

Regional Entrepreneurial Assessment Profiles

Region 6: Mary Ball Washington

November 13, 2018



Purpose/Intent of Engagement

GO Virginia Project:
Addressing Challenge of
Entrepreneurial
Development across
Regions

GO Virginia concerned that Virginia lags in the creation and growth of new ventures

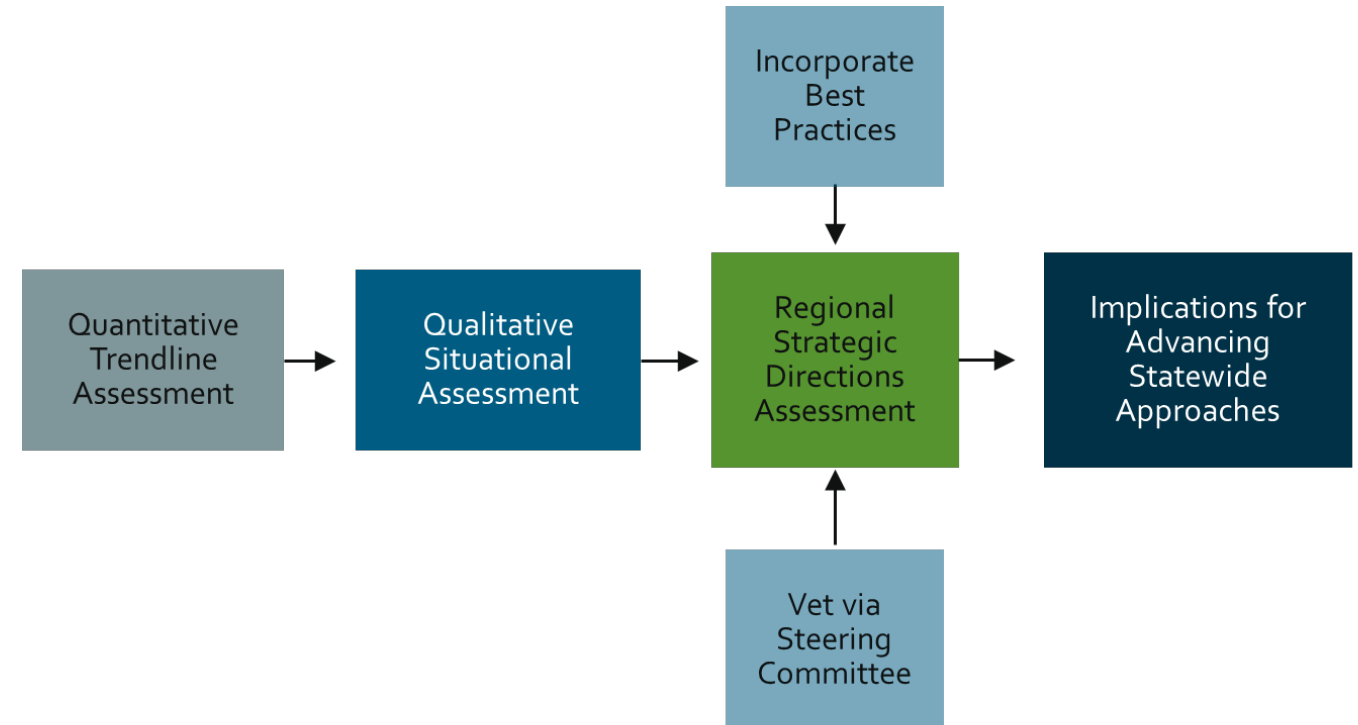
Improving the state's performance requires each region to assess and address their specific needs:

- Recognize entrepreneurial development is a very localized phenomenon
- Enable regions to access state resources and tools tailored to the needs of their specific regions
- Empower local stakeholders to play a key role in governance and oversight

This project aims to:

- Analyze common set of data, inventory assets, and stakeholder perspectives to help GO Virginia regions develop their own strategic directions
- Offer best practice lessons and benchmarking to national peers
- Support each GO Virginia region in identifying key investments/activities to catalyze the development of a robust innovation ecosystem
- Consider statewide approaches to address common needs and gaps

Overview of Work Plan for GO Virginia's project:





Preliminary Regional Data Profile and Trends Analysis

Why Focus on Traded Industry Sectors?

- New business creation is important for all regions. However, nationally, a small share of firms account for a disproportionate share of economic output and employment. **These firms tend to be in traded industries.**
- **Traded Industries** leverage customers outside the region. They include manufacturing; professional, scientific and technical services; information; finance and insurance; transportation and warehousing; mining; agriculture; and tourism-related industries.
- **Local industries** serve the local market and correlated to size of population: local K-12 school system, local hospitals, restaurants and retail, utilities, etc.

EDA U.S. Cluster Mapping Project:

“Traded clusters are the “engines” of regional economies; without strong traded clusters it is virtually impossible for a region to reach high levels of overall economic performance.”

In 2017, traded companies accounted for 12.1% of all companies and 13.3% of all company employment, but 19.6% of the high-growth startups in Region 6.

Companies and Employment in Traded Sector vs Non-Traded Sector Companies: Mary Ball Washington (Region 6), 2017

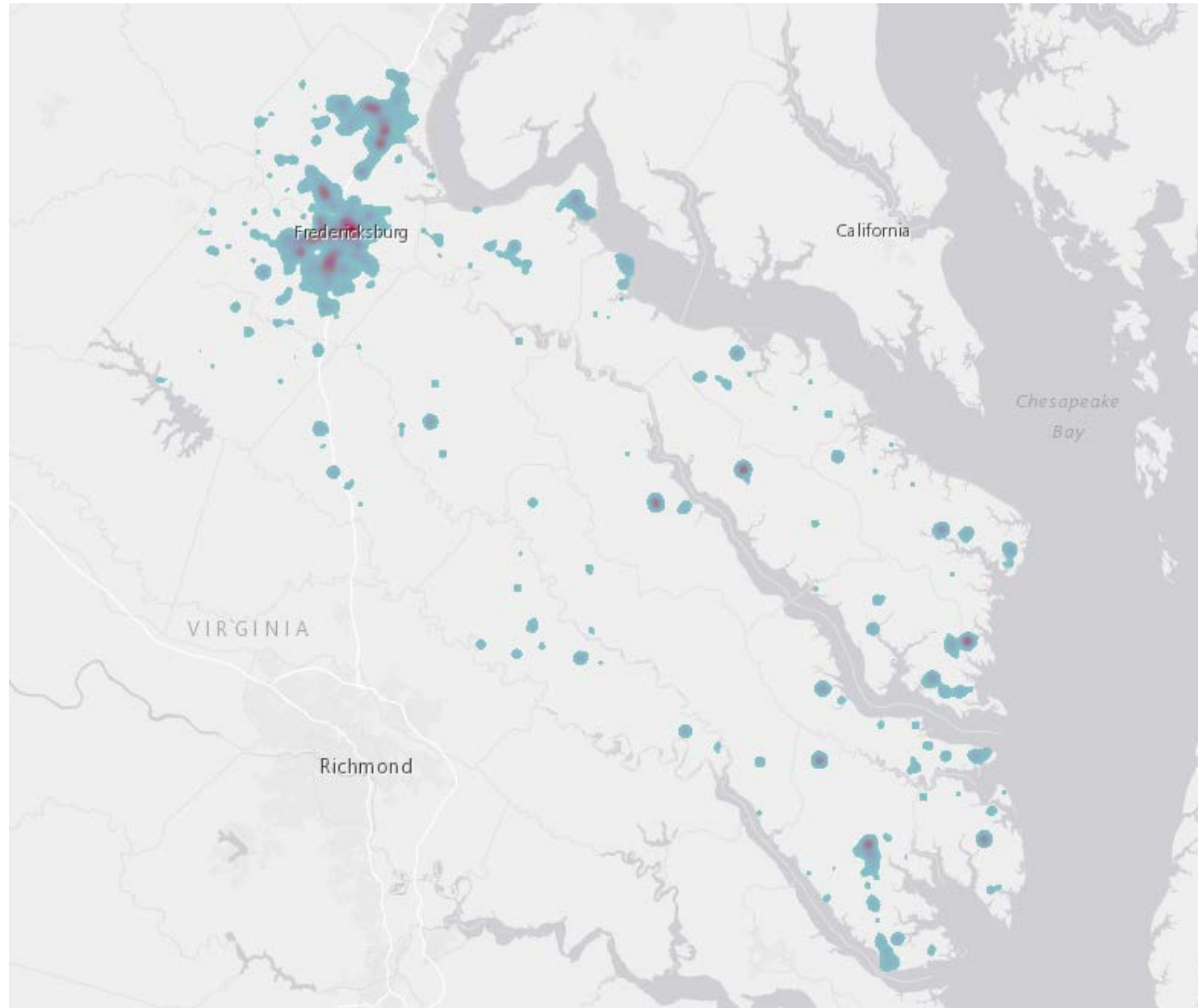
Total 2017 Companies	Traded	Non-Traded	Total	Traded/Total
All	2,037	14,819	16,856	12.1%
Startups	1,086	7,010	8,096	13.4%
High-growth startups	132	541	674	19.6%
Total 2017 Employment	Traded	Non-Traded	Total	
All	22,602	146,959	169,561	13.3%
Startups	6,090	40,603	46,693	13.0%
High-growth startups	2,027	8,300	10,327	19.6%

