

# Research Examples using QWI Explorer

## Local Employment Dynamics

### Using the QWI to Study Startup Firms

Suppose we are interested in pursuing a research agenda focused on startup firms. We can use QWI data, with tabulations by firm age, to study these new firms.

The QWI provides detailed tabulations by 5 firm age categories: 0-1 years, 2-3 years, 4-5 years, 6-10 years, and 11+ years. For this example, let us define “startup” firms as those that are of age 0-1. With this setup, we can investigate a variety of research questions.

We’ll use QWI Explorer for our analysis: <http://qwiexplorer.ces.census.gov/>

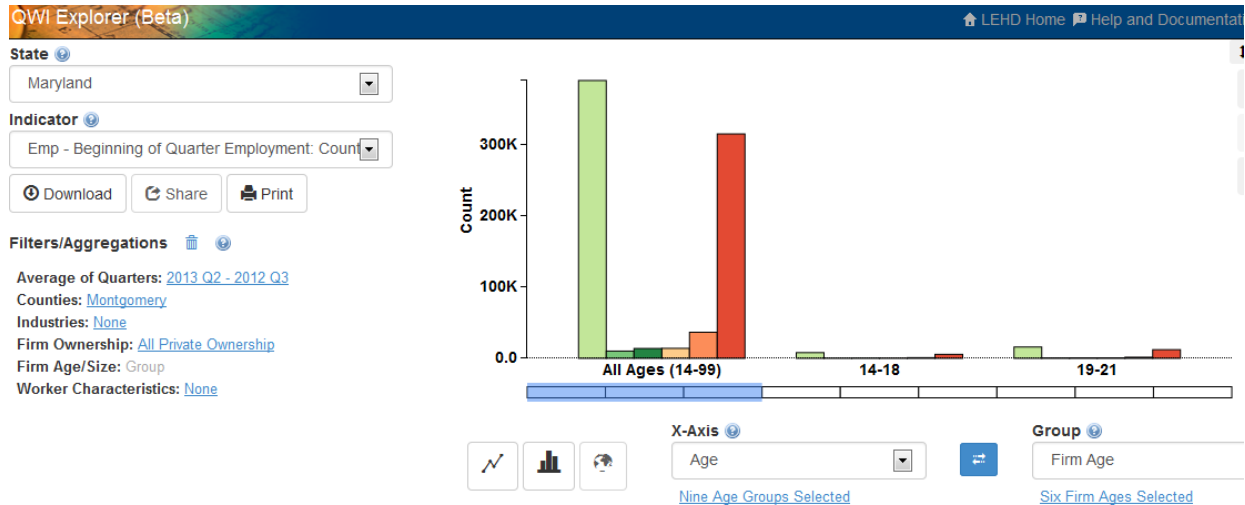
### Research Question 1: What is the Age of Workers at Startup Firms in Montgomery County, MD?

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.

In QWI Explorer, follow these steps:

- Set **State** to **Maryland**
- Set **Indicator** to **Emp** (Beginning-of-Quarter Employment)
- Change **X-Axis** to **Worker Age**
  - Click “Continue” on the conflict box (moving Worker Age from Group to X-Axis)
  - 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” on the conflict box (this will change ownership to **Private**)
  - Click “close” on the “No Data Available” box (firm age is not available for the most recent quarter. We’ll resolve this by choosing the filter)
  - 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, and select the 4 most recent quarters (2012Q3, 2012Q4, 2013Q1 & 2013Q2). This will generate the average employment over these 4 quarters.
  - **Sub-State Geography** – click the blue text, change the dropdown to County, and check the box for **Montgomery County**

The screen should look similar to this:



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 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 Download button, and select "Download Table as Zip." Open the CSV file.

In a new row, add together employment for ages 14-18, 19-21, 22-24, and 25-34 (should be rows 3-6). 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 All Firms and in Startup Firms. The spreadsheet should look similar to this:

