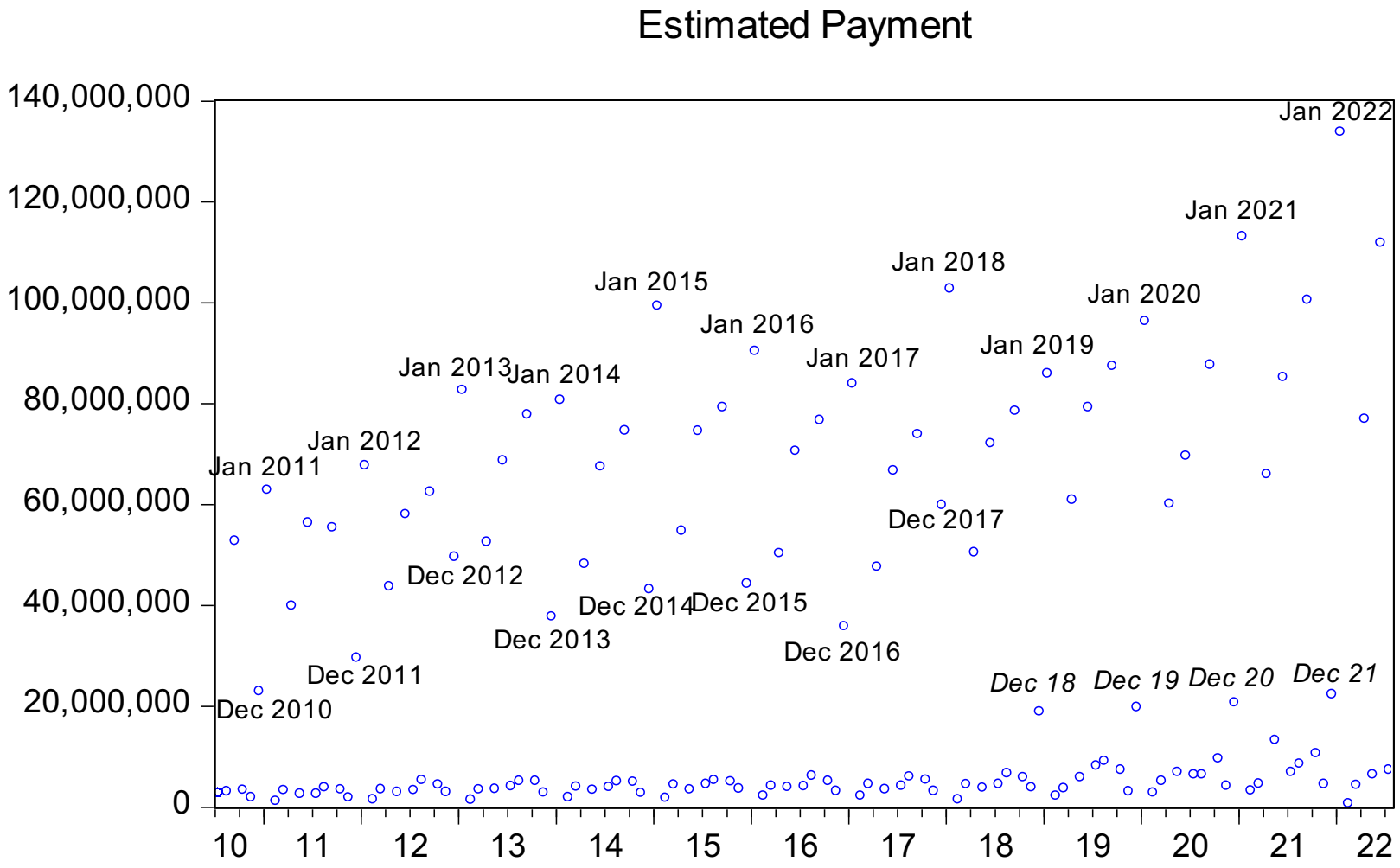
- Components of Individual Income Tax
  - Withholding
    - Wage incomes
  - Estimated Payment
    - Nonwage incomes
  - Final Payment
    - Heavily impacted by nonwage incomes
    - Capital gains.
  - Refund
    - Mostly due to wage earners over withholding.

