QWI Explorer

Advanced Scenario: 4 Research Questions

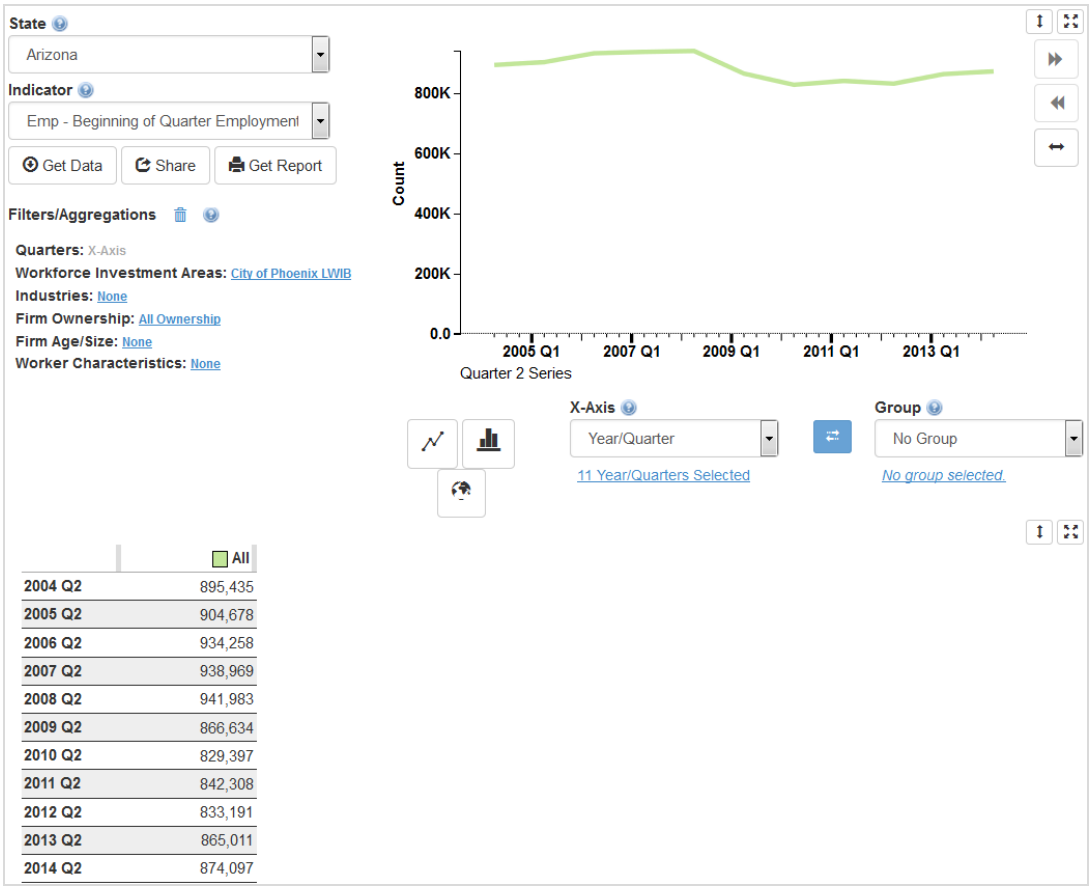
Local Employment Dynamics

Research Question 1: General Look at the Workforce in the City of Phoenix LWIB

A) How has Phoenix's employment changed over the last 10 years? In particular, how do the employment trends change when the data is broken out by worker demographics?

In QWI Explorer (http://qwiexplorer.ces.census.gov), follow these steps:

- Set **State** to **Arizona**
- Set **Indicator** to **Emp** (Beginning-of-Quarter Employment)
- Change **X-Axis** to **Year/Quarter**
  - Click "20 Year/Quarters Selected" under the X-Axis dropdown, and check only the boxes for Quarter 2.
- Change **Group** to **No Group**
- Under **Filters**:
  - **Sub-State Geography** – click the blue text, change the dropdown to WIAs, and check the box for **04004025 City of Phoenix LWIB**

