

Regional Economics

Lecture 3

J. M. Pogodzinski

Regional Economics Assignments

Wiki Posting on Urban Design (and Buckyballs)
- not a graded assignment

Assignment 1: Comment on "Slumburbia" Due
5pm Feb 18

Assignment 2: Comment on "Government
Intervention in the Housing Market" Due
5pm Feb 23

Outline of Lecture 3

- Alternative Measures of Labor Underutilization
- Examining the data on labor underutilization
- The geographic distribution of labor underutilization

Outline of Lecture 3

- The Location Quotient (LQ_i) Revisited
- The Hachman Index (HI)
- The Herfindahl-Hirschman (HHI)
- The Spatial Herfindahl-Hirschman Index (Spatial HHI)
- The plant Herfindahl-Hirschman Index
- The Ellison-Glaeser Index (EGI)

Outline of Lecture 3

- NAICS Codes
 - 6-digit
 - 4-digit
 - 3-digit
 - 2-digit
- Accessing County Business Patterns via American Factfinder
- Notes on .csv format
- Pondering the right measure

Alternative Measures of Labor Underutilization

- U-1, persons unemployed 15 weeks or longer, as a percent of the civilian labor force;
- U-2, job losers and persons who completed temporary jobs, as a percent of the civilian labor force;
- **U-3**, total unemployed, as a percent of the civilian labor force (this is the definition used for the official unemployment rate);
- U-4, total unemployed plus discouraged workers, as a percent of the civilian labor force plus discouraged workers;
- U-5, total unemployed, plus discouraged workers, plus all other marginally attached workers, as a percent of the civilian labor force plus all marginally attached workers; and
- **U-6**, total unemployed, plus all marginally attached workers, plus total employed part time for economic reasons, as a percent of the civilian labor force plus all marginally attached workers.