# Data Visualization

WITHHOLDING



# Data Visualization



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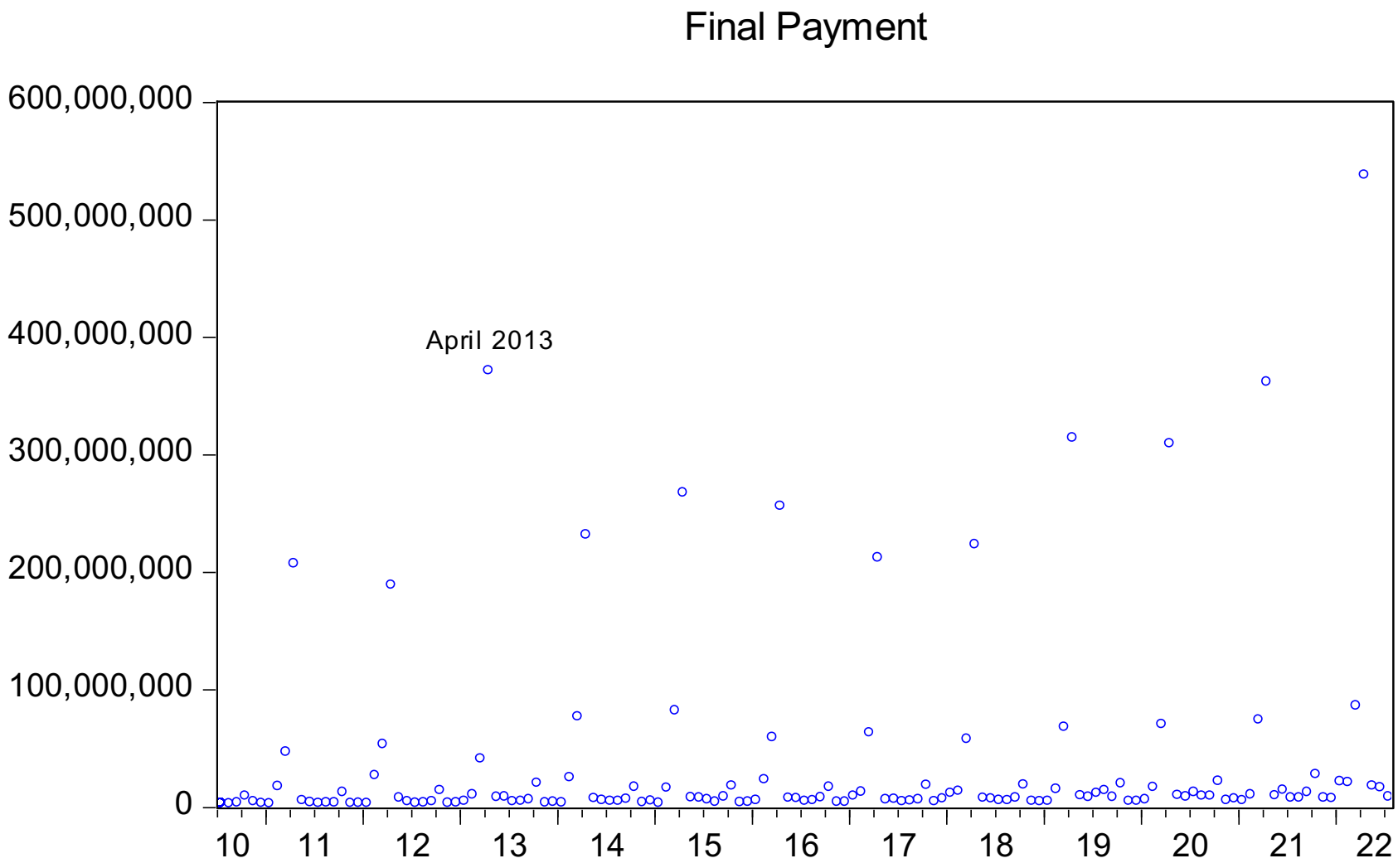