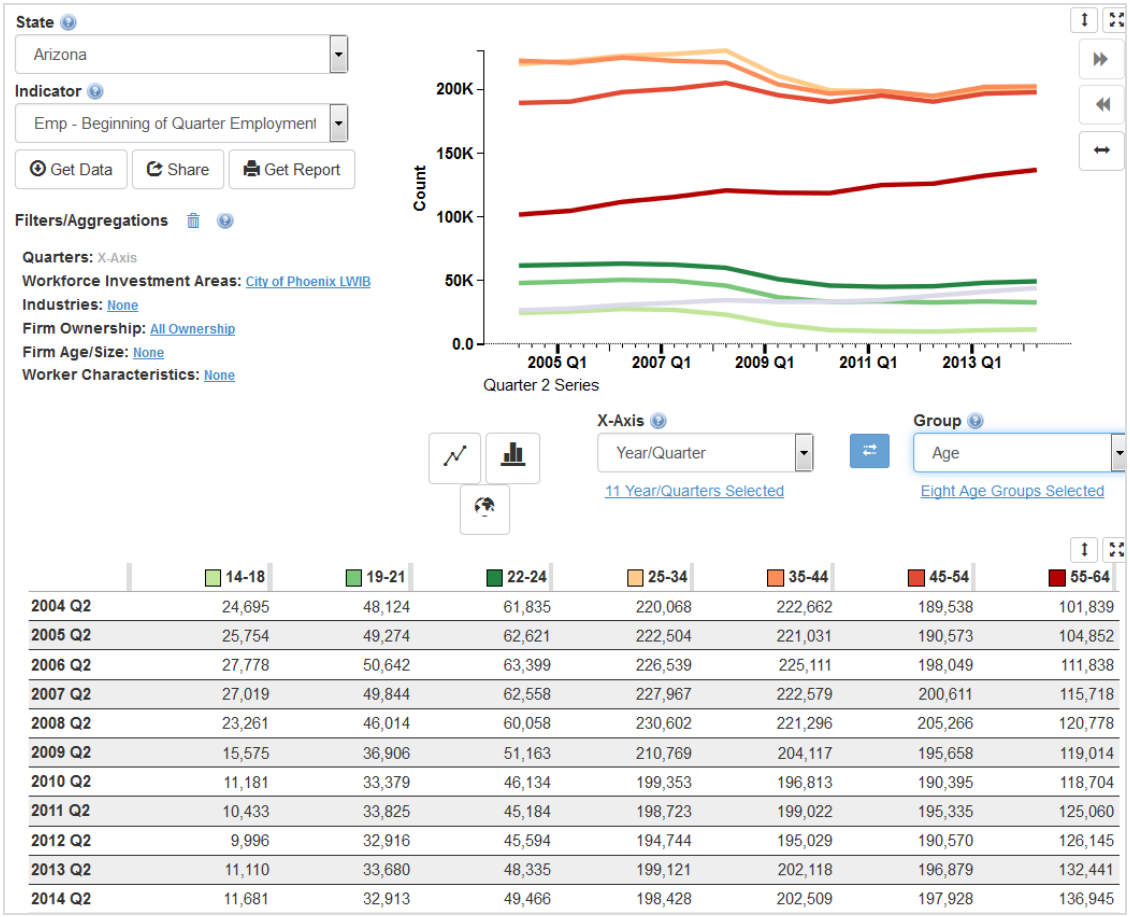


	All
2004 Q2	895,435
2005 Q2	904,678
2006 Q2	934,258
2007 Q2	938,969
2008 Q2	941,983
2009 Q2	866,634
2010 Q2	829,397
2011 Q2	842,308
2012 Q2	833,191
2013 Q2	865,011
2014 Q2	874,097

United States Census Bureau

The data shows that employment increased to a high point around 2008, but the Great Recession created a shallow valley in 2010. In the subsequent years, employment has slowly increased, but not to 2008 levels.

- Change **Group** to **Sex,** then to **Worker Age,** then to **Education,** then to **Race,** and then to **Ethnicity.**



	14-18	19-21	22-24	25-34	35-44	45-54	55-64
2004 Q2	24,695	48,124	61,835	220,068	222,662	189,538	101,839
2005 Q2	25,754	49,274	62,621	222,504	221,031	190,573	104,852
2006 Q2	27,778	50,642	63,399	226,539	225,111	198,049	111,838
2007 Q2	27,019	49,844	62,558	227,967	222,579	200,611	115,718
2008 Q2	23,261	46,014	60,058	230,602	221,296	205,266	120,778
2009 Q2	15,575	36,906	51,163	210,769	204,117	195,658	119,014
2010 Q2	11,181	33,379	46,134	199,353	196,813	190,395	118,704
2011 Q2	10,433	33,825	45,184	198,723	199,022	195,335	125,060
2012 Q2	9,996	32,916	45,594	194,744	195,029	190,570	126,145
2013 Q2	11,110	33,680	48,335	199,121	202,118	196,879	132,441
2014 Q2	11,681	32,913	49,466	198,428	202,509	197,928	136,945

Brief analysis of the employment trends for each of the worker characteristic categories:

- **Sex**: Female workers appeared to be closing the employment gap prior to the Great Recession, and did not appear to be hit quite as hard between 2008 and 2010.

