

STEM Pays, but Does it Produce More?

Ellis Griffin

¹ Department of Economics & Finance, College of Business, Louisiana Tech University

² email: ehg002@email.latech.edu



Question

STEM industries compose a major part of the Louisiana economy, accounting for more than 23% of all jobs in the state. Despite these jobs' contributions to the local economy, not all of them are of equal value to the parishes or regions in which they originate.

- Some parishes' STEM industries may not produce as much proportionally as others, but does the pay reflect that value?
- Are certain parishes' STEM industries over performing relative to the surrounding MSAs?
- Is it better to be working a STEM job in an MSA or is it better to work in a rural parish?

Methods

The data used for this paper came from the most recent estimates from the Bureau of Economic Analysis (BEA), and, among the list of industries, the STEM and non-STEM industries were identified.

- Figure 1 shows the differenced median Average Employee Compensation for both STEM and non-STEM jobs at the parish level, resulting in the pay increase that STEM jobs receive relative to non-STEM jobs
- Figure 2 shows parish STEM Output divided by total parish Output, resulting in the percent composition of STEM output at the parish level
- Table 1 has the results of Figures 1 and 2 applied to the MSA level, with 2 additional variables added in- total STEM employment at the MSA level, and the location quotient.

$$\text{Location Quotient} = \frac{\frac{\text{MSA STEM Employment}}{\text{MSA total employment}}}{\frac{\text{LA STEM Employment}}{\text{LA Total Employment}}}$$

The location quotient, in this instance, measures the MSA's STEM specialization relative to Louisiana's STEM specialization.