Geographic Distribution of Traded Sector Startup Activity in Mary Ball Washington Region, 2017

High Regional
Startup Activity
Levels

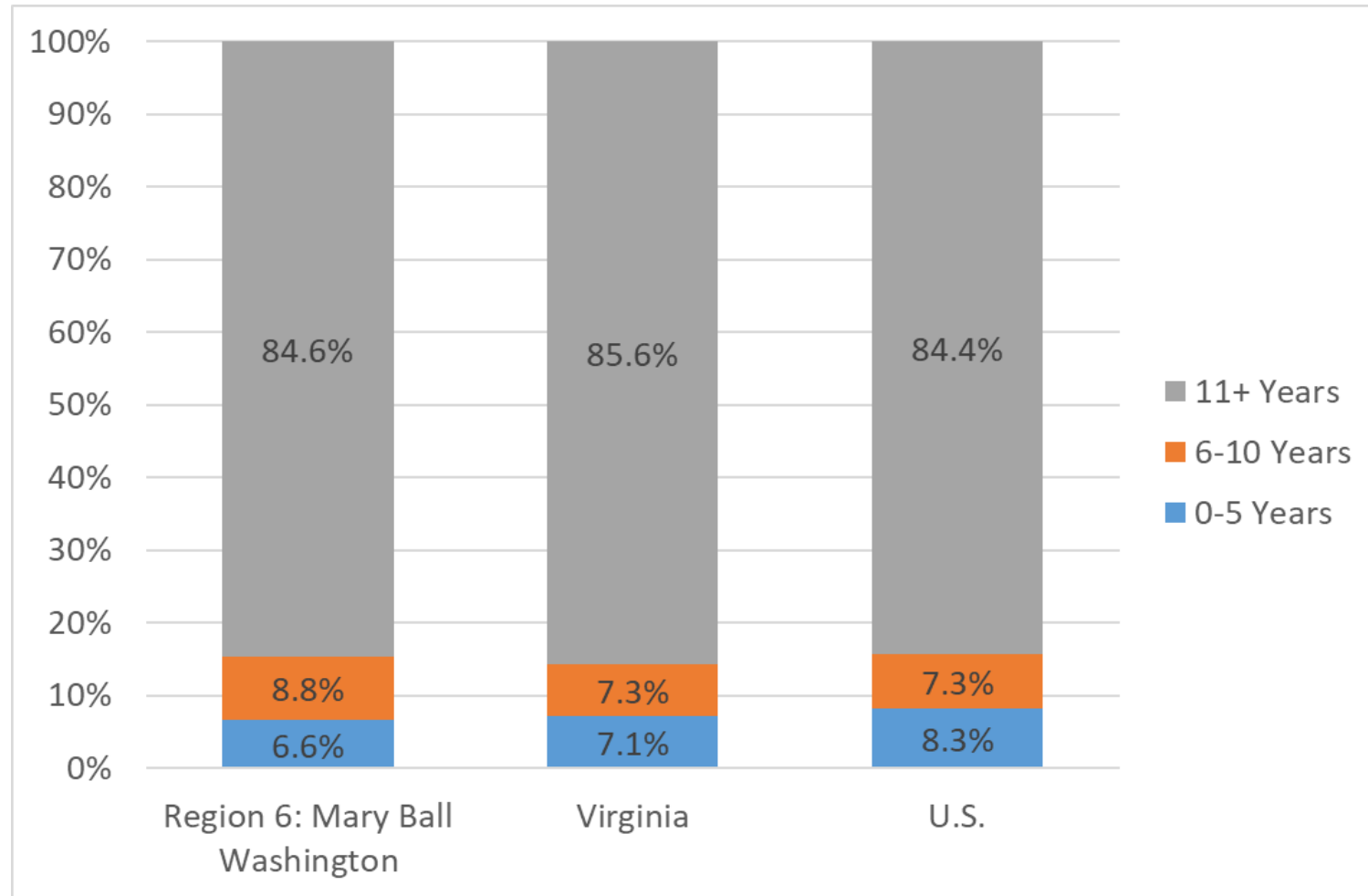


Low Regional
Startup Activity
Levels



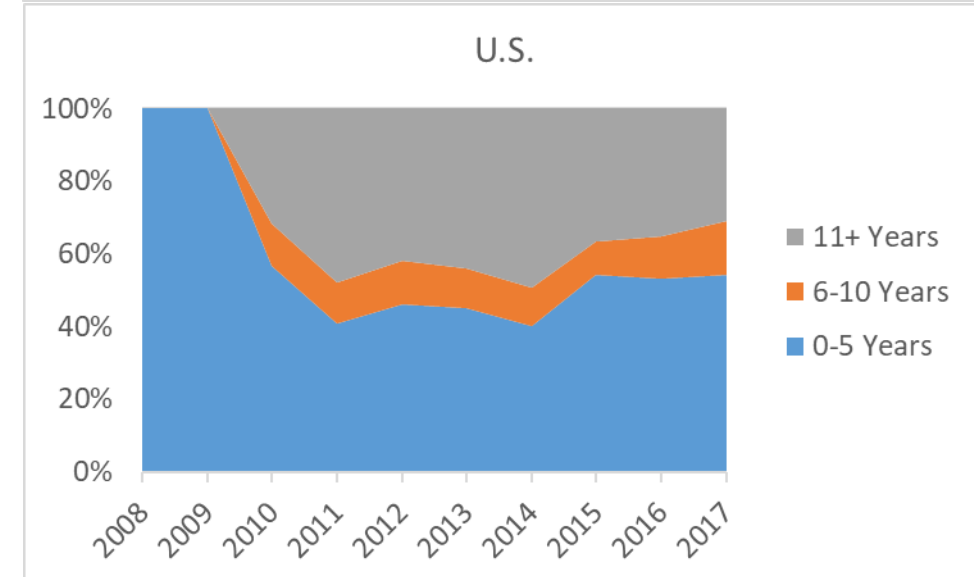
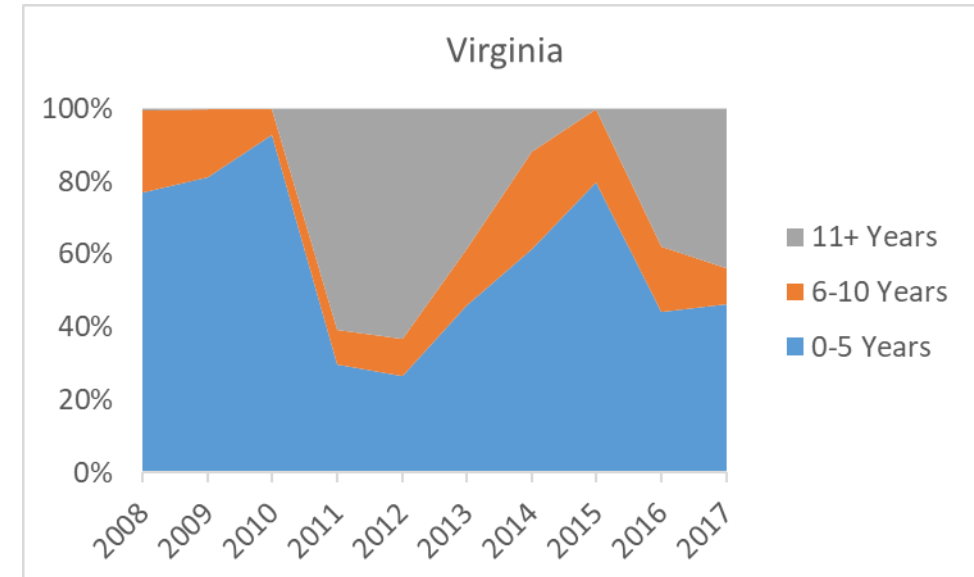
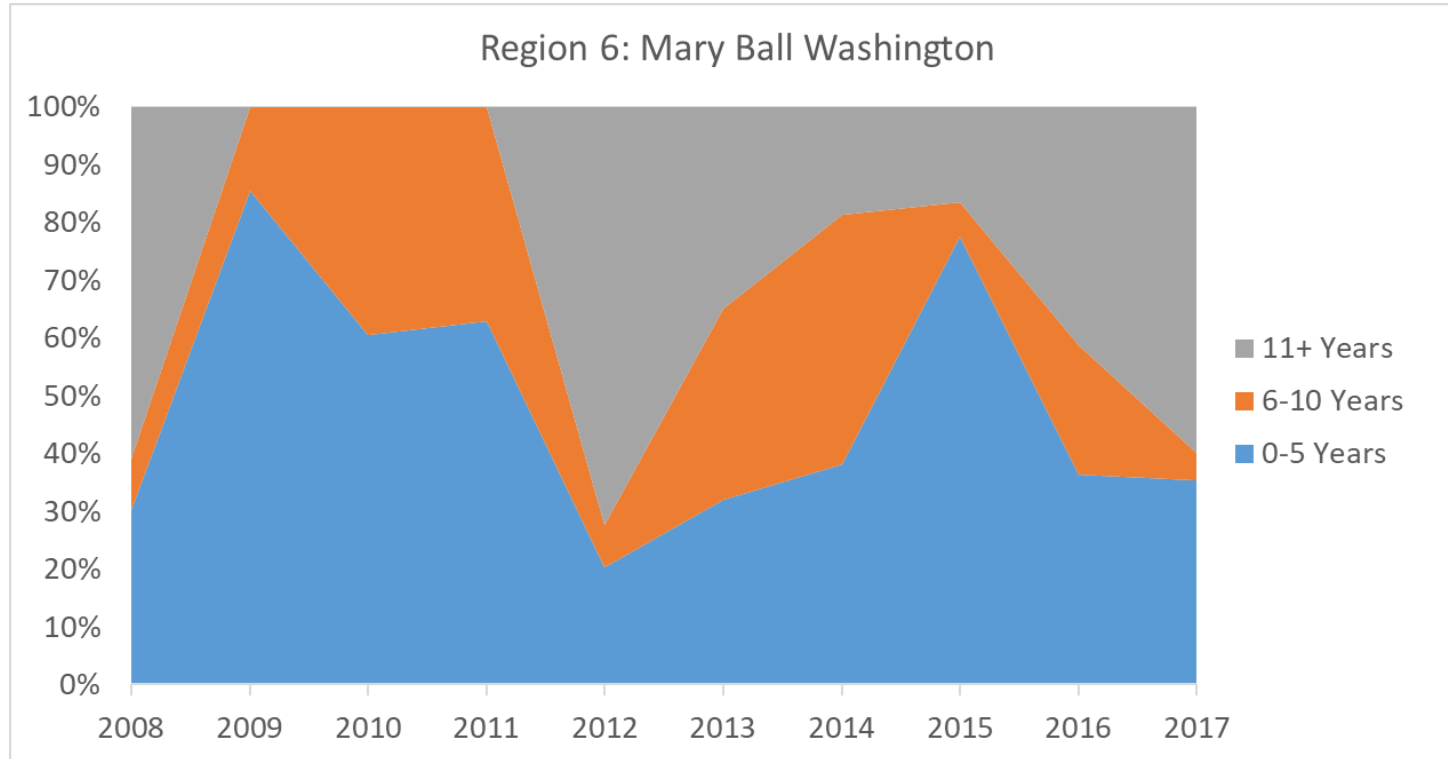
Startups in the Mary Ball Washington region account for a higher share of traded sector employment (15.4%) compared to Virginia (14.4%) and is comparable to the U.S. (15.6%)