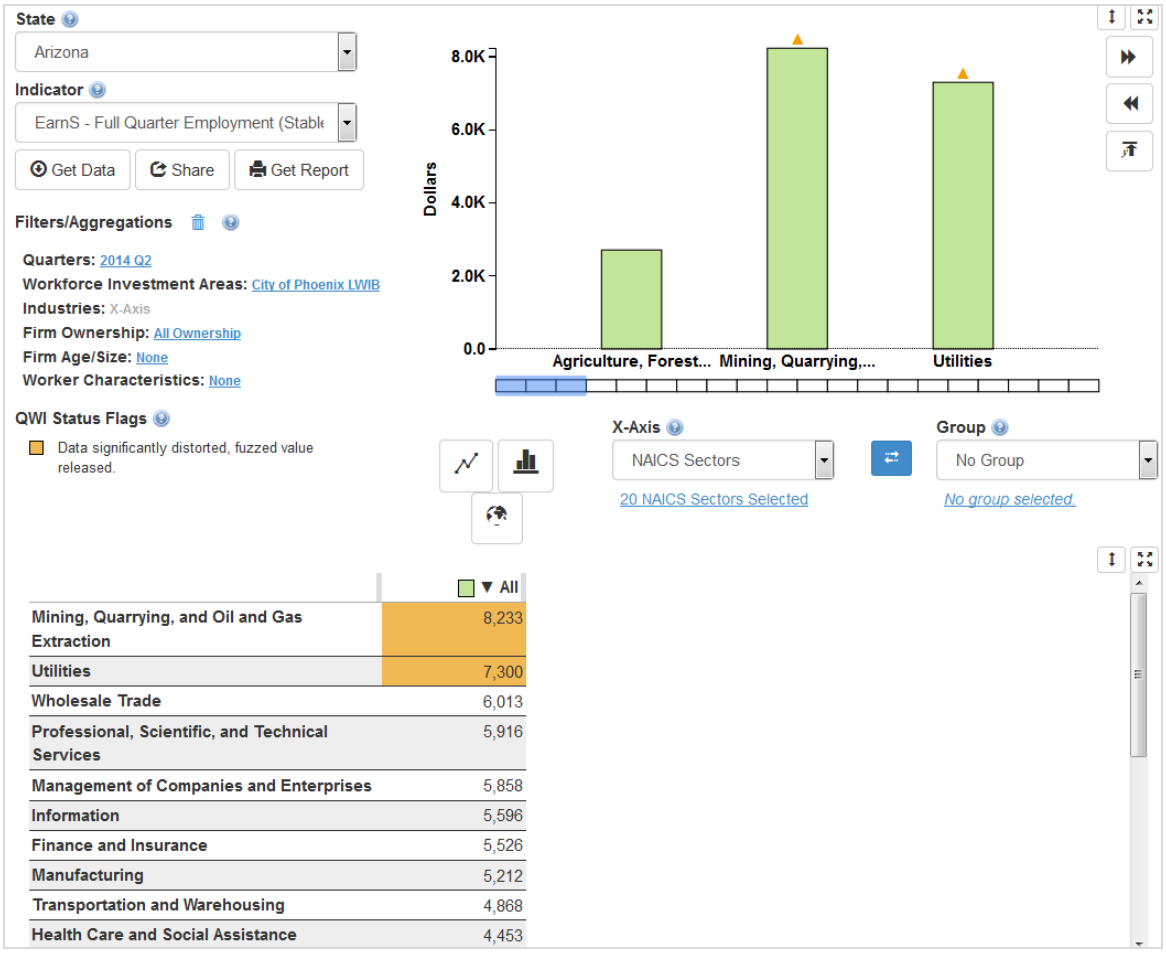
- **Age**: Young and middle aged workers had similar patterns of employment related to the Great Recession, yet workers in the 55-99 age range appeared to weather the recession better, with significantly lower rates of job loss between 2008 and 2010.

- **Education**: Young workers (with indeterminable educational attainment) were hit hardest and have not seemed to recover their employment levels since 2008.

- **Race** and **Ethnicity**: No trends that are unique from the "All Workers" table/chart.

B) What industries have the highest average monthly earnings? What about highest earnings for new hires?

- Set **Indicator** to **EarnS** (Stable Average Monthly Earnings) then **EarnHirNS** (New Hires Average Monthly Earnings)
- Change **X-Axis** to **NAICS Sector** (click "Continue" if you encounter a **Settings Conflict Popup**)
- Change **Group** to **No Group**



Click the "All" column twice to sort descending. You can see that **Mining, Quarrying, and Oil/Gas Extraction** and **Utilities** have the highest stable earnings and the highest earnings for new hires.

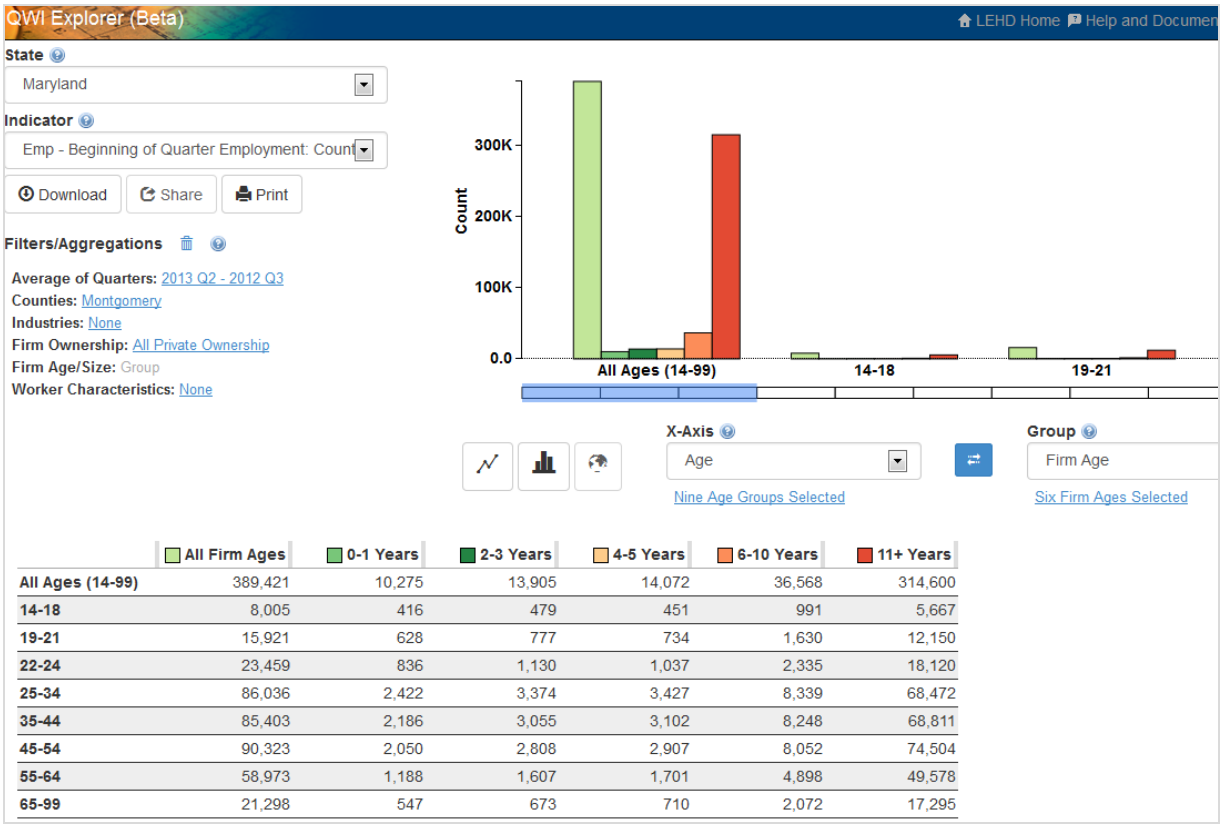
Research Question 2: What is the Age of Workers at Startup Firms in Montgomery County, MD?

