## COVID-19 Economic and Tax Revenue Impacts: Estimates for the Commonwealth of Virginia and Localities



Weldon Cooper Center for Public Service Center for Economic and Policy Studies

#### About the Study

COVID-19 National Economic Forecasts
Industry Exposure Differences
Local Economic Impact Estimates
State and Local Tax Revenue Impacts
Results

#### About the Study

#### ✤ Timeline

- Contacts from localities and state agency (3/20-3/25)
- REMI presentations: Rose, Vargas, Treyz (3/19-3/31)
- Literature review (March 21-27), assumptions (March 28-31), REMI Analysis and write-up (April 1-8), Study posted (April 10)
- Media: Richmond *Times*-*Dispatch*, CBS19, UVA Today



## **REMI Model Inputs**

• Use range of GDP forecasts because of forecast uncertainty (low and high)

- Length and severity of shelter-at-home and non-essential business restrictions
- Fall/winter second wave of pandemic length and severity
- Availability of effective therapies and vaccines
- Size of eventual federal assistance (3 rounds so far;, state and local assistance and possibly infrastructure funding forthcoming)
- Adjust national final demand (85 GDP components) accounting for differential effects
  - Sectors most affected have many employees (part-time and full-time) but relatively low valueadded per employee
  - Across the board constant rate of increase will underestimate employment impact
- I used information available on March 31<sup>st</sup>. We now have much more information.
  - First quarter GDP estimates (released April 29<sup>th</sup>)
  - Non-farm payrolls (release on May 8<sup>th</sup>)

#### **REMI Model Inputs**

Final Demand Level Income Rescale Nominal Value: Unemployment Rate Labor Productivity Gro	and Price Index	Macroeconomic Update The Macroeconomic Value macroeconomic data by o or a combination of final the level of final demand Price Index to enter a di national unemployment r average labor productivi	es Update allows yo component. You ca demand and persou d detail you wish to fferent inflation ass "ate assumption, or ity growth rate.	ou to calibrate n enter value nal income. Cl enter. You ca umption, che check Labor f	e the national s based on fin hanging the G n also check F ck Unemploym Productivity G	forecast to a nal demand, p DP type allow Rescale Nomir nent Rate to o rowth rate to	Iternative ersonal incon is you to spe hal Values and change the o change the	ne, cify d
Apply a percent change to b Adjust GDP 0.00% 2 Jupdate Reference	aseline							
Category	Variable Name	Units	2017 REMI	2017	2018	2019	2020	Ţ
Personal Consumption	New motor vehicles	Billions Chained 2012\$	272.437	272.437	277.494	281.113	266.515	٦
Expenditures	Net purchases of used motor vehicles	Billions Chained 2012\$	164.401	164.401	169.343	172.693	169.238	
	Motor vehicle parts and accessories	Billions Chained 2012\$	73.087	73.087	74.435	76.185	72.218	
	Furniture and furnishings	Billions Chained 2012\$	214.898	214.898	230.679	237.055	225.723	
	Household appliances	Billions Chained 2012\$	69.205	69.205	69.356	70.983	67.357	
	Glassware, tableware, and household utensils	Billions Chained 2012\$	45.114	45.114	49.188	50.690	48.091	
	Tools and equipment for house and garden	Billions Chained 2012\$	31.301	31.301	32.693	33.336	31.760	
	Video, audio, photographic, and information p	Billions Chained 2012\$	309.435	309.435	347.279	373.420	359.304	
	Sporting equipment, supplies, guns, and amm	Billions Chained 2012\$	77.717	77.717	81.475	83.820	79.625	
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Description								

#### Economic Forecasts Pre-Pandemic

- Pre-COVID-19 studies indicated possible 4-6% annual decline in real GDP.
  - CBO (2005) -4.1% Real GDP
  - McKibbin & Sidorenko (2006)
     -5.5% Real GDP

#### Pandemic

- Some academic studies are suggesting double digit annual decline in economic activity.
  - Ludvigson et al. (2020) VAR. Cumulative loss in IP of -12.75%, service employment -17.0%
  - Baker et al. (2020) Uncertainty shocks with model of disaster effects. -11.0% real GDP

# Economic Forecasts—Professional Forecasters

- Professional forecaster average is now generally in -3% to -6% real GDP range
  - Blue Chip Economic Indicators Panel
  - WSJ Economic Forecasting Survey
  - Survey of Professional Forecasters (Philadelphia Federal Reserve)
- CBO (2020) -5.6% real
   GDP



**Source**: WSJ Economic Forecasting Survey, 60 economists; https://www.wsj.com/graphics/econsurvey/

## National Macro Forecast Assumptions

	Date	2020	2021	2022	2023+
RSQE (Univ. of Michigan)	3/19	-1.8	3.2	2.1	NA
Wells Fargo	4/8	-3	1.7	NA	NA
IHS Markit	3/30	-5.4	3.4	5.2	NA
Average		-3.4	2.8	3.6	
Scenarios					
-6% (severe)		-6.0%	3.0%	3.0%	2.0%
-2% (moderate)		-2.0%	3.0%	3.0%	2.0%