Traded Sector Employment by Firm Age as a Percentage of Total Employment, 2008 Q1 through 2017 Q2



Net job growth in Greater Fredericksburg region driven by 11+ years and 0-5 year firms

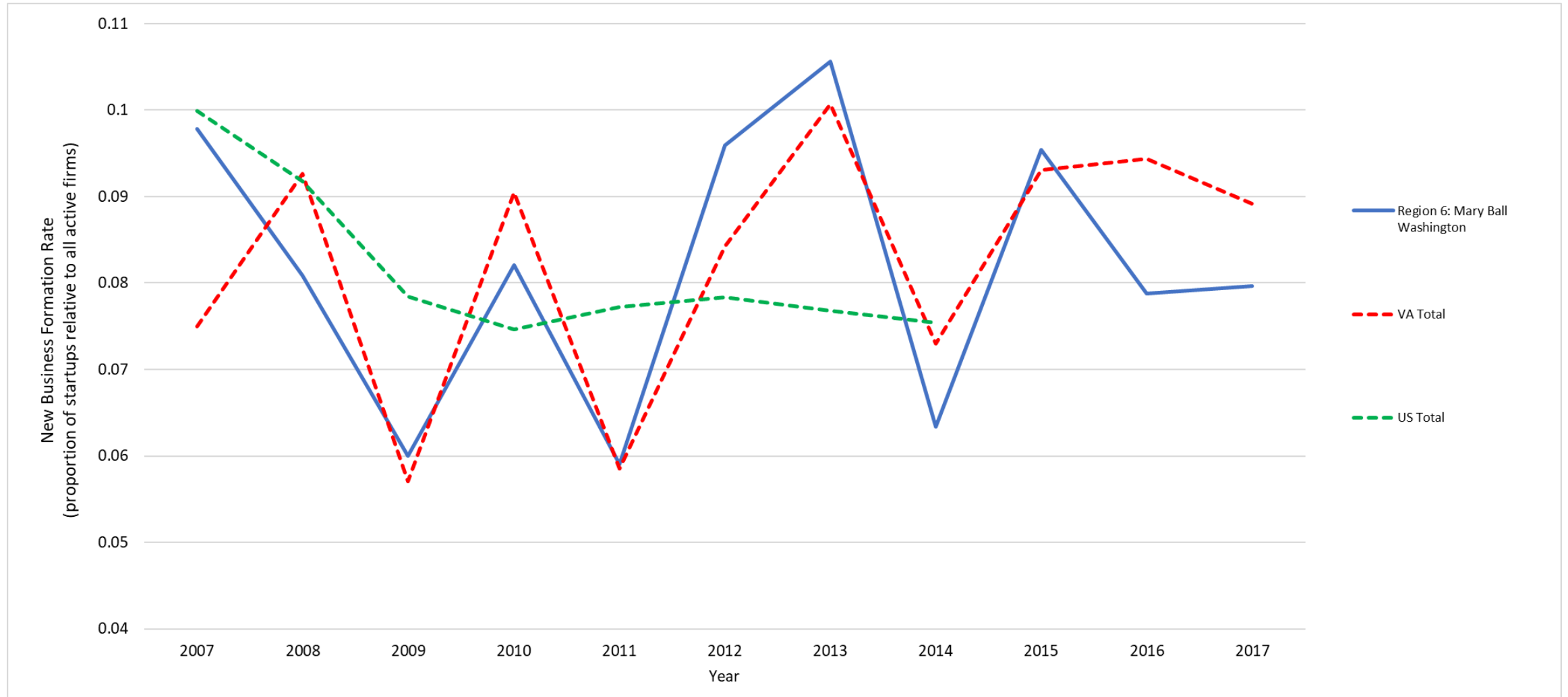
Traded Sector Net Job Change by Firm Age, 2008 Q1 through 2017 Q2



Source: U.S. Census Bureau Quarterly Workforce Indicators dataset.

Mary Ball Washington new business formation rate tracks Virginia's and is in the 6% to 10% range

New Business Formation Rates: Mary Ball Washington, Virginia, U.S., 2007-2017



Source: Business Dynamics Research Consortium database for Greater Fredericksburg and Virginia; U.S. Longitudinal Business Database for U.S.

*U.S. new business formation rates latest available is 2014

Survival Rates and Employment Generated by Traded Sector Startups, by Cohort by Year

In 2010, 256 traded sector companies were launched in the Mary Ball Washington region; 89 were still active in 2017 (34.8% survival rate), and these 89 companies have created 574 jobs

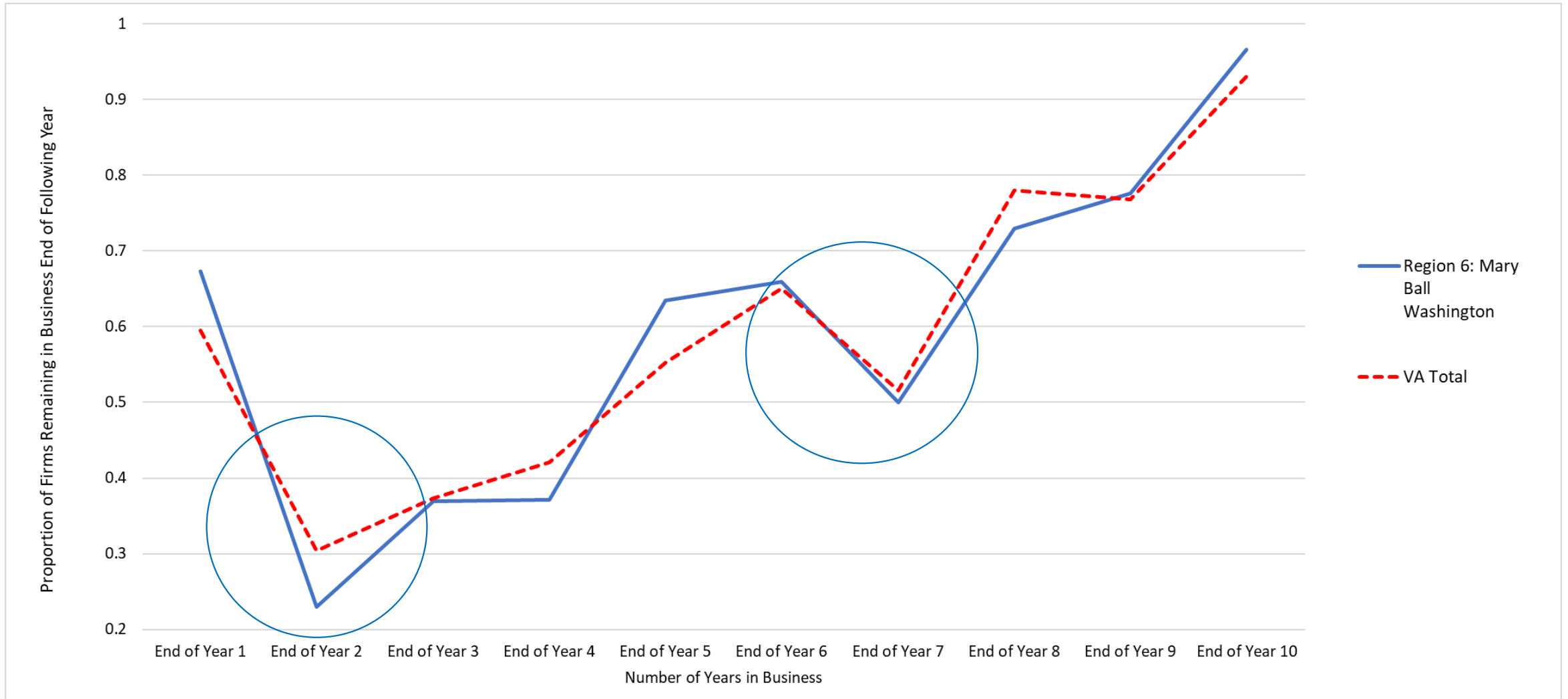
Founding Year of Startup Cohort*	Number of Startups in Traded Sector Industries	Number of Startups Surviving by 2017	Survival Rate by 2017	Start-up Employment Levels 2017
2007	245	65	26.5%	483
2008	190	56	29.5%	441
2009	135	45	33.3%	296
2010	256	89	34.8%	574
2011	113	43	38.0%	261
2012	233	110	47.2%	679
2013	300	149	49.7%	604
2014	164	91	55.5%	434
2015	213	152	71.4%	876
2016	150	107	71.3%	494
2017	179	179	100%	948