What is the age distribution of workers in startup firms? In particular, does the composition of the workforce at startups differ from the workforce at other firms? To answer this, we can compare the distribution of various worker characteristics at startups with the distribution at all firms.

Follow these steps:

- Set **State** to **Maryland**
- Set **Indicator** to **Emp** (Beginning-of-Quarter Employment)

- Change **X-Axis** to **Worker Age**
  - Click "Continue" if you encounter one or more **Setting Conflict Popup** windows
  - Click the blue text under the X-Axis dropdown, which reads "Eight Age Groups Selected," and check the box for "All Ages" (so that all boxes are checked)
- Change **Group** to **Firm Age**
  - Click "Continue" if you encounter one or more **Setting Conflict Popup** windows
  - Click the blue text under the Group dropdown, which reads "Five Firm Ages Selected", and check the box for "All Firm Ages" (so that all boxes are checked)
- Under **Filters**:
  - **Quarters** – click the blue text showing the current quarter and select only the four quarters for 2013 (Note: the screenshots below use older data). This will generate the average employment over these four quarters.
  - **Sub-State Geography** – click the blue text, change the dropdown to County, and check the box for **Montgomery County**



	All Firm Ages	0-1 Years	2-3 Years	4-5 Years	6-10 Years	11+ Years
All Ages (14-99)	389,421	10,275	13,905	14,072	36,568	314,600
14-18	8,005	416	479	451	991	5,667
19-21	15,921	628	777	734	1,630	12,150
22-24	23,459	836	1,130	1,037	2,335	18,120
25-34	86,036	2,422	3,374	3,427	8,339	68,472
35-44	85,403	2,186	3,055	3,102	8,248	68,811
45-54	90,323	2,050	2,808	2,907	8,052	74,504
55-64	58,973	1,188	1,607	1,701	4,898	49,578
65-99	21,298	547	673	710	2,072	17,295

From looking at the table, the age distribution at startups differs slightly from all firms – the largest Worker Age category for 0-1 Years is 25-34, while the largest Worker Age category for All Firm Ages is 45-54.

Let's calculate the percentage of workers that are under age 35, by firm age. Click the **Get Data** button, and select **Download Table as XLSX**. Open the XLSX file in Microsoft Excel or your spreadsheet software of choice.

In a new row, add together employment for ages 14-18, 19-21, 22-24, and 25-34. Do this for the "All Firm Ages" and "0-1 Years" columns.

In the next row, divide this total by the "All Ages" Row. This gives us the share of workers that are age 14-34 in both All Firms and Startup Firms.

	All Firm Ages	0-1 Years	2-3 Years	4-5 Years	6-10 Years	11+ Years
All Ages (14-99)	388711	13045	13691	14337	37468	310170
14-18	7013	493	438	319	904	4856
19-21	14822	828	736	657	1565	11036
22-24	22681	1048	1058	982	2400	17190
25-34	85327	2858	3369	3508	8538	67053
35-44	85998	2679	3047	3228	8478	68565
45-54	90381	2813	2732	3107	8255	73471
55-64	60255	1673	1612	1792	5145	50031
65-99	22231	649	695	742	2179	17964
Sum 14-34	129843	5227				
Share 14-34	33.4%	40.1%				

