



Science and Technology Incentives

JLARC evaluation of economic development incentives

- Appropriation Act directs JLARC to evaluate economic development incentives on an ongoing basis
 - Spending and business activity
 - Economic benefits
 - Effectiveness
- JLARC contracts with Weldon Cooper Center for the evaluations

2021 Appropriation Act, Item 32(F).

In-depth incentive reports presented through 2022

Date	Incentives covered
November 2017	Film incentives (3)
June 2018	Workforce and small business incentives (9)
June 2019	Data center and manufacturing incentives (11)
September 2020	Infrastructure and regional incentives (10)
June 2021	Trade and transportation incentives (11)
June 2022	Science and technology incentives (11)

11 science and technology incentives evaluated in this report

Incentive	Incentive type	Amount spent FY20
R&D tax credits and exemption	Tax credits, exemption	\$27.7M
“Angel” investment tax credit, long-term capital gains, and venture capital subtractions*	Tax credit, subtractions	4.8
GAP Funds and Commonwealth Research and Commercialization Fund (CRCF)	Investment fund, grant	5.2
Spaceport users exemption and Zero G human flight and resupply subtractions	Exemption, subtractions	1.1

Angel tax credit = Qualified Equity and Subordinated Debt Investments Tax Credit. Both the GAP Funds and CRCF programs were ‘rebranded’ in 2021 (referred to here by their former names).

*Long-term capital gains and venture capital subtractions are not included in presentation.

In brief

Research indicates R&D tax credits typically help businesses—especially small businesses—increase R&D spending. Virginia’s credits are too small to meaningfully affect overall statewide R&D activity, but increasing the credits would not substantially improve activity.

“Angel” investment tax credit has little impact on startup growth, but programs that provide financial assistance directly to startups, like GAP Funds and CRCF, help businesses innovate and grow.

Space tax incentives have minimal impact on space activity in Virginia.

In this presentation

R&D tax credits and exemptions

Angel investment tax credit

GAP Funds and CRCF

Spaceport users exemption and Zero G subtractions

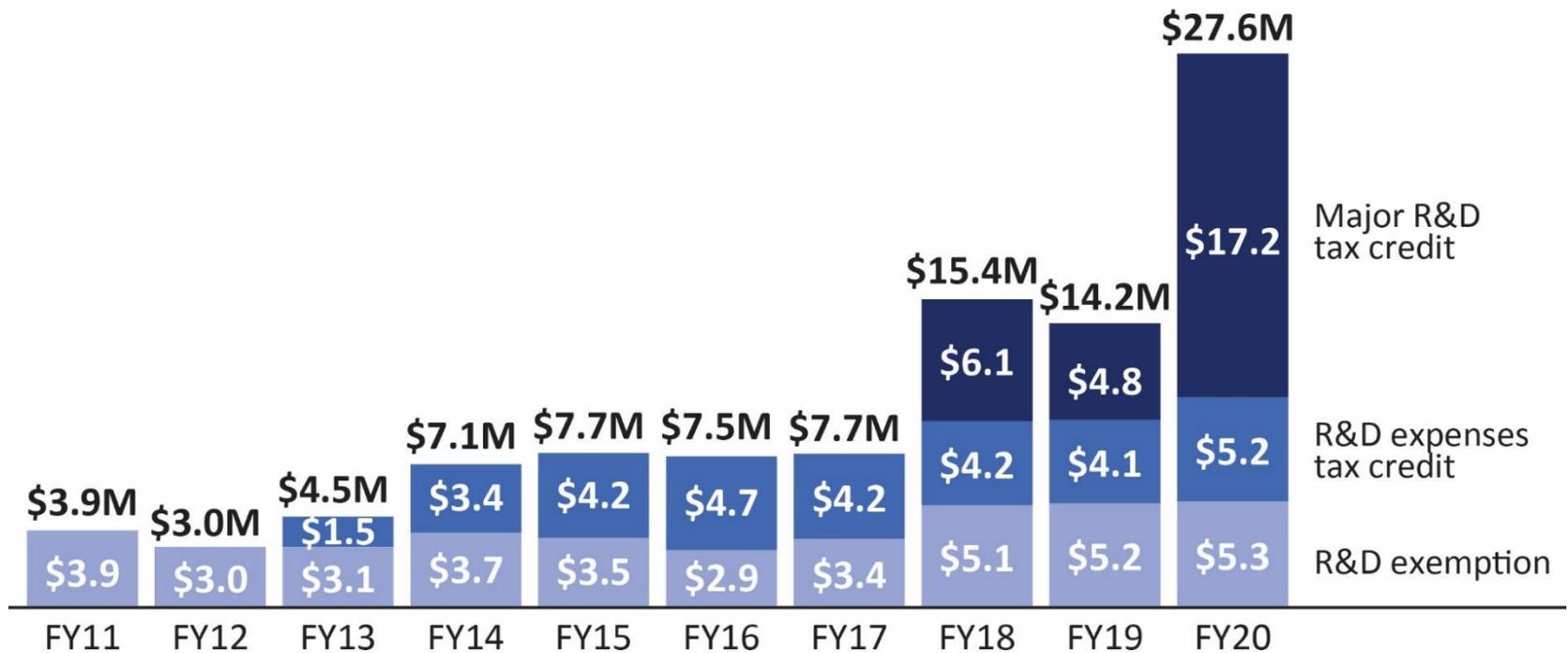
U.S. and many states offer tax credits to address private underinvestment in R&D

