Forecasting PIT During the Pandemic

Presented to the FTA Revenue Forecasting Conference by Joshua Goldstein

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Forecasting PIT During the Pandemic

How did our forecast evolve through COVID-19?

What did we get wrong?

Why did we get it wrong?

Did we get it wrong because our model was correct, but our exogenous variables were incorrect?

Or

Did we get it wrong because our model was incorrect, but our exogenous variables were correct?
NYC Tax Revenue Forecast From January 2020 through June 2021
Property Taxes Vs Non-Property Taxes

Property Taxes

Non-Property Taxes

FY 2019  FY 2020  FY 2021  FY 2022  FY 2023  FY 2024

$20  $22  $24  $26  $28  $30  $32  $34  $36  $38  $40
PIT Withholding
Personal Income Tax - Withholding

Jan Plan 20
June 21 Adoption
June 20 Adoption

FY 2019 FY 2020 FY 2021 FY 2022 FY 2023 FY 2024

$7.0 $7.5 $8.0 $8.5 $9.0 $9.5 $10.0 $10.5 $11.0 $11.5 $12.0

Billions
A few things to note about NYC PIT

- NYC Personal Income top tax rate is 3.876% ($50k for single & $90k for Joint).
- NYS’s top tax rate was increased in 2021 to 10.9% ($25m).
- NYC Personal Income top is only levied on RESIDENTS.
- NYC Wage Earnings (QCEW) is by place of work and includes non-residents.
- NYC taxes unemployment insurance, but does not withhold unemployment insurance. NYS offers recipients the option to withhold for the State and the Federal Government, just not the City.
Withholding & Wage Earnings

% Change Withholding = % Change Wage Earnings × 1.1

-25.0% -20.0% -15.0% -10.0% -5.0% 0.0% 5.0% 10.0% 15.0% 20.0% 25.0%

FY 19 Q1 FY 19 Q2 FY 19 Q3 FY 19 Q4 FY 20 Q1 FY 20 Q2 FY 20 Q3 FY 20 Q4 FY 21 Q1 FY 21 Q2 FY 21 Q3 FY 21 Q4 FY 22 Q1

% Change Y/Y

Wage Earnings
Withholding Actuals
Withholding June 2020
NYC employment fell by 20 percent.
Average Wages (QCEW) grew by 10 percent in 2020.
## Average Wage by Sector and Employment

<table>
<thead>
<tr>
<th>Sector</th>
<th>2020 Wage Growth</th>
<th>2020 Average Wage</th>
<th>2020 Job losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>3.6%</td>
<td>$87,000</td>
<td>-23,000</td>
</tr>
<tr>
<td>Education</td>
<td>9.3%</td>
<td>84,000</td>
<td>-21,000</td>
</tr>
<tr>
<td>Finance</td>
<td>6.1%</td>
<td>325,000</td>
<td>-6,000</td>
</tr>
<tr>
<td>Health</td>
<td>6.8%</td>
<td>55,000</td>
<td>-30,000</td>
</tr>
<tr>
<td>Information</td>
<td>12.1%</td>
<td>174,000</td>
<td>-14,000</td>
</tr>
<tr>
<td>Leisure &amp; Hospitality</td>
<td>6.7%</td>
<td>50,000</td>
<td>-196,000</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>6.2%</td>
<td>68,000</td>
<td>-15,000</td>
</tr>
<tr>
<td>Professional &amp; Business Service</td>
<td>10.6%</td>
<td>134,000</td>
<td>-63,000</td>
</tr>
<tr>
<td>Retail</td>
<td>9.5%</td>
<td>51,000</td>
<td>-63,000</td>
</tr>
<tr>
<td>Wholesale</td>
<td>7.3%</td>
<td>105,000</td>
<td>-19,000</td>
</tr>
<tr>
<td>Government</td>
<td>2.4%</td>
<td>83,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Private</td>
<td>11.7%</td>
<td>109,000</td>
<td>-518,000</td>
</tr>
<tr>
<td>Total</td>
<td>10.4%</td>
<td>105,000</td>
<td>-517,000</td>
</tr>
</tbody>
</table>
Model Fixes

▪ Is there a structural shift between Withholding & Wage Earnings?

▪ Do we add dummies for 2020-2021

▪ Should we disaggregate employment by sector to better control for the wage distribution.
  ▪ Will we gain more accuracy by forecasting smaller subsectors or does that simply add more uncertainty.
  ▪ Will the survivor bias reverse as employment for low wage jobs or will other economic factors impact wages.
Spring (April & May) estimated payments (Installments and Extension) are nearly $1 billion above previous record levels.
NYC Forecasts PIT liability and non-wage income by component

<table>
<thead>
<tr>
<th>Non-Wage Income</th>
<th>Share of Total Income 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Gains</td>
<td>11.5%</td>
</tr>
<tr>
<td>Net Business Income</td>
<td>3.5%</td>
</tr>
<tr>
<td>Dividend Income</td>
<td>4.1%</td>
</tr>
<tr>
<td>Interest Income</td>
<td>2.5%</td>
</tr>
<tr>
<td>Rent Royalty</td>
<td>5.6%</td>
</tr>
<tr>
<td>Taxable Pension</td>
<td>5.0%</td>
</tr>
<tr>
<td>Other (including transfers)</td>
<td>2.2%</td>
</tr>
</tbody>
</table>
Is it necessary to build a new model to predict other income, which typically comprises only 2 percent of total income?
Capital Gain NYC

Capital Gains ($ Millions)

SP500 Markets have dropped by 33 percent in Feb 2020, but then increased 67 percent by the end of the 2020.

![SP500 Daily Close Graph](image)

- **Index Level**: 2237.4, 3756.07, 4391.34
Total U.S Financial Assets increased by nearly $20 TRILLION from Q1 2020 to Q4.

U.S Net Worth has increased significantly
Testing New Relationships. NYC capital gains vs. 3-year Change in Household Net Worth

NYC Capital Gains ($ Millions) vs. 3 Year Change in Net Worth ($ Billion) - IHS September 2021