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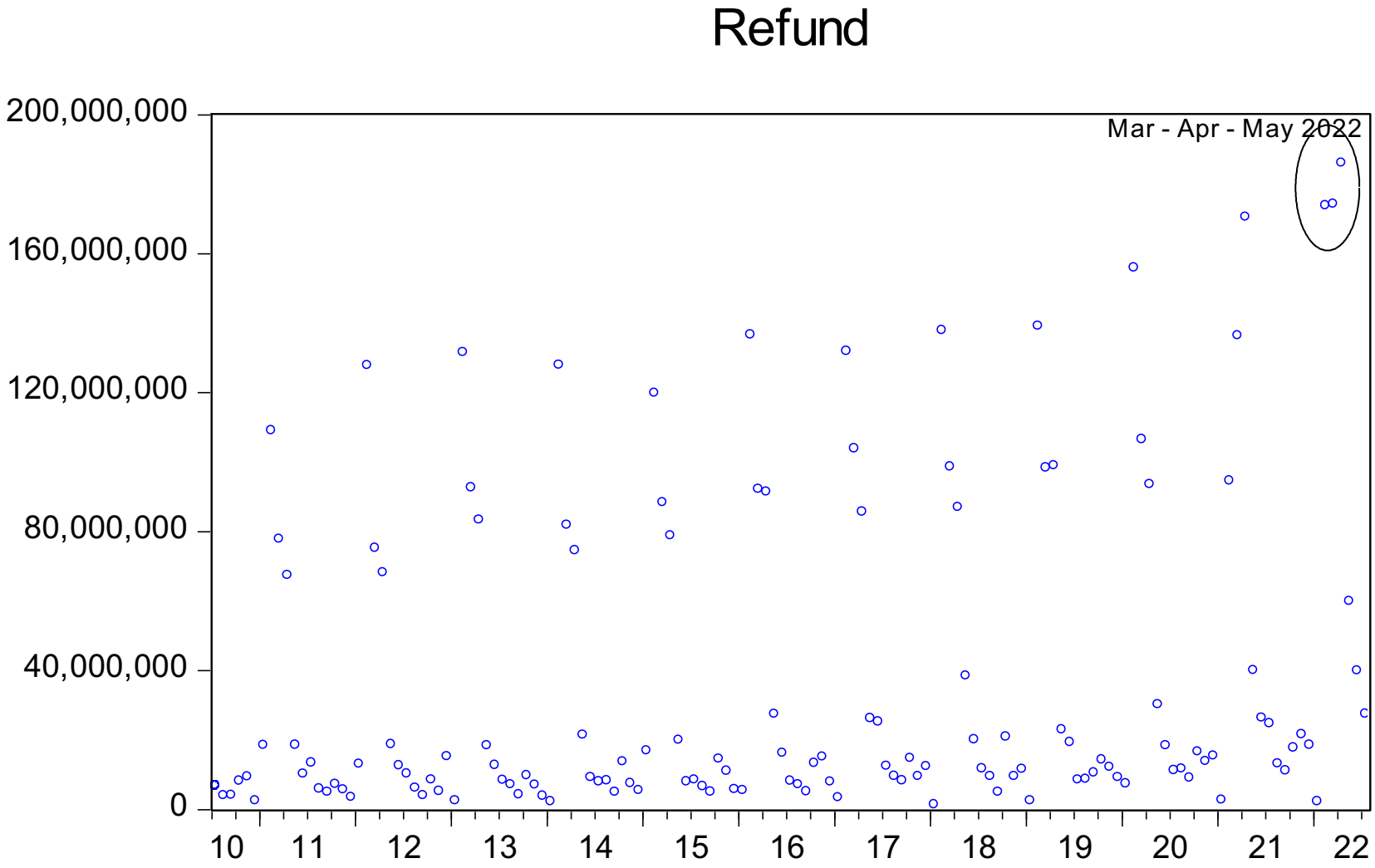