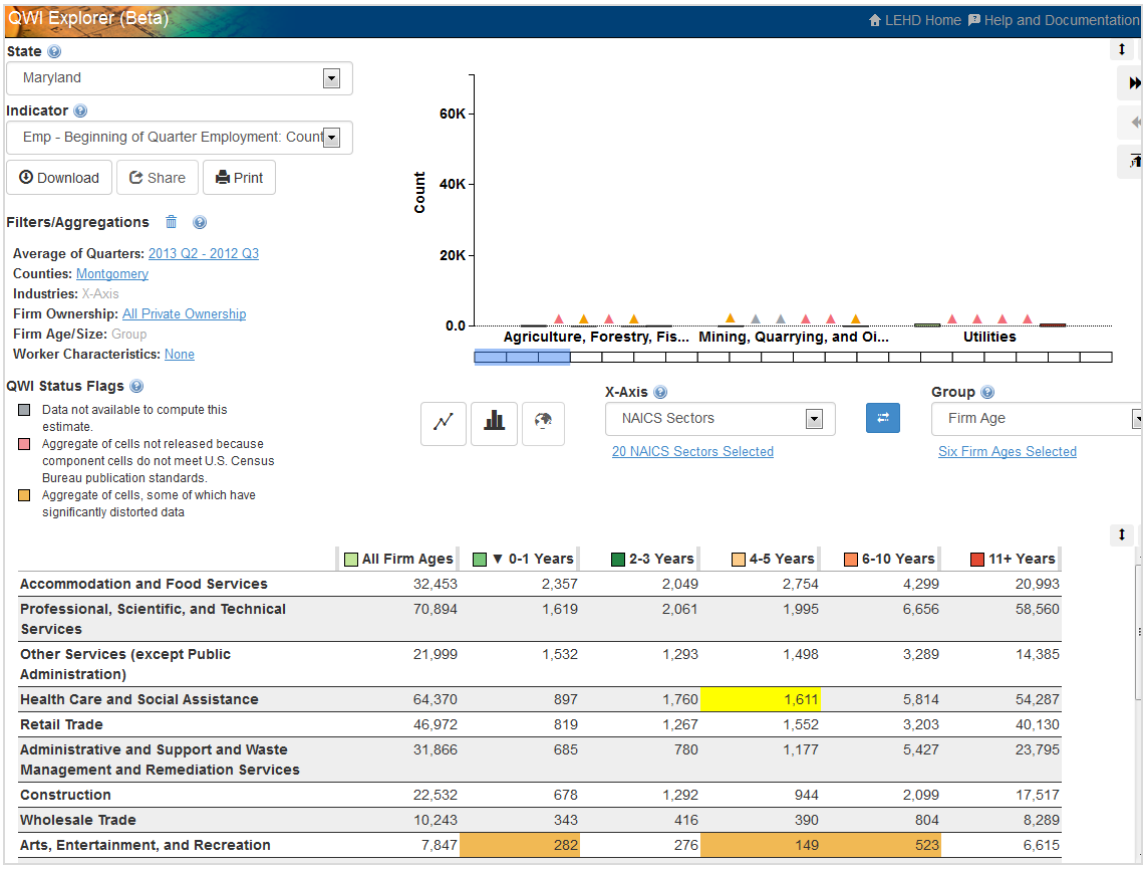
This table suggests that startup firms disproportionately employ younger workers: 40% of workers at startups are under age 35, compared to only 33% at all firms.

Research Question 3: Startup Employment, Hires and Wages by Industry, in Montgomery County, MD.

Let's study startup employment in 2-digit NAICS Sectors in Montgomery County, MD. We'll rank industries by total employment at startups; percentage of employment at startups; and average wages at startups.

A) Which Sectors have the most Employment at Startups?

- Set **State** to **Maryland**
- Set **Indicator** to **Emp** (Beginning-of-Quarter Employment)
- Change **X-Axis** to **NAICS Sectors**
- Change **Group** to **Firm Age**
    - Click "Continue" if you encounter one or more **Setting Conflict Popup** windows
    - Click the blue text under the Group dropdown, which reads "Five Firm Ages Selected", and check the box for "All Firm Ages"
- Under **Filters**:
    - **Quarters** – click the blue text showing the current quarter and select only the four quarters for 2013 (Note: the screenshots below use older data). This will generate the average employment over these four quarters.
    - **Sub-State Geography** – click the blue text, change the dropdown to County, and check the box for **Montgomery County**
- Click twice on the column heading for "0-1 Years" to sort by this column



	All Firm Ages	▼ 0-1 Years	2-3 Years	4-5 Years	6-10 Years	11+ Years
Accommodation and Food Services	32,453	2,357	2,049	2,754	4,299	20,993
Professional, Scientific, and Technical Services	70,894	1,619	2,061	1,995	6,656	58,560
Other Services (except Public Administration)	21,999	1,532	1,293	1,498	3,289	14,385
Health Care and Social Assistance	64,370	897	1,760	1,611	5,814	54,287
Retail Trade	46,972	819	1,267	1,552	3,203	40,130
Administrative and Support and Waste Management and Remediation Services	31,866	685	780	1,177	5,427	23,795
Construction	22,532	678	1,292	944	2,099	17,517
Wholesale Trade	10,243	343	416	390	804	8,289
Arts, Entertainment, and Recreation	7,847	282	276	149	523	6,615

Industries with the most startup employment include: Retail Trade, Accommodation & Food Services, Professional Services, Health Care, and Other Services.

B) Which Sectors have the Highest Share of Their Employment in Startups?