## National Macro Forecast Update

	Date	2020	2021	2022	2023+
RSQE (Univ. of Michigan)	4/9	-3.0	2.9	2.6	NA
Wells Fargo	5/1	-3.9	1.7	NA	NA
IHS Markit	3/30	-5.4	3.4	5.2	NA
Average		-4.1	2.7	3.6	
Scenarios					
-6% (severe)		-6.0%	3.0%	3.0%	2.0%
-2% (moderate)		-3.0%	3.0%	3.0%	2.0%

# Reasons for Industry Exposure Differences

#### Demand

- Social distancing
- Supply
  - Government mandates: shelter at home; non-essential business designation
  - Productivity (workplace capacity reduction; plant reconfiguration and usage of social distancing equipment and supplies)
  - Labor force participation (worker mortality, morbidity and fear; availability of enhanced unemployment benefits)
  - Supply chain problems
  - Teleworking potential (1/3 of economy)

# Estimating Industry Exposure

- Extrapolate from previous pandemic experience (e.g., SARS, H1N1) (CBO 2005)
- Imputation of sector vulnerability using occupational data (e.g., O\*NET, LaborCube) (Dingel & Nieman 2020; Lund et al. 2020)
- Expert opinion
- Economic activity reports
  - Quarterly GDP by spending component (e.g., First quarter)
  - Weekly/monthly labor market information by industry (Unemployment claims, Monthly Labor Report)
- Other (e.g., data mining of social media and text)

## Industry Exposure Factors

- Used CBO (2005) industry exposure factors
  - Crosswalk of GDP personal consumer expenditure categories to 2-3-digit NAICS (and exposure factors)
    - BEA Input-Output Accounts--PCEBridge (commodity composition of PCE for 2012--405 commodities), Supply Table (2012)
  - Exposure for 4 months of 2020, not beyond 2020
- First Quarter GDP data is now available for extrapolation

Industry	Decline
Agriculture	10
Mining	10
Utilities	0
Construction	10
Manufacturing	10
Trade (wholesale and retail)	10
Transportation & warehousing	67
Information; Finance; Prof. & business services	0
Education	0
Health care	-15
Arts/entertainment/accommodation/food	80
Other services	5
Government	0
Source: CBO (2005)	

# Consumption Expenditure Exposure Update

Category	% Change (Annualized)	Category	% Change (Annualized
Expenditures of nonresidents	-55.9	Expenditures of nonprofits serving hh	34.2
Air transportation	-52.7	Food/nonalcoholic beverages	25.3
Foreign travel by U.S. residents	-50.2	Alcoholic beverages	24.0
Ground transportation	-48.2	Pharmaceuticals and medical products	20.9
Water transportation	-46.9	Tools and equipment for household/garden	16.6
Membership clubs, sports centers, etc.	-46.3	Recreational items	15.5
Accommodations	-45.7	Postal and delivery services	15.3
Luggage and similar personal items	-39.6	Video, audio, & info equipment	11.8
Gambling	-38.2	Therapeutic appliances & equipment	10.3
Net purchases of used motor vehicles	-36.9	Telephone & facsimile equipment	8.5

Source: Bureau of Economic Analysis, Real PCE by Type of Product

# Locality Economic Impact Estimation

- Estimates of county employment impacts were made using information from the Virginia industry employment impact estimates.
- State industry employment percentage impact results were reweighted to reflect locality industrial compositions
  - Used Eckert (2020) locality employment imputations for six-digit to two-digit NAICS industries for U.S. Census Bureau County Business Patterns that were aggregated into 70 REMI industries.
- Results reflect industry composition differences only; do not take into account other local economic variables that affect growth used in local economic forecasting models.

## State Revenue Impact Modelling

- National Governor's Association. \$500 billion needed.
- National Association of Counties, National League of Cities, U.S.
   Conference of Mayors. \$250 billion needed
- Center for Budget and Policy Priorities (CBPP), Economic Policy Institute, Brookings Institute--\$500 billion state needed.
  - CBPP now says \$650 billion state aid needed.
  - Brookings now says \$700 billion to \$1 trillion in state and local aid needed.
  - Seem to be based on more dire forecasts (e.g., Goldman Sachs)



#### State Revenue Impact Modelling

- Progressive think-tax state estimates appear to be based loosely on Fiedler, Furman, and Powell (2019).
  - 1% increase in unemployment associated with 3.7% reduction in state tax revenues (1985-2018).
  - CBPP. Impact of \$110 billion (FY2020), \$350 billion (FY2021), and \$190 billion (FY2022) for total of \$650 billion.
- Bartik (2020) uses same methodology to estimate state and local tax revenue impact of \$478 billion using RSQE April forecast
  - Local aid need is approximately half of state aid need because revenue less sensitive to recession.
- National Association of Counties (NACO). \$110 billion county aid estimate based on weighted sample of surveyed counties.
- Moody's Analytics (2020). Estimated state aid need at \$203 billion (tax revenue \$172 billion/Medicaid \$31 billion) for severe recession scenario.