- Innovation through R&D is important for long-term economic growth
- Businesses often underinvest in R&D because they do not capture the full returns from their investment
 - Benefits often “spillover” to other companies and the public

Virginia's R&D tax incentives are designed to encourage business R&D spending

Incentive	Description	Business tax savings FY20
Major R&D tax credit	Tax credit for larger companies with more than \$5M in R&D expenses	\$17M
R&D expenses tax credit	Tax credit for smaller companies with \$5M or less in R&D expenses; refundable	5
R&D exemption	Exempts purchases of chemicals, lab equipment, and other tangible goods used for R&D activities from sales tax	5

Business tax savings from R&D incentives greatly increased after major R&D tax credit adopted



Numbers may not sum because of rounding.

Findings

Virginia's R&D tax credits and exemption are too small overall to meaningfully increase statewide business R&D activity, and increases to the credits would not substantially improve the level of activity.

However, research indicates R&D tax credits increase business R&D spending for the companies using them.

Virginia's spending on R&D tax credits is too small to increase statewide business R&D activity

- Virginia's R&D tax credits are small: equal to 0.15% of private R&D spending in the state (FY11–FY20)
- Increasing spending on R&D tax credits would not substantially improve statewide R&D activity
 - Virginia's business R&D intensity (1.33%) is half the national rate (2.6%) and lower than many states
 - Doubling the tax credits would only increase Virginia's business R&D intensity from 1.33% to 1.35%
 - Other factors, such as strength of the economy and industry mix, have greater effect on R&D activity

Business R&D intensity is the ratio of business R&D spending to private GDP.

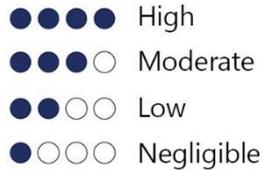
Research indicates R&D tax credits have positive outcomes for the businesses using them

- Estimated that \$1 in R&D credits may lead to at least \$2 of additional business R&D spending
- Some state R&D tax credits found to have generated small increases in R&D employment, establishments, startups

Findings

R&D tax incentives are estimated to have negligible measurable economic benefits per \$1 million in spending and negligible returns in revenue compared with other incentives.

R&D tax incentives have negligible measurable economic benefits and returns in revenue



Economic benefit

per \$1M spent



Return in revenue

per \$1 spent

Major R&D tax credit (FY18-FY20)

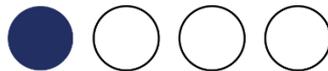


5 jobs, \$0.8M in state GDP, and \$0.5M in personal income



4¢

R&D expenses tax credit (FY13-FY20)

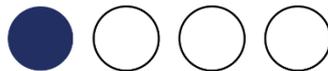


8 jobs, \$1.3M in state GDP, and \$0.8M in personal income



5¢

R&D sales tax exemption (FY18-FY20)



