

Add-ons methodology

Manuel Alcala Kovalski

January 15, 2021

1 State Taxes

State taxes growth with nominal gdp. Let s_i denote state taxes where i = personal, corporate, production and imports, and social insurance, y refer to nominal gdp growth, and t denote time. Then, the forecasted state taxes are given by state taxes grow with nominal gdp. That is,

$$s_{i,t} = s_{i,t-1} * y_t.$$

2 Grants

2.1 Medicaid NIPA's

In the NIPA's, all medicaid spending is registered as state spending. The nipa definition of medicaid spending in Haver is **yptmdx**. In the forecast period, we use the annual CBO projections for Medicaid spending until Q3 of 2021.

$$\text{yptmdx}_{y,q} = \text{yptmdx}_{y,q-1} * \left(\frac{CBO_y}{CBO_{y-1}}\right)^g.$$

where the growth rate g is 0.18 in Q4 of 2020 and Q1 of 2021 and 0.1 in Q2 of 2021.

$$g = \begin{cases} 0.18 & \text{in Q4 of 2020 and Q1 of 2021} \\ 0.10 & \text{in Q2 of 2021} \\ 0 & \text{after Q2 of 2021} \end{cases}.$$

Therefore, we assume medicaid spending is constant after Q2 of 2021.

2.2 Federal Medicaid grants

In Haver, federal medicaid grants are **gfeghdx**. In the forecast period, we assume these grants are a specific share of the Medicaid spending in the NIPA's. That is,

$$\text{gfeghdx}_t = \text{federal share} * \text{yptmdx}_t.$$

where

$$\text{Federal share} = \begin{cases} 0.74 & \text{Q4 2020 } \leq t \leq \text{Q1 of 2022} \\ 0.68 & t > \text{Q1 of 2022} \end{cases}.$$

$$gfeghdx_t = .$$

2.3 All Non-medicaid grants

Using haver codes, non Medicaid grants are

$$\text{Non-medicaid grants} = gfegx - gfeghdx.$$

where **gfegx** denotes all grants to states and **gfeghdx** refers to Medicaid grants. The x at the end of these codes specifies that they are in millions of dollars. We *only* define this for the **historical period**

2.4 BEA legislation grants

Haver code is **gfegl**.

2.5 Non-medicaid grants excluding legislation

In the historical period we simply define this to be the difference between BEA's grants legislation and all non-medicaid grants.

In the forecast period we grow non-medicaid grants excluding legislation by nominal federal purchases (**gf**). Let μ be non-medicaid grants excluding legislation. Then, in the forecast period we have

$$\mu_t = \mu_{t-1} * gf_{g,t}.$$

2.6 Our estimate of legislation grants

Our estimates of the legislation grants start in Q2 of 2020 and go through Q1 of 2023. They are defined as

Grants = Grants to State and Local Govt's+Support for hospitals (state)+Education.

Equivalently letting, λ_i where $i = \text{S\&L Govt's, Hospitals, and Education}$ we can rewrite this more compactly as

$$\lambda_t^* = \sum_{i=1}^3 \lambda_i.$$

Remark. Currently, these values are hardcoded but I'm assuming they come from scores?

2.7 All grants to states

In haver, all grants to states is **gfeg** (in billions) and **gfegx**(in millions). In the forecast period, all grants to states is equal Non medicaid grants excluding legislation plus the sum of our estimate of the grants legislation from Q3 2020 through Q4 of 2022 divided by 6. In other words, it's all non medicaid grants to states plus our estimate of the total grants in legislation for COVID distributed equally over the six quarters.

Let γ be all grants to states, μ refer to non-medicaid grants excluding legislation and λ^* refer to our estimate of the legislation. Then, in the forecast period

$$\gamma = \mu + \frac{1}{6} \sum_{t=1}^6 \lambda_t^*.$$

Remark. I think we can make this more explicit in this spreadsheet by creating a row that is the sum of all our legislation estimate divided by 6 for 6 quarters.