Source: Business Dynamics Research Consortium database

Note: *Composed of all new non-branch firms with first recorded employment activity in a given year

Startup survival rates decline dramatically in year 2, and then improve over time, except for a second dip in year 7

Year-over-Year Survival Rate Trends in Traded Sector Startups

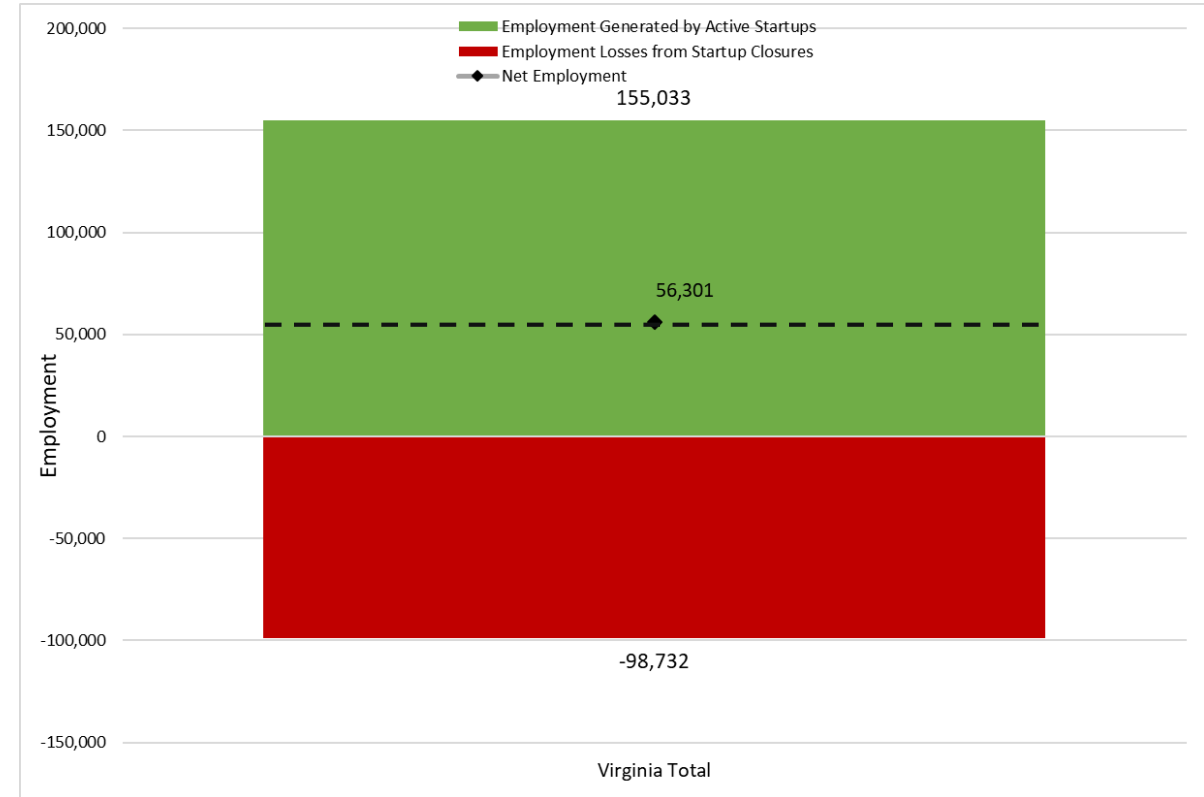
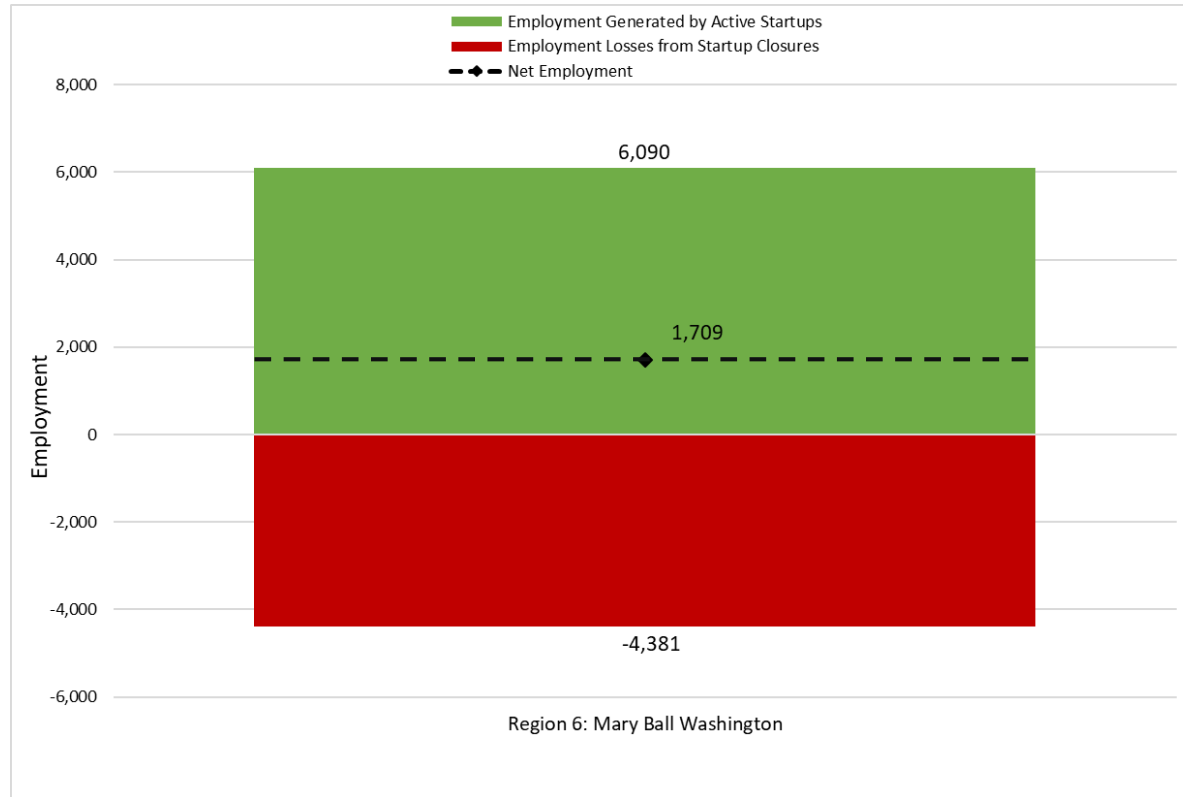


Source: Business Dynamics Research Consortium database

Note: *Startups defined as having firm age <10 years as of 2017

Net employment creation by surviving traded sector startups greater than losses from failures

Net Employment Impact Generated by Traded Sector Startups in the Mary Ball Washington region and Virginia: net employment in Virginia slightly higher



Source: Business Dynamics Research Consortium database.
Note: Startups are defined as companies <10 years as of 2017

Survival Rates and Employment Generated by Traded Sector High-Growth Startups* by Cohort