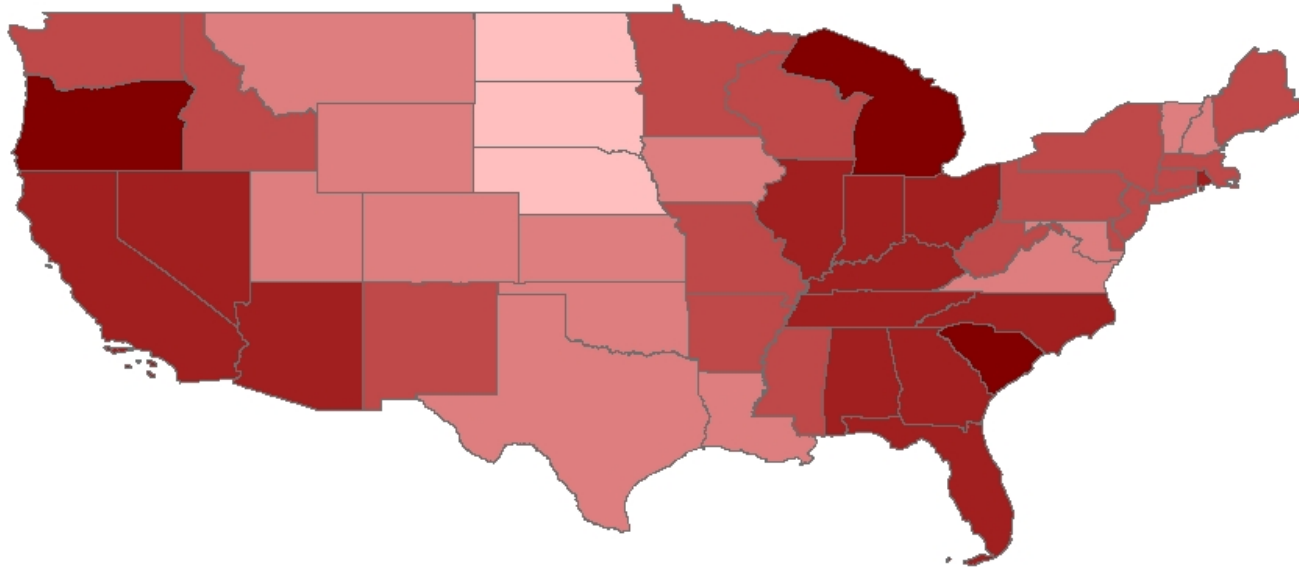
<http://www.bls.gov/lau/stalt.htm>

Go to Excel File

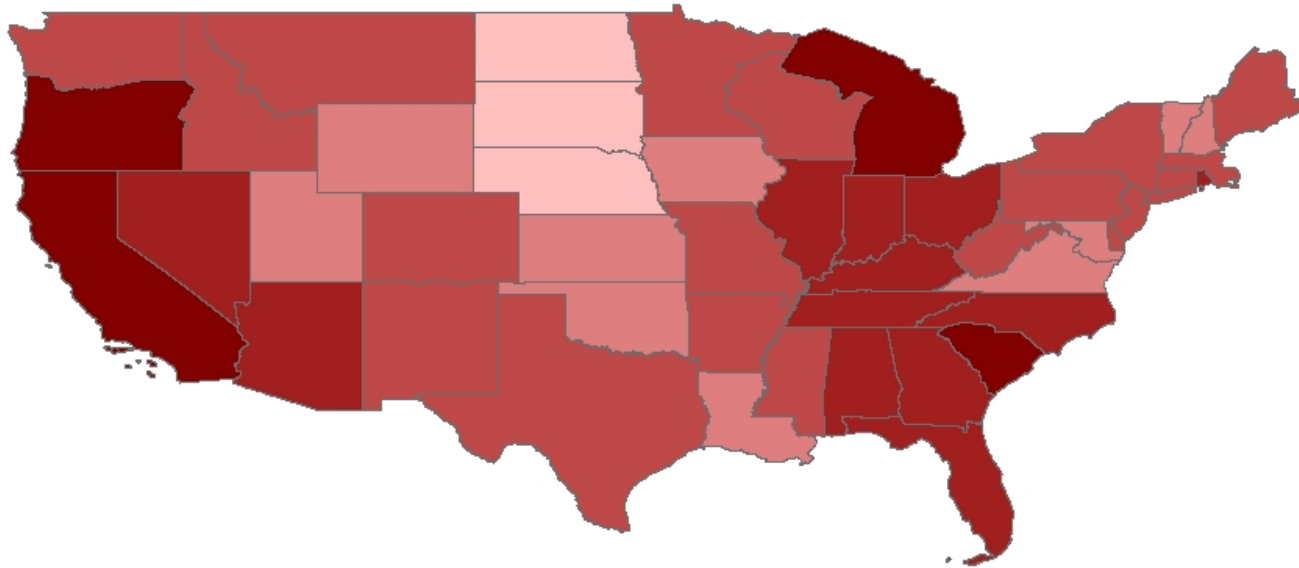
BLS_Alternative_Labor_Underutilization_Measures.xls
2009 annual averages (percent)

U-3 (“Headline”) Unemployment Rate

(in Standard Deviations from the Mean)



U-6 (Including Discouraged Workers and Underemployed) Unemployment Rate (in Standard Deviations from the Mean)



Location Quotient for a particular industry (i)

Concept

compare the structure of employment in a given **local area** to the structure of employment in a **reference area** – that is compare the ratio of employment in industry i to total employment in the local area compared to the same ratio in the reference area – usually, the base area is much larger than the local area (say, the local area is a city and the reference area is a country)

Uses

to determine the degree to which some industries are over-represented in a given local area compared to the reference area, and other industries are under-represented in a given local area compared to the reference area

Location Quotient for a particular industry (*i*)

Implementation

(lower case refers to **local area**, upper case refers to **reference area**)

e_i – employment in industry *i* in the local area

e_T - employment in all industries in the local area

E_i – employment in industry *i* in the reference area

E_T – employment in all industries in the reference area

$$LQ_i = [(e_i/e_T)/(E_i/E_T)]$$

The Location Quotient is (obviously) a relative measure.

Location Quotient for a particular industry (*i*)

Spatial representation and implications

Versatility

many variables besides employment can be used to compute location quotients, including sales, value added, occupation*

Limitations/issues

*Blair and Carroll (2009, p.81)

Quarterly Census of Employment and Wages (QCEW)

