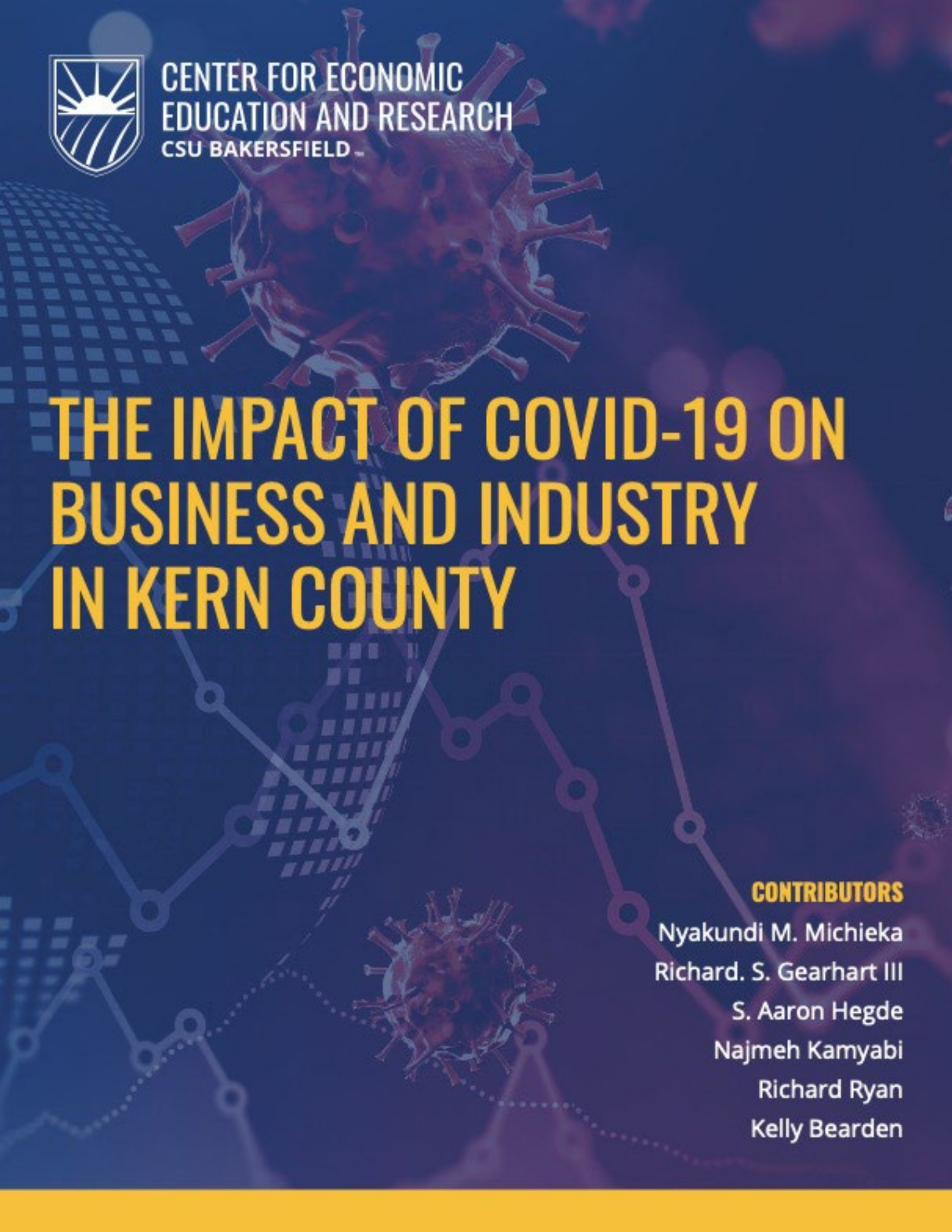

CENTER FOR ECONOMIC EDUCATION AND RESEARCH
CSU BAKERSFIELD

THE IMPACT OF COVID-19 ON BUSINESS AND INDUSTRY IN KERN COUNTY

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About CEER

The Center for Economic Education and Research (CEER) is located in the Economics Department at CSUB. CEER has 3 Objectives: (1) Carry out an applied regional economic studies program incorporating student-faculty research, community engagement, and collaboration with centers and researchers having similar missions and research programs; (2) Offer economic and financial literacy programs for special audiences and the public; and (3) Sponsor and sustain activities and programs supporting the Economics Department's and University's mission.

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Executive Summary

In this study, we assess the impact of COVID-19 on business and industry in Kern County. In the first chapter, we focus on the impact of restaurant and retail closures, along with panic buying on Kern's economy. We employ an IMPLAN model for the analysis and show that County lost 5,944 jobs and $5,535,621 in County tax revenue due to these behavioral changes. The second chapter assesses COVID-19 related business closures in Kern County and focuses on underserved areas. Though COVID-19 impacted small businesses with 5 to 15 employees, there occurred growth in very small businesses, or those with less than 5 employees, suggesting economic resilience. Though some underserved areas saw a significant reduction in the number of employers, most underserved zip codes saw no change in employers.

In the third chapter, we explore the changes in Kern County's unemployment between 2019 and 2022. During the pandemic, Kern's unemployment rose by 5 percent, compared to the state's increase of 6 percent. In the post recovery period, the County witnessed a quicker recovery compared to the state, implying that the region was not significantly affected by the pandemic, relative to the state of California as a whole. Then, in chapter four, we analyze employment trends by industry in both California and Kern County before, during, and after the COVID-19 pandemic. The pandemic heavily impacted Kern County's agriculture and health care industries and caused a surge in employment in those industries, whereas California's diverse economy experienced varying impacts across industries.

Chapter five considers the impact of the pandemic on small businesses. It also discusses some surprises coming out of the pandemic, such as a surge of small business startups resulting in an unexpected boost for small business development. Chapter six defines the environmentally sustainable industries in Kern County and provides an overview of how the region's top emitters performed during the pandemic. To assess this performance, five metrics (proxies for environmental sustainability) were tracked between 2020 and 2021. These include greenhouse gas emissions, water usage, criteria pollutants, pesticide emissions, and toxic emissions. In all metrics, Kern County lagged in its sustainability efforts.

