

COVID-19 ECONOMIC AND TAX REVENUE IMPACTS: ESTIMATES FOR THE COMMONWEALTH OF VIRGINIA AND LOCALITIES

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Introduction

This report provides an initial look at the potential economic and fiscal impacts of the COVID19 pandemic on the Commonwealth of Virginia and its localities (i.e., 133 counties and independent cities). Much is still unknown at this point about how different regions of the country and sectors of the economy will be affected, the length and intermittency of jurisdictional stay-at-home orders, the effectiveness and timetable for medical therapies and vaccines, the size and rate of deployment of federal public health and economic relief spending, and other factors such as state and local policy. Moreover national macroeconomic forecasts of COVID19 effects vary widely. The assumptions that underpin them are also often not disclosed to the general public, being either hidden behind subscriber paywalls or considered proprietary methodologies that cannot be disclosed without compromising intellectual property. This report provides an initial look at potential COVID19 economic effects using a standard commercial regional economic model. The model characteristics, data and modelling assumptions are spelled out more fully in a methodological appendix. The report provides estimates for two different recessionary scenarios (“moderate” and “severe” scenarios), allowing readers to interpolate or extrapolate as additional national macroeconomic information becomes available. Updates to the assumptions, modelling methods and results will be provided as more information becomes available and time permits.

Estimating the economic and fiscal impacts of COVID19

The study uses REMI PI+ (Regional Economic Models, Inc. Policy Insight Plus) to estimate the economic effects of COVID19. REMI PI+ is a respected, peer-reviewed model that has been used by federal, state, and local government agencies and private consultants in thousands of national and regional economic studies, including at least one previous study of a national pandemic (Loose et al. 2010). It is a dynamic, multi-sector regional economic simulation model used for economic forecasting and measuring the impact of public policy changes on economic activity, area demographics, and government fiscal conditions. The model used in this analysis is calibrated to use in modelling economic impacts for events in Virginia.

The Virginia modelling of COVID19 undertaken here depends on national-level data inputs. The Virginia model effectively piggybacks on the national macroeconomic forecasts with the REMI PI+ model apportioning national impacts to the Virginia economy using its model data, parameters and architecture. Two fundamental pieces of data are key. First, national macroeconomic forecasts of COVID19 are needed. Second, since industry-level demand sensitivity to social distancing varies, some allowance must be made for these differential effects at the industry level.

This analysis develops national macroeconomic GDP forecast scenarios that are based on several recent national macroeconomic forecasts that provide a range of plausible 2020-2025 national GDP growth estimates. Forecasts vary by forecasting organization and time period of forecast. Generally speaking, economic forecasts have deteriorated over time as the pandemic progressed. **Table 1** shows three major forecasts released over the period 3/19/20-4/8/20 that publicly released their results and some modelling assumptions. RSQE provides baseline macroeconomic forecasts for the REMI PI+ model, but the 3/19/20 “Prolonged Scenario” forecast is an update to that forecast that captures moderate pandemic effects and a fiscal stimulus package with elements similar to the Coronavirus Aid, Relief, and Economic Act (known as the CARES Act) (Burton et al. 2020). The other two (Wells Fargo and IHS Markit) forecasts were released well after the CARES Act was signed, and presumably capture its full effects.

TABLE 1: Economic Forecasts and Virginia REMI Simulation Assumptions

| | Forecast Date | 2019-20 | 2020-21 | 2021-22 | Beyond 2022 |
|------------------------|---------------|---------|---------|---------|-------------|
| RSQE | 3/19/20 | -1.8% | 3.2% | 2.1% | NA |
| Wells Fargo | 4/8/20 | -3.0% | 1.7% | NA | NA |
| IHS Markit | 3/31/20 | -5.4% | 3.4% | 5.2% | NA |
| Average | | -3.4% | 2.8% | 3.6% | |
| Simulation Assumptions | | | | | |
| -6 Percent Scenario | | -6.0% | 3.0% | 3.0% | 2.0% |
| -2 Percent Scenario | | -2.0% | 3.0% | 3.0% | 2.0% |

For this modelling exercise, moderate and severe recessionary scenarios are used (more methodological details are provided in **Appendix A**). For the moderate scenario, it is assumed that GDP growth declines at an annual rate of 2% in 2020 and the national economy “snaps back” slightly in 2021 and 2022 before resuming baseline (pre-COVID19) growth of 2% for 2023-2025. In the severe scenario, 2020 decline is assumed to be -6%, which would make it the most serious economic downturn since WWII, eclipsing the financial crisis induced Great Recession of 2007-09. For out-years, the growth assumptions are the same as the moderate scenario. It should be noted that an earlier CBO study (CBO 2005) that modelled a severe epidemic estimated a -5% annual effect on GDP growth. Subsequent studies such as McKibbin and Sidorenko (2006) provided estimates of similar magnitude. Thus, the range of the two scenarios modelled here include the best guesstimates of growth impacts for similar pandemics prior to the arrival of COVID19.

The other key piece of data used were industry exposure factors. In estimating these factors, the analysis relies on earlier CBO study (2005) assumptions about which industries are affected most by pandemics, based loosely on Asian Avian flu experience. The study estimates that those industries most affected by social-distancing include transportation (air and transit services), arts and entertainment, accommodation, and food services industries. These assumptions are likely to be revised as more U.S. data becomes available. Current estimates of industry impacts rely on industry data from previous epidemics, imputations of industry exposure based on surveys such as the Occupational Information Network (O*NET) (Dingel and Neiman 2020), and expert assessments. One CBO industry exposure assumption, that medical services would see increasing demand because of pandemic health needs, is already being called into question because of the closure of ambulatory care facilities by regional medical systems around the country due to consumer avoidance and a reduction in accidents and other health problems.

Results

Table 2 presents the result of the moderate and severe recession scenarios. In the severe scenario of -6% growth in 2020, the state is projected to lose more than 500,000 jobs and \$40.7 billion in GDP in 2020 relative to baseline growth assumptions. The impact lessens to -168,000 jobs and- \$8.7 billion in state GDP by 2025. Under the moderate (-2% growth scenario), the state loses almost 300,000 jobs relative to baseline and nearly \$18 billion in GDP. This turns positive by 2024, meaning that the state recovers and grows above baseline levels. **Appendix B**, provides an industry-level breakout of employment impacts by scenario and **Appendix C**, provides a locality-level breakdown.

TABLE 2: COVID-9 Economic impact on Virginia, employment and GDP relative to baseline, 2020-2025

| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|-------------------|-----------|-----------|-----------|-----------|-----------|----------|
| -6 Percent | | | | | | |
| Total Employment | -503,918 | -332,586 | -249,143 | -222,762 | -195,348 | -168,049 |
| GDP (\$ Billions) | -\$40.764 | -\$33.109 | -\$22.180 | -\$17.757 | -\$13.275 | -\$8.746 |
| -2 Percent | | | | | | |
| Total Employment | -298,779 | -126,205 | -45,115 | -21,977 | 3,314 | 29,335 |
| GDP (\$ Billions) | -\$17.898 | -\$9.864 | \$1.543 | \$6.280 | \$11.203 | \$16.307 |

Table 3 shows state tax revenue estimates under the two scenarios (details on the revenue impact methodology are provide in Appendix A). Under the severe scenario, the state is projected to lose over \$1 billion in revenues relative to baseline growth, growing to \$1.8 billion in FY2021 before declining and stabilizing at levels above \$1 billion. For the moderate scenario, FY2020 revenue losses relative to baseline are nearly \$600 million in FY2020, growing to \$900 million in 2025 and gradually declining to less than \$200 million by FY2025.

TABLE 3: COVID-9 Tax Revenue Impact for Virginia, 2 Scenarios, FY2020-FY2025

| | -6 Percent | -2 Percent |
|--------|------------------|----------------|
| FY2020 | -\$1,036,901,657 | -\$591,218,702 |
| FY2021 | -\$1,818,365,897 | -\$899,821,742 |
| FY2022 | -\$1,365,883,582 | -\$448,893,329 |
| FY2023 | -\$1,164,965,831 | -\$261,751,830 |
| FY2024 | -\$1,152,885,925 | -\$223,999,362 |
| FY2025 | -\$1,129,194,295 | -\$182,427,065 |

Table 4 shows that both state and local governments experience significant tax revenue declines relative to baseline over the FY2020-FY2021 period. However, the state is projected to experience a disproportionately higher revenue impact (70-75% of the total) because of its reliance on more business activity sensitive revenue sources such as income and sales taxes. Localities rely on property taxes for substantially more than half of their revenues. However, individual state localities such municipalities with more income sensitive revenues and localities with greater exposure to tourism and other COVID19 sensitive industries are also projected to experience large revenue declines. **Appendix C.** provides revenue impact results for individual localities.