To answer this question, we need to move this data to a spreadsheet, calculate percentages, and then sort the table. Keep the same Settings as in Part A. Click the **Get Data** button, and **Download Table as XLSX**. Open the XLSX file in Microsoft Excel or your spreadsheet software of choice.

Perform the following steps:

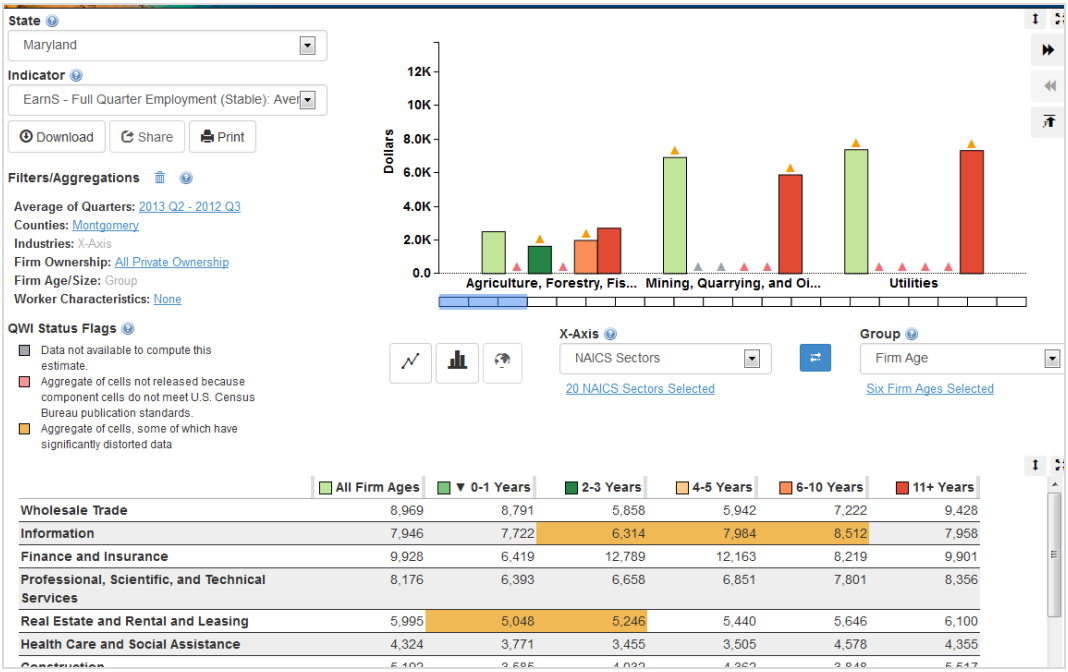
- In the next empty column, type “Share 0-1 Years” in the first row.
- In the second row, divide the value in “0-1 Years” by the value in “All Firm Ages”
- Select that cell, click and drag on the bottom right-hand corner of that cell to copy the formula
- And finally, select the “Share 0-1 Years” column, click “Sort and Filter,” and then click “Sort largest to smallest”

	All Firm Ages	All Firm Ages Flags	0-1 Years	0-1 Years Flags	2-3 Years	2-3 Years Flags	4-5 Years	4-5 Years Flags	6-10 Years	6-10 Years Flags	11+ Years	11+ Years Flags	Share 0-1 Years
Accommodation and Food Services	32453	10	2357	10	2049	10	2754	10	4299	10	20993	10	7%
Other Services (except Public Administration)	21999	10	1532	10	1293	10	1498	10	3289	10	14385	10	7%
Transportation and Warehousing	3994	10	154	10	191	10	305	12	291	10	3051	10	4%
Arts, Entertainment, and Recreation	7847	10	282	12	276	10	149	12	523	12	6615	10	4%
Wholesale Trade	10243	10	343	10	416	10	390	10	804	10	8289	10	3%
Construction	22532	10	678	10	1292	10	944	10	2099	10	17517	10	3%
Professional, Scientific, and Technical Services	70894	10	1619	10	2061	10	1995	10	6656	10	58560	10	2%
Real Estate and Rental and Leasing	11159	10	243	10	489	10	270	10	834	10	9323	10	2%
Educational Services	10186	10	219	10	382	10	434	12	585	10	8565	10	2%
Administrative and Support and Waste Management	31866	10	685	10	780	10	1177	10	5427	10	23795	10	2%
Retail Trade	46972	10	819	10	1267	10	1552	10	3203	10	40130	10	2%
Health Care and Social Assistance	64370	10	897	10	1760	10	1611	10	5814	10	54287	10	1%
Finance and Insurance	20378	10	224	10	815	10	614	10	1433	10	17291	10	1%
Manufacturing	12240	10	94	10	139	10	113	10	458	10	11434	10	1%
Information	12507	10	85	10	334	12	220	12	751	10	11115	10	1%
Agriculture, Forestry, Fishing and Hunting	250	10		11	20	12		11	25	12	189	10	0%
Mining, Quarrying, and Oil and Gas Extraction	169	12		-1		-1		11		11	137	12	0%
Utilities	693	10		11		11		11		11	663	10	0%
Management of Companies and Enterprises	8661	12		11	323	12		11	43	12	8255	12	0%
Public Administration		-1		-1		-1		-1		-1		-1	

Accommodation and Food Services and Retail Trade (in more current data) have the highest share of their employment at startups.