STEM Pay Differential

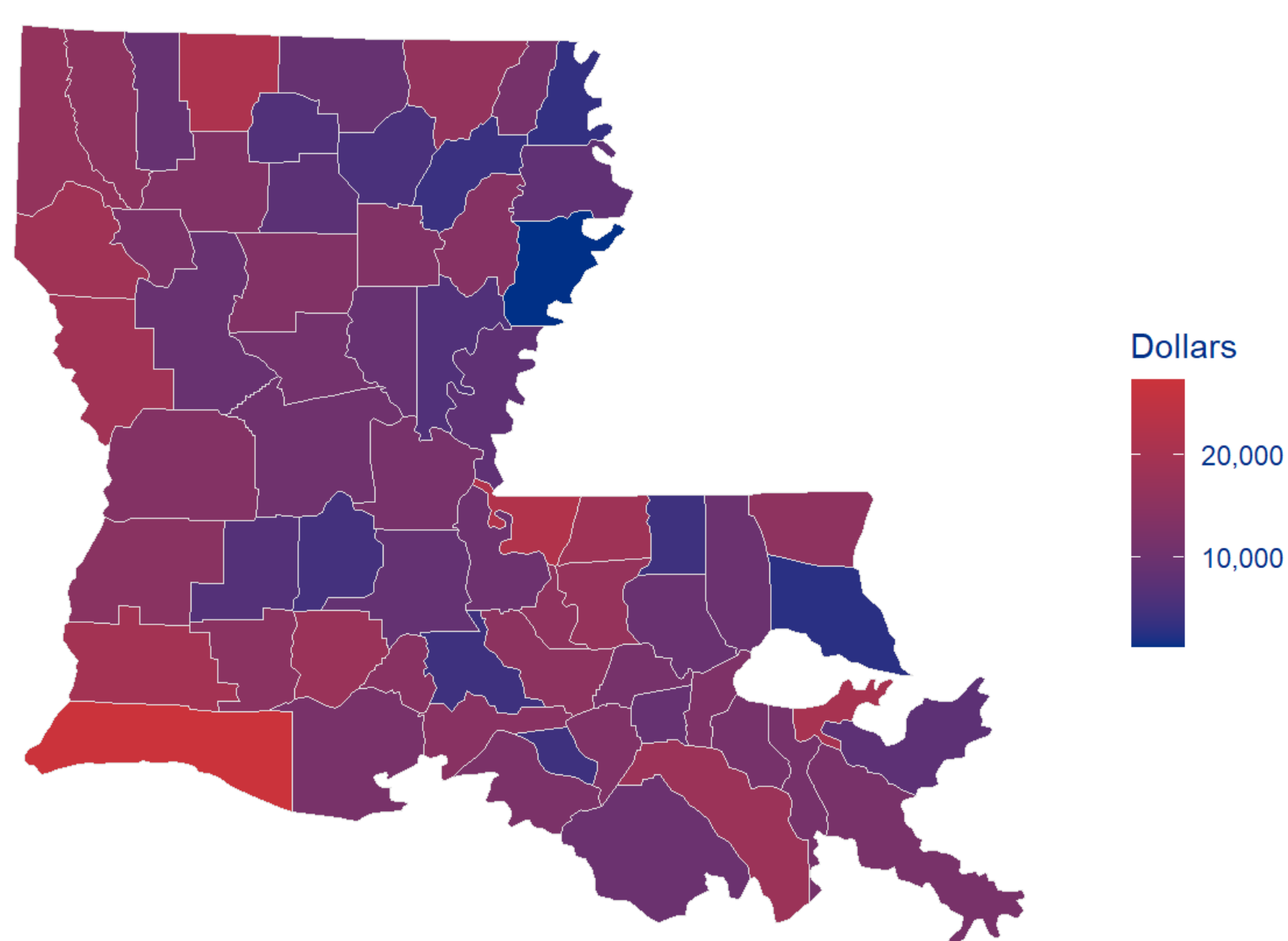


Figure 1: Median STEM Pay Differential

Figure 1 shows this pay difference between STEM and non-STEM jobs at the parish level. The parishes with the largest pay differential are Cameron, West Feliciana, Claiborne, and Orleans, each with a median pay differential of above \$20,000. This is substantially higher than the state-wide average of \$12,038.74, with Cameron having the highest pay difference, at \$27,373. Each of these 4 parishes are all hotspots for oil and gas refining, with secondary emphasis on mining industries, industrial construction, and, especially

in Orleans' case, Insurance. This density of high paying STEM jobs in combination with these parishes' lower density of high paying non-STEM jobs causes their pay gap to be so pronounced.