2.8 Consumption grants

We define consumption grants as the difference between all grants to states γ and federal medicaid grants (**gfeghdx**). Letting μ equal non-medicaid grants minus legislation,

$$\psi = \lambda^* + \delta.$$

where $\psi =$ consumption grants

3 State purchases

3.1 Real

Real state purchases (**gsz**) are from haver in the historical period. In the forecast period, we use the growth rates from CBO

3.2 Nominal

Nominal state purchases(**gsx**) are from haver in the historical period.

Remark. Currently, the projections are hardcoded.

4 State Social Benefits (FIM Definition)

We treat state social benefits a bit differently than the NIPA's. Specifically, we reallocate UI from federal to state and a portion of Medicaid from State spending to Federal spending. Therefore,

$$FIM_{\text{state s.b.}} = NIPA_{\text{state s.b.}} + \text{State UI} - \text{Federal medicaid grants}.$$

5 FIM State Health Outlays

Since we take out federal medicaid grants from state medicaid spending, state health outlays are

$$\text{State health} = \text{Medicaid in the NIPA's} - \text{Federal medicaid grants}.$$

6 Federal social benefits

Federal social benefits in the nipas is equal to medicare, total unemployment insurance (BEA UI, Federal UI, Lost Wages Supplemental Payment Assistance program (WLA), and State UI), and the remainder of total social benefits. We make this decomposition because the BEA did not include the Trump UI (WLA) in their UI category.

6.1 Medicare

Our medicare forecast is based on CBO's annual projections, after making some adjustments to translate these projections to the nipas. Since we need to translate annual projections to quarterly ones our forecast formula for medicare is

$$M_{y,q} = M_{y,q-1} * (\frac{M'_y}{M'_{y-1}}).$$

where y refers to the fiscal year, q to the quarter, M to medicare in the NIPA's and M' to medicare in the annual CBO projections.

6.2 Unemployment Insurance

The UI projections come from line items 22-25 from Effects of Selected Federal Pandemic Response Programs on Personal Income, July 2020

Remark. We need more clarity on how these projections were constructed.

6.3 Remainder

In the historical period, the remainder is defined simply as the difference between the federal social benefits line item in the NIPA's (found in Table 3.2) and our calculations for Medicare, Rebate checks, total Unemployment Insurance, and PPP and provider relief in personal income.

$$\varepsilon = \text{Medicare} - \text{Rebate Checks} - UI - PPP.$$

where ε refers to the remainder. In the forecast period, we grow the remaindre ε by -0.75% until 2021 Q3 and by 1.5% until 2022 Q3, and then by 1% in Q4 of 2022

Remark. We need more clarity on where these growth rates are coming from.

6.4 PPP

These numbers come from CBO scores.

7 Subsidies

Subsidies are defined as

$$\text{Subsidies} = \text{PPP} + \text{Aviation} + \text{Employee retention} + \text{Paid sick leave}.$$

All these numbers come from CBO scores on the impact of stimulus legislation. They can be found in Haver PPP(gfsubp), the sum of the other three subsidies (gsubl), aviation (gfsubg), employee retention (gsube), and paid sick leave (gfsubk)

8 Add factors

Currently, the FIM code incorporates COVID legislation from CBO projections. However, CBO doesn't reallocate spending in the same way we do (particularly for UI and Medicaid) and makes different timing assumptions (all spending happens in a single quarter). Basically, CBO will say when states will *recieve* grants but in order to construct the FIM we need to know when the money will be *spent*. Therefore, we need to spread out the legislation score and reallocate Federal Medicaid Grants to federal spending as well as Unemployment legislation. To make these adjustments, the current methodology is to run the code and compare the output of health outlays, social benefits, taxes, subsidies, and consumption grants to the calculations described above present in the add factors spreadsheet. Let α denote the add factor x be the output from the code for these variables and x^* be the variable in the spreadsheet which accounts for COVID legislation. Then, the add factors are defined as

$$\alpha = x^* - x.$$

We then go back into the code and add the add factor α to each x . Therefore, we manually put

$$x^* = x + \alpha.$$

in the code.

Remark. We could either

- Read the variables x^* in the spreadsheet directly into the code so that they override the original x 's
- Perform these calculations directly in the code.

We could do the first one pretty easily but in the long term we should try to make the latter option work.