Chapter seven investigates the impact of Economic Policy Uncertainty (EPU) raised during the COVID-19 pandemic on the number of employees or hiring across industries in California and Kern County. The results show that the EPU had a positive impact on most industries in California. However, the magnitude of the impact is different across industries. In contrast, the effect of EPU is negative for most industries in Kern County. Some policy implications can be drawn from these findings. Given the more substantial negative effect on industries at the county and local level, this suggests that local businesses may suffer more during periods of high economic policy uncertainty. Chapter eight provides an overview of the logistical issues that impacted international trade, and how Kern County's agricultural industries faired despite these bottlenecks. Of the ten major industries in Kern County, three thrived during the pandemic – tree nut farming, truck transportation, and limited-service restaurants. The COVID-19 pandemic changed economic activity in the Bakersfield–Kern community. At the start of the pandemic, residents worked from home shopped online. In chapter nine, we investigate whether these patterns changed in the post-pandemic period. Using cellphone location data, survey responses, and online job postings, we document a permanent shift towards working from home, both in Kern County and the national economy.

Edited by Nyakundi M. Michieka, Richard S. Gearhart III, S. Aaron Hegde

Chapter 1: Modeling the Economic Impacts of COVID-19 on Kern County's Economy

Nyakundi M. Michieka [1]

Abstract

There has been growing interest on the economy-wide impact of COVID-19 on regional economies. In this chapter, the number of jobs lost in Kern County (California) as a result of the COVID-19 pandemic is quantified using an Input-Output model. Using data for Kern County from 2020, results from an IMPLAN model show that 4,741 direct jobs were lost due to restaurant closures, while the county lost $5,033,564 in tax revenue. When accounting for retail closures and panic buying, the County lost 5,944 jobs and $5,535,621 in county tax revenue.

1.1 Introduction

COVID-19 disrupted global and regional economies with restrictions in movement, leading to large unemployment and revenue losses (Beckman and Countryman 2021). Several studies assessed the impact of COVID-19 on various sectors of the U.S. economy (Atkeson 2020; Bloom, 2021; Chen et al. 2021; Liz et al., 2022; Mahmoudi, 2022; Walmsley, Rose and Wei 2021) while others focused on the impacts at the state level (Hotton et al. 2022; Wang and Li 2021). In California, much of the literature investigated the impact of COVID-19 on air pollution (Liu 2021; Naeger and Murphy 2020; Parker et al. 2020) while Mora et al (2022) focused on farmworkers' health, and Kim (2022) considered education. However, there is a paucity of studies investigating COVID's impacts on economies at the county level, and none exist for Kern County.

Using an Input-Output (I-O) model we trace the economic impacts of COVID-19 on Kern County's economy. I-O models are suitable for this exercise since they predict the economy-wide impacts of shocks from one sector to another. For example, the closure of restaurants during COVID had downstream effects on other industries. I-O models can capture these impacts breaking them down into direct, indirect and induced effects. The direct effects of the restaurant closures would be the average number of jobs lost from restaurants shutting down. The indirect effects would include the average number of jobs in other industries along the restaurant supply chain (due to restaurants shutting down); while the induced effects are jobs lost in the economy due to reduced spending by restaurants and their suppliers' employees (who no longer are earning wages). The reduction of household spending by these workers could cause job losses in other sectors of the economy.

This chapter quantifies the number of jobs lost due to three events that took place in 2020: (1) restaurant closures; (2) increased consumer spending on soap and sanitizers and (3) retail store closures. An IMPLAN model is used for the analysis and tax losses as a result of the pandemic are reported. The analysis focuses on the impacts felt in 2020.

1.2 Economy-wide Analysis

Data from the California Employment Development Department (2023) indicates that unemployment in Kern County increased by 5 percentage points from 2019 to 2020. The number of civilian employees decreased by 21,000 workers, from 358,400 in 2019 to 337,400 in 2020.

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Non-farm employment decreased by 12,100 workers, while service industry employment decreased by 9,000. Restaurants hired 2,600 fewer workers while the healthcare and social assistance industry employment an additional 200 workers (California Employment Development 2023). In the section that follows, I first assess the impact of restaurant closures on Kern County's economy. Next, I include the impact of retail store closures and increased spending on cleaning supplies to the model and present results. Findings will focus on employment changes and tax revenue. To perform this analysis using IMPLAN, we use the assumptions in 1., 2., and 3.:

1. **Restaurant industry shut down**: During the pandemic, there was a 100 percent shutdown of full-service restaurants and bars. Over time, some restaurants restricted operations to take out only, implying a 50 percent reduction in limited-service offerings. We also assume that there was an 85 percent reduction in all other food and drinking (includes bars and catering) activities. These events had the following impacts on the economy (Table 1.1) below.

Table 1.1: Economic impact due to restaurant closures in Kern County (2020)

Impact	Employment	County Tax Revenue	County GDP
Direct	-4,741	-$3,191,891	-$217,159,032
Indirect	-551	-$625,768	-$48,014,538
Induced	-462	-$1,215,904	-$47,917,445
Total	-5,753	-$5,033,564	-$313,091,016

The direct effects (loss in employment) from restaurants shutting down was 4,741 employees, with a loss of Kern County tax revenue of $3,191,891. This had an indirect effect of 551 jobs lost, with another $625,768 lost in tax revenue for Kern County. The induced effects led to 462 workers losing jobs, with an additional $1,215,904 loss in tax revenue. The total effect was an increase in the number of unemployed workers of 5,753 workers, with a reduction in Kern County tax revenues of$5,033,564. The total GDP lost in the county amounted to $313 million, which is slightly over one-half of one percent of annual GDP.