# Model Specification

$$\log(withholding_t) = C + \beta_1 * (Month\ After\ Five\ Friday) + \beta_2 * (\log(Wage\ and\ Salary_{t-1})) + \beta_3 * (\log(withholding_{t-12})) + \epsilon_t + \beta_4 * (\epsilon_{t-3})$$

Where

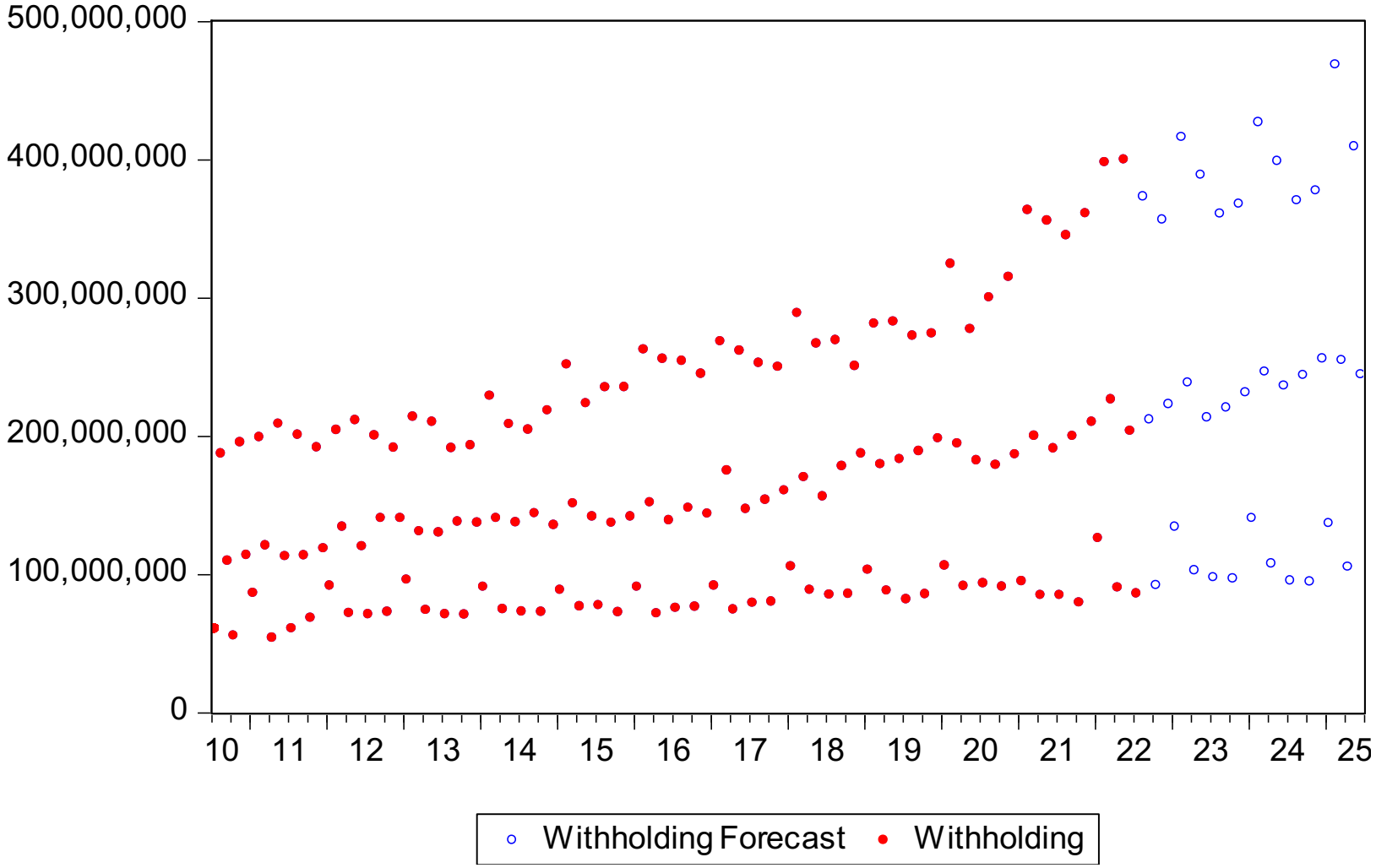
$$Month\ After\ Five\ Friday = 1\ if\ month\ prior\ has\ 5\ Friday; 0\ otherwise$$