STEM Proportion of Output

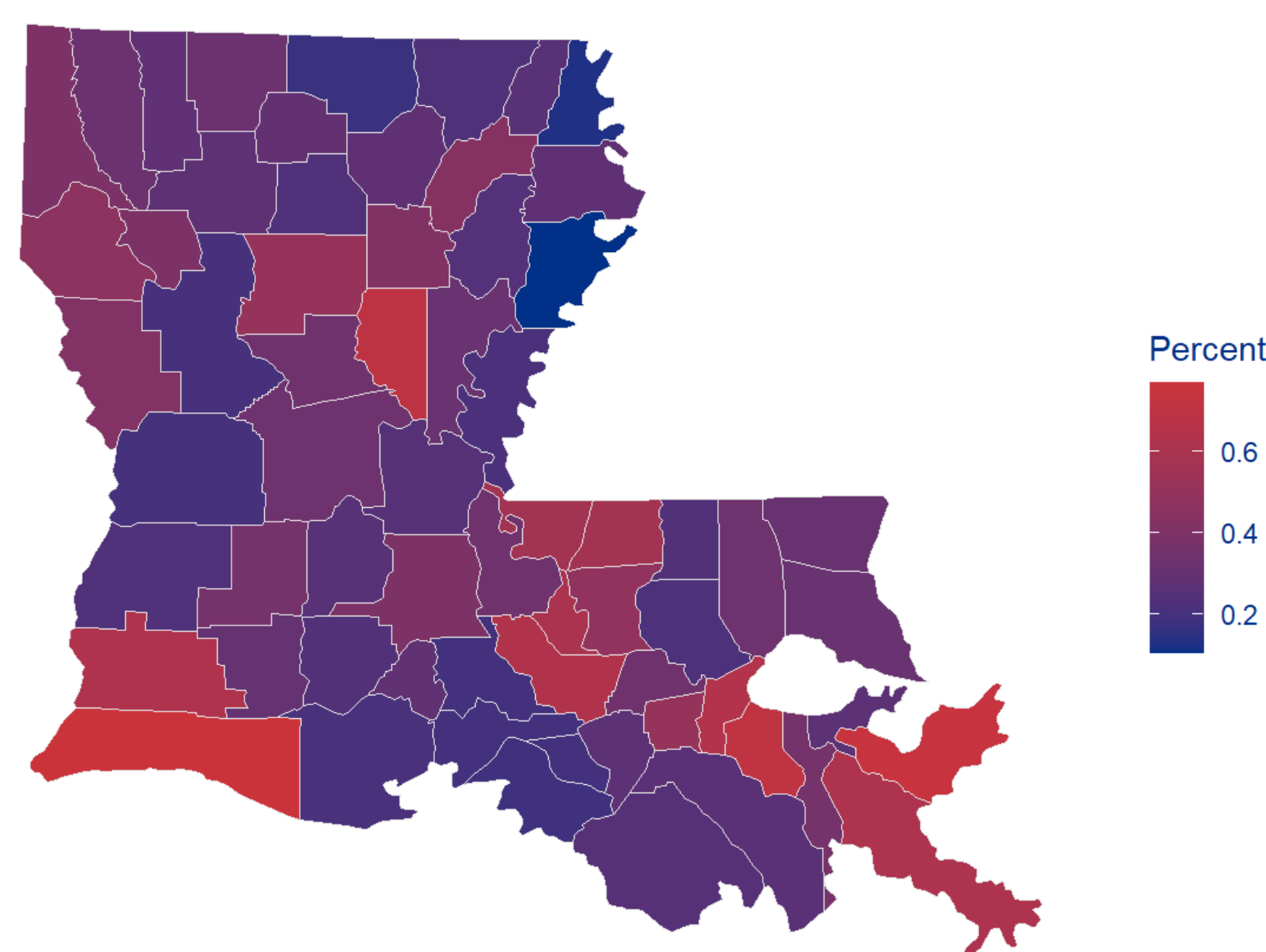


Figure 2: % STEM Composition

Figure 2 shows how much of a parish's GDP is composed of STEM-related output. The parishes with the largest proportion of STEM are Cameron, St. Bernard, St. Charles, and La Salle, each with STEM industries that compose more than 70% of their parishes outputs, putting them considerably above the state-wide average of 36.68%.

Comparing this to Figure 1, there are some notable differences:

- Despite these massive contributions to their local economy, the median pay differential of St. Bernard, St. Charles, and La Salle each fall well below the state average, with St. Bernard's STEM industries receiving the least, with only a \$7,800 pay increase compared to non-STEM.
- Of the top 4 parishes from Figure 1, only Cameron is the only one to keep its position, with a 77.13% STEM composition, once again the highest. The STEM industries of West Feliciana, Claiborne, and Orleans, despite being paid much higher than non-STEM industries, compose only 57%, 32.16%, and 26.87% of each of their respective parish's outputs.

Data by MSA

	% STEM Output	Median STEM Pay Differential	STEM Employment	Location Quotient
Monroe	26.41%	\$12,289.59	26,682	1.084
Shreveport-Bossier	37.67%	\$10,538.20	59,153	1.054
Alexandria	33.39%	\$11,540.49	21,309	1.182
Lake Charles	63.64%	\$16,194.25	35,612	1.306
Lafayette	25.9%	\$10,821.52	56,358	0.973
Baton Rouge	46.94%	\$15,205.77	126,963	1.071
Hammond	33.4%	\$9,769.18	13,235	0.865
New Orleans	44.71%	\$7,565.09	105,558	0.894
Houma	25.56%	\$13,394.48	21,292	0.881

Comparing this to Figures 1 and 2, while there is a decrease of the average median pay differential and an increase in the average percent STEM composition, both the changes are minor ones.

- The median pay only very slightly decreased by \$114.48, going from the state average of \$12,038.74 to an MSA average median pay differential of \$11,924.29. However, this is still \$32.98 higher than the non MSA parish average of \$11,891.31
- The percent STEM composition is a similarly small increase of 3.22%, from a state average of 35.68% to an MSA average of 38.90%.

These small changes are expected to be close to the state average, especially considering a large portion of the Louisiana population lives in MSAs, therefore contributing a large portion to the state averages.

- Regardless of this change to average median STEM pay differential, there are only 4 MSAs who fall above either the state-wide or MSA average, those being Monroe, Lake Charles, Baton Rouge, and Houma.
- The New Orleans MSA has the lowest median pay differential, despite having an above-average percent STEM composition. The location quotient does a good job of fully contextualizing this, as it has the second lowest, at 0.894. This location quotient means that the ratio of STEM workers is less than the state wide ratio, yet, despite this, New Orleans has a higher STEM composition than the state-wide average, meaning that STEM workers in New Orleans MSA are not only proportionally more productive, but they are also relatively underpaid compared to other STEM workers in the state.
- In contrast to the New Orleans MSA, the Baton Rouge MSA, while having only a slightly higher percent STEM composition, has the second highest median STEM pay differential, being around \$8,000 greater than New Orleans', and about \$3,000 greater than the state average. This difference is compounded by Baton Rouge's location quotient of 1.071, meaning that Baton Rouge has a higher proportion of STEM workers relative to the state average. This means that, relative to the STEM workers of New Orleans, Baton Rouge's workers are proportionally less productive, but get paid considerably more when compared to their non STEM counterparts.

Conclusions

The pay that STEM jobs receive does not always reflect the value that the STEM industries provide to the local economy. The New Orleans MSA is a great example of a series of above-average producing STEM industries that are paid below average wages relative to non-STEM jobs. Orleans parish, on the other hand, is a great example of under performing STEM industries being paid much higher than than what is to be expected. However, Cameron parish is an example of STEM industries being both paid well and producing a large portion of the local economy.

While the average median STEM pay differential is slightly higher in MSAs than in rural areas, only four out of nine MSAs pay above the state average median.