C) Which Sectors have the highest Wages at Startups?

Keep the same settings as in Part A. Change Indicator to **EarnS** (Stable Earnings). Click twice on the column heading "0-1 Years" to sort.



	All Firm Ages	▼ 0-1 Years	2-3 Years	4-5 Years	6-10 Years	11+ Years
Wholesale Trade	8,969	8,791	5,858	5,942	7,222	9,428
Information	7,946	7,722	6,314	7,984	8,512	7,958
Finance and Insurance	9,928	6,419	12,789	12,163	8,219	9,901
Professional, Scientific, and Technical Services	8,176	6,393	6,658	6,851	7,801	8,356
Real Estate and Rental and Leasing	5,995	5,048	5,246	5,440	5,646	6,100
Health Care and Social Assistance	4,324	3,771	3,455	3,505	4,578	4,355

Wholesale Trade, Information, Finance and Insurance (especially in more current data) have the highest wages at startup firms.

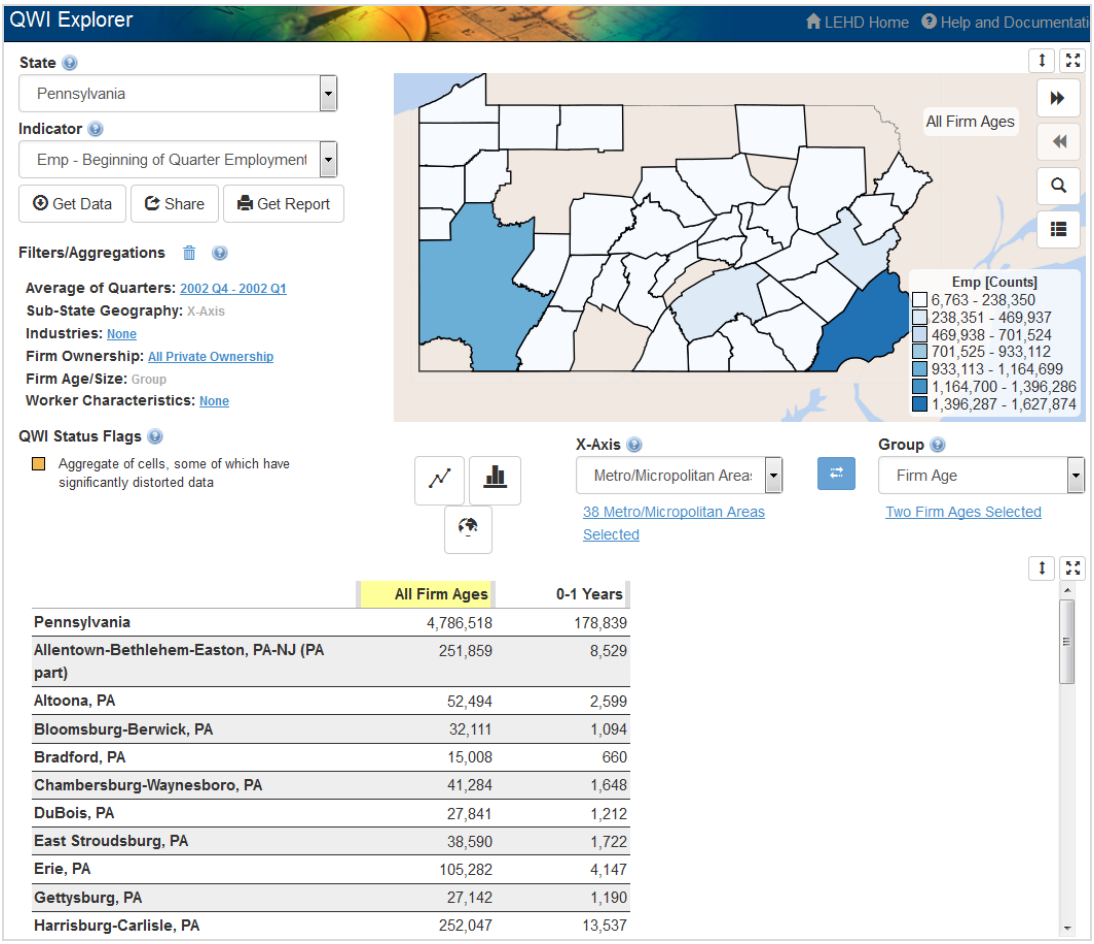
Research Question 4: Does Regional Variation in Startup Concentration Predict Employment Growth? Case Study: Pennsylvania Metro Areas.

Finally, suppose we want to study the relationship between startup concentration and overall employment growth. For instance, does a large concentration of startups drive employment growth? If so, this would have interesting policy implications – perhaps localities would want to do more to attract and support startups.

To start to answer this question, let's examine regional variation in the concentration of startup employment in Pennsylvania. Specifically, we will test whether metro areas with the highest concentration of startup employment in 2002 experienced high employment growth over the next decade.