|                  | 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 |
|------------------|---------------|---------------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|------------|------------------|-----------|-----------------|
| All Ages (14-99) | 389421        | 10                  | 10275     | 10              | 13905     | 10              | 14072     | 10              | 36568      | 10               | 314600    | 10              |
| 14-18            | 8005          | 10                  | 416       | 10              | 479       | 10              | 451       | 10              | 991        | 10               | 5667      | 10              |
| 19-21            | 15921         | 10                  | 628       | 10              | 777       | 10              | 734       | 10              | 1630       | 10               | 12150     | 10              |
| 22-24            | 23459         | 10                  | 836       | 10              | 1130      | 10              | 1037      | 10              | 2335       | 10               | 18120     | 10              |
| 25-34            | 86036         | 10                  | 2422      | 10              | 3374      | 10              | 3427      | 10              | 8339       | 10               | 68472     | 10              |
| 35-44            | 85403         | 10                  | 2186      | 10              | 3055      | 10              | 3102      | 10              | 8248       | 10               | 68811     | 10              |
| 45-54            | 90323         | 10                  | 2050      | 10              | 2808      | 10              | 2907      | 10              | 8052       | 10               | 74504     | 10              |
| 55-64            | 58973         | 10                  | 1188      | 10              | 1607      | 10              | 1701      | 10              | 4898       | 10               | 49578     | 10              |
| 65-99            | 21298         | 10                  | 547       | 10              | 673       | 10              | 710       | 10              | 2072       | 10               | 17295     | 10              |
| Sum 14-34        | 133421        |                     | 4302      |                 |           |                 |           |                 |            |                  |           |                 |
| Share 14-34      | 34%           |                     | 42%       |                 |           |                 |           |                 |            |                  |           |                 |

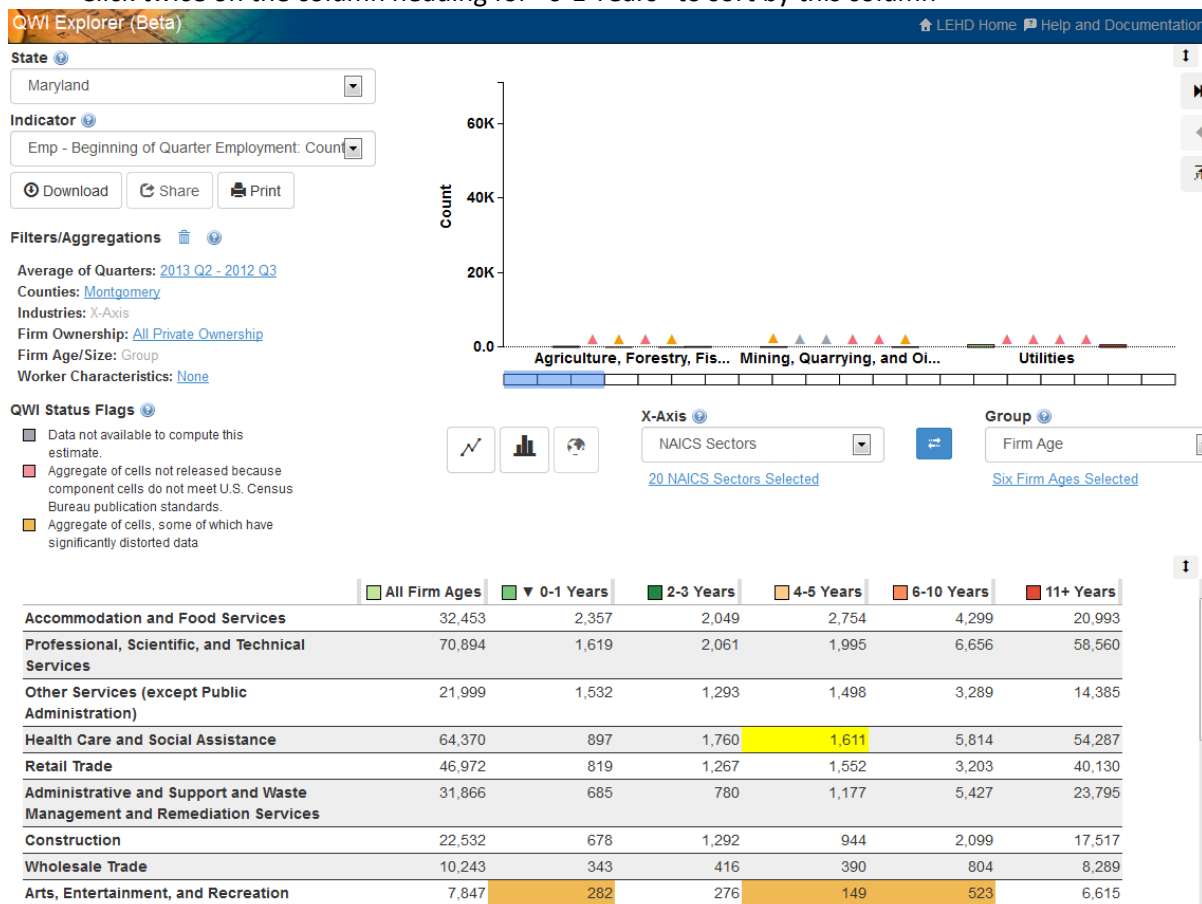
This table suggests that startup firms disproportionately employ younger workers: 42% of workers at startups are under age 35, compared to only 34% at all firms.