TABLE 4: COVID-9 Fiscal Impact on State and Localities (FY2020-FY2021)

| | -6 Percent | -2 Percent |
|------------|------------------|------------------|
| State | -\$2,855,267,554 | -\$1,491,040,444 |
| Localities | -\$974,744,806 | -\$621,373,474 |
| Total | -\$3,830,012,360 | -\$2,112,413,918 |
| % State | 74.5% | 70.6% |

APPENDIX A.

Data and Methodology

REMI PI+ Model Estimation of COVID19 State and Local Economic Effects

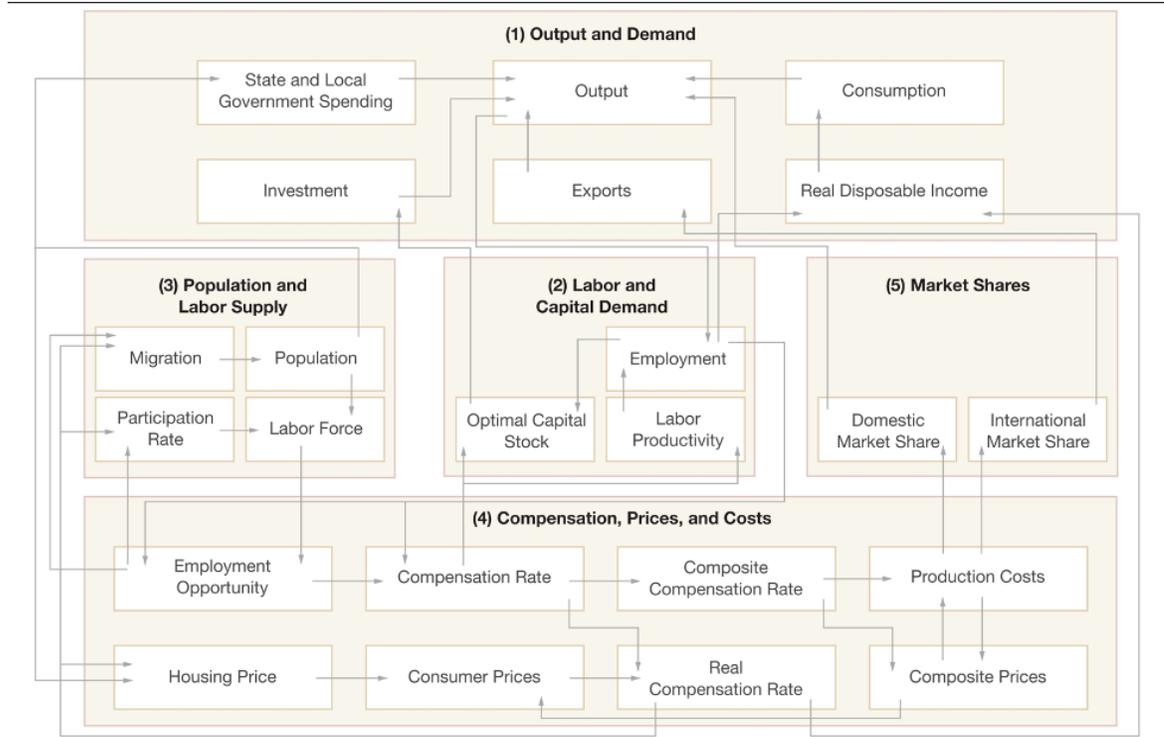
REMI PI+ (Policy Insight Plus) is a dynamic, multi-sector regional economic simulation model used for economic forecasting and measuring the impact of public policy changes on economic and population variables. REMI PI+ has been described as an eclectic economic model (Partridge and Rickman 2010). It utilizes different economic modeling methods such as input-output analysis, econometric forecasting, and computable general equilibrium in combination to characterize the mechanics and path of a regional economy (Treyz, Rickman, and Shao 1991). The model used for this analysis was customized for the state of Virginia. REMI PI+ and earlier versions of the software have been used in thousands of national and regional economic studies, including at least one economic impact study of a national flu pandemic (Loose et al. 2010).

The model contains five major modules or blocks (see **Figure A.1**), which interact simultaneously. The Output block determines expenditures for final demand, including consumption, investment, government, imports, and as well as demand for intermediate inputs. Final demand responds to changes in other model blocks. This module contains a key engine in the model, an input-output model based on the BEA benchmark transactions table that shows flows of goods and services among industries. The Labor and Capital Demand block determines employment, capital, and fuel demand as well as labor productivity. The Population and Labor force block determines the population characteristics of the region, including age, race, and sex composition. Labor force participation changes in response to wages and employment opportunities. A key driver of state population changes is migration, which is influenced by relative wage levels as well as amenities. The Wage, Price, and Costs block is where the prices of factor and housing and product price levels are determined. The Market Shares block helps to measure exports to and imports to the region. Changes in market share are driven by production costs, demand characteristics, distance to markets, and output. Full model documentation, including model equations, data sources, and other pertinent information for the Version 2.3 model and software used in this study is available at the company website (www.remi.com).

The basic procedure used to obtain COVID-19 economic impacts is illustrated in **Figure A.2** and briefly summarized here. A new national control forecast was created using information from published recent national macroeconomic forecasts of annual aggregate GDP growth forecasts for 2020 and beyond. The new national control forecast replaced the default RSQE national forecast produced prior to COVID-19, which assumed approximately 2% GDP growth over the horizon of the simulation period (2020-2025). Two scenarios were modelled that reflect the wide range of annual forecasts available on March 31, 2020: (a) a moderate recessionary scenario of -2 percent growth in 2020 GDP with 3% growth each in 2021 and 2022 and reversion to REMI/RSQE approximately 2% thereafter and (b) a severe recessionary scenario of -6 percent growth in 2020 GDP with 3% growth each in 2021 and 2022 and reversion to REMI/RSQE approximately 2% growth thereafter.

Rather than assume that GDP growth/decline would be the same for all GDP components, the scenarios were modelled by calibrating individual consumer expenditure adjustment factors in the Final Demand Macroeconomic Update for 85 Major GDP Components (75 Personal Consumption Expenditure categories, 4 private fixed investment categories, 3 government purchase categories, imports of goods and services, exports of goods and services, and change in private inventories). Adjustment to the default growth assumptions were introduced using information from a much earlier CBO study (2005) of a global pandemic similar to

FIGURE A.1: Simplified Economic Structure of the Key Interactions in Regional Economies Based on the REMI PI+ Model



Source: Regional Economic Models, Inc.

COVID-19. The study estimated industry (2 and 3 digit NAICS) industry exposure factors based on a review of other Asian studies of the effect of pandemic social distancing and public avoidance on industry activity (see **Table A.1**). Since the CBO study expresses exposure by industry, an industry to commodity to PCE category crosswalk was developed using information from 2012 BEA Input-Output Accounts (PCE Bridge connecting PCE categories to commodities and the Supply table connecting commodities to industries). These exposure factors were assumed to abate after 2020, which seemed the most realistic assumption based on the resiliency of Asian economies after SARS and Avian flu experiences. However, other scenarios were run in which the exposure factors were more permanent; these scenarios (not reported here) created significantly longer negative employment impacts.

TABLE A.1 : Industry Exposure Factors (Decline as Percentage of Final Industry Demand)

| Industry | % |
|---------------------------------------|-----|
| Agriculture | 10 |
| Mining | 10 |
| Utilities | 0 |
| Construction | 10 |
| Manufacturing | 10 |
| Wholesale trade | 10 |
| Retail Trade | 10 |
| Transportation and warehousing | |
| Air | 67 |
| Rail | 67 |
| Transit | 67 |
| Information | 0 |
| Finance | 0 |
| Professional and business services | 0 |
| Education/health care | 0 |
| Education | 0 |
| Health care | -15 |
| Arts/entertainment/accommodation/food | |
| Arts and recreation | 80 |
| Accommodation | 80 |
| Food service | 80 |
| Other services | 5 |
| Government | |
| Federal | 0 |
| State and local | 0 |

Source: CBO (2005)

Following the creation of new national controls, a new regional control forecast for the Virginia economy was generated. This “alternative forecast” for Virginia is then measured against the previous Virginia “control forecast” based on baseline data for the nation and Virginia to examine how COVID19 affects the Virginia economy. 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 using locality employment imputations for six-digit to two-digit NAICS industries from imputed U.S. Census Bureau County Business Pattern employment data for 2016 made by Eckert (2020) that were cross-walked with 70 REMI industries. This locality estimation technique does not take into account other local economic variables that affect local growth and decline that are used in more complete local economic forecasting models.