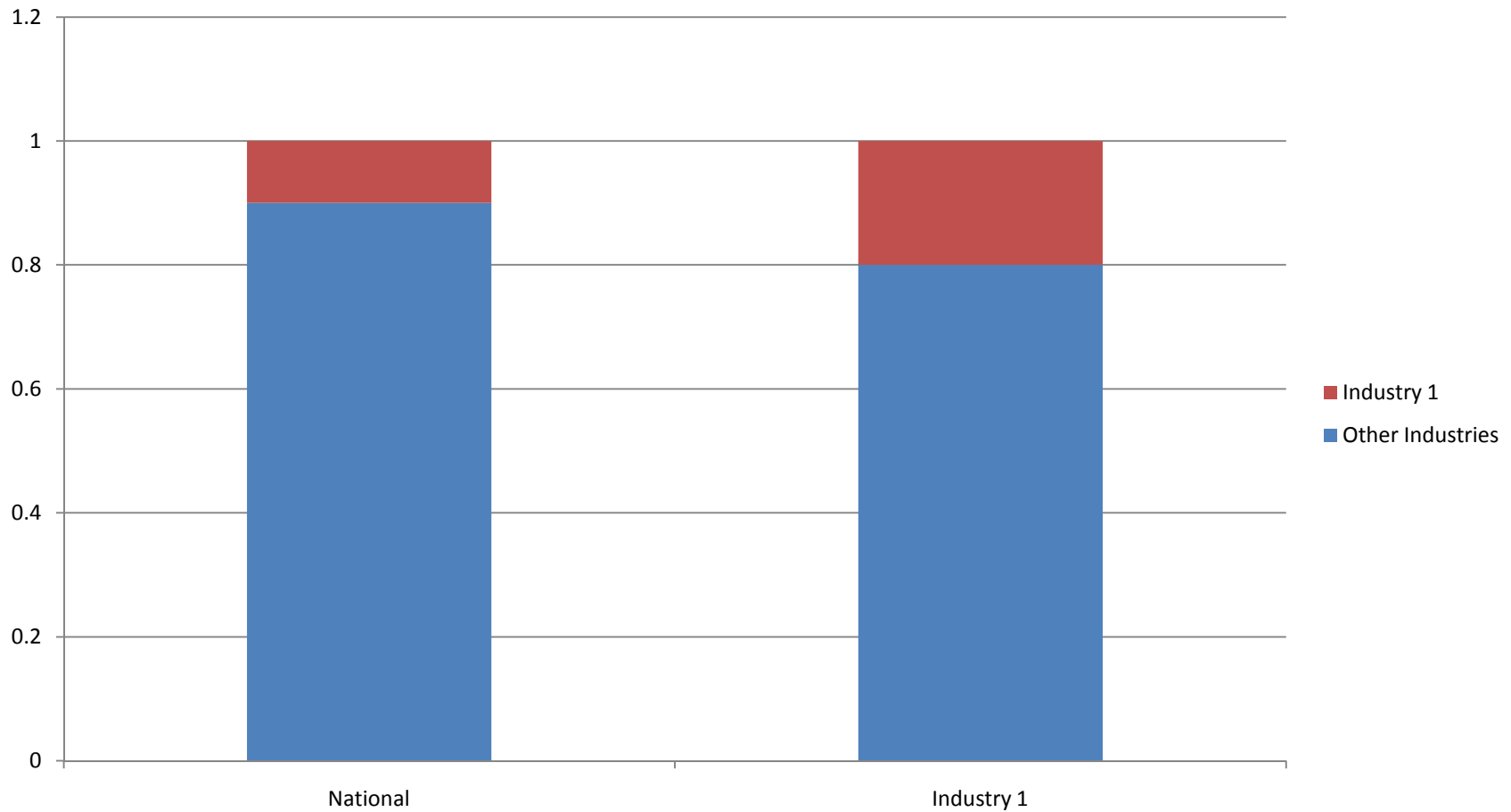
Location Quotient Calculator

[http://data.bls.gov:8080/LOCATION_QUOTIENT/
servlet/lqc.ControllerServlet](http://data.bls.gov:8080/LOCATION_QUOTIENT/servlet/lqc.ControllerServlet)

Location Quotient Illustrated (numerical example)

National	Industry 1
0.9	0.8
0.1	0.2

Location Quotient Illustrated (graph)



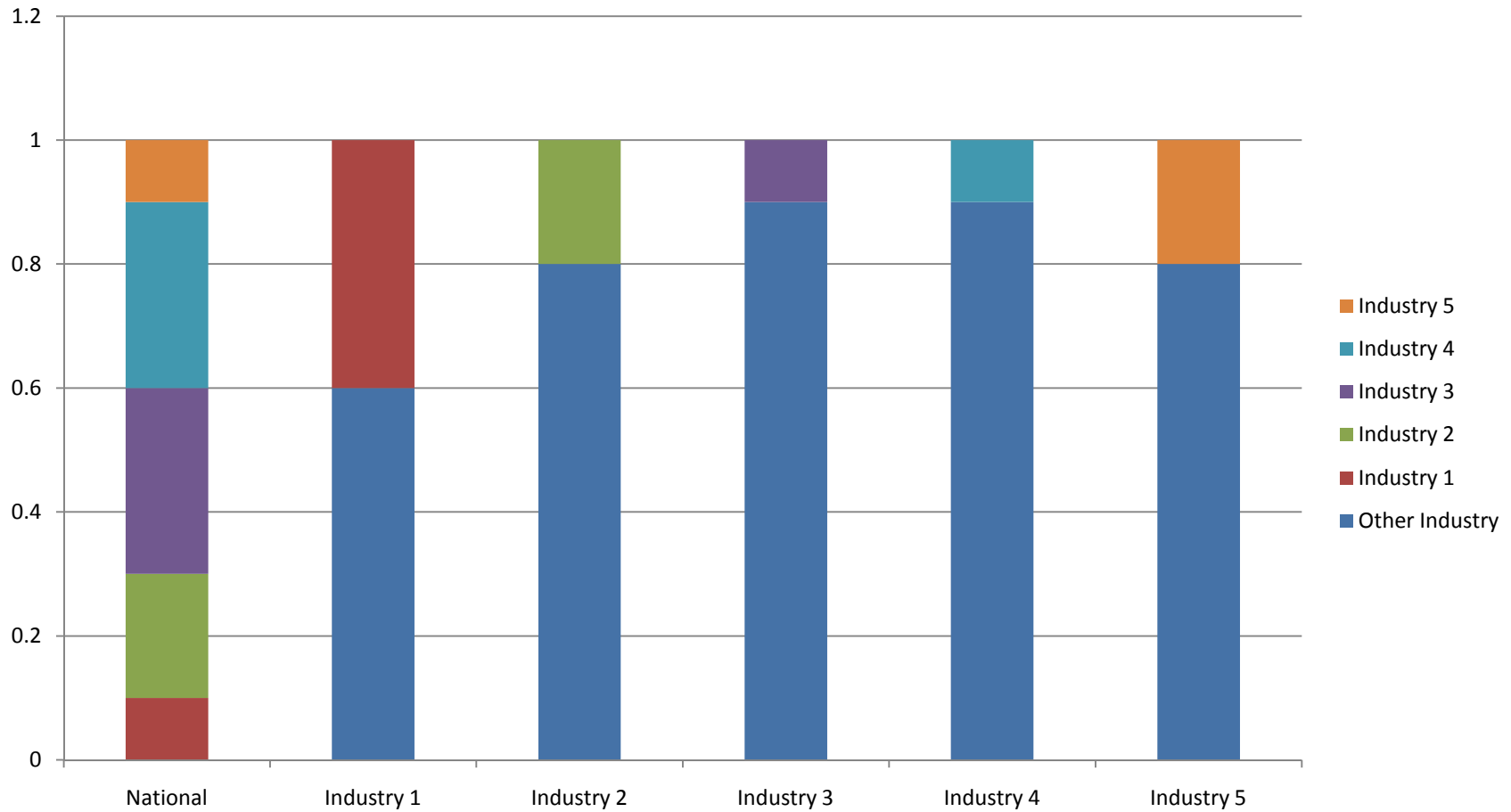
Location Quotient Illustrated

(several industries - numerical example)