10 jobs, \$0.9M in state GDP, and \$1.0M in personal income



1¢

R&D tax incentive economic benefits and returns in revenue likely underestimated

- Estimates do not reflect spillover benefits to other companies or public, which could be substantial
- Estimates in report are short-term effects
- Research suggests R&D tax credits can have long-term impacts that do not materialize until after 5 years

Prioritize R&D tax credits for smaller companies to improve credits' economic benefits

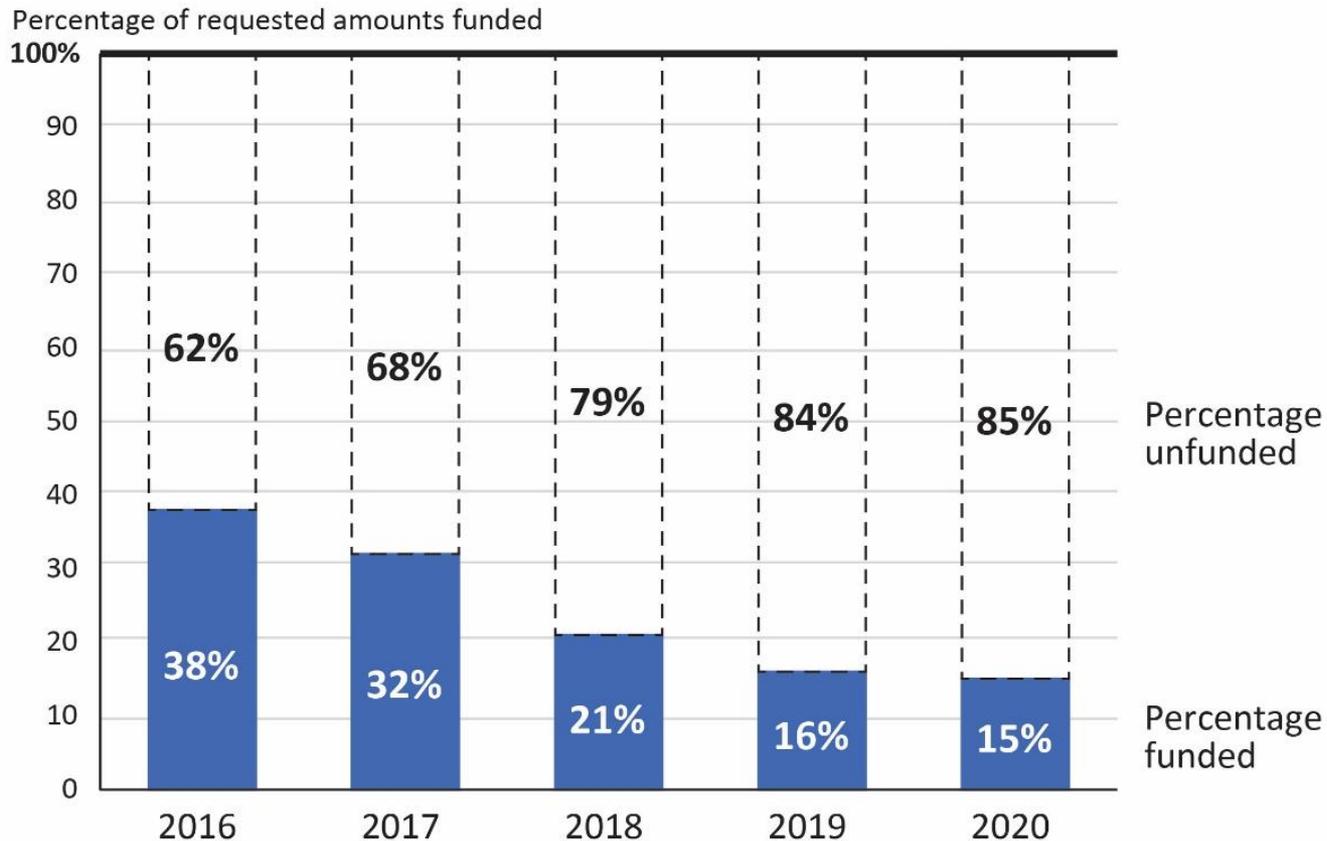
- Research indicates tax credits lead to greater R&D spending increases for smaller companies
- Other states prioritize R&D credits for small businesses
 - Restrict R&D credits to small businesses (CT, NM, ND)
 - Provide small businesses more generous R&D credits (DE, LA, PA, NY)

Recommendation

The General Assembly may wish to consider prioritizing R&D tax credits to smaller companies by

- reallocating a portion of the major R&D tax credit cap to the R&D expenses tax credit cap or
- combining the two credits and giving smaller companies priority for awards.