Founding Year of Startup Cohort**	Total Number of Startups in Traded Sector Industries	Number of High Growth Start-ups in Traded Sector Industries*	Number of High Growth Start-ups Surviving by 2017	Employment Levels of High Growth Start-ups, 2017
2007	245	28	8	163
2008	190	21	7	200
2009	135	7	3	85
2010	256	16	9	310
2011	113	11	6	69
2012	233	32	17	322
2013	300	28	16	157
2014	164	25	20	202
2015	213	56	46	519
2016	150	0	0	0
2017	179			

Source: Business Dynamics Research Consortium database

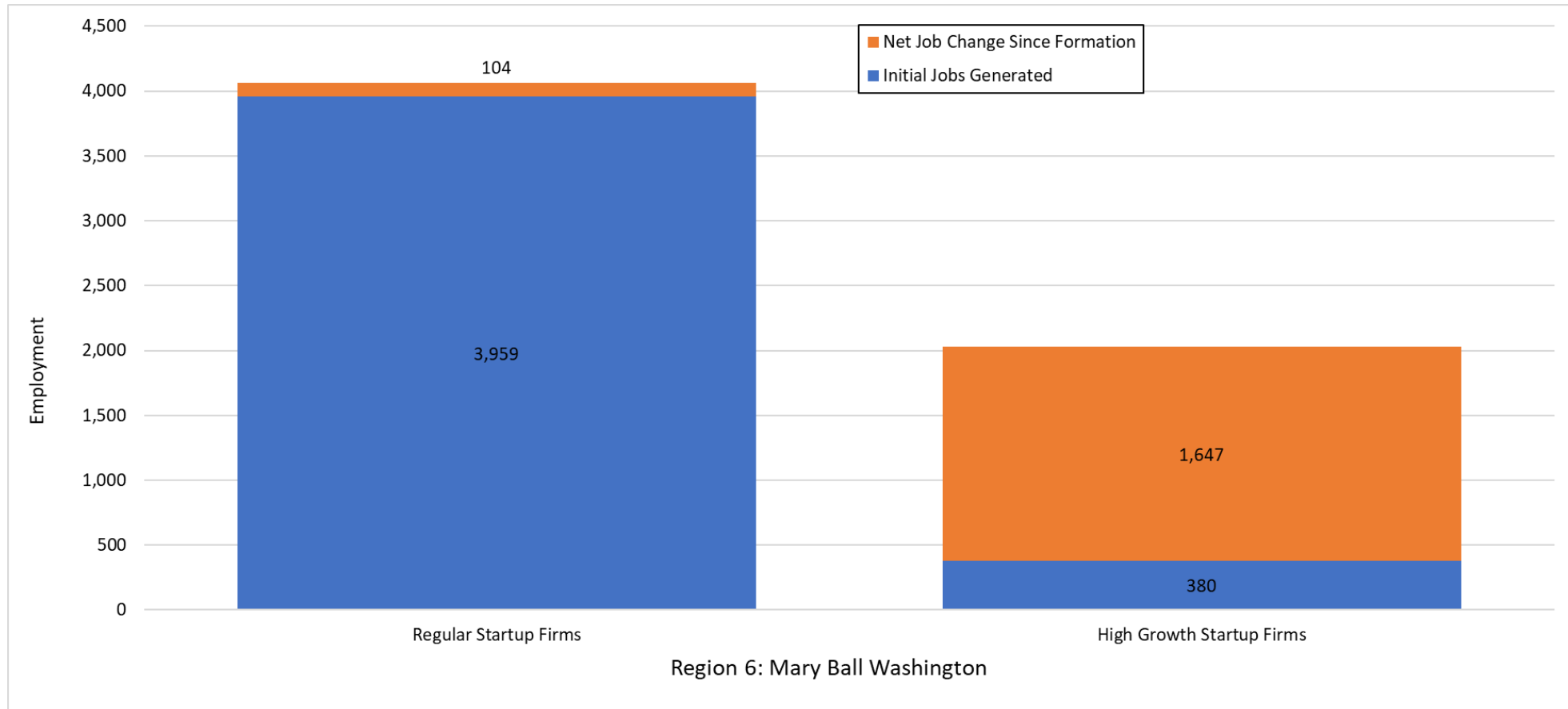
* High growth startups defined as >25% annualized employment growth over lifetime of business

** A cohort is all new non-branch firms with first recorded employment activity in a given year

Disproportionate share of lasting net job creation observed from high-growth** traded sector startups

Initial and Net Employment Growth Generated by Current Traded Sector Startups in Mary Ball Washington Region: Firms that are < 10 years in 2017

	Total VA Regular Startup Firms	Total VA High Growth Startup Firms
Initial Jobs Generated	124,266	10,474
Net Job Growth Since Formation	-959	52,944



Source: Business Dynamics Research Consortium database

**Startups defined as having firm age <10 years as of 2017, high growth startups defined as >25% annualized employment growth over lifetime of business

Mary Ball Washington Region: Startup employment highly concentrated in four industry sectors

	Major Industry Cluster	Number of Startups in Cluster	Number of Start-ups Surviving by 2017	Number of High Growth Start-ups in Cluster**	Start-up Employment Levels, 2017	Start-ups Industry Cluster Employment Concentration Index*
<p>Region 6 Priority Clusters from 2017 Growth and Diversification Plan:</p> <ul style="list-style-type: none"> Professional, Scientific and Technical Services Information / Data Centers Forestry / Wood Products / Paper Manufacturing Seafood Processing / Aquaculture / Commercial Fishing Logistics / Distribution 	Agriculture & Food Processing	169	101	6	371	1.04
	Business Services	994	514	77	2,067	0.71
	Energy, Natural Resources, & Finished Products	110	57	14	572	1.40
	Engineering, R&D, Testing & Technical Services	136	94	23	744	1.17
	Financial & Insurance Services	278	127	7	391	0.60
	Health Care Services	50	36	8	814	1.20
	Information Technology & Communications Services	128	74	26	560	0.60
	Life Sciences	70	34	10	258	1.03
	Manufacturing	127	72	16	603	1.29
	Ship Building, Aerospace, & Defense	7	3	2	8	0.10
	Transportation, Distribution and Logistics	285	128	22	625	0.92
	Other Traded Sectors	875	394	69	2,361	0.69

*Startups Employment Concentration Index represents specialization of startup activity in certain industry clusters given overall state trends, >1.2 indicates highly specialized concentration of startups in a particular industry sector. **Defined as >25% annualized employment growth over lifetime of business

GWRC: Startup employment is highly concentrated in two industry clusters, 2017

Major Industry Cluster	Number of Startups in Cluster	Number of Start-ups Surviving by 2017	Number of High Growth Start-ups in Cluster**	Start-up Employment Levels, 2017	Start-ups Industry Cluster Employment Concentration Index*
Agriculture & Food Processing	77	45	3	371	0.64
Business Services	687	365	63	2,067	0.74
Energy, Natural Resources, & Finished Products	63	30	10	572	0.99
Engineering, R&D, Testing & Technical Services	99	70	23	744	1.48
Financial & Insurance Services	193	88	4	391	0.61
Health Care Services	35	25	5	814	1.12
Information Technology & Communications Services	99	58	21	560	0.70
Life Sciences	47	27	6	258	0.88
Manufacturing	81	46	12	603	1.42
Ship Building, Aerospace, & Defense	4	1	1	8	0.05
Transportation, Distribution and Logistics	339	155	28	625	0.77

*Startups Employment Concentration Index represents specialization of startup activity in certain industry clusters given overall state trends, >1.2 indicates highly specialized concentration of startups in a particular industry sector. **Defined as >25% annualized employment growth over lifetime of business

Northern Neck PDC: Startup employment highly concentrated in three industry clusters, 2017

Major Industry Cluster	Number of Startups in Cluster	Number of Start-ups Surviving by 2017	Number of High Growth Start-ups in Cluster**	Start-up Employment Levels, 2017	Start-ups Industry Cluster Employment Concentration Index*
Agriculture & Food Processing	38	24	3	106	2.80
Business Services	124	62	6	266	0.86
Energy, Natural Resources, & Finished Products	18	10	2	121	2.78
Engineering, R&D, Testing & Technical Services	17	9	0	26	0.38
Financial & Insurance Services	32	14	2	39	0.56
Health Care Services	5	3	0	27	0.38
Information Technology & Communications Services	22	12	1	76	0.77
Life Sciences	7	3	1	12	0.45
Manufacturing	20	14	1	69	1.39
Ship Building, Aerospace, & Defense	1	1	0	1	0.12
Transportation, Distribution and Logistics	70	24	1	132	0.86

*Startups Employment Concentration Index represents specialization of startup activity in certain industry clusters given overall state trends, >1.2 indicates highly specialized concentration of startups in a particular industry sector. **Defined as >25% annualized employment growth over lifetime of business

Middle Peninsula PDC: Startup employment highly concentrated in four industry clusters, 2017

