

Assessing Private Sector Capacity for Wage Increase Using the CPS ASEC

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Method

- Use the 2023 CPS ASEC
- A combination of 2 ratios: Unemployment Ratio and Wage Ratio as capacity indicators
- Break down by Education (EWR) and Regions (RWR)
- Use the weight MARSUPWT to reflect the true size of the US population
- Use RStudio for data manipulation and analysis

The Labor Force

Labor Force		
*Part-time for economic reasons counted as employed		
Emp Status	No of People	Proportion
Employed	152,755,644	96.4%
Unemployed	5,699,905	3.6%
Total	158,455,550	100%

Labor Force		
*Part-time for economic reasons counted as unemployed		
Emp Status	No of People	Proportion
Employed	148,576,122	93.77%
Unemployed	9,879,428	6.23%
Total	158,455,550	100%

- Official unemployment vs. broad unemployment measure
- Unemployment: from 3.6% to 6.2%
- 158m vs 329m (Labor force ~ Population)

Unemployment Ratio UR

- UR: Normalize Unemployment Rates against the baseline 3%
- $UR \geq 1$: sector has a full capacity (3% ~ $UR = 1$)
- Almost none of the sectors has a full capacity

- $Corr(\text{Unemp}, \text{Wage}) = -0.6$ (Moderately strong)
- Unemployment-Wage Dynamics: Higher unemployment associated with lower wages (wage curve)

Unemployment Rate and Ratio by Sector				
Ratios normalized against the baseline 3%				
Sector	#Unemp	Total Labor	Unemp Rate	Unemp Ratio
Information	159,892	3,133,009	0.05	0.59
Finance Insure & RE	294,576	11,191,541	0.03	1.14
Prof Scient & Manage	1,306,561	21,332,340	0.06	0.49
Educ & Health	1,395,782	37,713,656	0.04	0.81
Mining & Gas	41,991	627,543	0.07	0.45
Manufacturing	667,069	16,137,006	0.04	0.73
Construction	1,181,735	12,142,732	0.10	0.31
Transport & Utils	893,359	10,512,918	0.08	0.35
Agriculture	226,739	2,361,114	0.10	0.31
Whole & Retail	1,646,641	20,419,121	0.08	0.37
Arts & Entertain	1,564,360	15,320,322	0.10	0.29
Other	500,723	7,564,247	0.07	0.45

Sectoral Wage Ratio

- Median or Average? Sectoral Gini coef > 0.44.
- WR: Normalize sectoral median wage against the baseline National Median 45k
- Wage Ratio ≥ 1 : sector is fully capable (45k ~ Wage Ratio =1)
- Thriving and Lagging sectors

Wage Cost & Wage Cost Ratio by Sector			
Ratios Normalized against the baseline of \$45,000			
Sector	Av Wage	Med Wage	Wage Ratio
Information	96,195	70,000	1.56
Finance Insure & RE	91,479	60,000	1.33
Prof Scient & Manage	82,845	57,000	1.27
Educ & Health	61,236	48,000	1.07
Mining & Gas	96,769	74,196	1.65
Manufacturing	70,567	54,000	1.20
Transport & Utils	60,369	49,000	1.09
Construction	54,921	44,000	0.98
Whole & Retail	49,962	35,000	0.78
Arts & Entertain	32,700	22,400	0.50
Agriculture	36,392	25,000	0.56
Other	40,766	30,000	0.67

Educational Wage Ratio EWR

Median Wage by Sector & Educational Level										
Sector/Educ Level	Pre-High School	High School Graduate	Some college	Associate degree/Acad	Associate degree/Voc	Bachelor's Degree	Master's Degree	Doctorate	Professional Degree	Sector Median
Information	20,800	50,000	50,000	60,000	77,500	80,000	102,000	141,361	68,000	70,000
Finance Insure & RE	31,600	41,600	47,000	47,500	48,100	75,000	105,000	100,000	100,000	60,000
Prof Scient & Manage	17,650	33,000	40,000	47,869	42,500	80,000	100,000	109,250	125,000	57,000
Educ & Health	15,000	30,000	30,000	40,000	45,000	52,000	67,819	100,000	105,125	48,000
Mining & Gas	47,920	67,000	71,500	80,000	83,500	97,500	107,500	118,000	30,000	74,196
Manufacturing	32,000	44,000	50,000	55,000	58,000	85,000	110,000	150,000	115,000	54,000
Transport & Utils	35,000	40,000	45,000	52,000	49,000	65,855	83,342	50,514	100,000	49,000
Construction	30,000	40,001	50,000	54,500	60,000	65,000	78,000	64,000	60,000	44,000
Whole & Retail	12,000	31,200	31,000	36,000	40,951	55,000	75,000	130,000	122,483	35,000
Arts & Entertain	7,200	25,000	24,000	29,800	34,000	40,000	46,642	25,000	50,000	22,400
Agriculture	23,000	25,000	20,000	2,500	30,000	32,500	16,919	0	15,000	25,000
Other	14,000	26,000	26,940	32,000	28,000	44,000	64,913	68,250	60,000	30,000
Educ Median	19,000	35,000	36,000	43,000	45,000	60,000	77,000	100,000	110,000	45,000