## Research Question 2: Startup Employment, Hires and Wages by Industry, in Montgomery County, MD.

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

### Part 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" on the conflict box (this will change ownership to **Private**)
  - Click "close" on the "No Data Available" box (firm age is not available for the most recent quarter. We'll resolve this by choosing the filter)
- 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, and select the 4 most recent quarters (2012Q3, 2012Q4, 2013Q1 & 2013Q2). This will generate the average employment over these 4 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



Industries with the most startup employment include: Accommodation & Food Services; Professional Services; and Other Services.

## Part B: Which Sectors have the Highest Share of Their Employment in Startups?

To answer this, we need to move this data to a spreadsheet, calculate percentages, and then sort. Keep the same Settings as in Part A. Click the Download button, and select “Download Table as Zip.” Open the CSV file.

Perform the following steps:

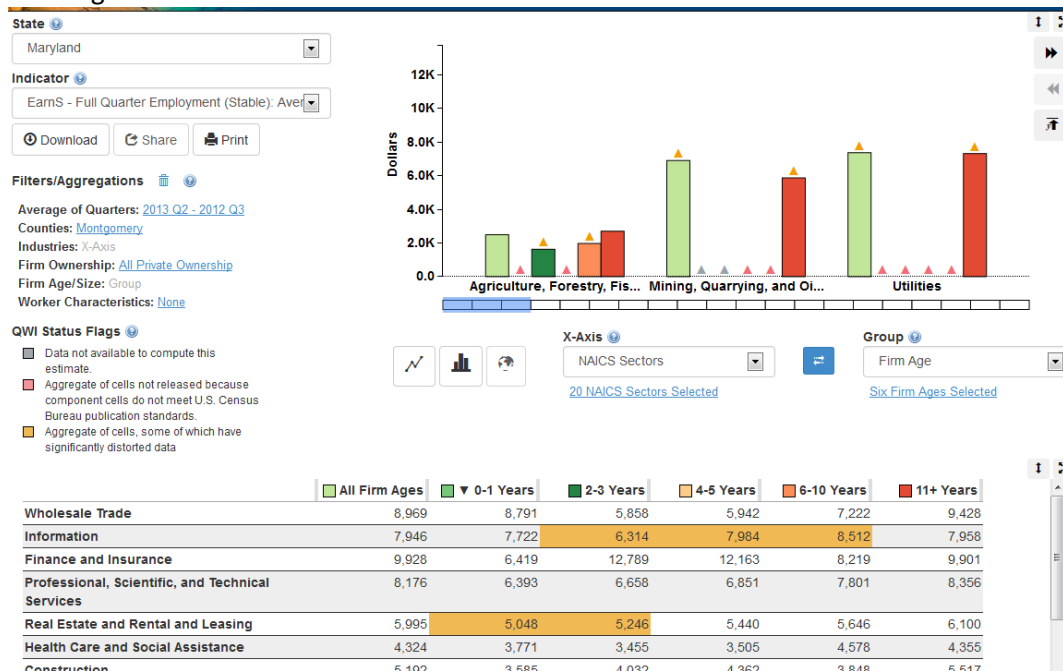
- In the next empty column, type “Share 0-1 Years” in the first row.
- In the second row, divide the value in “0-1 Years” by the value in “All Firm Ages”
- Select that cell, click and drag on the bottom right-hand corner of that cell to copy the formula
- Finally, select this “Share 0-1 Years” column,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

|  | All Firm 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 Other Services have the highest share of their employment at startups.

## Part 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.



Wholesale Trade, Information, Finance and Insurance have the highest wages at startup firms.

## Research Question 3: Does Regional Variation in Startup Concentration Predict Employment Growth? Case Study: Pennsylvania Metro Areas.