Sources of data for state and local economic and revenue impact estimates are described in **Table A.2**.

FIGURE A.2: REMI PI+ Model Simulation Flow

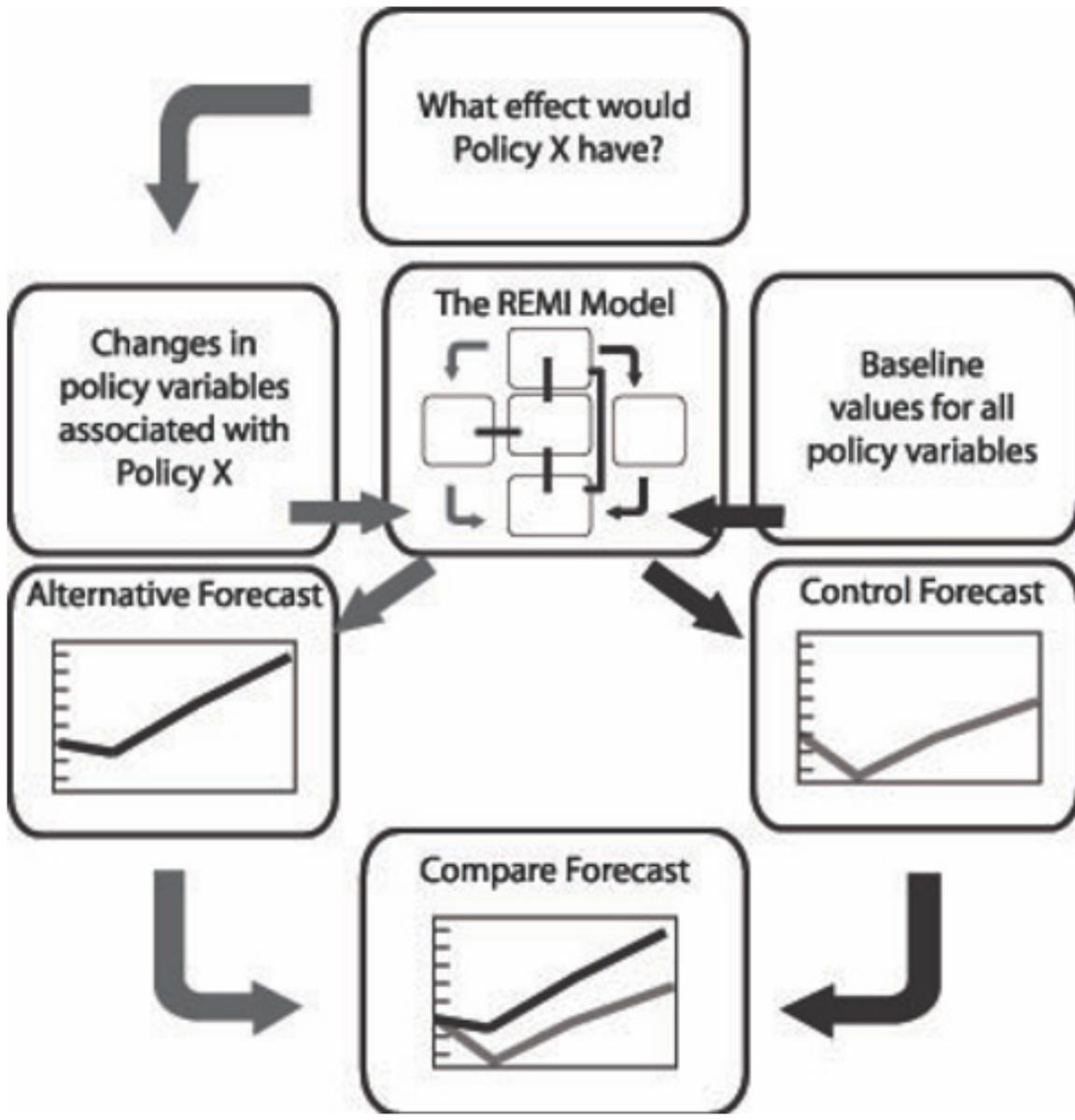


TABLE A.2: Data Sources

| Data source | Description of data | Analysis |
|---|---|---|
| Congressional Budget Office (2005) | Assumed declines in demand, by industry, in the event of an avian flu pandemic, severe scenario | Estimate industry exposure factors |
| REMI PI+ | Demand by industry, GDP, personal income, and transfer receipts by year; value added and employment by industry | State and local tax revenue impact analyses. |
| U.S. Bureau of Economic Analysis Input-Output Accounts | PCEBridge (commodity composition of PCE for 2012--405 commodities), Supply Table (2012) | Crosswalk of GDP personal consumer expenditure components to 3-digit NAICS and REMI industries |
| U.S. Census Bureau; Census of Government, Annual Survey of State Government Finances | State tax revenue by tax category | 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. | 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 | 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 impact to commercial real property tax revenues |

State and Local Revenue Estimation

In order to conduct state tax revenue analysis, this study scaled revenues to economic outputs using the procedure described in Regional Economic Models, Inc. (2012). State tax revenues were obtained from the Census of Government's State Government Finance and Annual Survey of State Tax Collections. Revenue estimates are calculated by multiplying state revenue rates by the corresponding base quantity, which included state-level demand for selected industries (general sales tax, selective sales tax, license taxes), state-level personal income less transfer payments (individual income tax), corporate income tax (gross domestic product), and personal income (other taxes).

For estimating local tax revenues, estimates of total state and industry employment impact were applied to individual local tax revenue categories. The following revenue categories were multiplied by total employment impact factors: (a) 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 industry employment impact factors were used when detailed industry impact factors seemed more appropriate, including (a) real property (Rental and leasing services; REMI Sector 48), 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), and coal and oil tax (Mining; REMI 4). For real property, only the commercial component was estimated, using Weldon Cooper Center data on the percentage of total property assessments that were commercial/industrial properties. These properties are often assessed using the income approach which estimates property value on the basis of rental income potential. Residential and farm properties and personal property assessments are assumed to be less responsive to economic downturns in the short run and are not modelled. These assumptions can be revisited and revised as more information becomes available.