2. **Consumer Spending Increased for Soap and Sanitizers:** During this period, residents did not go to restaurants but spent money on soaps and sanitizers, increasing grocery store purchases. To model this in IMPLAN, we assume that households spent 50% more on soaps and sanitizers. This implies that an additional $18,307,642 was spent on soaps and other detergents (NAICS 3177), with an additional $8,718,072 spent on polish and other sanitation goods (NAICS 3178).
3. **Retail Employment Reduced by 250 workers.** Data from the California Employment Development (2023) indicated that the retail industry lost 1,000 workers in 2020. To model this in IMPLAN, an industry employment event was created where we estimated the impact of having 250 less workers. The combined effects on assumptions 1, 2 and 3 resulted in the following findings (Table 1.2) for Kern County:

Table 1.2: Economic impact of restaurant closures, increased spending on sanitary products and reduced retail employment (2020)

Impact	County Employment	County Tax Revenue	County GDP
Direct	-4,883	-$3,637,756	-$221,848,888
Indirect	-585	-$644,386	-$50,752,440
Induced	-476	-$1,253,478	-$49,401,731
Total	-5,944	-$5,535,621	-$322,003,059

The direct effects (loss in employment) due to restaurant closures, increased spending on sanitary products and reduced retail employment was 4,883 fewer workers employed, while Kern County lost $3,637,756 in tax revenue. Indirect effects led to 585 fewer workers and $644,386 lost in tax revenue. Induced impacts led to 476 fewer workers and $1,253,478 in a reduction in Kern County tax revenue. Overall, Kern County lost $5,535,621 in tax revenue, while the number of unemployed increased by 5,944 workers. GDP decreased by $322 million.

1.3 Conclusion

These results summarize the effects of COVID-19 on Kern County's economy. The findings are limited to the impacts of restaurant closures, increased spending on sanitary products and reduced retail employment. It is important to note that these findings understate the overall impact of COVID to the economy since all impacts were not accounted for in this analysis. For example, households had more home-cooked meals, suggesting that food away from home (FAFH) decreased, further impacting restaurant profitability. Given that workers also increased the time that they worked from home, this could have led to an increase in purchases for home office equipment and electronics, such as monitors, printers, webcams or office chairs. On the other hand, offices reduced spending on supplies and food for workers who were working remotely. And given the substantial health costs imposed by the COVID-19 pandemic, this analysis only presents a partial figure. Including all relevant impacts would provide a more complex and complete picture of how the economy faired in 2020.

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Chapter 2: COVID-19 and Kern County Business Patterns

Richard S. Gearhart III [2]

Abstract

We collected data assessing COVID-19 related business closures in Kern County, as well by underserved areas. Though COVID-19 impacted small businesses with 5 and 15 employees, there occurred growth in very small businesses, with less than 5 employees, suggesting economic resilience. Though some underserved areas saw a significant reduction in the number of employers, most underserved zip codes saw no change in employers, or even growth in potentially high value employers during COVID-19.

2.1 Introduction

We investigate the impact of COVID-19 on business closures, both based on the size of the business (number of employees), as well as the impact of COVID-19 on traditionally underserved areas in Kern County. Our objective is to (i) Quantify the number of businesses that closed down during the pandemic; and (ii) Determine which of these businesses are in underserved areas. Using data from the County Business Patterns, we find that Kern County, overall, weathered the COVID-19 pandemic adequately.

2.2 Data and Analysis

Data for the tables comes from 2 major sources. County Business Patterns, provided by the United States Census Bureau, provide employment in total, both at the county and zip code level. The County Business Patterns data also contain the number of employers by employee size at the county level, as well as the number of employers by NAICS code (industry code). The County Business Patterns data also contains the total number of employees, at the county level in total and by NAICS code, but only in total at the zip code level. The dataset can be found from the U.S Census Bureau (2023). The Bakersfield Metropolitan Statistical Area (MSA) data come from the Employment Development Department (EDD) of the State of California. The datasets can be found at California Employment Development Department (2023).

The designation of a "needy" or "underserved" area was the designation of a "needy" area by Governor Gavin Newsome, which were zip codes that have 20 percent of the population, but were designated to receive 40 percent of all new COVID-19 vaccine doses in March of 2021. Metrics to determine vulnerability included household income, education, housing status, and access to transportation. The list of "vulnerable" Kern County zip codes can be found at KGET (2021).

Table 2.1: Kern County, Number of Businesses by Number of Employees

	2005	2010	2015	2019	2005 to 2019 (%)	2020	2021	2019 to 2021 (%)
<5	5,947	5,925	6,322	6,628	11.45%	6,855	7,240	9.23%
5 to 9	2,385	2,376	2,398	2,443	2.43%	2,421	2,422	-0.86%
10 to 19	1,717	1,862	1,849	1,980	15.32%	1,988	1,969	-0.56%
20 to 49	1,241	1,171	1,368	1,415	14.02%	1,448	1,435	1.41%
50 to 99	354	351	419	448	26.55%	446	397	-11.38%

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100 to 249	181	174	213	206	13.81%	205	195	-5.34%
250 to 499	42	44	52	49	16.67%	57	48	-2.04%
500 to 999	17	12	11	20	17.65%	20	18	-10%
>1000	7	10	10	8	14.29%	7	7	-12.5%

Table 2.2: Fresno County, Number of Businesses by Number of Employees

	2005	2010	2015	2019	2005 to 2019 (%)	2020	2021	2019 to 2021 (%)
<5	8,067	8,003	8,163	8,712	8.00%	8,932	9,556	9.69%
5 to 9	3,112	3,165	3,250	3,336	7.20%	3,344	3,324	-0.36%
10 to 19	2,210	2,297	2,268	2,464	11.49%	2,488	2,509	1.83%
20 to 49	1,694	1,553	1,765	1,815	7.14%	1,856	1,828	0.72%
50 to 99	537	474	575	649	20.86%	664	618	-4.78%
100 to 249	243	211	232	264	8.64%	258	257	-2.65%
250 to 499	55	47	63	71	29.09%	70	67	-5.63%
500 to 999	23	23	22	24	4.35%	25	24	0%
>1000	9	9	12	16	77.78%	16	16	0%

The above analysis shows that, prior to COVID, there was growth in every business size in Kern County and Fresno County (as a comparable county). The biggest gains in Kern County (in terms of percentage) were in medium-sized businesses (with 50 to 99 employees) and larger employers (250 or more employees). Though there was smaller growth in small business (with fewer than 10 employees), there was still growth of over 700 of these small businesses in Kern County. Unfortunately, though very small businesses (less than 5 employees) saw growth between 2019 and 2021 over the COVID era, nearly every other business size saw contractions in the number of businesses. In total, there are 534 more businesses between 2019 and 2021, suggesting that COVID did not inhibit business formation or retention. The growth in total businesses over this time span was due to the growth in the number of very small businesses (less than 5 employees), which increased by 612 between 2019 and 2021. This suggests that many individuals who were let go from bigger firms may have chosen to become entrepreneurs during the COVID-19 pandemic. Over the same time period, Fresno saw an increase in the total number of businesses by 848, with 844 coming from very small businesses, suggesting similar trends in both Kern and Fresno Counties.