		REGIONAL				
Industry	National	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5
Other Industries	0	0.6	0.8	0.9	0.9	0.8
1	0.1	0.4	0	0	0	0
2	0.2	0	0.2	0	0	0
3	0.3	0	0	0.1	0	0
4	0.3	0	0	0	0.1	0
5	0.1	0	0	0	0	0.2

Location Quotient Illustrated

(several industries - graph)



Hachman Index

Concept

gives a measure of similarity of a local area to a reference area based on *all* industries – the closer to 1 is the Hachman Index the closer is the area to the reference area across all industries; Hachman Index ranges from 0 (completely different structure from the reference area) to 1 (identical structure to the reference area);

Uses

used as a “measure of diversity” by Moody’s economy.com and in reports on economic diversity by the Federal Reserve Bank of San Francisco

Hachman Index

Implementation

1. Determine LQ_i for all $i=1,2,\dots,N$ industries
2. compute the weighted sum

$$\sum_N [LQ_i] * e_i$$

3. Compute the reciprocal ($1/x$) of the weighted sum in Step 2:

$$HI = \{1 / (\sum_N [LQ_i] * e_i)\}$$

Hachman Index

Spatial representation and implications

Perlich (1994)

<http://www.bebr.utah.edu/>

Versatility

similar to LQs, many variables besides employment can be used to compute the Hachman Index

Limitations/issues

Herfindahl-Hirschman Index (HHI)

$$H = \sum_{i=1}^N s_i^2$$

where s_i is the market share of firm i in the market, and N is the number of firms. Thus, in a market with two firms that each have 50 percent market share, the Herfindahl index equals $0.50^2 + 0.50^2 = 1 / 2$.

http://en.wikipedia.org/wiki/Herfindahl_index

Herfindahl-Hirschman Index (HHI)

$$H = \sum_{i=1}^N s_i^2$$

where s_i is the market share of firm i in the market, and N is the number of firms. Thus, in a market with two firms that each have 50 percent market share, the Herfindahl index equals $0.50^2 + 0.50^2 = 1 / 2$.

Herfindahl-Hirschman Index (HHI)

The Herfindahl Index (H) ranges from $1 / N$ to one, where N is the number of firms in the market. Equivalently, the index can range up to 10,000, if percents are used as whole numbers, as in 75 instead of 0.75. The maximum in this case is $100^2 = 10,000$.

A HHI index below 0.01 (or 100) indicates a highly competitive index.

A HHI index below 0.1 (or 1,000) indicates an unconcentrated index.

A HHI index between 0.1 to 0.18 (or 1,000 to 1,800) indicates moderate concentration.

A HHI index above 0.18 (above 1,800) indicates high concentration

Legal and Regulatory Uses of HHI

See

<http://www.justice.gov/atr/public/testimony/hhi.htm>

Spatial Herfindahl-Hirschman Index

$$\sum_i (s_{ir} - x_r)^2$$

where

s_{ir} = share of industry i 's national employment in region r

x_r = share of aggregate national employment in region r

$$\sum_i ([E_{ir}/E_{in}] - [E_r/E_n])^2$$

McCann, expression (2.11), p. 81

Spatial Herfindahl-Hirschman Index

What does it say?

What data do I need to compute it?

How do I interpret it?

LQs, Spatial HHIs, and HI

	LQ	shares	Er/En	(shares-Er/En) ²	LQ-i*Ei
LQ-Other	#DIV/0!	#DIV/0!	0.1	#DIV/0!	#DIV/0!
LQ-1	4.0	0.4	0.1	0.1	160,000.0
LQ-2	1.0	0.1	0.1	0.0	20,000.0
LQ-3	0.3	0.0	0.1	0.0	3,333.3
LQ-4	0.3	0.0	0.1	0.0	3,333.3
LQ-5	2.0	0.2	0.1	0.0	40,000.0
				0.1	0.0
				HHI	HI

LIVE SOFTWARE DEMO

INDEXES.XLS

Hachman Index

Teaser Questions:

1. Why is the HI weighted by e_i ? What happens if the HI is unweighted (equally weighted – i.e., all $e_i = 1$)?
2. Why take the reciprocal of the weighted sum? What happens if we don't take the reciprocal?

NAICS Codes

North American Industrial Classification System
(NAICS)

Go to <http://www.census.gov/eos/www/naics/>

SIC, NAICS, AND INDUSTRY CLASSIFICATION GENERALLY

Industry classification is the process of creating a typology (categorizing) firms into industries – groups of firms which produce related goods and services. The classification of firms into industries can be done on a coarse level (for example, the classification “restaurant” includes expensive bistros, burrito stands, and McDonalds) or a finer level (for example, the classification “fast-food restaurant”). In the US, two systems of industry classification are often referred to: SIC codes and NAICS codes. SIC stands for Standard Industry Classification; NAICS stands for North American Industry Classification System. Both systems can be used to classify industries coarsely (at the 2-digit level, like “restaurant”) or finely (at the 6-digit level, like “fast food restaurant”). We will see examples of both coarse and fine classification.

NAICS is the current system of industry classification used by the US Department of Commerce (<http://www.census.gov/eos/www/naics/>); it replaced the SIC in 1997. Concordances are available which show the relationships among the code numbers (<http://www.census.gov/eos/www/naics/concordances/concordances.html>).

NAICS

NAICS is the current system of industry classification used by the US Department of Commerce (<http://www.census.gov/eos/www/naics/>); it replaced the SIC in 1997.