APPENDIX B.
State Employment Impacts by Scenario and Industry

TABLE B.1: Employment Impact by Industry, -6% Growth Scenario

| Industries | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|----------|----------|----------|----------|----------|----------|
| All Industries | -503,918 | -332,586 | -249,143 | -222,762 | -195,348 | -168,049 |
| Forestry, fishing, and hunting | -1,984 | -737 | -479 | -392 | -335 | -255 |
| Forestry and Logging; Fishing, hunting and trapping | -1,066 | -320 | -187 | -135 | -103 | -51 |
| Support activities for agriculture and forestry | -918 | -418 | -292 | -257 | -232 | -204 |
| Mining | -1,150 | -713 | -468 | -359 | -267 | -166 |
| Oil and gas extraction | -594 | -291 | -145 | -72 | -8 | 60 |
| Mining (except oil and gas) | -484 | -360 | -277 | -247 | -221 | -187 |
| Support activities for mining | -73 | -61 | -46 | -40 | -38 | -39 |
| Utilities | 9 | -526 | -221 | -67 | 84 | 227 |
| Construction | -16,932 | -14,672 | -9,840 | -7,248 | -3,496 | 732 |
| Manufacturing | -26,270 | -15,670 | -11,699 | -10,395 | -9,731 | -8,911 |
| Wood product manufacturing | -1,399 | -963 | -779 | -725 | -662 | -547 |
| Nonmetallic mineral product manufacturing | -872 | -590 | -469 | -428 | -382 | -316 |
| Primary metal manufacturing | -381 | -210 | -133 | -95 | -78 | -57 |
| Fabricated metal product manufacturing | -1,808 | -1,137 | -836 | -716 | -649 | -563 |
| Machinery manufacturing | -1,275 | -919 | -675 | -560 | -535 | -523 |
| Computer and electronic product manufacturing | -1,459 | -1,151 | -1,032 | -1,010 | -1,046 | -1,066 |
| Electrical equipment, appliance, and component manufacturing | -941 | -610 | -503 | -469 | -463 | -440 |
| Motor vehicles, bodies and trailers, and parts manufacturing | -1,094 | -623 | -385 | -267 | -225 | -202 |
| Other transportation equipment manufacturing | -2,283 | -1,664 | -1,106 | -890 | -734 | -590 |
| Furniture and related product manufacturing | -1,465 | -1,105 | -1,085 | -1,172 | -1,301 | -1,420 |
| Miscellaneous manufacturing | -1,026 | -690 | -511 | -454 | -444 | -429 |
| Food manufacturing | -3,863 | -1,780 | -1,224 | -1,084 | -987 | -920 |
| Beverage and tobacco product manufacturing | -1,079 | -370 | -108 | 23 | 135 | 244 |
| Textile mills; Textile product mills | -1,336 | -495 | -328 | -272 | -242 | -178 |
| Apparel manufacturing; Leather and allied product manufacturing | -699 | -132 | -16 | 40 | 79 | 136 |
| Paper manufacturing | -837 | -464 | -344 | -308 | -282 | -251 |
| Printing and related support activities | -1,073 | -717 | -565 | -527 | -498 | -467 |
| Petroleum and coal products manufacturing | -52 | -29 | -19 | -15 | -11 | -8 |
| Chemical manufacturing | -1,591 | -1,015 | -826 | -790 | -770 | -735 |
| Plastics and rubber products manufacturing | -1,735 | -1,006 | -755 | -677 | -636 | -580 |
| Wholesale trade | -12,310 | -8,373 | -6,964 | -6,857 | -6,814 | -6,764 |
| Retail trade | -59,952 | -37,664 | -33,180 | -34,148 | -34,952 | -35,852 |

TABLE B.1: Employment Impact by Industry, -6% Growth Scenario (continued)

| Industries | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---------|---------|---------|---------|---------|---------|
| Transportation and warehousing | -23,201 | -12,583 | -10,120 | -9,671 | -9,265 | -8,852 |
| Air transportation | -2,803 | -797 | -497 | -367 | -244 | -123 |
| Rail transportation | -411 | -269 | -216 | -207 | -204 | -198 |
| Water transportation | -143 | -84 | -68 | -65 | -63 | -60 |
| Truck transportation | -4,309 | -2,835 | -2,310 | -2,235 | -2,191 | -2,146 |
| Couriers and messengers | -2,090 | -1,536 | -1,320 | -1,327 | -1,339 | -1,351 |
| Transit and ground passenger transportation | -7,583 | -3,346 | -2,558 | -2,313 | -2,046 | -1,774 |
| Pipeline transportation | -26 | -22 | -14 | -10 | -7 | -4 |
| Scenic and sightseeing transportation; Support activities for transportation | -2,488 | -1,449 | -1,195 | -1,169 | -1,152 | -1,135 |
| Warehousing and storage | -3,348 | -2,244 | -1,943 | -1,977 | -2,020 | -2,061 |
| Information | -8,329 | -6,755 | -6,005 | -6,048 | -6,169 | -6,297 |
| Publishing industries, except Internet | -1,901 | -1,713 | -1,597 | -1,636 | -1,721 | -1,817 |
| Motion picture and sound recording industries | -1,062 | -903 | -904 | -967 | -1,041 | -1,110 |
| Data processing, hosting, and related services; Other information services | -2,018 | -1,434 | -1,164 | -1,110 | -1,073 | -1,042 |
| Broadcasting, except Internet | -973 | -721 | -606 | -579 | -569 | -563 |
| Telecommunications | -2,375 | -1,983 | -1,734 | -1,756 | -1,765 | -1,766 |
| Finance and insurance | -5,983 | -11,522 | -7,620 | -6,392 | -5,343 | -4,567 |
| Monetary authorities - central bank; Credit intermediation and related activities | -3,798 | -4,557 | -3,390 | -3,137 | -2,937 | -2,815 |
| Securities, commodity contracts, other investments; Funds, trusts, other financial vehicles | -2,893 | -4,115 | -3,010 | -2,801 | -2,652 | -2,611 |
| Insurance carriers and related activities | 707 | -2,851 | -1,220 | -455 | 247 | 859 |
| Real estate and rental and leasing | 687 | -11,550 | -6,864 | -4,811 | -2,584 | -407 |
| Real estate | 2,155 | -10,531 | -6,038 | -4,013 | -1,813 | 341 |
| Rental and leasing services; Lessors of nonfinancial intangible assets | -1,468 | -1,019 | -826 | -797 | -771 | -748 |
| Professional, scientific, and technical services | -54,563 | -40,687 | -30,901 | -27,262 | -24,817 | -22,967 |
| Management of companies and enterprises | -9,223 | -5,635 | -4,562 | -4,350 | -4,263 | -4,170 |
| Administrative, support, waste management, and remediation services | -22,853 | -19,819 | -14,623 | -12,958 | -11,362 | -9,842 |
| Administrative and support services | -22,382 | -19,304 | -14,291 | -12,702 | -11,187 | -9,748 |
| Waste management and remediation services | -471 | -515 | -332 | -255 | -175 | -94 |
| Educational services; private | -5,653 | -7,927 | -6,525 | -6,199 | -5,656 | -4,932 |
| Health care and social assistance | -25,045 | -37,472 | -33,002 | -34,274 | -35,299 | -36,425 |
| Ambulatory health care services | -9,356 | -14,971 | -12,868 | -13,422 | -14,093 | -15,064 |
| Hospitals; private | -3,794 | -6,859 | -5,701 | -5,815 | -6,000 | -6,320 |
| Nursing and residential care facilities | -4,097 | -5,986 | -5,223 | -5,378 | -5,490 | -5,609 |
| Social assistance | -7,799 | -9,657 | -9,210 | -9,658 | -9,715 | -9,432 |

TABLE B.1: Employment Impact by Industry, -6% Growth Scenario (continued)

| Industries | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|--|---------|---------|---------|---------|---------|---------|
| Arts, entertainment, and recreation | -20,232 | -7,275 | -5,685 | -5,295 | -4,914 | -4,569 |
| Performing arts, spectator sports, and related industries | -7,511 | -3,601 | -2,938 | -2,816 | -2,719 | -2,636 |
| Museums, historical sites, and similar institutions | -888 | -736 | -798 | -901 | -972 | -1,008 |
| Amusement, gambling, and recreation industries | -11,832 | -2,937 | -1,950 | -1,578 | -1,223 | -924 |
| Accommodation and food services | -98,571 | -25,804 | -19,197 | -16,691 | -13,793 | -10,719 |
| Accommodation | -12,316 | -3,686 | -2,875 | -2,649 | -2,395 | -2,137 |
| Food services and drinking places | -86,255 | -22,117 | -16,322 | -14,042 | -11,398 | -8,582 |
| Other services (except public administration) | -37,222 | -25,620 | -23,190 | -23,662 | -23,433 | -22,674 |
| Repair and maintenance | -9,006 | -2,992 | -1,895 | -1,493 | -1,145 | -880 |
| Personal and laundry services | -11,976 | -7,306 | -5,759 | -5,395 | -4,933 | -4,466 |
| Religious, grantmaking, civic, professional, and similar organizations | -12,915 | -13,252 | -13,893 | -15,252 | -16,001 | -16,163 |
| Private households | -3,324 | -2,070 | -1,643 | -1,521 | -1,354 | -1,165 |
| State and Local Government | -34,667 | -23,710 | -11,516 | -4,916 | 2,376 | 9,741 |
| State Government | -10,559 | -7,209 | -3,472 | -1,433 | 816 | 3,087 |
| Local Government | -24,108 | -16,502 | -8,045 | -3,483 | 1,560 | 6,654 |
| Federal Civilian | -23,706 | -8,243 | -2,469 | 450 | 3,223 | 5,615 |
| Federal Military | -10,980 | -6,812 | -1,951 | 690 | 3,288 | 5,751 |
| Farm | -5,789 | -2,817 | -2,064 | -1,908 | -1,825 | -1,746 |