Table 2.3: Kern County, by NAICS Code, Changes

	2005 to 2019 (% Change)			2019 to 2021 (% Change)		
NAICS Code	Employ	Estab	Employ-to-Estab	Employ	Estab	Employ-to-Estab
11: Agriculture, Forestry, Fishing, and Hunting	49.4	-14.7	75.2	-8.6	8.6	-15.9
21: Mining, Quarrying, and Oil and Gas Extraction	42.3	3.7	37.3	-10.3	-4.1	-6.5
211: Oil and Gas Extraction	154.7	14.0	123.5	-12.0	-18.4	7.9
22: Utilities	-16.0	22.2	-31.3	6.1	4.5	1.5
23: Construction	-18.1	-8.9	-10.0	2.1	3.2	-1.0
31: Manufacturing	3.3	-2.9	6.4	-5.3	6.5	-11.1
44: Retail Trade	6.9	-0.7	7.7	2.4	0.6	1.8
441: Motor Vehicle and Parts Dealers	-5.5	-8.5	3.3	-4.4	3.0	-7.2
442: Furniture and Home Furnishings Store	5.8	-29.6	50.3	-10.5	-2.9	-7.9
443: Electronics and Appliance Stores	-48.9	-50.7	3.8	-22.9	-30.3	10.6
445: Food and Beverage Stores	3.2	-5.7	9.5	7.7	3.0	4.6
446: Health and Personal Care Stores	-17.6	18.7	-30.6	4.9	3.6	1.2
447: Gasoline Stations	38.0	32.8	3.9	4.4	0.8	3.6
448: Clothing and Clothing Accessories Stores	68.2	7.2	56.9	-9.7	-13.1	3.9
452: General Merchandise Stores	19.7	55.6	-23.0	8.9	0.9	7.9
48: Transportation and Warehousing	68.5	51.2	11.4	11.4	52.6	-27.0
51: Information	14.3	9.2	4.6	-47.0	3.2	-48.6
52: Finance and Insurance	-24.3	0.8	-24.8	-5.0	-3.8	-1.3
531: Real Estate	-3.1	28.1	-24.3	2.5	10.9	-7.6
532: Rental and Leasing Services	-10.7	-2.1	-8.8	-7.6	-1.4	-6.3
54: Professional, Scientific, and Technical Services	6.9	14.4	-6.6	-9.9	-0.9	-9.0
55: Management of Companies and Enterprises	10.1	-21.7	40.7	-6.8	3.7	-10.1
621: Ambulatory Health Care Services	42.9	32.8	7.5	8.7	0.9	7.8
623: Nursing and Residential Care Facilities	34.4	46.4	-8.2	6.6	-1.8	8.5

624: Social Assistance	-	8.5	-	7.4	9.0	-1.5
71: Arts, Entertainment, and Recreation	27.3	12.7	13.0	-44.5	-0.6	-44.1
721: Accommodation	28.5	30.4	-1.5	-24.0	-9.3	-16.2
722: Food Service and Drinking Places	33.6	33.4	0.1	-1.2	2.6	-3.7
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	15.4	6.3	8.5	-13.2	1.6	-14.5

This table provides the percent changes in the number of employers, employees, and employee-to-employer ratio, between 2005 and 2019 (pre-COVID era) and between 2019 and 2021 (COVID-era), based on industry classification.
Note: Estab = Establishments

Between 2005 and 2019, employers were lost in agriculture, construction, manufacturing, and most aspects of retail trade except health stores, gasoline stations, clothing stores, and general merchandise stores. Employers were also lost in rental and leasing services, and professional management of companies. Unfortunately, it appears that these jobs were almost wholly eliminated from the labor market in the construction, motor vehicles, electronics stores, and rental and leasing services, with concomitant falls in employment in these industries. Overall, in Kern County, most industries highlighted increases in both employment and the number of employers (10 industries LOST employers).

Between 2019 and 2021, 11 industries lost employers. Interestingly, there is little overlap between industries that lost employers between 2005 and 2019 and those that lost employers between 2019 and 2021. Unfortunately, this is suggestive as COVID-19 as the causal mechanism for job losses, rather than reorientation of the economy (losses between 2005 and 2019 were natural business forces, as sectors changed). The only industries that saw a consistent decline in the number of employers between 2005 and 2021 are furniture and electronics stores, and rental and leasing services.

The major industries with employer loss are from those that were disrupted the most from the reduction in both total economic activity and economic activities that require social interaction; oil and gas extraction, furniture, electronics, and clothing stores, finance and insurance, rental and leasing services, professional services, nursing and residential care facilities, arts, entertainment, and recreation, and accommodations (hotels). Distressingly, there were considerable employment losses during COVID-19, suggesting that intensive margin labor market changes (firing of employees) may have been more impacts than extensive margin labor market changes (business failures), suggesting that there may be further issues in 2022.

Intriguingly, there was an increase in the number of food service and drinking places employers, suggesting that alternative modes of food preparation (at home catering, food trucks, pop up stands) may have been an entrepreneurial push from COVID-19, as individuals may have been laid off from other industries.

However, the resiliency of certain sectors (manufacturing, construction, total retail trade, transportation and warehousing) are indicative of an overall economic resilience found in Kern County that may not have been found in other major cities with a more “white collar” or “downtown-centric” economy, suggesting that Kern County may be well poised to take advantage of comparative advantages from more “blue-collar” types of employers.