Major Industry Cluster	Number of Startups in Cluster	Number of Start-ups Surviving by 2017	Number of High Growth Start-ups in Cluster**	Start-up Employment Levels, 2017	Start-ups Industry Cluster Employment Concentration Index*
Agriculture & Food Processing	54	32	0	101	1.62
Business Services	183	87	8	254	0.50
Energy, Natural Resources, & Finished Products	29	17	2	160	2.23
Engineering, R&D, Testing & Technical Services	20	15	0	43	0.39
Financial & Insurance Services	53	25	1	66	0.58
Health Care Services	10	8	3	244	2.06
Information Technology & Communications Services	7	4	1	17	0.10
Life Sciences	16	4	3	87	1.97
Manufacturing	26	12	3	56	0.68
Ship Building, Aerospace, & Defense	2	1	1	4	0.30
Transportation, Distribution and Logistics	90	38	5	192	0.76

*Startups Employment Concentration Index represents specialization of startup activity in certain industry clusters given overall state trends, >1.2 indicates highly specialized concentration of startups in a particular industry sector. **Defined as >25% annualized employment growth over lifetime of business

Region 6: SBA 7(a) Loans and Loan Amounts, Cumulative Totals 2010-2018Q2

Industry Clusters	Co's Receiving Loans	Total No. of Loans	Total Loan Amounts (\$)	% of Total Loan Amounts
Total, All Traded Sector Industries	97	126	\$52,879,340	100%
Manufacturing	11	17	\$15,347,800	29%
Agriculture & Food Processing	10	15	\$12,047,600	23%
Engineering, R&D, Testing & Technical Services	7	10	\$6,135,600	12%
Business Services	22	30	\$4,886,500	9%
Information Technology & Communications Services	11	12	\$2,760,000	5%
Energy, Natural Resources, & Finished Products	7	10	\$2,491,900	5%
Transportation, Distribution and Logistics	5	5	\$465,000	1%
Life Sciences	2	2	\$450,000	1%
Financial & Insurance Services	1	1	\$50,000	0%
Ship Building, Aerospace, & Defense	1	1	\$50,000	0%
All Other, Non-cluster Industries	20	23	\$8,194,940	15%

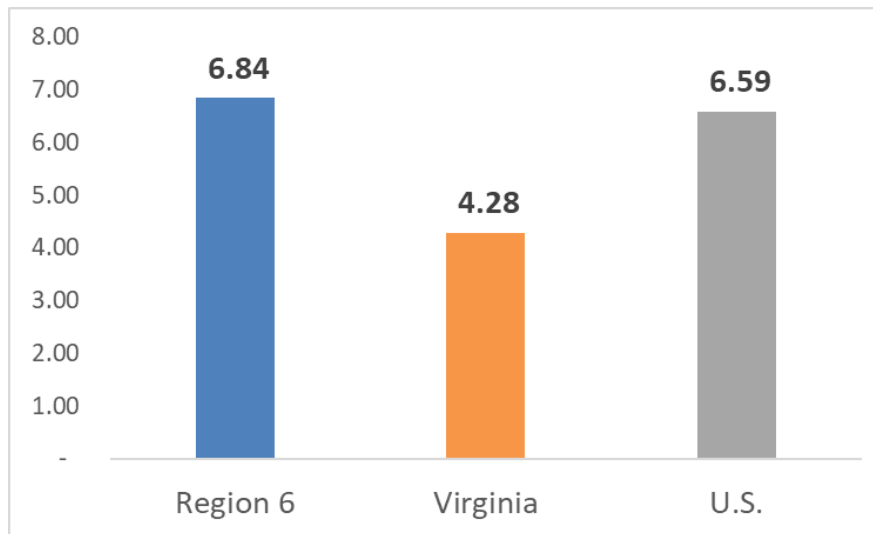
Source: TEconomy analysis of SBA loan data reports.

*Data for 2018 are through Q2.

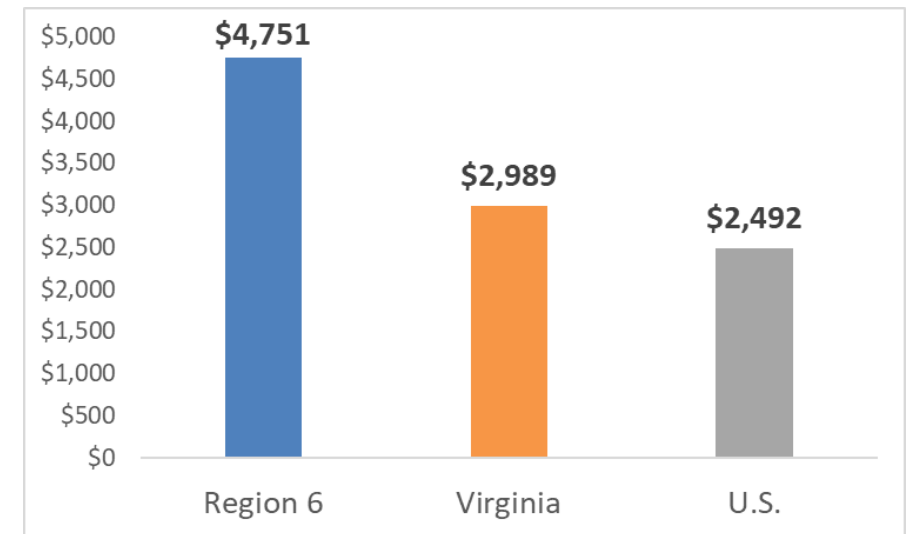
High SBA loan activity in priority industry clusters, such as Manufacturing, Ag and Food Processing, Professional Scientific and Technical Services

In 2017, Mary Ball Washington region small traded sector companies approved for more loans and larger loans relative to VA and the U.S.

SBA 7(a) Loan Counts, Traded Sector Companies Per 1,000 Establishments, 2017



SBA 7(a) Loan Amounts (\$), Traded Sector Companies Per Establishment, 2017



Source: TEconomy analysis of SBA loan reports.

Assignees of Patents with Mary Ball Washington Region Inventors, 2010-2017

Assignees	# of patents
U.S. Navy	96
U.S. Postal Service	13
KLA-Tencor Corporation (Milpitas, CA)	11
NASA	10
Reid, John H. (Reid Engineering Corp., Fredericksburg, VA)	9
QRC Technologies Inc. (Fredericksburg, VA)	8
Altria Client Services	8
U.S. Army	8
College of William and Mary (VIMS)	8
Printpack Illinois Inc. (Fredericksburg, VA location)	7
Life Technologies Corp. (owned by Thermo Fisher Scientific; manufacturing facility in Middletown, VA)	6
Trimble Navigation Ltd. (Sunnyvale, CA; Herndon, VA location)	5
Manufacturing Technologies Inc.	5

Source: U.S. Patent & Trademark Office data from Thomson Reuters Thomson Innovation patent analysis database.

Total Patent Activity Declining, 2014-2017

Region 6: Greater Fredericksburg	2014	2015	2016	2017	Total
Patent Counts	150	123	118	88	479

Technology Class Area	Number of Patents, 2010-2017
Digital computing or data processing equipment or methods, specially adapted for specific functions	11
Data processing systems specially adapted to administration and management purposes	7
Satellite radio beacon positioning systems; Determining position, velocity or attitude using signals transmitted by such systems	7
Biological treatment of water, waste water, or sewage	7
Mutation or genetic engineering; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification; Use of hosts therefor	6

Source: U.S. Patent & Trademark Office data from Thomson Reuters Thomson Innovation patent analysis database.

Three companies accounted for three-quarters of SBIR activity; none are startups (< 10 years old)

Small Business Innovation Research Awards, 2010-2017

Region 6: Greater Fredericksburg	2010	2011	2012	2013	2014	2015	2016	2017	Total
# of Companies	4	6	5	5	5	4	5	6	11
Award Counts	7	18	11	12	13	8	9	12	90
Award Amounts (\$M)	\$1.78	\$5.94	\$2.29	\$5.19	\$7.60	\$2.77	\$5.24	\$7.13	\$37.95

Source: SBIR award database



- McQ (1985), a remote monitoring and surveillance company received 40 SBIR awards from 2010-17;
- JRM Technologies (1998), a sensor company, received 18 awards;
- SimVentions (2000), a software, systems engineering, and cybersecurity company received 10 SBIR awards; Inc 5000 list in 2014, 2015, 2016 (211 employees, \$30M+ revenue)

Greater
Fredericksburg
Region companies
receiving Phase II
awards, 2015-2017

Company	Phase II Award Counts	Phase II Award Amounts (\$M)
IST Research Corp.	3	\$3.51
McQ Inc.	3	\$2.50
JRM ENTERPRISES, INC.	2	\$2.05
SimVentions, Inc.	2	\$1.98
Durbin Group LLC	1	\$1.50
Research, Evaluation and Social Solutions, Inc. (REESSI)	1	\$1.14
SYNTRONICS	1	\$0.49



- Founded in 2008
- Technology platforms for decision-making in challenging operating environments
- Less than 50 employees
- Awarded \$48.3M, 5-year Army contract in 2018
- Named to Inc. 5000 list for third consecutive year

Small number of companies and high concentration of deals in one company: smart grid software company with 6 reported deals from 2010-2016

Venture Capital Investment in Mary Ball Washington Region Companies, 2010-2017

Region 6: Mary Ball Washington	2010	2011	2012	2013	2014	2015	2016	2017	Total
# of Companies	1	2	2	2	2		1		6
Deal Counts	2	2	2	3	2		1		12
Investment Totals (\$M)	\$1.2	\$1.6	\$2.0	\$4.2	\$0.4		N/A		\$9.3

Source: PitchBook Data, Inc.