Concordances are available which show the relationships among the code numbers (<http://www.census.gov/eos/www/naics/concordances/concordances.html>).

541711 Biotechnology (6-digit classification) from Keyword Search

NAICS SEARCH

Enter keyword or 2-6 digit code

2007 NAICS Search

Enter keyword or 2-6 digit code

2002 NAICS Search

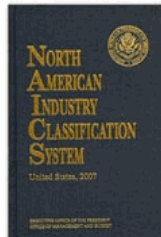
DOWNLOADS / REFERENCE FILES / TOOLS

[For 2007 NAICS](#)

[For 2002 NAICS](#)

[Concordances](#)

[NAICS Update Process Fact Sheet](#) [PDF
37 K]



2007 NAICS KEY WORD SEARCH

Search results for: **biotechnology**

Number of records found: 30

- [541711](#) **Biotechnology** research and development laboratories or service in botany
- [541711](#) **Biotechnology** research and development laboratories or services
- [541711](#) **Biotechnology** research and development laboratories or services in agriculture
- [541711](#) **Biotechnology** research and development laboratories or services in bacteriology
- [541711](#) **Biotechnology** research and development laboratories or services in biology
- [541711](#) **Biotechnology** research and development laboratories or services in chemical sciences
- [541711](#) **Biotechnology** research and development laboratories or services in entomology
- [541711](#) **Biotechnology** research and development laboratories or services in environmental science
- [541711](#) **Biotechnology** research and development laboratories or services in food science
- [541711](#) **Biotechnology** research and development laboratories or services in genetics
- [541711](#) **Biotechnology** research and development laboratories or services in health sciences
- [541711](#) **Biotechnology** research and development laboratories or services in industrial research
- [541711](#) **Biotechnology** research and development laboratories or services in the medical sciences
- [541711](#) **Biotechnology** research and development laboratories or services in the physical sciences
- [541711](#) **Biotechnology** research and development laboratories or services in the veterinary sciences
- [541712](#) Agriculture research and development laboratories or services (except **biotechnology** research and development)
- [541712](#) Bacteriological research and development laboratories or services (except **biotechnology** research and development)
- [541712](#) Biology research and development laboratories or services (except **biotechnology** research and development)
- [541712](#) Botany research and development laboratories or services (except **biotechnology** research and development)
- [541712](#) Chemical research and development laboratories or services (except **biotechnology** research and development)

5417 (4-digit classification)

U.S. Census Bureau

People | Business | Geography | Newsroom | Subjects A to Z | Search@Census

North American Industry Classification System (NAICS)

Main | FAQs | History | Development Partners | Federal Register Notices | Product Classification

NAICS SEARCH

Enter keyword or 2-6 digit code

2007 NAICS Search

Enter keyword or 2-6 digit code

2002 NAICS Search

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[For 2002 NAICS](#)
[Concordances](#)
[NAICS Update Process Fact Sheet](#) [PDF 37K]

2007 NAICS DEFINITION

Search results for: 5417
Number of records found: 6

- [5417](#) **Scientific Research and Development Services**
- [54171](#) Research and Development in the Physical, Engineering, and Life Sciences
- [541711](#) Research and Development in Biotechnology
- [541712](#) Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)
- [54172](#) Research and Development in the Social Sciences and Humanities
- [541720](#) Research and Development in the Social Sciences and Humanities



541 (3-digit classification)

The screenshot shows the U.S. Census Bureau website for the North American Industry Classification System (NAICS). The page features a search bar on the left and a list of search results on the right. The search results are for the 3-digit classification 541, which includes Professional, Scientific, and Technical Services. The results are listed in a hierarchical format, starting with the 3-digit code and then listing the 4-digit and 5-digit codes with their corresponding descriptions.

U.S. Census Bureau

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North American Industry Classification System (NAICS)

Main | FAQs | History | Development Partners | Federal Register Notices | Product Classification

NAICS SEARCH
Enter keyword or 2-6 digit code

2007 NAICS Search

Enter keyword or 2-6 digit code

2002 NAICS Search

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[Concordances](#)
[NAICS Update Process Fact Sheet](#) [PDF 37K]

2007 NAICS DEFINITION

Search results for: 541
Number of records found: 93

541 Professional, Scientific, and Technical Services

5411 Legal Services

- [54111](#) Offices of Lawyers
- [541110](#) Offices of Lawyers
- [54112](#) Offices of Notaries
- [541120](#) Offices of Notaries
- [54119](#) Other Legal Services
- [541191](#) Title Abstract and Settlement Offices
- [541199](#) All Other Legal Services

5412 Accounting, Tax Preparation, Bookkeeping, and Payroll Services

- [54121](#) Accounting, Tax Preparation, Bookkeeping, and Payroll Services
- [541211](#) Offices of Certified Public Accountants
- [541213](#) Tax Preparation Services
- [541214](#) Payroll Services
- [541210](#) Other Accounting Services

NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM
United States, 2007

54 (2-digit classification)

U.S. Census Bureau

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North American Industry Classification System (NAICS)

Main | FAQs | History | Development Partners | Federal Register Notices | Product Classification

NAICS SEARCH
Enter keyword or 2-6 digit code

2007 NAICS Search

Enter keyword or 2-6 digit code

2002 NAICS Search

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[For 2007 NAICS](#)
[For 2002 NAICS](#)
[Concordances](#)
[NAICS Update Process Fact Sheet](#) [PDF 37K]