TABLE B.2: Employment Impact by Industry, -2% Growth Scenario

| Industries | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|----------|----------|---------|---------|---------|---------|
| All Industries | -298,779 | -126,205 | -45,115 | -21,977 | 3,314 | 29,335 |
| Forestry, fishing, and hunting | -1,457 | -161 | 107 | 199 | 263 | 351 |
| Forestry and Logging; Fishing, hunting and trapping | -827 | -52 | 84 | 138 | 173 | 227 |
| Support activities for agriculture and forestry | -630 | -108 | 23 | 61 | 90 | 123 |
| Mining | -622 | -171 | 79 | 191 | 287 | 393 |
| Oil and gas extraction | -346 | -27 | 129 | 210 | 282 | 358 |
| Mining (except oil and gas) | -246 | -125 | -45 | -20 | 3 | 35 |
| Support activities for mining | -30 | -20 | -5 | 0 | 2 | 1 |
| Utilities | 549 | -30 | 266 | 409 | 551 | 686 |
| Construction | -6,188 | -5,036 | -1,235 | 439 | 3,567 | 7,477 |
| Manufacturing | -16,735 | -5,918 | -2,008 | -819 | -235 | 519 |
| Wood product manufacturing | -813 | -379 | -207 | -167 | -112 | -3 |
| Nonmetallic mineral product manufacturing | -508 | -224 | -108 | -74 | -33 | 29 |
| Primary metal manufacturing | -237 | -64 | 11 | 45 | 60 | 78 |
| Fabricated metal product manufacturing | -1,084 | -402 | -105 | 7 | 68 | 151 |
| Machinery manufacturing | -696 | -340 | -104 | 0 | 17 | 20 |
| Computer and electronic product manufacturing | -1,002 | -694 | -586 | -576 | -623 | -653 |
| Electrical equipment, appliance, and component manufacturing | -629 | -290 | -185 | -155 | -153 | -133 |
| Motor vehicles, bodies and trailers, and parts manufacturing | -667 | -186 | 52 | 165 | 205 | 226 |
| Other transportation equipment manufacturing | -1,155 | -531 | 28 | 237 | 388 | 528 |
| Furniture and related product manufacturing | -1,036 | -666 | -650 | -741 | -874 | -996 |
| Miscellaneous manufacturing | -589 | -247 | -70 | -16 | -9 | 3 |
| Food manufacturing | -2,613 | -462 | 102 | 244 | 346 | 420 |
| Beverage and tobacco product manufacturing | -693 | 31 | 290 | 416 | 523 | 628 |
| Textile mills; Textile product mills | -1,056 | -184 | -13 | 45 | 78 | 146 |
| Apparel manufacturing; Leather and allied product manufacturing | -595 | -6 | 115 | 175 | 219 | 280 |
| Paper manufacturing | -540 | -161 | -44 | -15 | 6 | 33 |
| Printing and related support activities | -654 | -297 | -152 | -124 | -105 | -81 |
| Petroleum and coal products manufacturing | -31 | -7 | 2 | 6 | 9 | 13 |
| Chemical manufacturing | -1,021 | -434 | -250 | -223 | -211 | -184 |
| Plastics and rubber products manufacturing | -1,117 | -376 | -133 | -66 | -34 | 14 |
| Wholesale trade | -7,552 | -3,569 | -2,212 | -2,179 | -2,189 | -2,180 |
| Retail trade | -40,935 | -18,492 | -14,520 | -16,057 | -17,324 | -18,603 |

TABLE B.2: Employment Impact by Industry, -2% Growth Scenario (continued)

| Industries | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---------|---------|---------|---------|---------|---------|
| Transportation and warehousing | -16,010 | -5,037 | -2,547 | -2,109 | -1,687 | -1,244 |
| Air transportation | -2,292 | -210 | 97 | 230 | 358 | 483 |
| Rail transportation | -247 | -101 | -48 | -40 | -37 | -31 |
| Water transportation | -94 | -33 | -16 | -13 | -11 | -7 |
| Truck transportation | -2,662 | -1,163 | -651 | -598 | -568 | -533 |
| Couriers and messengers | -1,235 | -663 | -444 | -453 | -464 | -474 |
| Transit and ground passenger transportation | -5,651 | -1,267 | -467 | -221 | 57 | 346 |
| Pipeline transportation | -8 | -5 | 4 | 7 | 10 | 12 |
| Scenic and sightseeing transportation; Support activities for transportation | -1,672 | -592 | -329 | -298 | -274 | -250 |
| Warehousing and storage | -2,149 | -1,003 | -693 | -723 | -757 | -789 |
| Information | -5,111 | -3,533 | -2,813 | -2,903 | -3,060 | -3,221 |
| Publishing industries, except Internet | -1,194 | -1,012 | -905 | -956 | -1,052 | -1,156 |
| Motion picture and sound recording industries | -747 | -583 | -585 | -652 | -727 | -798 |
| Data processing, hosting, and related services; Other information services | -1,237 | -625 | -341 | -279 | -232 | -190 |
| Broadcasting, except Internet | -615 | -361 | -252 | -233 | -228 | -229 |
| Telecommunications | -1,318 | -951 | -730 | -783 | -820 | -848 |
| Finance and insurance | 3,478 | -2,423 | 1,555 | 2,813 | 3,925 | 4,773 |
| Monetary authorities - central bank; Credit intermediation and related activities | -529 | -1,360 | -173 | 83 | 295 | 430 |
| Securities, commodity contracts, other investments; Funds, trusts, other financial vehicles | 239 | -1,073 | 59 | 284 | 460 | 533 |
| Insurance carriers and related activities | 3,768 | 10 | 1,669 | 2,447 | 3,171 | 3,809 |
| Real estate and rental and leasing | 10,610 | -2,561 | 1,902 | 3,692 | 5,711 | 7,734 |
| Real estate | 11,467 | -2,154 | 2,123 | 3,892 | 5,890 | 7,892 |
| Rental and leasing services; Lessors of nonfinancial intangible assets | -857 | -406 | -220 | -200 | -179 | -158 |
| Professional, scientific, and technical services | -31,387 | -17,003 | -6,935 | -3,159 | -492 | 1,617 |
| Management of companies and enterprises | -6,067 | -2,329 | -1,213 | -983 | -871 | -753 |
| Administrative, support, waste management, and remediation services | -10,074 | -7,070 | -1,807 | -141 | 1,506 | 3,108 |
| Administrative and support services | -9,997 | -6,940 | -1,860 | -269 | 1,297 | 2,817 |
| Waste management and remediation services | -77 | -129 | 54 | 129 | 209 | 291 |
| Educational services; private | -1,066 | -3,465 | -2,032 | -1,701 | -1,138 | -384 |
| Health care and social assistance | -4,053 | -17,310 | -12,905 | -14,338 | -15,450 | -16,619 |
| Ambulatory health care services | -254 | -6,214 | -4,085 | -4,647 | -5,294 | -6,223 |
| Hospitals; private | 487 | -2,828 | -1,732 | -1,932 | -2,187 | -2,569 |
| Nursing and residential care facilities | -748 | -2,753 | -1,991 | -2,167 | -2,289 | -2,414 |
| Social assistance | -3,538 | -5,516 | -5,097 | -5,593 | -5,680 | -5,413 |

TABLE B.2: Employment Impact by Industry, -2% Growth Scenario (continued)

| Industries | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|--|---------|---------|---------|---------|---------|---------|
| Arts, entertainment, and recreation | -16,366 | -2,956 | -1,368 | -995 | -613 | -257 |
| Performing arts, spectator sports, and related industries | -5,617 | -1,563 | -886 | -761 | -653 | -556 |
| Museums, historical sites, and similar institutions | -659 | -492 | -547 | -646 | -711 | -741 |
| Amusement, gambling, and recreation industries | -10,089 | -901 | 65 | 411 | 750 | 1,041 |
| Accommodation and food services | -86,266 | -11,050 | -4,769 | -2,681 | -142 | 2,628 |
| Accommodation | -10,528 | -1,607 | -825 | -638 | -414 | -180 |
| Food services and drinking places | -75,738 | -9,443 | -3,944 | -2,043 | 271 | 2,808 |
| Other services (except public administration) | -25,057 | -13,123 | -10,690 | -11,192 | -10,937 | -10,118 |
| Repair and maintenance | -6,913 | -716 | 374 | 764 | 1,112 | 1,383 |
| Personal and laundry services | -7,602 | -2,839 | -1,295 | -938 | -459 | 39 |
| Religious, grantmaking, civic, professional, and similar organizations | -8,420 | -8,731 | -9,365 | -10,736 | -11,482 | -11,633 |
| Private households | -2,122 | -836 | -405 | -282 | -107 | 93 |
| State and Local Government | -13,290 | -3,127 | 8,282 | 13,995 | 20,530 | 27,269 |
| State Government | -4,056 | -957 | 2,524 | 4,271 | 6,264 | 8,318 |
| Local Government | -9,234 | -2,170 | 5,758 | 9,724 | 14,266 | 18,951 |
| Federal Civilian | -16,126 | -118 | 5,754 | 8,712 | 11,539 | 13,985 |
| Federal Military | -5,151 | -907 | 4,032 | 6,705 | 9,350 | 11,859 |
| Farm | -3,903 | -816 | -39 | 126 | 222 | 313 |