$$Wage\ and\ Salary = Wage\ and\ Salary\ for\ the\ U.S. (IHS\ and\ Moody)$$

*EViews Model:*

*log(withholding) c ar(12) ma(3) month_after_five_friday*
*log(wageandsalary (−1))*

# Model Result



# Model Specification

$$\log(Estimated_t) = C + \beta_1 * log(S\&P500_{t-1}) + \beta_2 * \log(YP_{t-1}) \beta_3 * (December\ 2017_t) + \beta_4 * (\log(Estimated_{t-12})) + \epsilon_t + \beta_5 * (\epsilon_{t-12})$$

Where

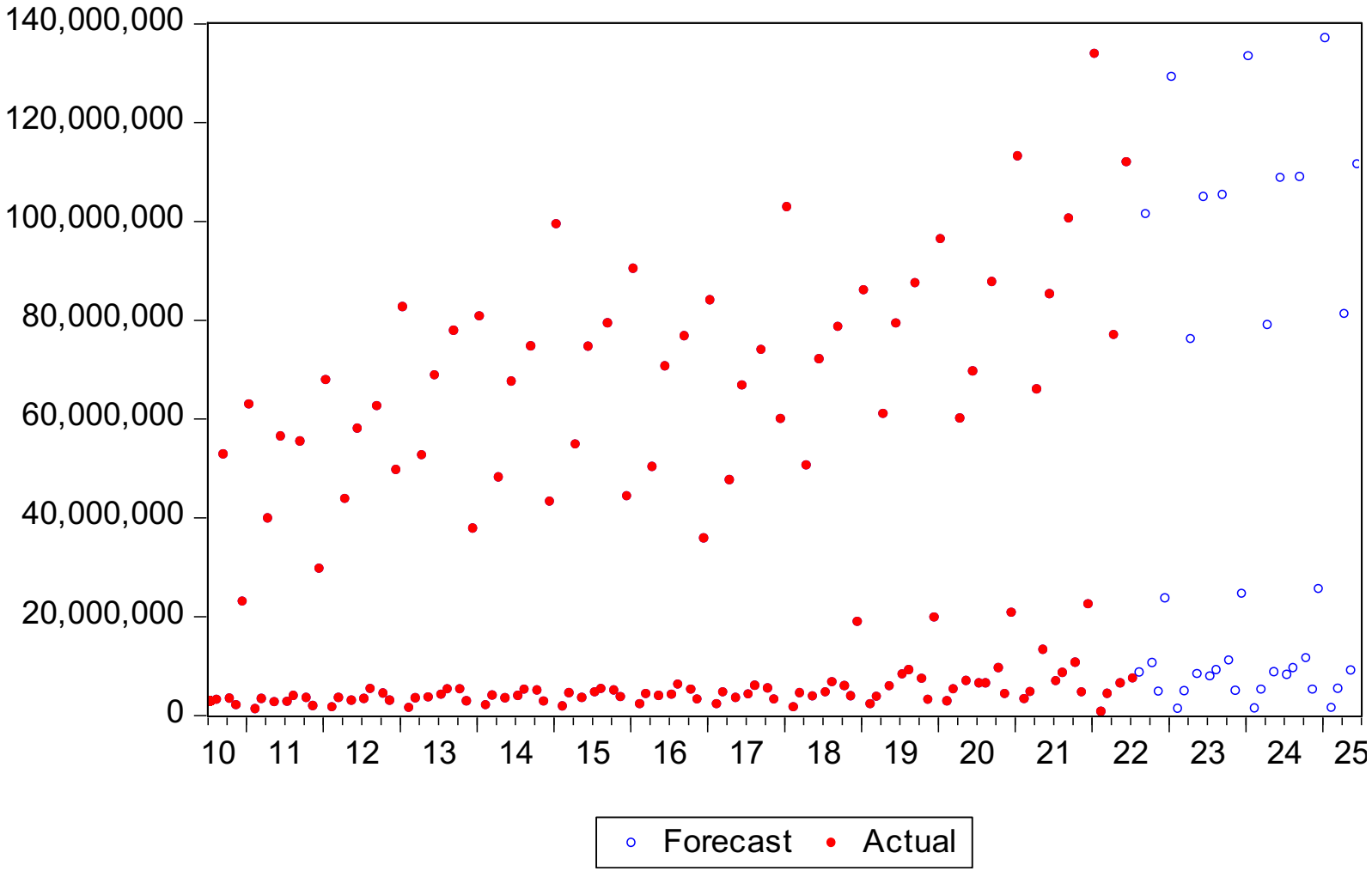
$$S\&P500 = S\&P\ 500\ Index\ from\ IHS\ and\ Moody$$
$$YP = Personal\ Income\ from\ IHS\ and\ Moody$$
$$December\ 2017 = 1\ for\ December\ 2017; 0\ otherwise$$