## State Revenue Impact Modelling

- Estimates based on UR methodology may not be as applicable to current crisis as previous recessions.
  - Unemployment is disproportionately in lower value-added sectors (retail trade, accommodations, food service, personal services)
  - Unemployment rate is probably not best correlate with state and local tax revenues
    - GDP, personal income, economic output levels for particular sectors is most closely tied to individual revenue streams
  - Recession is qualitatively different from previous ones; more akin to a nationwide natural disaster. Also, federal monetary and fiscal policy were more rapidly and energetically deployed than previous downturns (e.g., Great Recession began in December 2007 and ARRA was signed in February 2009).
    - CARES Act relief partially alleviates consumer spending impact.
    - Federal Reserve actions have quickly stabilized financial markets and elevated asset prices (supporting consumer spending through wealth effect).

#### **REMI** Outputs for Revenue Estimation

- State and Local Tax Revenues modelled differently
- State impact estimates based on REMI (2012)
- Local revenue impact based on ad-hoc method
  - Reliance on property taxes for most revenue
  - Less sensitive to business activity and lag in comps and assessments

# Tax Revenue Source, State and Local



**Source:** Census of Government, Annual Survey of State and Local Government Finances (FY17)

# REMI Outputs for State Revenue Estimation

- State tax revenues were obtained from the Census of Government's Annual Survey of State Government Finances
- Revenue estimates are calculated by multiplying state revenue rates by the corresponding base impact:
  - Demand for selected industries (general sales tax, selective sales tax, license taxes)
  - Personal income less transfer payments (individual income tax)
  - Gross domestic product (corporate income tax)
  - Personal income (other taxes).

# REMI Outputs for Locality Revenue Impacts Estimation

- Locality tax revenue data obtained from Virginia Auditor of Public Accounts, *Comparative Report of Local Government Revenues and Expenditures*
- Most revenue categories were multiplied by total local employment impact factors: consumer utility tax, business license tax, franchise license tax, motor vehicle tax, bank stock tax, recordation and will tax, tobacco tax, and other local taxes.
- Individual state industry employment impact factors were used when detailed industry impact factors seemed more appropriate, including:
  - Real property (Rental and leasing services; REMI Sector 48). Only the commercial component was estimated, using Weldon Cooper Center data on the percentage of total property assessments that were commercial/industrial properties.
  - Sales and use tax (Retail trade; REMI 29)
  - Admission tax (Amusement, gambling, and recreation; REMI 60)
  - Hotel and motel tax (Accommodation; REMI 61)
  - Restaurant and food tax (Food services and drinking places; REMI 62)
  - Coal and oil tax (Mining; REMI 4)

# Economic Impact on Virginia, Employment and GDP

	2020	2021	2022	2023	2024
-6 Percent					
Total Employment	-503,918	-332,586	-249,143	-222,762	-195,348
GDP (\$ Billions)	-\$40.764	-\$33.109	-\$22.180	-\$17.757	-\$13.275
-2 Percent					
Total Employment	-298,778	-126,205	-45,115	-21,977	3,314
GDP (\$ Billions)	-\$17.898	-\$9.864	\$1.543	\$6.280	\$11.203

# Tax Revenue Impact for Virginia (\$ Billions)

	-6%	-2%
FY2020	-\$1.036	-\$0.591
FY2021	-\$1.818	-\$0.900
FY2022	-\$1.366	-\$0.449
FY2023	-\$1.165	-\$0.261
FY2024	-\$1.129	-\$0.223

# State and Local Tax Revenue Impact for Virginia (\$ Billions)

	-6%	-2%
State	-\$2.855	-\$1.491
Localities	-\$0.975	-\$0.621
Total	-\$3.830	-\$2.112
% State	-74.5%	70.6%

#### Data Sources

Data Source	Description	Purpose	Analysis
U.S. Bureau of Economic Analysis Input-Output Accounts	PCEBridge (commodity composition of PCE for 2012- -405 commodities), Supply Table (2012)	Adjust GDP final demand components for differential industry exposure	Crosswalk of GDP personal consumer expenditure components to 2-3 digit NAICS and exposure factors
U.S. Census Bureau; Census of Government, Annual Survey of State Government Finances	State tax revenue by tax category	Estimate state tax revenue impacts	State tax revenue impact analysis
U.S. Census Bureau, County Business Patterns and Eckert (2020)	6-digit industry imputed non- farm private employment for localities.	Estimate locality employment impacts	Adjust statewide economic impact estimates to localities based on locality industry composition weights
Virginia Auditor of Public Accounts, Comparative Report of Local Government Revenues and Expenditures	Local revenues by tax category, Exhibits B and B2	Estimate locality tax revenue impacts	Local tax revenue impact analysis
Weldon Cooper Center for Public Service, Virginia Local Tax Rates	Assessed value of real property by category and by locality	Estimate locality tax revenue impacts (commercial real property)	Estimate impact to commercial real property tax revenues

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## **QUESTIONS**?