- National Median Wage: \$45k ~ baseline 1
- EWR computation: $EWR_{ij} = \frac{W_{ij}}{W_{baseline}}$
- Sector/Educ combination \geq 45k (full capacity)
- Example: Master's degree in Finance, 105k /45k = 2.3 (2.3 times fully capable, 130% above baseline)

Educational Wage Ratios

Wages normalized against the baseline of \$45,000

Sector/Educ Level	Pre-High School	High School Graduate	Some college	Associate degree/Acad	Associate degree/Voc	Bachelor's Degree	Master's Degree	Doctorate	Professional Degree	Sector Median
Information	0.46	1.11	1.11	1.33	1.72	1.78	2.27	3.14	1.51	1.56
Finance Insure & RE	0.70	0.92	1.04	1.06	1.07	1.67	2.33	2.22	2.22	1.33
Prof Scient & Manage	0.39	0.73	0.89	1.06	0.94	1.78	2.22	2.43	2.78	1.27
Educ & Health	0.33	0.67	0.67	0.89	1.00	1.16	1.51	2.22	2.34	1.07
Mining & Gas	1.06	1.49	1.59	1.78	1.86	2.17	2.39	2.62	0.67	1.65
Manufacturing	0.71	0.98	1.11	1.22	1.29	1.89	2.44	3.33	2.56	1.20
Transport & Utils	0.78	0.89	1.00	1.16	1.09	1.46	1.85	1.12	2.22	1.09
Construction	0.67	0.89	1.11	1.21	1.33	1.44	1.73	1.42	1.33	0.98
Whole & Retail	0.27	0.69	0.69	0.80	0.91	1.22	1.67	2.89	2.72	0.78
Arts & Entertain	0.16	0.56	0.53	0.66	0.76	0.89	1.04	0.56	1.11	0.50
Agriculture	0.51	0.56	0.44	0.06	0.67	0.72	0.38	0.00	0.33	0.56
Other	0.31	0.58	0.60	0.71	0.62	0.98	1.44	1.52	1.33	0.67
Educ Median	0.42	0.78	0.80	0.96	1.00	1.33	1.71	2.22	2.44	1.00

- Premium on Education: Wage ratios consistently increase with higher education levels, above the baseline.
- Impact most felt in Construction & Wholesale/Retail: median ratios close to 1.0 but exceed baseline across multiple education tiers.

Regional Wage Ratio RWR

Median Wage by Sector & Region										
Sector/Region	east north central	east south central	middle atlantic	mountain	new england	pacific	south atlantic	west north central	west south central	Sector Median
Information	72,000	50,000	92,500	60,500	70,000	90,000	75,000	49,000	60,000	70,000
Finance Insure & RE	61,000	50,000	75,000	55,000	78,500	60,000	65,000	60,000	55,000	60,000
Prof Scient & Manage	57,000	48,000	66,950	50,000	61,000	60,000	60,000	50,000	49,528	57,000
Educ & Health	49,000	48,000	50,000	45,000	53,000	50,000	50,000	47,002	43,000	48,000
Mining & Gas	60,000	60,000	90,000	80,000	130,000	80,000	70,000	67,652	75,000	74,196
Manufacturing	55,000	49,000	55,000	56,000	60,000	60,000	50,000	55,000	50,000	54,000
Transport & Utils	48,000	50,000	45,000	50,000	50,000	47,920	45,000	54,000	50,000	49,000
Construction	50,000	40,000	47,000	45,000	45,000	45,000	40,000	48,000	36,000	44,000
Whole & Retail	34,000	30,000	35,000	35,000	37,000	35,000	32,000	35,920	32,000	35,000
Arts & Entertain	18,750	21,500	22,482	22,000	24,000	27,000	24,387	17,000	20,000	22,400
Agriculture	11,000	25,000	0	31,200	15,550	29,225	25,000	5,791	21,750	25,000
Other	30,000	31,200	29,500	30,000	28,653	28,216	35,000	36,400	29,000	30,000
Region Median	46,000	40,000	49,000	42,000	50,000	45,000	45,000	45,000	40,000	45,000

$$RWR_{ij} = \frac{W_{ij}}{W_{baseline}}$$

- Economists working in East South Central, 50k vs. 45k (1.1 times capacity)
- Tech workers in the Pacific (Silicon Valley): 90k vs. 45k (2 times capacity)
- Wholesale & Retail workers in New England: 37k vs. 45k (Lacks capacity by 18%)