Major R&D tax credit is oversubscribed so businesses receive a fraction of eligible credits



Step-rate reimbursement structure would improve proration for major R&D tax credit

- Step-rate reimbursement: higher rate for initial R&D spending and lower rate for additional spending
 - Example: 10% for first \$1M; 5% for remaining spending
- Would improve proration - the fraction of eligible credits the business receives
- Some smaller businesses may receive more credits than they would have under current reimbursement

Annual per company cap would improve proration of major R&D tax credit

- Total credit amount would be allocated more evenly across recipients, reducing the impact of large requests
- Businesses would know maximum credit allowed, improving credit's predictability
- A \$300,000 cap would have brought supply of and demand for credit into better balance 2016–2020*

*Based on credit requests between 2016 and 2020.

Major R&D tax credit should prioritize research conducted with higher education institutions

- Research conducted with higher education is more likely to have higher spillover benefits
- Could establish higher per company cap for companies that conduct eligible R&D activities with Virginia higher education institutions
- R&D expenses tax credit already prioritizes research performed with Virginia higher education institutions

Recommendations

The General Assembly may wish to consider several improvements to the major R&D tax credit:

- adopting a step-rate reimbursement structure
- adopting an annual company-level cap
- prioritizing research with Virginia higher education institutions by providing a higher company-level cap.

Virginia lags on measures indicating vitality of private innovation and entrepreneurship

Measure	Rank
Total R&D intensity (public and private funding, 2018)	25th
Patents per capita (2020)	27th
Business R&D as percentage of output (2019)	29th
University business startups per 100,000 population (2016–2020)	33rd

In this presentation

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Virginia provides angel investment tax credit to encourage private investment in startups

- Credit available to private investors or “angels” who invest in small, high-tech startups based in Virginia
- Investment is through purchase of stock or ownership interest (equity) or unsecured loan (subordinated debt)
- Credit is capped at \$5M annually and has no expiration date

*Startups typically cannot access conventional loans and lines of credit.

Findings

Research suggests angel investment tax credits do not promote startup success.

Virginia's angel investment tax credit has had little impact on businesses' startup growth.

Research indicates state angel investment tax credits have not led to startup success

- Have helped startups receive early stage investment but have not led to startup success
 - Low growth in employment, patent activity, or likelihood of raising additional capital or successful exit*
- Used by inexperienced investors that invest in slow-growing businesses
 - 6% of tax credit investors had prior entrepreneurial experience vs. 55% of angel investors generally
 - Experienced angel investors are influenced by factors other than tax credits

*Merger or IPO, initial public offering.

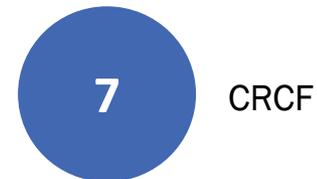
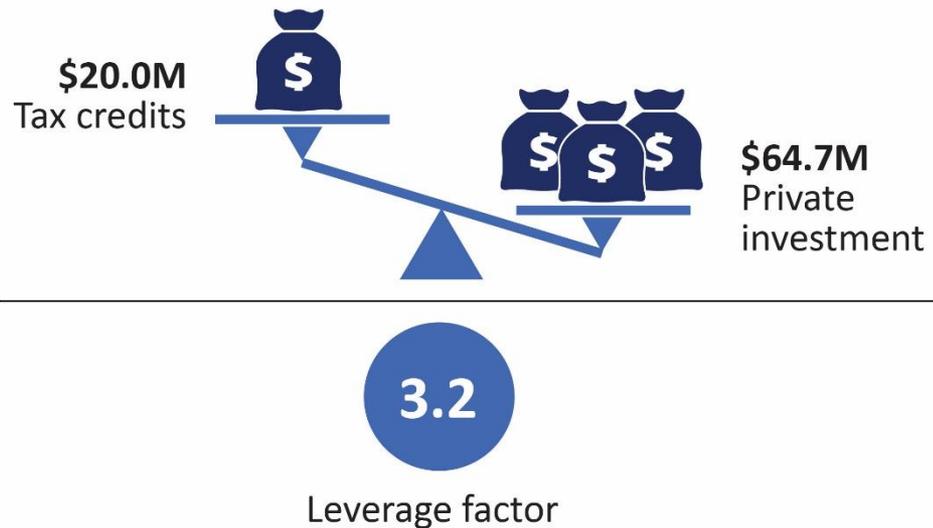
Virginia's angel investment tax credit not targeted to experienced investors