Inc 5000 companies (ranked by past 3-years revenue growth) are in the defense contracting space

Inc 5000 Ranked Companies in Mary Ball Washington Region, 2017

Region 6: Mary Ball Washington	Founded	Revenue	Employees	Inc 5000	SBIR	Patents	VC
IntelliWare (Fredericksburg) - cybersecurity	2005	\$27M	155	2015 2016 2017	x	x	x
IST Research (Fredericksburg) - software	2008	\$7M	44	2015 2016 2017	yes	yes	x
MarathonTS (Kilmarnock) – IT recruitment	2009	\$19M	165	2015 2016 2017	x	x	x
ATSI (Fredericksburg) – govt contract management	2011	\$12M	65	2015 2016 2017	x	x	x



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Key Measures:

Traded sector employment contribution by age of firm

- Total employment
- Job creation

Traded sector startups

- New business formation rates
- Survival rates

“Net” employment growth

- Contribution of high-growth traded sector startups vis-a-vis all traded sector startups

Traded sector SBA loan activity

Data Sources:

Quarterly Workforce Indicators (QWI), U.S. Census: Longitudinal database with job creation and other firm characteristics, by age groupings.

- **Geography:** County-level data
- **Coverage:** Over 95% of U.S. private sector jobs (does not cover ag jobs, self-employment)
- **Grouping of Employment by Age of Firms:** 0-1 Years; 2-3 Years; 4-5 Years; 6-10 Years; 11+ Years
- **Industry Sectors:** 2-digit NAICS industries, focus on traded industries
- **Frequency:** Quarterly data

Business Dynamics Research Consortium (BDRC) database: Time-series, establishment-level data by location, employment, sales, and industry from 1997 to 2017. Maintained by the University of Wisconsin

- **Coverage:** Compiles multiple data sets (e.g., Hoovers Dun & Bradstreet) to track performance and growth of individual businesses. Purchased for Virginia.
- **Industry Sectors:** Provides more detailed industry sectors
- **Unique feature:** Able to identify firms by address

U.S. Small Business Administration loan data: Size of loan, number of loans, by industry sector, by quarter.



Sub-Region: George Washington Regional Commission



GWRC: Survival Rates and Employment Generated by Traded Sector Startups, by Cohort by Year

Founding Year of Startup Cohort*	Number of Startups in Traded Sector Industries	Number of Startups Surviving by 2017	Survival Rate by 2017	Start-up Employment Levels 2017
2007	149	44	29.5%	363
2008	142	40	28.2%	363
2009	86	28	32.6%	228
2010	159	56	35.2%	442
2011	90	34	37.8%	233
2012	132	62	47.0%	436
2013	254	126	49.6%	518
2014	109	60	55.0%	315
2015	165	123	74.5%	731
2016	104	68	65.4%	326
2017	136	136	100.0%	655

Source: Business Dynamics Research Consortium database

Note: *Composed of all new non-branch firms with first recorded employment activity in a given year

GWRC: Survival Rates and Employment Generated by Traded Sector High-Growth Startups* by Cohort

Founding Year of Startup Cohort**	Total Number of Startups in Traded Sector Industries	Number of High Growth Start-ups in Traded Sector Industries*	Number of High Growth Start-ups Surviving by 2017	Employment Levels of High Growth Start-ups, 2017
2007	149	21	7	159
2008	142	17	7	200
2009	86	7	3	85
2010	159	13	8	250
2011	90	8	5	63
2012	132	25	14	261
2013	254	24	16	142
2014	109	20	15	156
2015	165	44	38	452
2016	104	0	0	0
2017	136			

Source: Business Dynamics Research Consortium database

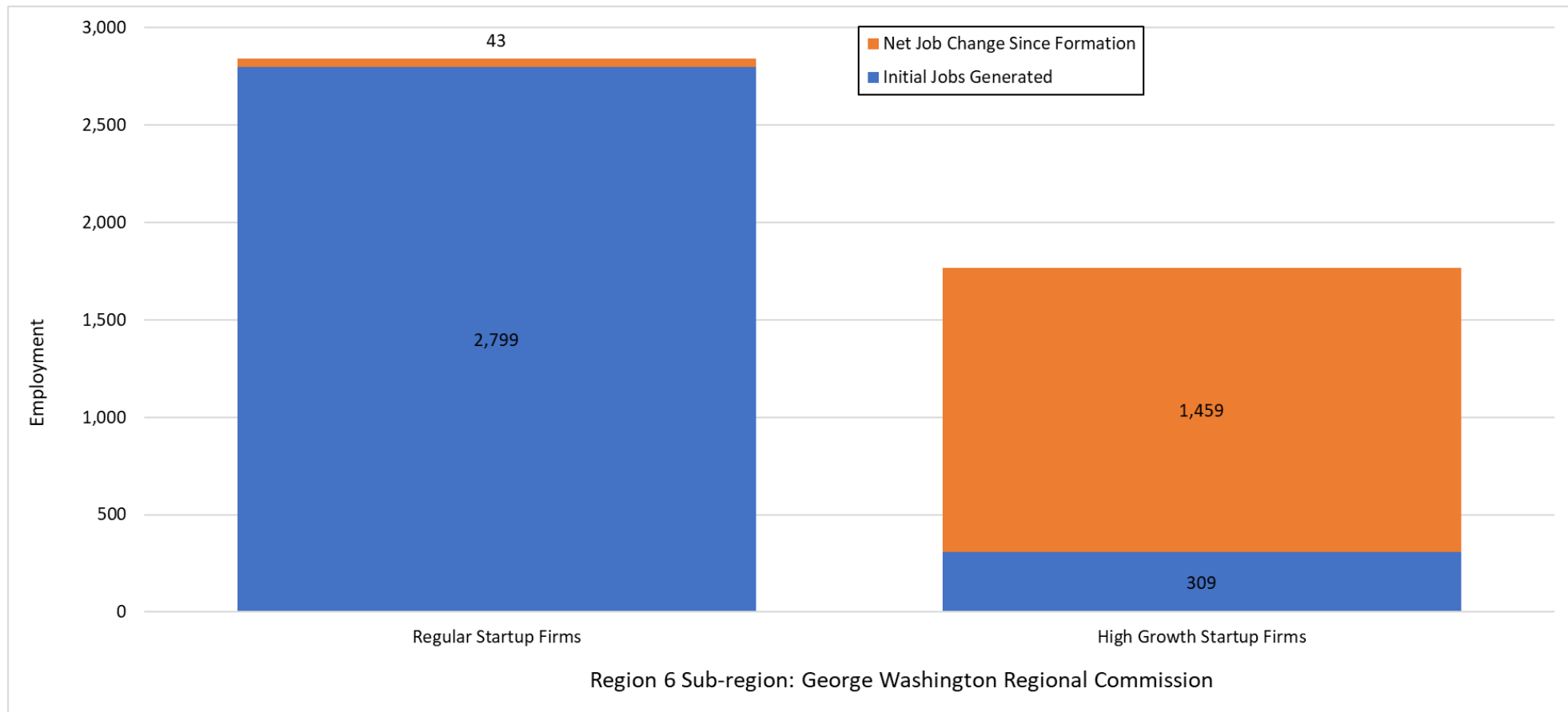
* High growth startups defined as >25% annualized employment growth over lifetime of business

** A cohort is all new non-branch firms with first recorded employment activity in a given year

GWRC: Disproportionate share of lasting net job creation observed from high-growth** traded sector startups

Initial and Net Employment Growth Generated by Current Traded Sector Startups: Firms that are < 10 years in 2017

	Total Region 6 Regular Startup Firms	Total Region 6 High Growth Startup Firms
Initial Jobs Generated	3,959	380
Net Job Growth Since Formation	104	1,647



Source: Business Dynamics Research Consortium database

**Startups defined as having firm age <10 years as of 2017, high growth startups defined as >25% annualized employment growth over lifetime of business



Sub-Region: Middle Peninsula Planning District



Middle Peninsula PDC: Survival Rates and Employment Generated by Traded Sector Startups, by Cohort by Year

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2007	53	9	17.0%	70
2008	32	13	40.6%	58
2009	28	10	35.7%	31
2010	60	19	31.7%	41
2011	15	7	46.7%	22
2012	57	30	52.6%	155
2013	21	12	57.1%	34
2014	30	17	56.7%	64
2015	29	18	62.1%	97
2016	27	22	81.5%	83
2017	20	20	100.0%	131

Source: Business Dynamics Research Consortium database

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Middle Peninsula PDC: Survival Rates and Employment Generated by Traded Sector High-Growth Startups* by Cohort

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2007	53	5	1	4
2008	32	2	0	0
2009	28	0	0	0
2010	60	1	0	0
2011	15	3	1	6
2012	57	3	2	53
2013	21	2	0	0
2014	30	3	3	25
2015	29	11	7	63
2016	27	0	0	0
2017	20			