APPENDIX C.
Locality Employment and Tax Revenue Impacts by Scenario

TABLE C.1: Locality Private Non-farm Employment and Tax Revenue Impacts, 2020 and 2021, -6% Growth Scenario

| Locality | Private Non-farm Employment (percentage of baseline) | | Tax Revenues (percentage of baseline) | |
|---------------------|---|--------|--|--------|
| | 2020 | 2021 | FY2020 | FY2021 |
| Accomack County | -11.19% | -6.35% | -0.99% | -1.56% |
| Albemarle County | -9.94% | -6.63% | -1.79% | -2.76% |
| Alleghany County | -10.15% | -6.74% | -0.72% | -1.09% |
| Amelia County | -9.02% | -6.58% | -0.59% | -1.00% |
| Amherst County | -10.44% | -6.78% | -1.23% | -1.91% |
| Appomattox County | -10.41% | -6.81% | -0.73% | -1.20% |
| Arlington County | -11.09% | -6.90% | -2.20% | -3.42% |
| Augusta County | -9.47% | -6.47% | -1.38% | -2.13% |
| Bath County | -15.84% | -6.59% | -2.17% | -2.95% |
| Bedford County | -10.20% | -6.78% | -1.04% | -1.60% |
| Bland County | -10.02% | -6.97% | -0.51% | -0.79% |
| Botetourt County | -9.90% | -6.34% | -1.35% | -2.05% |
| Brunswick County | -9.78% | -6.21% | -0.41% | -0.68% |
| Buchanan County | -9.14% | -6.44% | -2.50% | -4.31% |
| Buckingham County | -9.28% | -6.54% | -0.42% | -0.71% |
| Campbell County | -10.52% | -6.47% | -1.18% | -1.93% |
| Caroline County | -10.94% | -6.60% | -0.95% | -1.41% |
| Carroll County | -12.15% | -6.97% | -0.90% | -1.37% |
| Charles City County | -9.28% | -6.49% | -0.41% | -0.68% |
| Charlotte County | -10.10% | -6.60% | -0.53% | -0.87% |
| Chesterfield County | -10.64% | -6.58% | -1.44% | -2.33% |
| Clarke County | -8.95% | -6.80% | -0.58% | -0.99% |
| Craig County | -8.83% | -6.47% | -0.57% | -0.85% |
| Culpeper County | -10.56% | -6.75% | -0.85% | -1.40% |
| Cumberland County | -9.71% | -6.59% | -0.41% | -0.67% |
| Dickenson County | -9.64% | -6.49% | -2.51% | -4.32% |
| Dinwiddie County | -10.23% | -6.56% | -1.20% | -1.88% |
| Essex County | -11.41% | -6.71% | -1.00% | -1.65% |
| Fairfax County | -9.62% | -6.69% | -1.18% | -1.97% |
| Fauquier County | -10.64% | -6.57% | -0.83% | -1.37% |
| Floyd County | -10.99% | -6.61% | -0.58% | -0.93% |
| Fluvanna County | -9.90% | -6.49% | -0.45% | -0.73% |
| Franklin County | -10.02% | -6.59% | -1.06% | -1.66% |

TABLE C.1: Locality Private Non-farm Employment and Tax Revenue Impacts, 2020 and 2021, -6% Growth Scenario (continued)

| Locality | Private Non-farm Employment (percentage of baseline) | | Tax Revenues (percentage of baseline) | |
|-----------------------|---|--------|--|--------|
| | 2020 | 2021 | FY2020 | FY2021 |
| Frederick County | -10.64% | -6.53% | -1.76% | -2.72% |
| Giles County | -10.69% | -6.75% | -0.74% | -1.20% |
| Gloucester County | -11.10% | -6.75% | -1.54% | -2.32% |
| Goochland County | -9.17% | -6.27% | -1.16% | -1.95% |
| Grayson County | -11.08% | -7.34% | -0.37% | -0.61% |
| Greene County | -11.37% | -6.59% | -1.39% | -2.11% |
| Greensville County | -12.91% | -6.18% | -1.24% | -1.86% |
| Halifax County | -10.68% | -6.61% | -1.09% | -1.74% |
| Hanover County | -10.80% | -6.51% | -1.36% | -2.22% |
| Henrico County | -9.41% | -6.45% | -2.40% | -3.70% |
| Henry County | -11.16% | -6.69% | -1.97% | -3.01% |
| Highland County | -8.97% | -6.37% | -0.35% | -0.57% |
| Isle of Wight County | -11.37% | -6.19% | -0.86% | -1.37% |
| James City County | -12.13% | -6.42% | -1.75% | -2.58% |
| King and Queen County | -11.07% | -6.41% | -0.30% | -0.48% |
| King George County | -9.97% | -6.59% | -1.03% | -1.55% |
| King William County | -11.20% | -6.19% | -1.00% | -1.55% |
| Lancaster County | -9.51% | -6.72% | -0.77% | -1.28% |
| Lee County | -10.33% | -6.66% | -1.12% | -1.85% |
| Loudoun County | -10.82% | -6.58% | -1.17% | -1.91% |
| Louisa County | -9.35% | -6.44% | -0.68% | -1.03% |
| Lunenburg County | -10.44% | -6.43% | -0.46% | -0.74% |
| Madison County | -9.73% | -6.71% | -0.86% | -1.29% |
| Mathews County | -11.19% | -6.91% | -0.66% | -1.00% |
| Mecklenburg County | -10.91% | -6.71% | -0.73% | -1.20% |
| Middlesex County | -11.56% | -6.85% | -0.83% | -1.26% |
| Montgomery County | -11.24% | -6.88% | -1.02% | -1.69% |
| Nelson County | -13.67% | -6.54% | -1.33% | -1.90% |
| New Kent County | -9.99% | -6.40% | -0.85% | -1.28% |
| Northampton County | -11.28% | -6.64% | -1.05% | -1.59% |
| Northumberland County | -10.40% | -6.40% | -0.42% | -0.68% |
| Nottoway County | -9.15% | -6.67% | -0.83% | -1.37% |
| Orange County | -11.15% | -6.71% | -0.91% | -1.43% |
| Page County | -10.69% | -6.94% | -1.00% | -1.50% |
| Patrick County | -10.21% | -6.41% | -0.82% | -1.27% |
| Pittsylvania County | -9.90% | -6.80% | -0.95% | -1.52% |

TABLE C.1: Locality Private Non-farm Employment and Tax Revenue Impacts, 2020 and 2021, -6% Growth Scenario (continued)