- No requirement that investors have prior angel investment or entrepreneurial experience
- No requirement that investment be made in innovative startups with growth potential

Virginia's angel investment tax credit has lower investment leverage factor than similar programs

\$20M in tax credits may have leveraged \$64.7M in private funding in tax credit assisted businesses

Similar programs have higher leverage factors



Leverage factors are based on amounts of program spending and private investment obtained by program-assisted businesses between 2017 and 2020.

Findings

Angel investment tax credit has negligible economic benefits per \$1 million spent on the incentive and negligible returns in state revenue relative to other incentives.

Angel investment tax credit has negligible economic benefit and return in revenue

- High
- Moderate
- Low
- Negligible



Economic benefit
per \$1M spent



Return in revenue
per \$1 spent



8 jobs, \$0.5M in state GDP, and
\$0.6M in personal income



2¢

FY11-FY20

Recommendation

General Assembly may wish to consider eliminating the angel investment tax credit.

If not eliminated, substantial changes should be made to the angel investment tax credit

- Better target to innovative, fast-growing businesses
- Include an expiration date in statute for the tax credit
- Reduce the reimbursement rate (currently 50% of investment)
- Require businesses to attest that tax credits are needed and incentivize them to remain in Virginia

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GAP Funds and CRCF programs directly provide funds to startups to help them innovate and grow

Incentive	Description	FY20 awards
GAP Funds	Provides equity investment in high tech startups and has equity stake	\$3M
CRCF grant	Provides grants to high tech startups to help bring the products and services they are developing to market; “commercialization” program	2

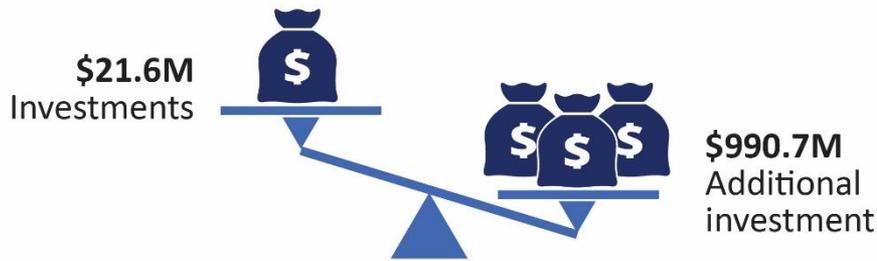
The Virginia Innovation Partnership Corporation (VIPIC) administers both programs.

Finding

GAP Funds and CRCF programs appear to help startups innovate and grow.

GAP Funds and CRCF projects leverage additional private investment to help businesses grow

GAP Funds investments



46

Leverage factor

CRCF grants



43

Leverage factor

Leverage factors are based on program funding and private investment received by program-assisted businesses between FY11 and FY20.

GAP Funds and CRCF programs generally perform well on other outcome measures

- GAP Funds program's investment returns are 60% above the original investments in startups
- GAP Funds-assisted startups have lower failure rate than national average for startups
- CRCF program helps Virginia remain competitive (ranks 6th) in receiving federal SBIR/STTR grant funds

SBIR, Small Business Innovative Research; STTR, Small Business Technology Transfer.

Findings

GAP Funds program is estimated to have high economic benefits per \$1 million in spending and a high return in state revenue relative to other incentives.

CRCF program is estimated to have low economic benefits per \$1 million in spending and a low return in state revenue relative to other incentives.