2007 NAICS DEFINITION

Search results for: 54
Number of records found: 94

- [54](#) Professional, Scientific, and Technical Services**
- [541](#) Professional, Scientific, and Technical Services**
- [5411](#) Legal Services**
 - [54111](#) Offices of Lawyers
 - [541110](#) Offices of Lawyers
 - [54112](#) Offices of Notaries
 - [541120](#) Offices of Notaries
 - [54119](#) Other Legal Services
 - [541191](#) Title Abstract and Settlement Offices
 - [541199](#) All Other Legal Services
- [5412](#) Accounting, Tax Preparation, Bookkeeping, and Payroll Services**
 - [54121](#) Accounting, Tax Preparation, Bookkeeping, and Payroll Services
 - [541211](#) Offices of Certified Public Accountants
 - [541213](#) Tax Preparation Services
 - [541214](#) Payroll Services

Access County Business Patterns (CBP) via American Factfinder

Go to

http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=EAS

Select

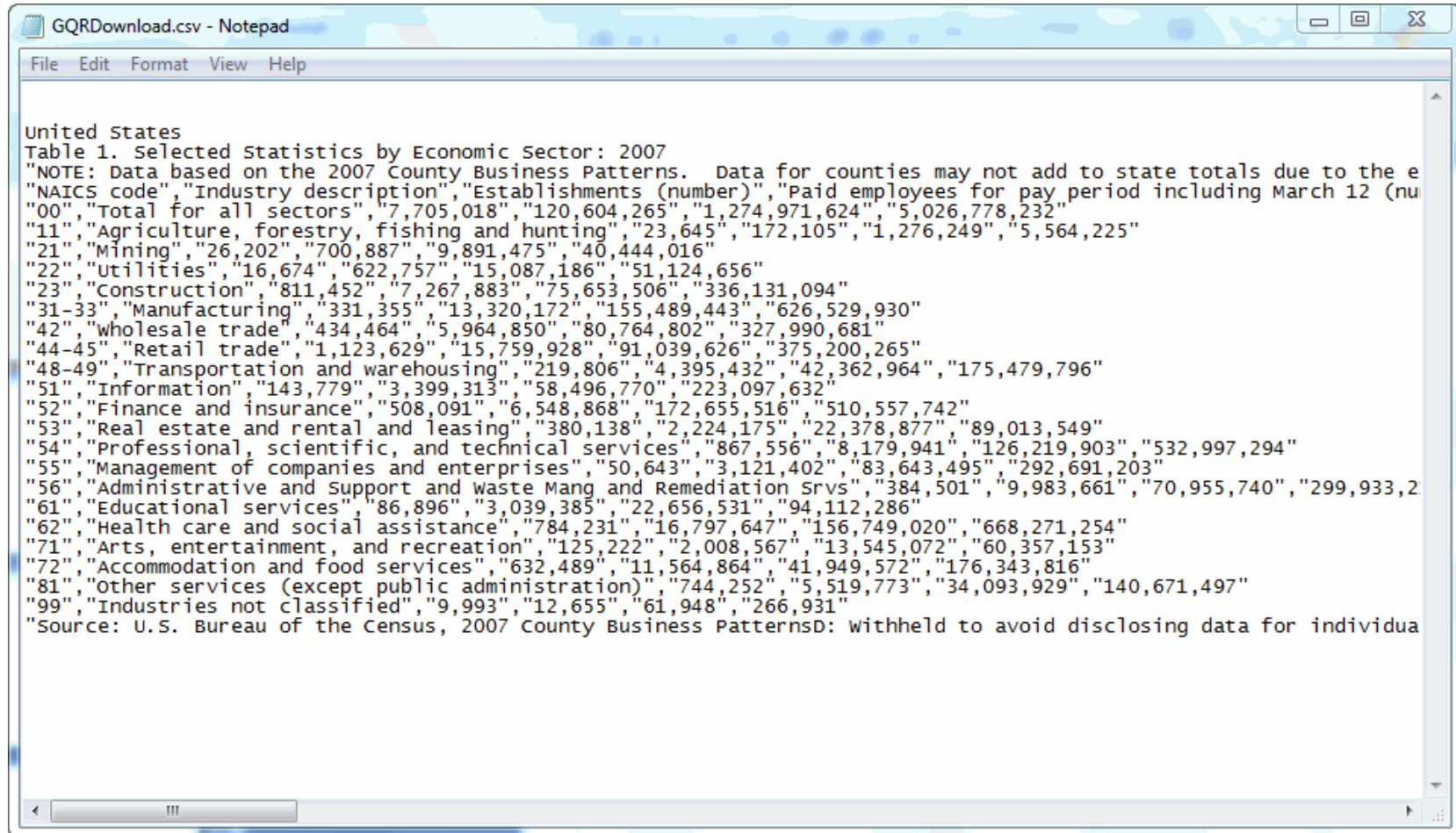
Industry Quick Reports - reports that show a single NAICS industry2007 County Business Patterns - [the United States and states](#)

Geography Quick Reports - reports showing all industries for a single geography2007 County Business Patterns - [select from the U.S., states, counties, and metropolitan areas](#)

Download data in .csv format (“comma separated values”)