| Locality | Private Non-farm Employment (percentage of baseline) | | Tax Revenues (percentage of baseline) | |
|-----------------------|---|--------|--|--------|
| | 2020 | 2021 | FY2020 | FY2021 |
| Powhatan County | -10.96% | -6.46% | -0.85% | -1.39% |
| Prince Edward County | -10.49% | -6.78% | -1.25% | -2.07% |
| Prince George County | -9.90% | -6.41% | -1.54% | -2.39% |
| Prince William County | -11.04% | -6.59% | -1.08% | -1.76% |
| Pulaski County | -10.99% | -6.46% | -1.25% | -1.89% |
| Rappahannock County | -12.94% | -6.43% | -0.68% | -1.01% |
| Richmond County | -9.56% | -7.07% | -0.93% | -1.54% |
| Roanoke County | -9.80% | -6.67% | -1.51% | -2.35% |
| Rockbridge County | -13.10% | -6.72% | -1.67% | -2.39% |
| Rockingham County | -10.31% | -6.36% | -0.90% | -1.43% |
| Russell County | -9.49% | -6.55% | -0.92% | -1.54% |
| Scott County | -11.02% | -7.04% | -0.88% | -1.45% |
| Shenandoah County | -10.90% | -6.64% | -0.85% | -1.40% |
| Smyth County | -9.84% | -6.40% | -0.74% | -1.22% |
| Southampton County | -11.60% | -6.60% | -0.56% | -0.86% |
| Spotsylvania County | -11.28% | -6.73% | -1.69% | -2.59% |
| Stafford County | -9.48% | -6.32% | -1.46% | -2.25% |
| Surry County | -3.26% | -4.99% | -0.13% | -0.24% |
| Sussex County | -10.57% | -6.72% | -0.40% | -0.65% |
| Tazewell County | -10.20% | -6.64% | -1.36% | -2.26% |
| Warren County | -10.85% | -6.78% | -1.17% | -1.85% |
| Washington County | -10.16% | -6.69% | -1.13% | -1.86% |
| Westmoreland County | -10.94% | -6.71% | -0.47% | -0.77% |
| Wise County | -10.21% | -6.66% | -1.20% | -2.02% |
| Wythe County | -11.77% | -6.49% | -1.26% | -1.96% |
| York County | -12.06% | -6.63% | -2.01% | -3.02% |
| Alexandria city | -10.23% | -6.96% | -1.95% | -3.04% |
| Bristol city | -12.19% | -6.76% | -3.28% | -4.67% |
| Buena Vista city | -10.48% | -6.57% | -1.05% | -1.56% |
| Charlottesville city | -10.34% | -6.86% | -2.58% | -3.82% |
| Chesapeake city | -10.54% | -6.55% | -2.18% | -3.31% |
| Colonial Heights city | -13.01% | -6.82% | -4.21% | -6.11% |
| Covington city | -11.28% | -6.53% | -2.10% | -3.10% |
| Danville city | -10.68% | -6.79% | -3.25% | -4.77% |
| Emporia city | -10.87% | -6.66% | -4.77% | -6.72% |
| Fairfax city | -10.90% | -6.80% | -2.69% | -4.19% |

TABLE C.1: Locality Private Non-farm Employment and Tax Revenue Impacts, 2020 and 2021, -6% Growth Scenario (continued)

| Locality | Private Non-farm Employment (percentage of baseline) | | Tax Revenues (percentage of baseline) | |
|---|---|--------|--|----------------|
| | 2020 | 2021 | FY2020 | FY2021 |
| Falls Church city | -10.13% | -6.77% | -1.87% | -2.89% |
| Franklin city | -10.04% | -6.90% | -2.45% | -3.67% |
| Fredericksburg city | -11.75% | -6.76% | -3.75% | -5.45% |
| Galax city | -10.19% | -6.79% | -3.42% | -4.98% |
| Hampton city | -10.53% | -6.80% | -2.18% | -3.21% |
| Harrisonburg city | -11.99% | -6.69% | -3.89% | -5.61% |
| Hopewell city | -10.14% | -6.73% | 0.00% | 0.00% |
| Lexington city | -9.61% | -6.99% | -2.56% | -3.69% |
| Lynchburg city | -9.23% | -6.68% | -2.72% | -4.05% |
| Manassas city | -10.33% | -7.02% | -1.96% | -3.09% |
| Manassas Park city | -8.39% | -5.91% | -1.14% | -1.84% |
| Martinsville city | -9.67% | -6.70% | -2.36% | -3.58% |
| Newport News city | -9.55% | -6.46% | -2.49% | -3.81% |
| Norfolk city | -9.94% | -6.62% | -2.67% | -3.95% |
| Norton city | -9.63% | -6.61% | -4.47% | -6.55% |
| Petersburg city | -8.46% | -6.67% | 0.00% | 0.00% |
| Poquoson city | -11.95% | -6.78% | -0.76% | -1.09% |
| Portsmouth city | -9.37% | -6.63% | -1.72% | -2.67% |
| Radford city | -13.26% | -6.88% | -1.64% | -2.38% |
| Richmond city | -9.32% | -6.61% | -2.21% | -3.33% |
| Roanoke city | -9.79% | -6.63% | -3.02% | -4.54% |
| Salem city | -9.98% | -6.65% | -2.83% | -4.26% |
| Staunton city | -10.60% | -6.82% | -2.42% | -3.54% |
| Suffolk city | -10.51% | -6.66% | -1.91% | -2.88% |
| Virginia Beach city | -10.68% | -6.51% | -2.32% | -3.39% |
| Waynesboro city | -12.38% | -6.85% | -2.68% | -3.91% |
| Williamsburg city | -16.01% | -7.51% | -5.65% | -7.79% |
| Winchester city | -9.68% | -6.74% | -3.52% | -5.28% |
| Estimated average percentage revenue impact | | | -1.68% | -2.60% |
| Estimated total local revenue impact | | | -\$374,454,721 | -\$600,290,086 |

TABLE C.2: Locality Private Non-farm Employment and Tax Revenue Impacts, 2020 and 2021, -2% Growth Scenario

| Locality | Private Non-farm Employment (percentage of baseline) | | Tax Revenues (percentage of baseline) | |
|---------------------|---|--------|--|--------|
| | 2020 | 2021 | FY2020 | FY2021 |
| Accomack County | -7.46% | -2.51% | -0.67% | -0.93% |
| Albemarle County | -6.17% | -2.82% | -1.25% | -1.68% |
| Alleghany County | -6.40% | -2.95% | -0.53% | -0.69% |
| Amelia County | -5.24% | -2.85% | -0.37% | -0.56% |
| Amherst County | -6.70% | -3.00% | -0.87% | -1.18% |
| Appomattox County | -6.69% | -3.06% | -0.48% | -0.69% |
| Arlington County | -7.36% | -3.07% | -1.54% | -2.05% |
| Augusta County | -5.68% | -2.66% | -0.96% | -1.29% |
| Bath County | -12.33% | -2.81% | -1.77% | -2.12% |
| Bedford County | -6.46% | -3.00% | -0.75% | -1.00% |
| Bland County | -6.25% | -3.14% | -0.37% | -0.50% |
| Botetourt County | -6.15% | -2.55% | -0.96% | -1.26% |
| Brunswick County | -6.02% | -2.39% | -0.27% | -0.39% |
| Buchanan County | -5.33% | -2.60% | -1.38% | -2.06% |
| Buckingham County | -5.50% | -2.76% | -0.27% | -0.40% |
| Campbell County | -6.79% | -2.67% | -0.78% | -1.10% |
| Caroline County | -7.23% | -2.82% | -0.71% | -0.92% |
| Carroll County | -8.49% | -3.19% | -0.65% | -0.86% |
| Charles City County | -5.51% | -2.77% | -0.26% | -0.38% |
| Charlotte County | -6.34% | -2.80% | -0.34% | -0.49% |
| Chesterfield County | -6.91% | -2.79% | -0.94% | -1.33% |
| Clarke County | -5.15% | -3.04% | -0.36% | -0.54% |
| Craig County | -5.03% | -2.69% | -0.42% | -0.55% |
| Culpeper County | -6.82% | -2.96% | -0.55% | -0.80% |
| Cumberland County | -5.96% | -2.85% | -0.26% | -0.39% |
| Dickenson County | -5.87% | -2.70% | -1.39% | -2.07% |
| Dinwiddie County | -6.48% | -2.75% | -0.83% | -1.12% |
| Essex County | -7.71% | -2.91% | -0.65% | -0.94% |
| Fairfax County | -5.83% | -2.86% | -0.74% | -1.07% |
| Fauquier County | -6.93% | -2.81% | -0.53% | -0.77% |
| Floyd County | -7.28% | -2.82% | -0.40% | -0.56% |
| Fluvanna County | -6.16% | -2.77% | -0.29% | -0.42% |
| Franklin County | -6.27% | -2.80% | -0.73% | -1.00% |