GAP Funds program has high economic benefits, and CRCF grant has low economic benefits

- High
- Moderate
- Low
- Negligible



Economic benefit
per \$1M spent



Return in revenue
per \$1 spent

GAP Funds program



274 jobs, \$53M in state GDP, and \$30M in personal income



\$1.66

CRCF grant



36 jobs, \$7M in state GDP, and \$4M in personal income



23¢

FY11–FY20

In this presentation

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Spaceport users exemption and Zero G subtractions

Virginia provides three tax incentives to promote Virginia space industry and spaceport

Incentive	Basic description
Spaceport exemption	Allows companies to purchase space vehicles, rocket fuel, equipment, and other items to perform spaceport activities at MARS tax free
Zero G resupply subtraction	Allows space flight companies to subtract income from resupplying the International Space Station from their state income taxes
Zero G human flight subtraction	Allows space flight companies to subtract income from launching people to space or providing space flight training from their state income taxes

MARS: Mid-Atlantic Regional Spaceport.

Companies saved \$6.7 million in income and sales taxes because of space tax incentives (FY11–FY20)

- Nearly all of the savings are from the spaceport exemption
- Tax savings from Zero G resupply subtraction are low
 - Must have ISS resupply contract with NASA
 - Few resupply launches in Virginia (FY11–FY20)
- Zero G human flight subtraction has not been used and is unlikely to be used in the future, according to stakeholders

ISS: International Space Station.

Findings

Multiple factors, including other state financial support and incentives, have greater influence on space activity in the state than the space tax incentives.

MARS has multiple infrastructure and location advantages

- One of four U.S. spaceports* with vertical launch capability for launching to orbit
- Coastal location for launches over the ocean, minimizing risk and insurance costs
- Proximity to D.C. metro area: access to workforce and major aerospace, defense customers
- Scheduling flexibility with only 1–2 launches per year

*Other spaceports are in Alaska, California, and Florida. Cape Canaveral in Florida is MARS's primary competitor.

Virginia has provided substantial support for space flight industry through other sources

- Virginia Space has received \$8.5M in bond financing and more than \$50M in appropriations for MARS infrastructure improvements
- Orbital Sciences received \$28M in Transportation Partnership Opportunity Fund grants for infrastructure development at MARS (FY11–FY20)

FY22: State support provided to Rocket Lab (\$15M custom incentive) and Virginia Space (\$30M for launchpad).

Findings

The spaceport exemption and Zero G resupply subtraction have negligible economic benefits per \$1 million spent on the incentives and negligible returns in state revenue relative to other incentives.

Spaceport exemption and Zero G resupply subtraction have negligible economic benefits and returns in state revenue (FY11–FY20)

- High
- Moderate
- Low
- Negligible



Economic benefit
per \$1M spent



Return in revenue
per \$1 spent



6 jobs, \$0.3M in state GDP, and
\$0.6M in personal income



4¢ for every \$1 spent

NOTE: Estimates of incentives are reported together to prevent disclosure of taxpayer information.

Spaceport exemption could be maintained for several reasons

- Primary beneficiaries are suppliers and sub-contractors of space launch companies
- Virginia would be at competitive disadvantage with other space launch states, all of which have exemption
- Maintains similar tax treatment to space industry as other capital intensive industries (data centers, airlines, etc.)

Zero G subtractions should be eliminated

- Zero G resupply subtraction benefits very few companies (must have resupply contract)
- Zero G human flight subtraction not used and unlikely to be used in future
- If Virginia wants to maintain an incentive to attract space launch companies
 - Replace subtractions with a new, broader grant to incentivize infrastructure development at Virginia Space

Recommendation

The General Assembly may wish to consider eliminating the Zero G resupply and human flight subtractions.