Table 2.4: Kern County, By Zip AND NAICS Code

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93203, Arvin, CA**					
Total	187 (4,408)	172 (4,566)	173 (4,625)	168 (4,340)	-8.02 (3.58); 12.62	-2.33 (-4.95); -2.69
11: Agriculture, Forestry, Fishing, and Hunting	3	3	3	3	0.00	0.00
23: Construction	6	6	5	5	0.00	-16.67
31: Manufacturing	11	10	11	11	-9.09	10.00
44: Retail Trade	76	70	69	66	-7.89	-5.71
441: Motor Vehicle and Parts Dealers	5	4	4	4	-20.00	0.00
442: Furniture and Home Furnishings Store	4	4	0	0	0.00	-100.00
445: Food and Beverage Stores	16	13	13	13	-18.75	0.00
446: Health and Personal Care Stores	3	4	7	7	33.33	75.00
447: Gasoline Stations	3	3	4	4	0.00	33.33
448: Clothing and Clothing Accessories Stores	40	37	34	29	-7.50	-21.62
452: General Merchandise Stores	0	3	3	3	-	0.00
48: Transportation and Warehousing	8	8	10	11	0.00	37.50
52: Finance and Insurance	5	4	4	4	-20.00	0.00
531: Real Estate	6	6	7	7	0.00	16.67
54: Professional, Scientific, and Technical Services	5	5	4	5	0.00	0.00
621: Ambulatory Health Care Services	6	6	6	6	0.00	0.00
623: Nursing and Residential Care Facilities	3	3	3	3	0.00	0.00
624: Social Assistance	3	0	0	0	-100.00	-
722: Food Service and Drinking Places	27	24	21	18	-11.11	-25.00
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	7	7	8	8	0.00	14.29

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Arvin, CA (with a zip code of 93203) saw reductions in the total number of employers (2.33 percent decline), the total number of employees (4.95 percent decline), and a reduction in the number of employees-per-business (2.69 percent decline) during the COVID era, between 2019 and 2021. Though there were pre-COVID trends (between 2017 and 2019) of a loss in employers in this zip code, there were increases in employees and employee-to-business ratios, which are suggestive of a competitive economic environment where winners succeeded and absorbed the labor force of competitors.

This does suggest that Arvin, CA suffered disproportionately from COVID-19, with 4 fewer employers, but over 200 fewer workers. Though workers may have found employment in other regions in Kern County, the increase in transit time to work have negative impacts on family incomes (more money spent on gas), children (less time spent with children), and health (less time to go to the physician).

Importantly, employer losses in Arvin, CA were concentrated among construction (1 fewer business), retail trade (4 fewer businesses), furniture stores (4 fewer businesses, meaning that all have closed), clothing stores (8 fewer businesses), and restaurants/bars (6 fewer businesses). Unfortunately, most of these businesses are clustered in the retail trade sector, which did suffer disproportionately from COVID. The loss of these employers also makes it harder for individuals in Arvin, CA to shop domestically, where they now than have to travel longer distances for household purchases.

On the plus-side for the economy, there are now 4 more transportation and warehousing employers in Arvin, CA, as well as 3 more health and personal care stores, the former of which may provide long-term sustained economic growth, the latter of which may help alleviate some of the health differentials found in the area.

Table 2.5: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93215, Delano, CA**					
Total	437 (6,423)	439 (6,948)	452 (7,191)	473 (6,715)	0.46 (8.17); 7.68	7.75 (-3.35); -10.30
11: Agriculture, Forestry, Fishing, and Hunting	8	8	10	9	0.00	12.50
23: Construction	13	14	11	14	7.69	0.00
31: Manufacturing	14	11	11	12	-21.43	9.09
44: Retail Trade	97	90	89	93	-7.22	3.33
441: Motor Vehicle and Parts Dealers	9	11	9	9	22.22	-18.18
442: Furniture and Home Furnishings Store	3	3	3	3	0.00	0.00
445: Food and Beverage Stores	22	19	21	22	-13.64	15.79
446: Health and Personal Care Stores	5	5	5	6	0.00	20.00
447: Gasoline Stations	15	16	16	16	6.67	0.00
448: Clothing and Clothing Accessories Stores	12	9	9	9	-25.00	0.00
452: General Merchandise Stores	10	9	7	8	-10.00	-11.11
48: Transportation and Warehousing	31	35	40	46	12.90	31.43
51: Information	6	8	8	10	33.33	25.00
52: Finance and Insurance	30	29	27	26	-3.33	-10.34
531: Real Estate	13	12	13	15	-7.69	25.00
532: Rental and Leasing Services	3	3	3	3	0.00	0.00
54: Professional, Scientific, and Technical Services	19	16	19	16	-15.79	0.00
621: Ambulatory Health Care Services	51	49	51	50	-3.92	2.04

623: Nursing and Residential Care Facilities	9	10	10	10	11.11	0.00
624: Social Assistance	15	17	13	18	13.33	5.88
71: Arts, Entertainment, and Recreation	5	4	4	6	-20.00	50.00
721: Accommodation	7	8	8	6	14.29	-25.00
722: Food Service and Drinking Places	57	55	63	65	-3.51	18.18
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	26	28	28	33	7.69	17.86

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Though Delano, CA (zip code 93215) saw increases in the total number of businesses (34 more employers in 2021, relative to 2019; a 7.75 percent increase), there were declines in both employees (233 fewer employees in 2021, relative to 2019; a 3.35 percent decline) and the employee-to-business ratio (1.6 fewer employees per business in 2021, relative to 2019; a 10.3 percent decrease). This does suggest that though businesses may not have closed, existing employers may not have been as fiscally successful to retain employees, who left for other parts of Kern County to find stable employment. The growth in business is likely smaller businesses that may employ fewer people, as individuals choose entrepreneurship during a time of social distancing.