*EViews Model:*

*log(estimated) c log(sp500(−1)) log(yp(−1)) dec_2017 ar(12) ma(12)*

# Model Result

## Estimated Payment



# Model Specification

$$\log(FinalPayment_t) = C + \beta_1 * recession + \beta_2 * log(S\&P500_{t-4}) \beta_3 * October_2019_flood + \beta_4 * (\log(FinalPayment_{t-12})) + \epsilon_t + \beta_5 * (\epsilon_{t-12})$$

Where

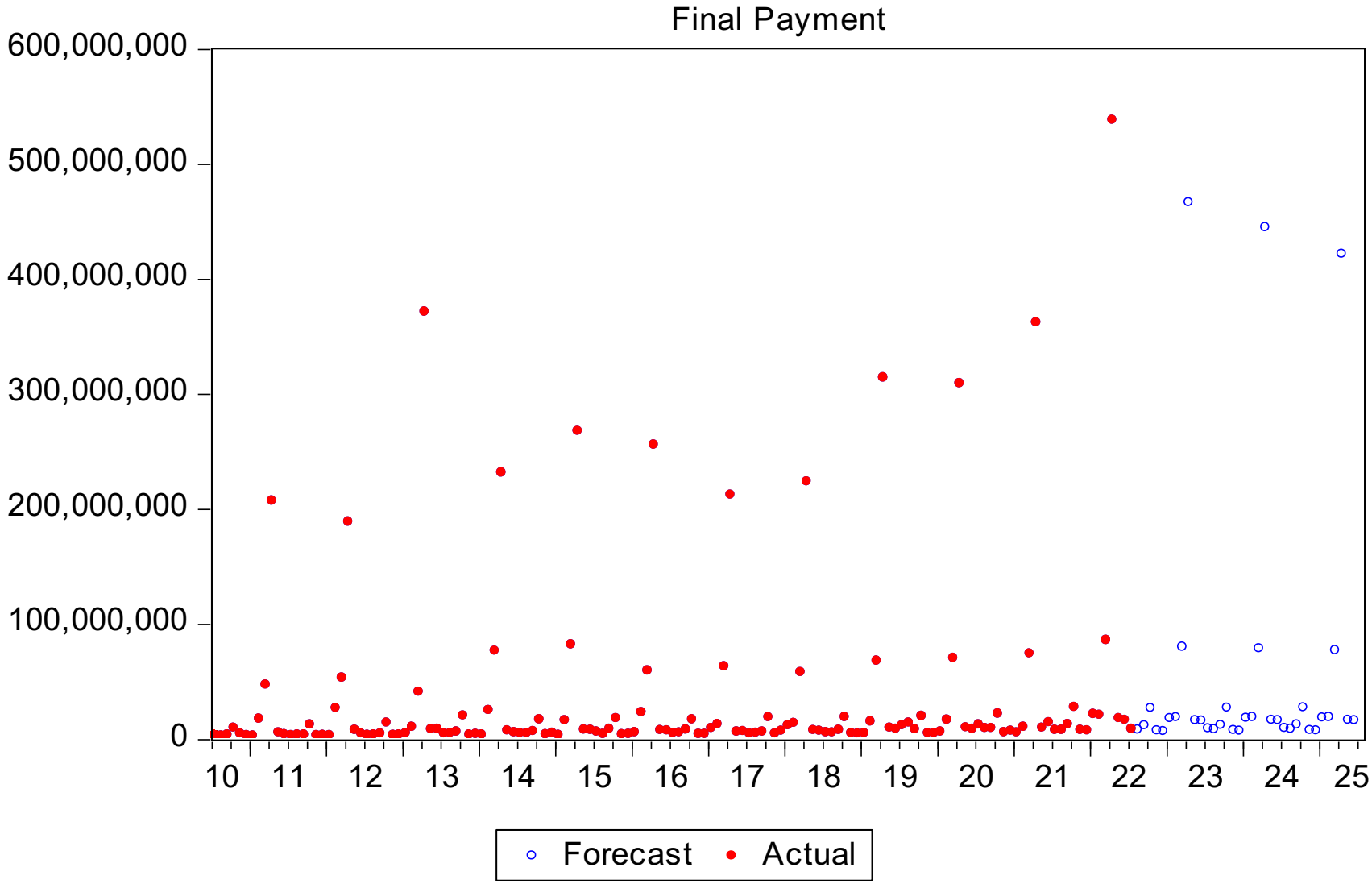
$$S\&P500 = S\&P\ 500\ Index\ from\ IHS\ and\ Moody$$

$$October\ 2019\ flood = 1\ for\ October\ 2019; 0\ otherwise$$

*EViews Model:*

*log(FinalPayment) c recession log(sp500(−4)) October_2019_flood ar(12) ma(12)*

# Model Result



# Model Specification

$$refund = C + \beta_1 * finalpayment + \beta_2 * withholding_{t-12} \beta_3 * February_2021_IRS_Late + \beta_4 * refund_{t-1} + \beta_5 * refund_{t-12} \epsilon_t + \beta_6 * (\epsilon_{t-12})$$