Follow these steps:

- Set **State** to **Pennsylvania**
- Set **Indicator** to **Emp** (Beginning-of-Quarter Employment)
- Change **X-Axis** to **Metro/Micro Areas**
  - Click the blue text under the X-Axis dropdown, which reads "37 Metro/Micro Areas Selected," and check the box for "42 Pennsylvania" (so that all boxes are checked)
- Change **Group** to **Firm Age**
  - Click "Continue" if you encounter one or more **Setting Conflict Popup** windows
  - Click the blue text under the Group dropdown, which reads "Five Firm Ages Selected", and check ONLY the boxes for "All Firm Ages" and "0-1 Years" (so only two boxes checked)
- Under **Filters**:
  - **Quarters** – click the blue text showing the current quarter and select only the four quarters for 2002. This will generate the average employment over these four quarters.



	All Firm Ages	0-1 Years
Pennsylvania	4,786,518	178,839
Allentown-Bethlehem-Easton, PA-NJ (PA part)	251,859	8,529
Altoona, PA	52,494	2,599
Bloomsburg-Berwick, PA	32,111	1,094
Bradford, PA	15,008	660
Chambersburg-Waynesboro, PA	41,284	1,648
DuBois, PA	27,841	1,212
East Stroudsburg, PA	38,590	1,722
Erie, PA	105,282	4,147
Gettysburg, PA	27,142	1,190
Harrisburg-Carlisle, PA	252,047	13,537

Similar to Research Questions 2 & 3, we want to identify the Metro Areas with the highest percentage of startups. Click the **Get Data** button, and select **Download Table as XLSX**. Open the XLSX file in Microsoft Excel or your spreadsheet software of choice.

Perform the following steps:

- In the next empty column, type “Share 0-1 Years” in the first row.
- In the second row, divide the value in “0-1 Years” by the value in “All Firm Ages”
- Select that cell, click and drag on the bottom right-hand corner of that cell to copy the formula
- Finally, select this “Share 0-1 Years” column, click “Sort and Filter,” and then click “Sort largest to smallest”

	All Firm Age	0-1 Years	Share 0-1 Years
New York-Newark-Jersey City, NY-NJ-PA (PA part)	6763	484	7.2%
Oil City, PA	17536	1112	6.3%
Indiana, PA	24211	1444	6.0%
Harrisburg-Carlisle, PA	252047	13537	5.4%
Sunbury, PA	24769	1324	5.3%
Johnstown, PA	47591	2421	5.1%
Altoona, PA	52494	2599	5.0%
Lewistown, PA	12916	627	4.9%
Selinsgrove, PA	14536	680	4.7%
Warren, PA	12749	594	4.7%
State College, PA	41610	1896	4.6%
East Stroudsburg, PA	38590	1722	4.5%
Bradford, PA	15008	660	4.4%
Gettysburg, PA	27142	1190	4.4%
DuBois, PA	27841	1212	4.4%
Somerset, PA	20719	848	4.1%
Chambersburg-Waynesboro, PA	41284	1648	4.0%
Erie, PA	105282	4147	3.9%
Scranton--Wilkes-Barre--Hazleton, PA	215834	8477	3.9%

Now, let’s focus on the Metro areas with the highest share of startup employment. We’ll study the top four Metro areas ranked by share of startup employment. We want to examine how much their employment grew between 2002 and 2014, and compare this growth to the state of Pennsylvania. Here are the steps in QWI Explorer:

- Set **State** to **Pennsylvania**
- Set **Indicator** to **Emp** (Beginning-of-Quarter Employment)
- Change **X-Axis** to **Year/Quarter**
    - Click “Continue” if you encounter one or more **Setting Conflict Popup** windows
    - Click the blue text under the X-Axis dropdown, which reads “Eight Year/Quarters Selected,” and check ONLY the boxes for 2002Q2 and 2014Q2.
- Change **Group** to **No Group**
- Under **Filters**:
    - **Firm Ownership** – click the blue text and select the radio button for “All Private Ownership.” We want to focus our analysis on private firms only (Since we identified startup concentration by region for only private firms, we want to examine employment growth for private firms – important to be consistent)
    - **Sub-State Geography** – click the blue text and change the dropdown Geography Type to “Metro/Micropolitan Areas”, and select the four areas that had the highest concentration of startup employment in 2002:
        - New York (PA part)
        - Oil City
        - Indiana
        - Harrisburg-Carlisle
    - This will generate the total employment for these four Metro Areas

Employment in these metro areas grew from 298,922 in 2002Q2 to 323,443 in 2014Q2.

To calculate the percentage growth, we can download this to a spreadsheet and divide the two rows. You would find that (323,443 – 298,922) / 298,922 = 8.2%, suggesting that total employment grew by 8.2% in these regions.

How does this compare to the state of Pennsylvania as a whole? Simply remove the filters: click on the blue text next to "Sum of Metro/Micro Areas," and click "Check None."

Notice that employment in the state of Pennsylvania grew from 4,776,042 in 2002Q2 to 4,936,865 in 2014Q2. Calculating the percentage growth gives us (4,936,865 – 4,776,042) / 4,776,042 = 3.4%. This suggests that between 2002 and 2014, employment in the metro areas with the highest concentration of startup firms grew at a rate of almost 2.5 times that of employment in the entire state (8.2% vs 3.4%)!

Remember, correlation is not causation – we can't say that the concentration of startups necessarily caused the higher rate of employment growth, only that a correlation exists. Still, this is an interesting finding for motivating future research.