TABLE C.2: Locality Private Non-farm Employment and Tax Revenue Impacts, 2020 and 2021, -2% Growth Scenario (continued)

| Locality | Private Non-farm Employment (percentage of baseline) | | Tax Revenues (percentage of baseline) | |
|-----------------------|---|--------|--|--------|
| | 2020 | 2021 | FY2020 | FY2021 |
| Frederick County | -6.90% | -2.71% | -1.24% | -1.66% |
| Giles County | -6.96% | -2.94% | -0.49% | -0.70% |
| Gloucester County | -7.40% | -2.99% | -1.12% | -1.47% |
| Goochland County | -5.35% | -2.39% | -0.71% | -1.04% |
| Grayson County | -7.36% | -3.54% | -0.25% | -0.37% |
| Greene County | -7.68% | -2.85% | -1.00% | -1.32% |
| Greensville County | -9.26% | -2.33% | -0.91% | -1.18% |
| Halifax County | -6.94% | -2.80% | -0.74% | -1.02% |
| Hanover County | -7.08% | -2.73% | -0.89% | -1.27% |
| Henrico County | -5.62% | -2.63% | -1.70% | -2.26% |
| Henry County | -7.43% | -2.86% | -1.41% | -1.87% |
| Highland County | -5.17% | -2.57% | -0.22% | -0.32% |
| Isle of Wight County | -7.65% | -2.35% | -0.57% | -0.78% |
| James City County | -8.46% | -2.62% | -1.31% | -1.67% |
| King and Queen County | -7.36% | -2.62% | -0.20% | -0.28% |
| King George County | -6.21% | -2.77% | -0.76% | -0.99% |
| King William County | -7.50% | -2.40% | -0.69% | -0.93% |
| Lancaster County | -5.73% | -2.93% | -0.49% | -0.73% |
| Lee County | -6.60% | -2.91% | -0.73% | -1.06% |
| Loudoun County | -7.09% | -2.78% | -0.75% | -1.07% |
| Louisa County | -5.57% | -2.65% | -0.49% | -0.65% |
| Lunenburg County | -6.70% | -2.63% | -0.30% | -0.43% |
| Madison County | -5.98% | -2.95% | -0.63% | -0.83% |
| Mathews County | -7.49% | -3.15% | -0.48% | -0.64% |
| Mecklenburg County | -7.18% | -2.90% | -0.47% | -0.68% |
| Middlesex County | -7.88% | -3.09% | -0.61% | -0.81% |
| Montgomery County | -7.53% | -3.09% | -0.66% | -0.95% |
| Nelson County | -10.06% | -2.74% | -1.02% | -1.28% |
| New Kent County | -6.26% | -2.68% | -0.63% | -0.82% |
| Northampton County | -7.57% | -2.84% | -0.76% | -1.00% |
| Northumberland County | -6.68% | -2.63% | -0.27% | -0.39% |
| Nottoway County | -5.36% | -2.88% | -0.53% | -0.78% |
| Orange County | -7.45% | -2.94% | -0.64% | -0.87% |
| Page County | -6.96% | -3.17% | -0.74% | -0.97% |
| Patrick County | -6.44% | -2.56% | -0.58% | -0.78% |
| Pittsylvania County | -6.15% | -3.04% | -0.64% | -0.90% |

TABLE C.2: Locality Private Non-farm Employment and Tax Revenue Impacts, 2020 and 2021, -2% Growth Scenario (continued)

| Locality | Private Non-farm Employment (percentage of baseline) | | Tax Revenues (percentage of baseline) | |
|-----------------------|---|--------|--|--------|
| | 2020 | 2021 | FY2020 | FY2021 |
| Powhatan County | -7.28% | -2.77% | -0.56% | -0.80% |
| Prince Edward County | -6.76% | -3.00% | -0.81% | -1.19% |
| Prince George County | -6.12% | -2.57% | -1.07% | -1.43% |
| Prince William County | -7.34% | -2.85% | -0.70% | -1.00% |
| Pulaski County | -7.26% | -2.61% | -0.90% | -1.18% |
| Rappahannock County | -9.32% | -2.66% | -0.50% | -0.64% |
| Richmond County | -5.78% | -3.29% | -0.60% | -0.89% |
| Roanoke County | -6.02% | -2.85% | -1.05% | -1.41% |
| Rockbridge County | -9.47% | -2.93% | -1.29% | -1.62% |
| Rockingham County | -6.56% | -2.54% | -0.61% | -0.84% |
| Russell County | -5.71% | -2.76% | -0.57% | -0.83% |
| Scott County | -7.29% | -3.24% | -0.57% | -0.83% |
| Shenandoah County | -7.17% | -2.82% | -0.55% | -0.79% |
| Smyth County | -6.07% | -2.57% | -0.48% | -0.69% |
| Southampton County | -7.90% | -2.76% | -0.40% | -0.53% |
| Spotsylvania County | -7.59% | -2.96% | -1.21% | -1.60% |
| Stafford County | -5.69% | -2.51% | -1.01% | -1.35% |
| Surry County | 0.77% | -1.16% | -0.07% | -0.11% |
| Sussex County | -6.83% | -2.91% | -0.28% | -0.39% |
| Tazewell County | -6.45% | -2.85% | -0.86% | -1.25% |
| Warren County | -7.12% | -3.00% | -0.80% | -1.10% |
| Washington County | -6.40% | -2.86% | -0.73% | -1.06% |
| Westmoreland County | -7.22% | -2.91% | -0.32% | -0.45% |
| Wise County | -6.46% | -2.87% | -0.74% | -1.08% |
| Wythe County | -8.08% | -2.68% | -0.89% | -1.20% |
| York County | -8.40% | -2.86% | -1.47% | -1.91% |
| Alexandria city | -6.46% | -3.14% | -1.35% | -1.82% |
| Bristol city | -8.52% | -2.94% | -2.55% | -3.16% |
| Buena Vista city | -6.72% | -2.72% | -0.78% | -1.01% |
| Charlottesville city | -6.59% | -3.07% | -1.92% | -2.46% |
| Chesapeake city | -6.81% | -2.77% | -1.57% | -2.06% |
| Colonial Heights city | -9.39% | -3.06% | -3.22% | -4.06% |
| Covington city | -7.57% | -2.71% | -1.57% | -2.01% |
| Danville city | -6.94% | -2.98% | -2.45% | -3.12% |
| Emporia city | -7.15% | -2.88% | -3.75% | -4.61% |
| Fairfax city | -7.18% | -3.00% | -1.88% | -2.53% |

TABLE C.2: Locality Private Non-farm Employment and Tax Revenue Impacts, 2020 and 2021, -2% Growth Scenario (continued)

| Locality | Private Non-farm Employment (percentage of baseline) | | Tax Revenues (percentage of baseline) | |
|---|---|--------|--|----------------|
| | 2020 | 2021 | FY2020 | FY2021 |
| Falls Church city | -6.38% | -2.99% | -1.31% | -1.75% |
| Franklin city | -6.29% | -3.12% | -1.80% | -2.35% |
| Fredericksburg city | -8.07% | -2.97% | -2.85% | -3.59% |
| Galax city | -6.43% | -2.99% | -2.60% | -3.30% |
| Hampton city | -6.79% | -3.00% | -1.63% | -2.08% |
| Harrisonburg city | -8.31% | -2.89% | -2.98% | -3.74% |
| Hopewell city | -6.37% | -2.91% | 0.00% | 0.00% |
| Lexington city | -5.82% | -3.18% | -1.98% | -2.47% |
| Lynchburg city | -5.42% | -2.86% | -2.01% | -2.58% |
| Manassas city | -6.59% | -3.24% | -1.33% | -1.82% |
| Manassas Park city | -4.62% | -2.24% | -0.74% | -1.03% |
| Martinsville city | -5.88% | -2.88% | -1.69% | -2.23% |
| Newport News city | -5.75% | -2.60% | -1.76% | -2.31% |
| Norfolk city | -6.17% | -2.80% | -1.97% | -2.52% |
| Norton city | -5.85% | -2.80% | -3.37% | -4.29% |
| Petersburg city | -4.64% | -2.86% | 0.00% | 0.00% |
| Poquoson city | -8.29% | -3.04% | -0.59% | -0.74% |
| Portsmouth city | -5.58% | -2.83% | -1.20% | -1.60% |
| Radford city | -9.62% | -3.07% | -1.25% | -1.58% |
| Richmond city | -5.52% | -2.79% | -1.58% | -2.06% |
| Roanoke city | -6.01% | -2.82% | -2.18% | -2.85% |
| Salem city | -6.21% | -2.83% | -2.06% | -2.68% |
| Staunton city | -6.86% | -3.02% | -1.83% | -2.33% |
| Suffolk city | -6.78% | -2.87% | -1.38% | -1.80% |
| Virginia Beach city | -6.95% | -2.72% | -1.75% | -2.20% |
| Waynesboro city | -8.72% | -3.05% | -2.03% | -2.58% |
| Williamsburg city | -12.50% | -3.75% | -4.58% | -5.54% |
| Winchester city | -5.90% | -2.92% | -2.58% | -3.35% |
| Estimated average percentage revenue impact | | | -1.17% | -1.57% |
| Estimated total local revenue impact | | | -\$260,413,996 | -\$360,959,478 |

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