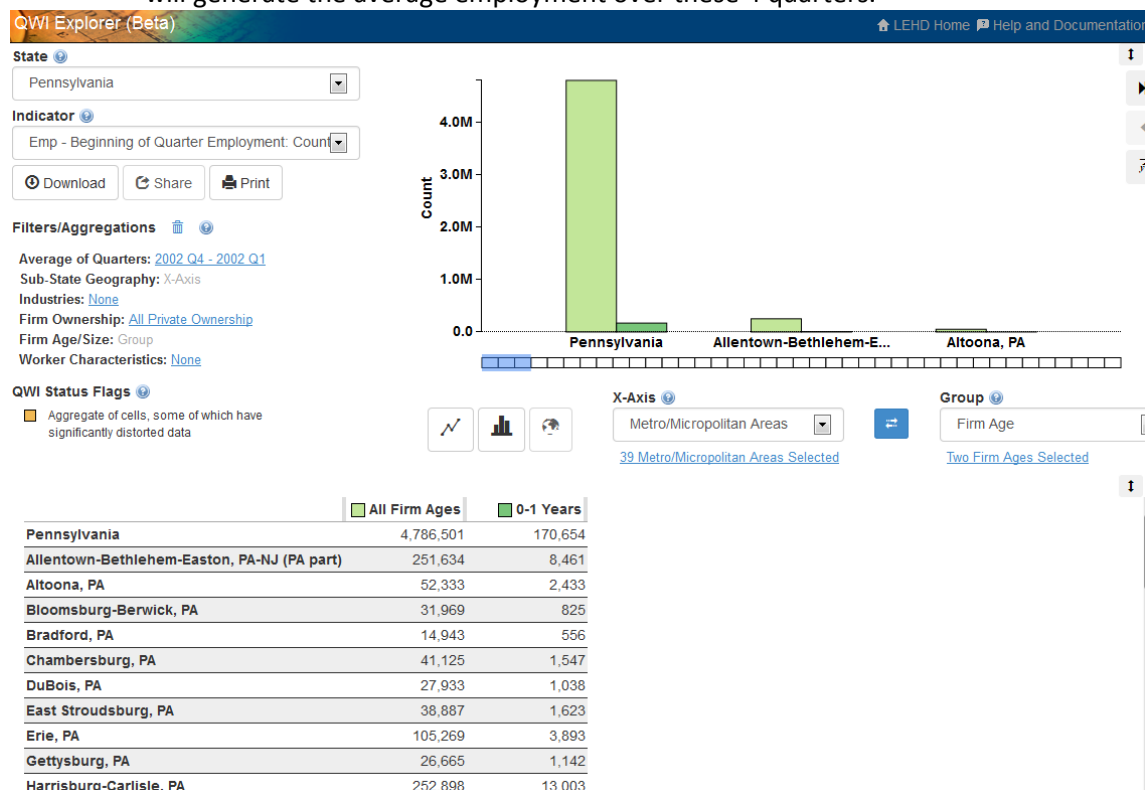
Finally, suppose we want to study the relationship between startup concentration and overall employment growth. For instance, does a large concentration of startups drive employment growth? If so, this would have interesting policy implications – perhaps localities would want to do more to attract and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

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

In the guided example, we'll use Pennsylvania (feel free to choose a different state)

In QWI Explorer, 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 “38 Metro/Micro Areas Selected,” and check the box for “42 Pennsylvania” (so that all boxes are checked)
- Change **Group** to **Firm Age**
  - Click “continue” on the conflict box (this will change ownership to **Private**)
  - Click “close” on the “No Data Available” box (firm age is not available for the most recent quarter. We'll resolve this by choosing the filter)
  - 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 2 boxes checked)
- Under **Filters**:
  - **Quarters** – click the blue text, deselect 2013Q2, and check all 4 quarters in 2002. This will generate the average employment over these 4 quarters.



Similar to Questions 1 & 2, we want to identify the Metro Areas with the highest percentage of startups.

Click the Download button, and select “Download Table as Zip.” Open the CSV file.

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”

The resulting output should look like this:

|  | All Firm Ages | All Firm Ages Flags | 0-1 Years | 0-1 Years Flags | Share 0-1 Years |
|--|---------------|---------------------|-----------|-----------------|-----------------|
| New York-Northern New Jersey-Long Island, NY-NJ-PA (PA part) | 6907          | 10                  | 463       | 10              | 6.7%            |
| Oil City, PA   | 17758         | 10                  | 1102      | 10              | 6.2%            |
| Sunbury, PA  | 24708         | 10                  | 1311      | 12              | 5.3%            |
| Harrisburg-Carlisle, PA                                      | 252898        | 10                  | 13003     | 10              | 5.1%            |
| St. Marys, PA  | 14577         | 10                  | 703       | 10              | 4.8%            |
| Lewistown, PA  | 13058         | 10                  | 627       | 12              | 4.8%            |
| Selinsgrove, PA  | 14491         | 10                  | 695       | 12              | 4.8%            |
| Altoona, PA  | 52333         | 10                  | 2433      | 10              | 4.6%            |
| Warren, PA   | 12754         | 10                  | 562       | 10              | 4.4%            |
| Gettysburg, PA   | 26665         | 10                  | 1142      | 10              | 4.3%            |
| Johnstown, PA  | 47852         | 10                  | 2021      | 10              | 4.2%            |
| East Stroudsburg, PA   | 38887         | 10                  | 1623      | 10              | 4.2%            |
| Indiana, PA  | 24176         | 10                  | 981       | 10              | 4.1%            |
| Scranton--Wilkes-Barre, PA                                   | 216257        | 10                  | 8389      | 10              | 3.9%            |
| Nonmetropolitan, nonmicropolitan                             | 94271         | 10                  | 3614      | 10              | 3.8%            |
| Somerset, PA   | 20923         | 10                  | 791       | 10              | 3.8%            |