JLARC staff for this report

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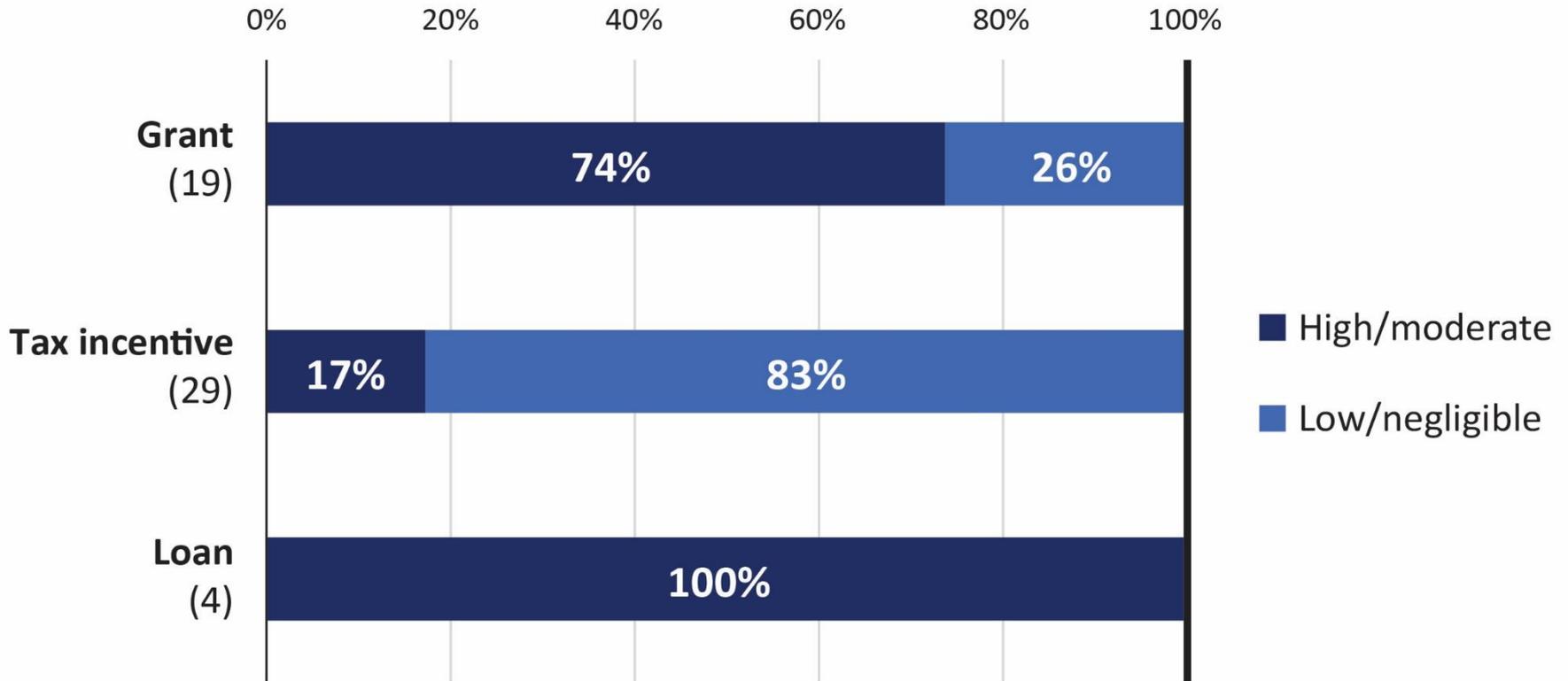
Ellen Miller, Chief Analyst

Economic impact analysis

Terance J. Rephann, Regional Economist

Weldon Cooper Center for Public Service

Grants and loans typically have higher economic benefits than tax incentives*



*Of the 52 incentives evaluated to date for which economic benefits could be estimated.

Next round of incentives: business location and expansion

Industry targeted	Program
Agriculture	Agriculture and Forestry Industries Development Fund Grant Farm Wineries and Vineyards Tax Credit
Headquarters or major employers	Virginia Economic Development Incentive Grant Major Eligible Employer Grant Major Business Facility Jobs Tax Credit
Manufacturers or other export-base industries	Virginia Investment Partnership Grant Commonwealth's Opportunity Fund New Company Incentive Program* GO Virginia Collaborative Economic Development Performance Grant**

*New Company Incentive Program (tax incentive/grant) and GO Virginia Collaborative Economic Development Performance Grant have been unused or have few users. **Comprehensive evaluation of the overall GO Virginia program not included, but could be comprehensively evaluated later.