Source: Business Dynamics Research Consortium database

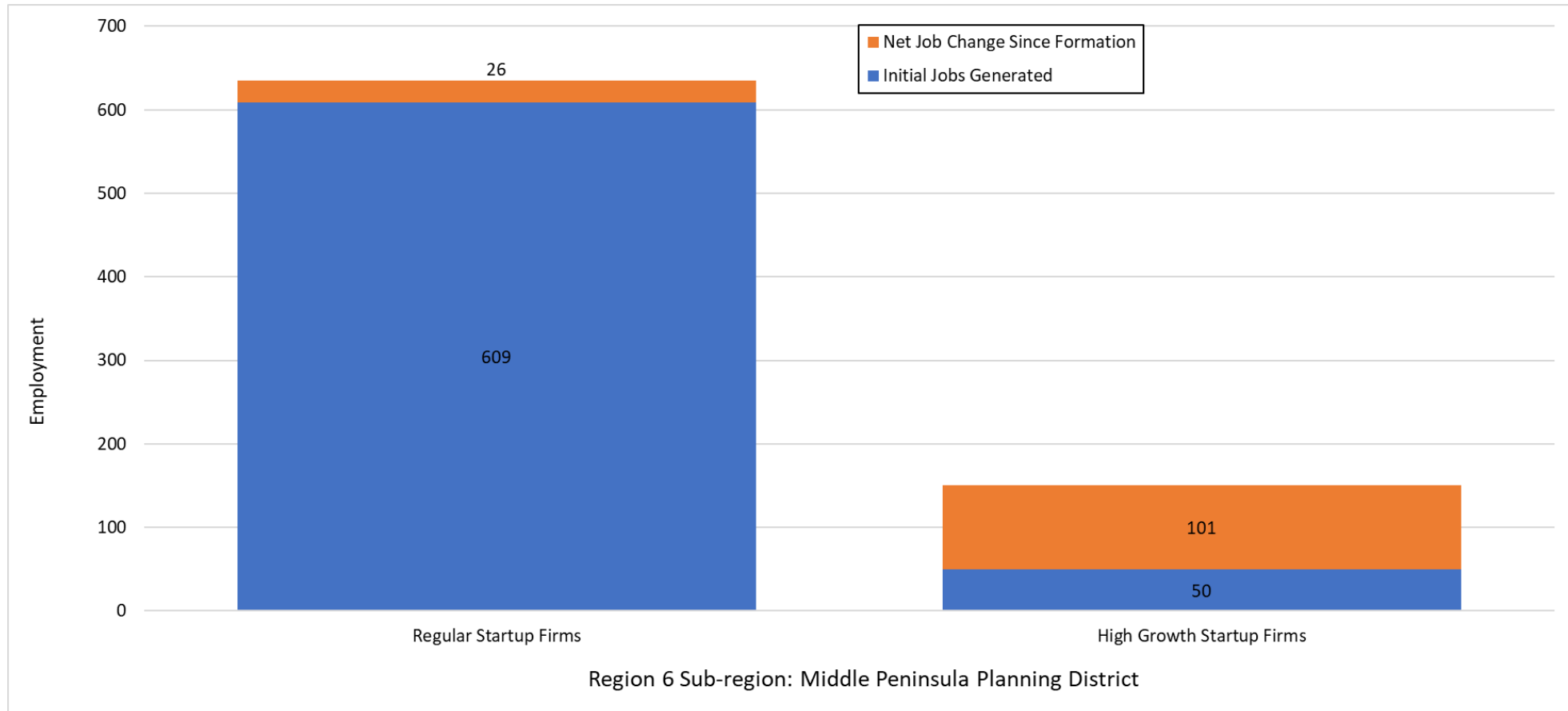
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Middle Peninsula PDC: Lasting job creation observed from very small number of high-growth traded sector startups

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Sub-Region: Northern Neck Planning District

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2008	16	3	18.8%	20
2009	21	7	33.3%	37
2010	37	14	37.8%	91
2011	8	2	25.0%	6
2012	44	18	40.9%	88
2013	25	11	44.0%	52
2014	25	14	56.0%	55
2015	18	11	61.1%	48
2016	19	17	89.5%	85
2017	23	23	100.0%	162

Source: Business Dynamics Research Consortium database

Note: *Composed of all new non-branch firms with first recorded employment activity in a given year

Northern Neck PDC: Survival Rates and Employment Generated by Traded Sector High-Growth Startups* by Cohort

Founding Year of Startup Cohort**	Total Number of Startups in Traded Sector Industries	Number of High Growth Start-ups in Traded Sector Industries*	Number of High Growth Start-ups Surviving by 2017	Employment Levels of High Growth Start-ups, 2017
2007	43	2	0	0
2008	16	2	0	0
2009	21	0	0	0
2010	37	2	1	60
2011	8	0	0	0
2012	44	4	1	8
2013	25	2	0	0
2014	25	2	2	21
2015	18	1	1	4
2016	19	0	0	0
2017	23			

Source: Business Dynamics Research Consortium database

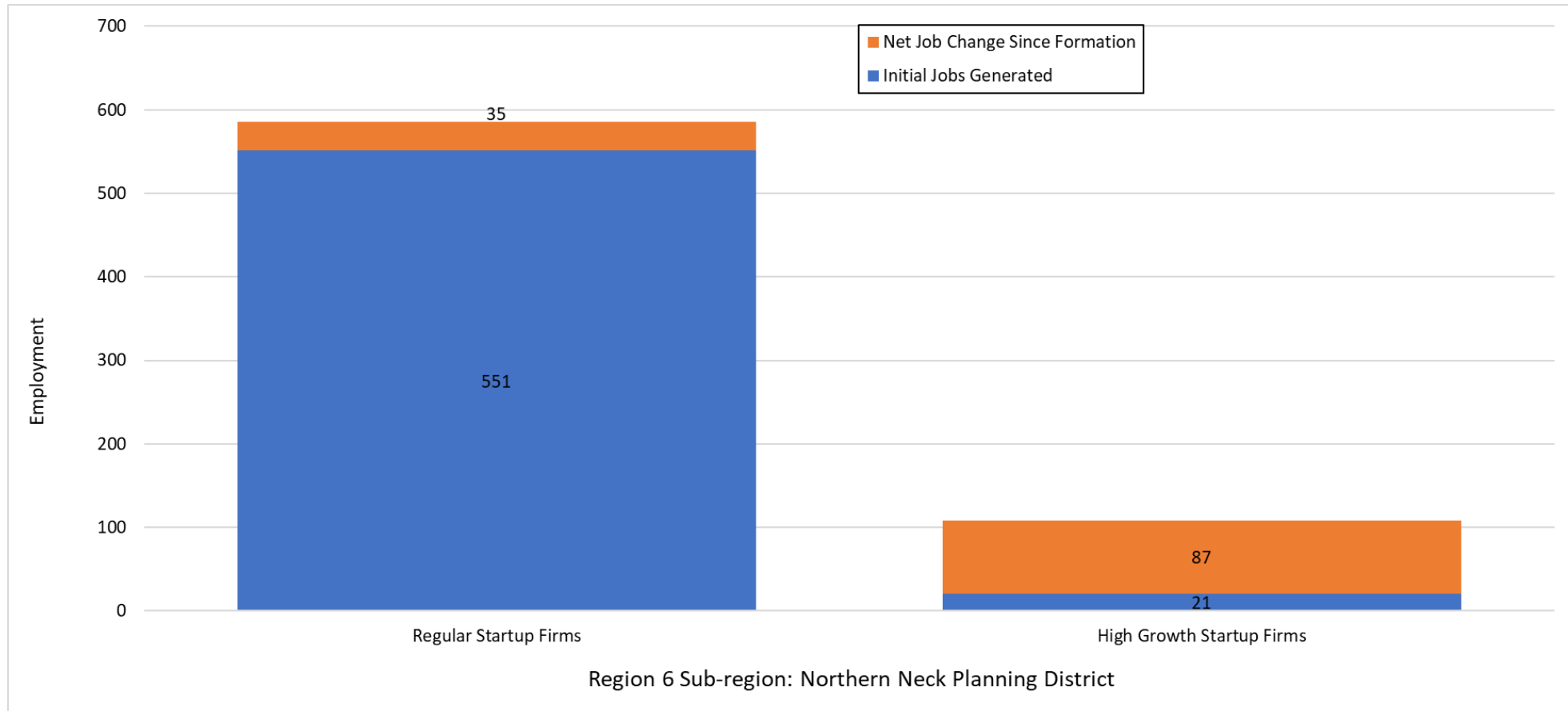
* High growth startups defined as >25% annualized employment growth over lifetime of business

** A cohort is all new non-branch firms with first recorded employment activity in a given year

Northern Neck PDC: Lasting job creation observed from very small number of high-growth traded sector startups

Initial and Net Employment Growth Generated by Current Traded Sector Startups: Firms that are < 10 years in 2017

	Total Region 6 Regular Startup Firms	Total Region 6 High Growth Startup Firms
Initial Jobs Generated	3,959	380
Net Job Growth Since Formation	104	1,647



Source: Business Dynamics Research Consortium database

**Startups defined as having firm age <10 years as of 2017, high growth startups defined as >25% annualized employment growth over lifetime of business