Note on .csv format

(“comma separated values”)
viewed in Notepad



```
GQRDownload.csv - Notepad
File Edit Format View Help

United States
Table 1. Selected Statistics by Economic Sector: 2007
"NOTE: Data based on the 2007 County Business Patterns. Data for counties may not add to state totals due to the e
"00","Total for all sectors","7,705,018","120,604,265","1,274,971,624","5,026,778,232"
"11","Agriculture, forestry, fishing and hunting","23,645","172,105","1,276,249","5,564,225"
"21","Mining","26,202","700,887","9,891,475","40,444,016"
"22","Utilities","16,674","622,757","15,087,186","51,124,656"
"23","Construction","811,452","7,267,883","75,653,506","336,131,094"
"31-33","Manufacturing","331,355","13,320,172","155,489,443","626,529,930"
"42","wholesale trade","434,464","5,964,850","80,764,802","327,990,681"
"44-45","Retail trade","1,123,629","15,759,928","91,039,626","375,200,265"
"48-49","Transportation and warehousing","219,806","4,395,432","42,362,964","175,479,796"
"51","Information","143,779","3,399,313","58,496,770","223,097,632"
"52","Finance and insurance","508,091","6,548,868","172,655,516","510,557,742"
"53","Real estate and rental and leasing","380,138","2,224,175","22,378,877","89,013,549"
"54","Professional, scientific, and technical services","867,556","8,179,941","126,219,903","532,997,294"
"55","Management of companies and enterprises","50,643","3,121,402","83,643,495","292,691,203"
"56","Administrative and Support and Waste Mang and Remediation Srvs","384,501","9,983,661","70,955,740","299,933,2
"61","Educational services","86,896","3,039,385","22,656,531","94,112,286"
"62","Health care and social assistance","784,231","16,797,647","156,749,020","668,271,254"
"71","Arts, entertainment, and recreation","125,222","2,008,567","13,545,072","60,357,153"
"72","Accommodation and food services","632,489","11,564,864","41,949,572","176,343,816"
"81","other services (except public administration)","744,252","5,519,773","34,093,929","140,671,497"
"99","Industries not classified","9,993","12,655","61,948","266,931"
"Source: U.S. Bureau of the Census, 2007 County Business PatternsD: withheld to avoid disclosing data for individua
```

Note on .csv format

("comma separated values")

viewed in Excel

NAICS code	Industry description	Establishments	Paid employees	First quarter payroll (\$1,000)	Annual payroll (\$1,000)
0	Total for all	7,705,018	120,604,265	1,274,971,624	5,026,778,232
11	Agriculture, forestry, and fishing	23,645	172,105	1,276,249	5,564,225
21	Mining, quarrying, and oil and gas extraction	26,202	700,887	9,891,475	40,444,016
22	Utilities	16,674	622,757	15,087,186	51,124,656
23	Construction	811,452	7,267,883	75,653,506	336,131,094
31-33	Manufacturing	331,355	13,320,172	155,489,443	626,529,930
42	Wholesale trade	434,464	5,964,850	80,764,802	327,990,681
44-45	Retail trade	1,123,629	15,759,928	91,039,626	375,200,265
48-49	Transportation and warehousing	219,806	4,395,432	42,362,964	175,479,796
51	Information	143,779	3,399,313	58,496,770	223,097,632
52	Finance and insurance	508,091	6,548,868	172,655,516	510,557,742
53	Real estate and rental and leasing	380,138	2,224,175	22,378,877	89,013,549
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55	Management of companies and enterprises	50,643	3,121,402	83,643,495	292,691,203
56	Administrative and support and waste management and remediation services	384,501	9,983,661	70,955,740	299,933,212
61	Education and health care services	86,896	3,039,385	22,656,531	94,112,286
62	Health care and social assistance	784,231	16,797,647	156,749,020	668,271,254
71	Arts, entertainment, and recreation	125,222	2,008,567	13,545,072	60,357,153
72	Accommodation and food services	632,489	11,564,864	41,949,572	176,343,816
81	Other services (except food services)	744,252	5,519,773	34,093,929	140,671,497

What is the right measure?

- Number of firms?
- Number of employees?
- Payroll?
- Should we use *relative* measures rather than *absolute* measures?
- What are appropriate *relative* measures?
 - *per capita*
 - *per person in the labor force*