Looking at the breakdown by types of employers, we again see that any growth trends found pre-COVID (between 2017 and 2019) were nearly eliminated. This does suggest that even if COVID-19 had no negative immediate impacts on the economy, it may have bumped the economy from the pre-COVID trend, which both businesses, government officials, and citizens would have expected. This is especially problematic for capital-intensive employers, who may have to buy specialized or costly equipment, which may have been upended during COVID-19.

Between 2019 and 2021, the COVID era, we see that only 4 major industries saw declines in the total numbers of employers. The first was motor vehicles and parts dealers (2 fewer employers; an 18.2 percent decline). However, the decline was back to the pre-COVID number of employers in this sector back in 2017. There were also declines in general merchandise stores, with a decline of 1 employer (an 11.11 percent decline) during the COVID era, where there are now 2 fewer employers relative to what there were in 2017. This is problematic, as general merchandise stores often provide low-cost goods to low- income areas. There were also declines in finance and insurance (3 fewer employers in 2021, relative to 2019; a 10.34 percent decline) and accommodation (2 fewer employers in 2021, relative to 2019; a 25 percent decline). The former is important, as finance and insurance provide financing and insurance safety nets for individuals; a reduction in the number of these employers suggests that individuals may have to go elsewhere to shop for financing and/or insurance, which raises costs for businesses.

Table 2.6: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93240, Lake Isabella, CA**					
Total	120 (1,077)	121 (1,095)	121 (1,192)	119 (1,249)	0.83 (1.67); 9.76	-1.65 (1.41); 6.54
22: Utilities	3	3	3	3	0.00	0.00
23: Construction	7	12	12	12	71.43	0.00
44: Retail Trade	27	27	29	29	0.00	7.41
441: Motor Vehicle and Parts Dealers	3	3	4	4	0.00	33.33
445: Food and Beverage Stores	3	4	4	4	33.33	0.00
447: Gasoline Stations	5	5	5	5	0.00	0.00
452: General Merchandise Stores	0	3	3	3	-	0.00
48: Transportation and Warehousing	0	3	3	3	-	0.00
51: Information	4	4	4	3	0.00	-25.00
52: Finance and Insurance	11	9	8	7	-18.18	-22.22
531: Real Estate	4	6	5	4	50.00	-33.33
54: Professional, Scientific, and Technical Services	7	6	6	6	-14.29	0.00
621: Ambulatory Health Care Services	15	13	15	15	-13.33	15.38
722: Food Service and Drinking Places	11	12	13	13	9.09	8.33
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	14	14	14	13	0.00	-7.14

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

In total, there was minimal growth in employers (1 more) and employee (18 more) between 2017 and 2019. During COVID, however, 2 businesses were lost (a 1.65 percent decline), though there were increases in the total number of employees (154 more employees between 2019 and 2021; a 1.41 percent increase) and employees-per-business (a 6.54 percent increase). Though this suggests a local resilience to COVID-19, Lake Isabella tends to be a little more isolated from major metro areas, and so individuals may not have the resources to be able to drive elsewhere to find employment, suggesting that the local economy is insular. Though this means that employment losses during exogenous shocks may not be large, it also means that there are limited economic opportunities for individuals residing in these areas.

There were losses in the information sector (1 fewer employer between 2019 and 2021; a 25 percent decrease), finance and insurance (2 fewer employers between 2019 and 2021, with 4 fewer since 2017; a 22 percent decrease), real estate (2 fewer employers between 2019 and 2021, a 33.33 percent decrease; though this is the same number of employers as in 2017), and other

services (1 fewer employer between 2019 and 2021; a 7.14 percent decrease). Again, the reduction in local information, finance and insurance, and real estate employers is only detrimental, as it reduces the number of available alternatives for an economically depressed area, raises rates, and impedes economic activity.

Table 2.7: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93241, Lamont, CA**					
Total	98 (1,068)	93 (935)	94 (1,083)	97 (1,022)	-5.10 (-12.45); -7.75	4.30 (9.30); 4.80
23: Construction	3	4	4	4	33.33	0.00
44: Retail Trade	31	30	31	33	-3.23	10.00
441: Motor Vehicle and Parts Dealers	6	6	6	7	0.00	16.67
445: Food and Beverage Stores	13	11	12	12	-15.38	9.09
447: Gasoline Stations	3	5	4	4	66.67	-20.00
48: Transportation and Warehousing	6	5	5	6	-16.67	20.00
52: Finance and Insurance	3	4	3	4	33.33	0.00
621: Ambulatory Health Care Services	8	8	7	7	0.00	-12.50
624: Social Assistance	3	4	0	4	33.33	0.00
722: Food Service and Drinking Places	18	17	19	17	-5.56	0.00
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	11	9	9	8	-18.18	-11.11

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Intriguingly, Lamont, CA (zip code 93241) lost employers (5 fewer employers), employees (133 fewer employees), and employee-to-business ratio (nearly 1 fewer employee per business) between 2017 and 2019, which suggests that the area was having economic struggles prior to COVID-19. These losses were in retail trade, transportation and warehousing, restaurants, and other services; all further signs of an area that is struggling, has significant poverty, and individuals who are struggling with disposable income. However, Lamont, CA (zip code 93241) saw increases in both total employers (4 more employers), employees (87 more employees), and employee-per-business (nearly 0.5 more employees-per-business). The growth in businesses was from 2 sectors: retail trade and transportation and warehousing. The former represents a likely response to pre-COVID closures; the latter is important, as transportation and warehousing are long-term economic indicators that provide relatively high-paying jobs for the education levels, and which can improve income stability for many households.

One thing that should be watched is the decline in the number of employees between 2020 and 2021, with 61 fewer employees (and the number of employees in 2021 lower than that of 2017). This may suggest that individuals residing in Lamont, CA (zip code 93241) are opting for economic opportunities in other areas.

Importantly, there were employer losses in gasoline stations (1 fewer employer), ambulatory healthcare services (1 fewer employer), and other services (2 fewer employers). The middle is important, as Lamont, CA is both underserved in terms of the number of healthcare providers and healthcare services, but also in worse health than other areas in Kern County. This loss will likely increase how long it takes for individuals to seek care (further worsening health outcomes), preclude individuals from seeking care (further worsening health outcomes), or increase costs for individuals.