Where

$$finalpayment = Forecasted\ value\ of\ finalpayment$$

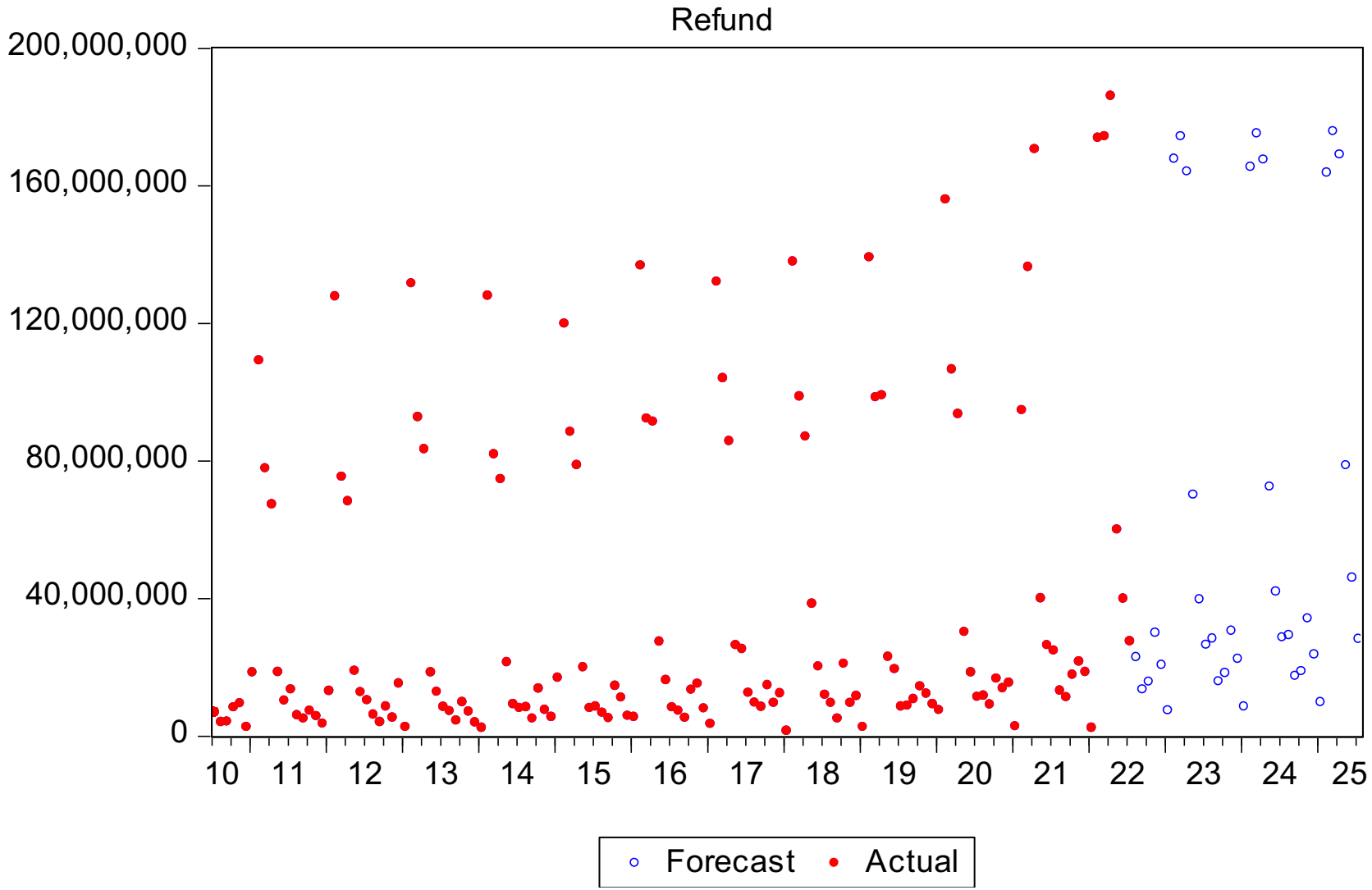
$$withholding = Forecasted\ value\ of\ withholding$$

$$February\ 2021\ IRS\ Late = 1\ for\ February\ 2021; 0\ otherwise$$

*EViews Model:*

$$Refund\ c\ finalpayment\ withholding(-12)\ ar(1) ar(12) ma(12)\ feb_2021_irs_late$$

# Model Result



# Adjustment to Forecast Results

- Withholding
  - Adjustment for change in withholding table.
    - Model a simulation for a change in withholding table then apply to the forecast.
- Estimated Payment and Final Payment
  - Adjustment for change in federal tax law.
    - Look back to history for similar scenario and make a judgment call based on experience.
    - Change in state tax laws –
      - Change in tax base and/or tax rate.
      - Introduction of new tax credits.
- Refund
  - Adjustment for change in state tax code.
    - New refundable income tax credit.

# Question?

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