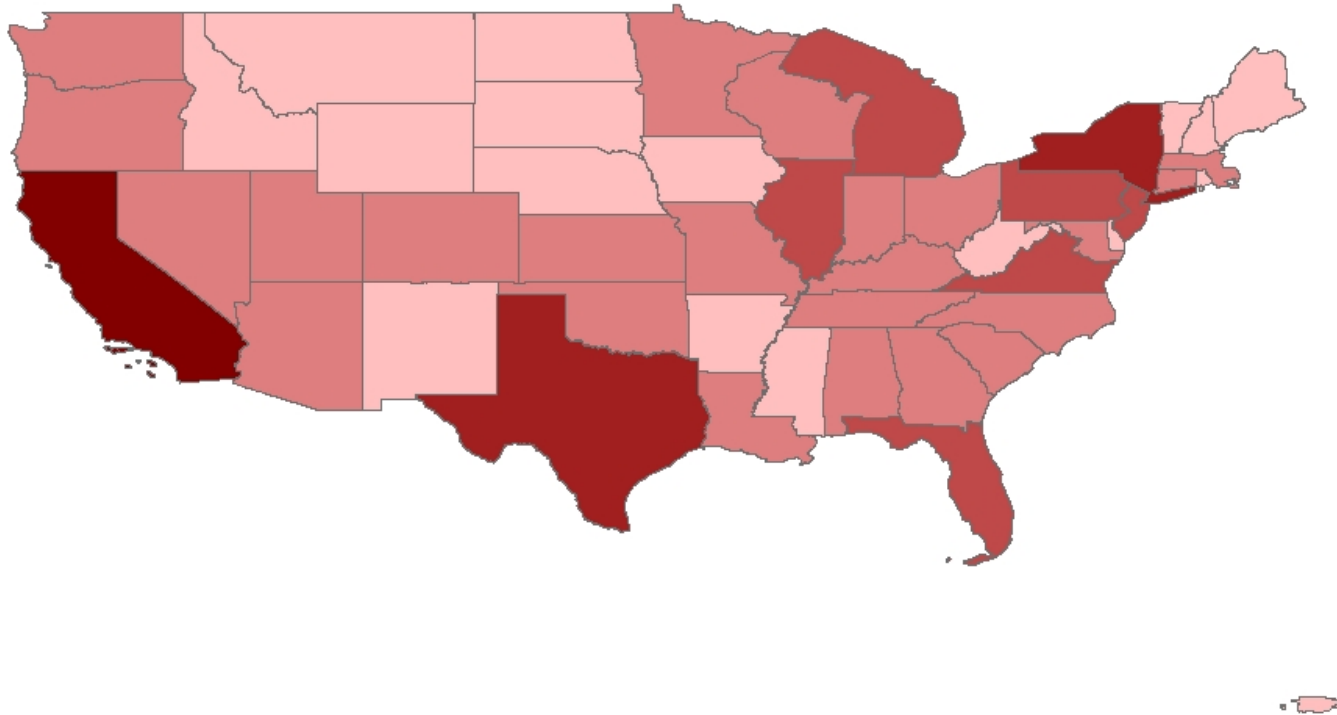
Issues

- Level of industry aggregation
- Level of geographic aggregation
 - of local area
 - of reference area

Some Preliminary Maps (related to industry 54)

FOLLOWING SLIDES

Industry 54 Employees Standard Deviations



WHAT'S WRONG WITH THESE MAPS?

Another teaser question

Miscellaneous Information

FOLLOWING SLIDES

County Weekly Wages in California

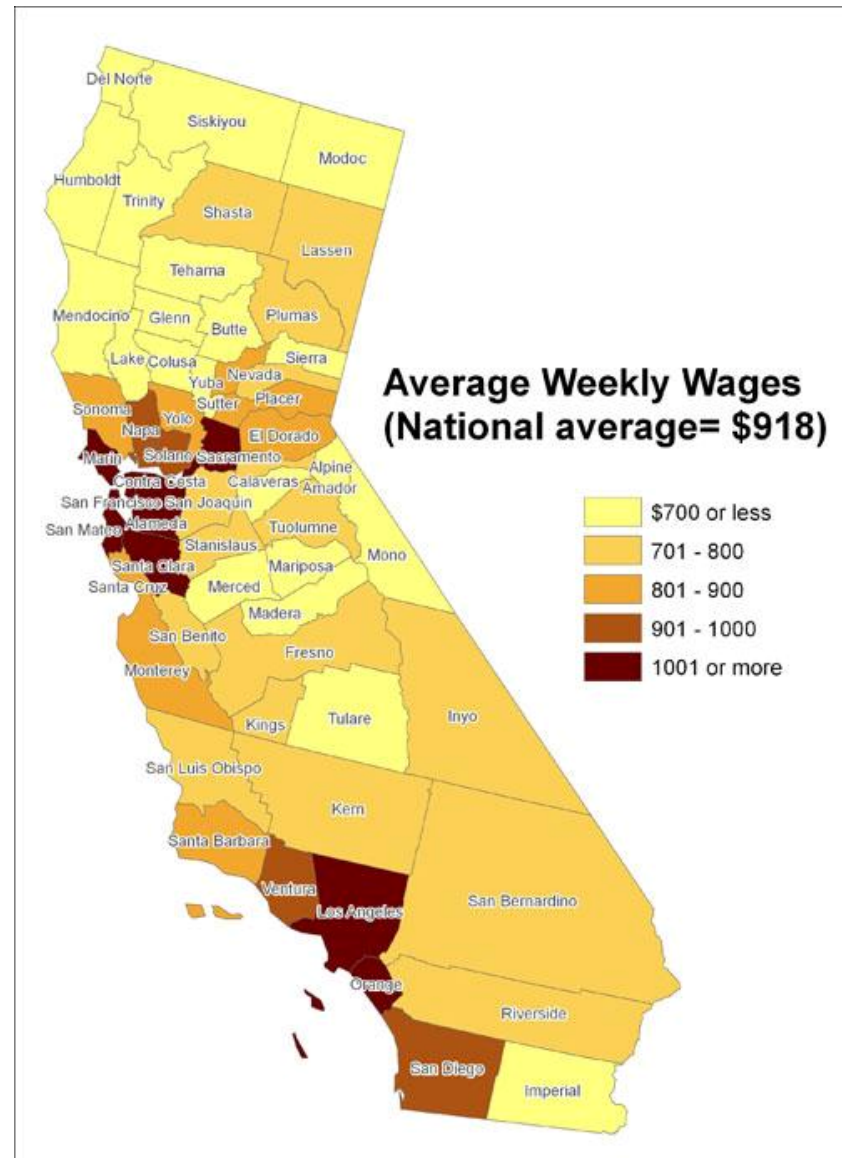
(latest report from BLS regional office)

Information and data:

<http://www.bls.gov/ro9/qcewca.htm>

Graphic:

<http://www.bls.gov/ro9/qcewca.jpg>



Local Area Unemployment Statistics (BLS)

<http://www.bls.gov/Lau/>