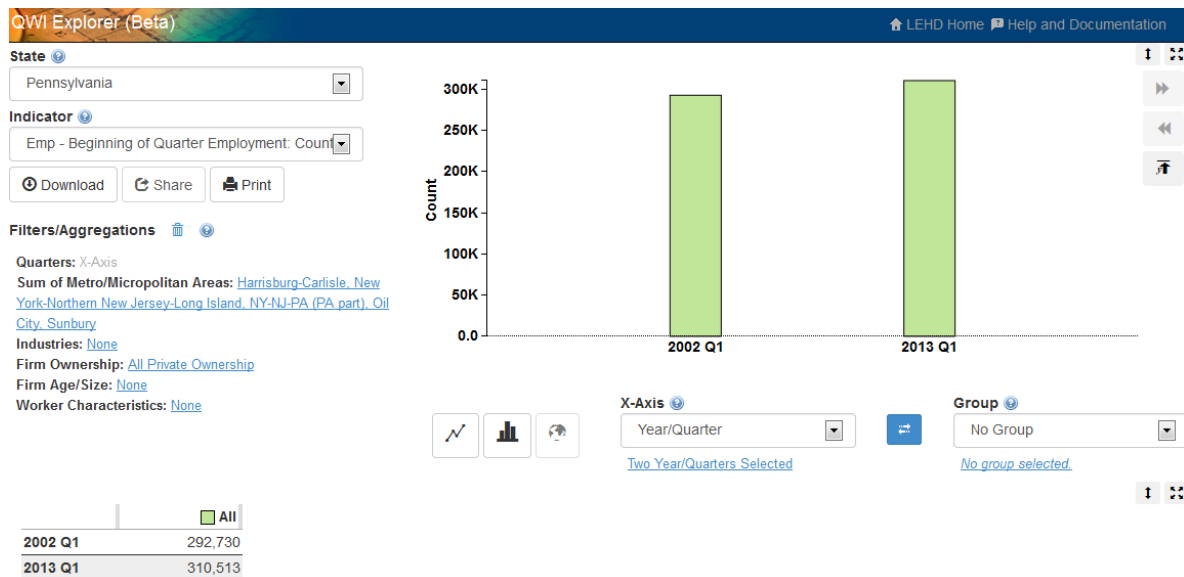
Now, let’s focus on the Metro areas with the highest share of startup employment. We’ll study the 4 Metro areas where the share of startup employment is greater than 5%. We want to examine how much their employment grew between 2002 and 2013, and compare this growth to the state of Pennsylvania as a whole. Here are the steps in QWI Explorer:

In QWI Explorer, follow these steps:

- Set **State** to **Pennsylvania**
- Set **Indicator** to **Emp** (Beginning-of-Quarter Employment)
- Change **X-Axis** to **Year/Quarter**
  - Click the blue text under the X-Axis dropdown, which reads “Eight Year/Quarters Selected,” and check ONLY the boxes for 2002Q1 and 2013Q1.
- 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, change the dropdown menu to Metro/Micro, and select the 4 Areas that had the highest concentration of startup employment in 2002:
    - New York (PA part)
    - Oil City
    - Sunbury
    - Harrisburg-Carlisle

This will generate the total employment for these 4 Metro Areas

So far, the screen should look like this:



Employment in these metro areas grew from 292,730 in 2002Q1 to 310,513 in 2013Q1.

To calculate the percentage growth, we can download this to a spreadsheet and divide the two rows. You would find that  $(310,513 - 292,730) / 292,730 = 6.1\%$ , suggesting that total employment grew by 6.1% 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 4,703,172 in 2002Q1 to 4,796,095 in 2013Q1. Calculating the percentage growth gives us  $(4,796,095 - 4,703,172) / 4,703,172 = 1.5\%$ . This suggests that between 2002 and 2013, employment in the metro areas with the highest concentration of startup firms grew at a rate four times more than employment in the entire state (6.1% vs 1.5%)!!

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 result that can motivate future research.