Regional Wage Ratios

Wages normalized against the baseline of \$45,000

Sector/Region	east north central	east south central	middle atlantic	mountain	new england	pacific	south atlantic	west north central	west south central	Sector Median
Information	1.60	1.11	2.06	1.34	1.56	2.00	1.67	1.09	1.33	1.56
Finance Insure & RE	1.36	1.11	1.67	1.22	1.74	1.33	1.44	1.33	1.22	1.33
Prof Scient & Manage	1.27	1.07	1.49	1.11	1.36	1.33	1.33	1.11	1.10	1.27
Educ & Health	1.09	1.07	1.11	1.00	1.18	1.11	1.11	1.04	0.96	1.07
Mining & Gas	1.33	1.33	2.00	1.78	2.89	1.78	1.56	1.50	1.67	1.65
Manufacturing	1.22	1.09	1.22	1.24	1.33	1.33	1.11	1.22	1.11	1.20
Transport & Utils	1.07	1.11	1.00	1.11	1.11	1.06	1.00	1.20	1.11	1.09
Construction	1.11	0.89	1.04	1.00	1.00	1.00	0.89	1.07	0.80	0.98
Whole & Retail	0.76	0.67	0.78	0.78	0.82	0.78	0.71	0.80	0.71	0.78
Arts & Entertain	0.42	0.48	0.50	0.49	0.53	0.60	0.54	0.38	0.44	0.50
Agriculture	0.24	0.56	0.00	0.69	0.35	0.65	0.56	0.13	0.48	0.56
Other	0.67	0.69	0.66	0.67	0.64	0.63	0.78	0.81	0.64	0.67
Region Median	1.02	0.89	1.09	0.93	1.11	1.00	1.00	1.00	0.89	1.00

Horizontal & Vertical View:

- Most regions meet baseline wage levels
- Thriving and Lagging Sector
 - 7 thriving sectors never fall below the baseline in any region
 - 3 Lagging sectors' wages consistently fall below the baseline across all region
- Construction and Wholesale & Retail sectors deviate from typical thriving/lagging patterns, approaching full capacity, with Construction showing above-baseline wages in many regions

- Thriving sectors elevate wages in all regions, but regions do not elevate wages in lagging sectors to above-baseline levels
- Regional differences don't overcome sector-specific wage limitations
- Sectors have a greater impact on regions than regions have on sectors

Composite Ratio Index CRI

$$CRI = \frac{UR + EWR + RWR}{3}$$

	Unemp	Educational	Regional	Index
Wholesale and Retail	0.37	1.67	0.8	0.95
Arts and Entertainment	0.29	1.11	0.6	0.67
Construction	0.31	1.73	1.07	1.04
Agriculture	0.35	0.72	0.69	0.59

- Multidimensional framework: Unemployment, Educational and Regional factors collectively influence sectoral capacity
- By balancing one elevated ratio against two lower ratios, CRI Improves, demonstrating increased sectoral capacity.
- Regional/Educational offset Unemployment

4 simulations:

- Master's degree, in West North Central in Wholesale & Retail
- Professional degree, in the Pacific in Arts & Entertainment
- Master's degree, in the West North Central in Construction
- Bachelor's degree, in the Mountain in Agriculture

Intervention Strategies:

- Capacity utilization to improve efficiency in using available resources. Firms can boost output by reallocating resources and tapping into regions or workers with unused potential (e.g., lower wages or less-educated workforce), thus balancing overstrained areas (high labor demand and wages).
- Targeted Investment in Underperforming Regions: In regions where wage costs remain relatively low, increased investment yield higher returns and boost productivity and output. By directing capital to these areas, firms can leverage cost advantages while fostering local economic growth.
- Targeted Training Programs for the Less Educated: Implementing training programs in regions with less-developed labor markets can expand the talent pool and address potential supply constraints and long-term productivity.