Table 2.8: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019	2019 to 2021
NAICS Code	**Zip Code 93249, Lost Hills, CA**					
Total	38 (1,706)	36 (1,507)	38 (1,297)	38 (1,578)	-5.26 (-11.66); -6.76	5.56 (4.71); -0.80
31: Manufacturing	3	3	3	3	0.00	0.00
44: Retail Trade	11	10	10	10	-9.09	0.00
447: Gasoline Stations	8	7	7	7	-12.50	0.00
531: Real Estate	3	0	0	0	-100.00	-
621: Ambulatory Health Care Services	0	0	3	3	-	-
721: Accommodation	0	0	0	3	-	-
722: Food Service and Drinking Places	7	7	7	7	0.00	0.00
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	3	3	3	0	0.00	-100.00

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

The areas where we should expect the most devastating impacts of COVID-19 are those areas that are relatively close to a major metro area (individuals can choose to work in their place of residence or drive to the major metro area), are relatively large, and have pre-existing negative economic outcomes (low median income, low educational attainment, high poverty). Prior to COVID-19, McFarland, CA (zip code 93250) was suffering from negative employer trends (5 fewer businesses between 2017 and 2019; a 6.25 percent decline), but there were more employees (108 more employees). The biggest pre-COVID employer losses were in retail trade, agriculture, restaurants, and healthcare services.

However, COVID-19 had an extremely detrimental impact on McFarland, CA (zip code 93250). Though there have been no employer losses between 2019 and 2021, there was a substantial decline in the number of employed in McFarland, CA. Between 2019 and 2021, there are 541 fewer workers employed (a 40.4 percent decline), with most of the employee loss occurring between 2020 and 2021. This is extremely detrimental to the workforce, as it suggests that individuals are choosing to be employed in a separate major metro area (Bakersfield, CA), which

means that individuals will spend longer commuting, spending less time with their children, being less able to engage in healthcare, and likely choosing to shop in that major metro area (Bakersfield, CA), rather than in McFarland, CA, which would reduce economic activity in McFarland, CA, causing a downward economic spiral.

During the COVID-19 pandemic, the only sectors of the economy that showcased employer increases were restaurants/bars and transportation and warehousing, while all other sectors showed no growth or losses. Even though transportation and warehousing provide quality economic jobs relative to educational attainment, the fact that there has been a considerable exodus of employees during this same time period suggests that individuals are fleeing to outside economic opportunities. The continued loss in ambulatory healthcare services is also worrisome, as McFarland, CA tends to have considerably worse health outcomes, which would suggest that individuals will continue to see poor health outcomes, which reduces the ability to work. Lastly, the loss of all employers in other services suggests that entrepreneurs are not optimistic about the economic future and viability of McFarland, CA.

Table 2.9: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93263, Shafter, CA**					
Total	224 (4,281)	220 (5,845)	247 (6,282)	248 (6,750)	-1.79 (36.53); 39.02	12.73 (15.48); 27.22
11: Agriculture, Forestry, Fishing, and Hunting	8	6	6	5	-25.00	-16.67
21: Mining, Quarrying, and Oil and Gas Extraction	7	6	8	8	-14.29	33.33
23: Construction	15	13	17	17	-13.33	30.77
31: Manufacturing	13	15	13	14	15.38	-6.67
44: Retail Trade	34	37	35	36	8.82	-2.70
441: Motor Vehicle and Parts Dealers	6	7	7	6	16.67	-14.29
445: Food and Beverage Stores	7	7	7	8	0.00	14.29
446: Health and Personal Care Stores	3	3	3	3	0.00	0.00
447: Gasoline Stations	6	8	7	8	33.33	0.00
452: General Merchandise Stores	3	3	0	3	0.00	0.00
48: Transportation and Warehousing	31	32	39	45	3.23	40.63
52: Finance and Insurance	9	8	9	9	-11.11	12.50
531: Real Estate	4	0	3	4	-100.00	-
532: Rental and Leasing Services	3	4	3	3	33.33	-25.00
54: Professional, Scientific, and Technical Services	9	10	13	12	11.11	20.00
621: Ambulatory Health Care Services	10	11	13	11	10.00	0.00
623: Nursing and Residential Care Facilities	0	0	3	-	-	-
71: Arts, Entertainment, and Recreation	3	3	5	3	0.00	0.00
722: Food Service and Drinking Places	16	16	17	14	0.00	-12.50

81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	20	17	20	22	-15.00	29.41

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Pre-COVID, there were employment losses in Shafter, CA (zip code 93263), with 4 fewer businesses. However, there was an acceleration in both the number of employees and the employee-to-business ratio, suggesting that Shafter, CA was considered an area with improved economic fortunes. In fact, the gains pre-COVID in manufacturing, retail trade, transportation and warehousing, rental and leasing services, professional services, and healthcare services suggest that pre-COVID, Shafter, CA was poised to be an area with growing economic opportunities for high-value industries and skilled employees.

Fortunately, it appears that COVID has only accelerated these trends, likely representing a migration of individuals from smaller, outlying communities that have seen economically depressed opportunities in those areas, especially given the proximity of Shafter, CA to Bakersfield, CA and the lower average and median home prices. In fact, relative to 2019, there are 28 more employers (a 12.7 percent increase), nearly a 1,000 more employees (a 15.5 percent increase), and a 27.2 percent increase in the employee-to-business ratio.

In fact, the growth in construction, transportation and warehousing, finance and insurance, real estate, professional services, and other services suggest an area that continues to provide economic opportunities for both residents and transplants. A modest decline in retail trade employers does suggest that the relative proximity to Bakersfield, CA may depress some economic opportunities, but this decline was exclusively from motor vehicle dealer closures. While in many areas a decline in rental and leasing service employers would be worrisome, it is likely a consequence of a relatively cheaper supply of homes, with increased homeownership rates during this time span.

Overall, however, Shafter, CA provides an economic template for outlying communities to both weather and succeed during negative exogenous shocks.

Table 2.10: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93268, Taft, CA**					
Total	203 (2,845)	201 (2,978)	200 (3,028)	199 (2,363)	-0.99 (4.67); 5.72	-1.00 (-20.65); -19.85
21: Mining, Quarrying, and Oil and Gas Extraction	8	9	9	10	12.50	11.11
211: Oil and Gas Extraction	4	4	3	3	0.00	-25.00
22: Utilities	3	3	3	3	0.00	0.00
23: Construction	15	14	14	15	-6.67	7.14
31: Manufacturing	4	5	4	4	25.00	-20.00
44: Retail Trade	35	33	34	34	-5.71	3.03
441: Motor Vehicle and Parts Dealers	4	3	3	4	-25.00	33.33
445: Food and Beverage Stores	9	8	9	8	-11.11	0.00
447: Gasoline Stations	7	6	6	6	-14.29	0.00
452: General Merchandise Stores	3	4	5	5	33.33	25.00

48: Transportation and Warehousing	7	7	8	9	0.00	28.57
51: Information	4	5	5	4	25.00	-20.00
52: Finance and Insurance	10	11	10	9	10.00	-18.18
531: Real Estate	3	3	5	4	0.00	33.33
532: Rental and Leasing Services	3	0	0	0	-100.00	-
54: Professional, Scientific, and Technical Services	9	9	9	9	0.00	0.00
621: Ambulatory Health Care Services	13	12	14	11	-7.69	-8.33
624: Social Assistance	3	3	3	3	0.00	0.00
71: Arts, Entertainment, and Recreation	3	3	3	3	0.00	0.00
722: Food Service and Drinking Places	33	28	26	30	-15.15	7.14
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	27	25	24	25	-7.41	0.00

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Though Taft, CA (zip code 93268) has continued minor employer loss that occurred pre-COVID (2 employers lost between 2017 and 2019, with 2 additional employers lost between 2019 and 2021), pre-COVID had both employee gains in Taft, CA, as well as increases in the employee-to-business ratio. However, there were considerable losses in both employees in Taft, CA during COVID (615 fewer employees between 2019 and 2021; a 20.7 percent decline) and the employee-to-business ratio (over 2 fewer employees-per-business between 2019 and 2021). Coupled with employment and employee losses in smaller towns nearby Taft, CA (such as Maricopa), this suggests a further exodus of employees to the larger, metro areas that are nearby (Bakersfield, CA). In an already economically depressed area, this has considerable implications for the long-run economic viability of Taft, CA. Especially given the considerable employee losses between 2020 and 2021.

Though there were gains in retail trade, construction, real estate, and transportation and warehousing, and restaurants/bars, which would tend to suggest an optimistic economic path, the exodus of employees suggest that these are small employers set up by individuals who may have lost their jobs and decided to become entrepreneurs. Unfortunately, the losses in manufacturing, information, finance and insurance, and ambulatory healthcare services, which tend to be industries with longer-term outlooks, suggests that COVID-19 had a detrimental impact on Taft, CA. And given the relatively low income and low education nature of Taft, CA, losses in healthcare services and finance and insurance reduce the ability of employees to work consistently, as well as increase the costs of doing business in Taft, CA, further worsening the economic outlook.

Table 2.11: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93280, Wasco, CA**					
Total	194 (2,161)	182 (2,223)	191 (2,352)	194 (2,657)	-6.19 (2.87); 9.65	6.59 (19.52); 12.13
11: Agriculture, Forestry, Fishing, and Hunting	3	3	4	6	0.00	100.00

23: Construction	13	12	14	14	-7.69	16.67
31: Manufacturing	13	13	12	11	0.00	-15.38
44: Retail Trade	36	32	32	34	-11.11	6.25
441: Motor Vehicle and Parts Dealers	7	7	6	7	0.00	0.00
445: Food and Beverage Stores	11	10	10	11	-9.09	10.00
446: Health and Personal Care Stores	0	3	3	3	-	0.00
447: Gasoline Stations	4	5	5	5	25.00	0.00
452: General Merchandise Stores	6	5	5	5	-16.67	0.00
48: Transportation and Warehousing	17	14	18	18	-17.65	28.57
51: Information	0	0	3	4	-	-
52: Finance and Insurance	7	7	8	7	0.00	0.00
531: Real Estate	16	14	14	14	-12.50	0.00
54: Professional, Scientific, and Technical Services	6	6	8	6	0.00	0.00
621: Ambulatory Health Care Services	12	13	12	11	8.33	-15.38
623: Nursing and Residential Care Facilities	4	4	4	3	0.00	-25.00
624: Social Assistance	0	3	0	3	-	0.00
722: Food Service and Drinking Places	30	33	32	34	10.00	3.03
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	17	14	14	15	-17.65	7.14

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Prior to COVID, Wasco, CA (zip code 93280) was seeing negative economic trends, with 12 fewer employers (though with 62 more employees). There were fewer employers in construction, retail trade, real estate, and other services, with only ambulatory healthcare and restaurants/bars seeing employer growth. However, these trends have reversed during COVID. Between 2019 and 2020, Wasco, CA gained 9 additional employers; the city gained an additional 3 between 2020 and 2021. Though Wasco, CA now has the same number of employers it did in 2017, along with more employees (nearly 500 more employees in 2021 than in 2017), which means a higher employee-to-business ratio.

Between 2019 and 2021, the only industries that saw employer loss in Wasco, CA were manufacturing (2 fewer employers), ambulatory healthcare services (2 fewer employers), and nursing and residential care facilities (1 fewer employer), the latter 2 which were likely due to the impacts of COVID-19 in the healthcare sector. In fact, Wasco, CA saw growth in agricultural employers (3 more employers), construction (2 more employers), retail trade (2 more employers), transportation and warehousing (4 more employers), restaurants/bars (1 more employer), and other services (1 more employer). Though some of these employers are not as high value as manufacturing, the diversification of an economy is important for long-term stability and to weather negative economic shocks.

Even more important is the growth in the number of employees; between 2019 and 2020, 432 more employees were hired, with most of the hiring occurring between 2020 and 2021, during the peak of the pandemic on social mobility.

Table 2.12: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93301, Downtown Bakersfield, CA**					
Total	1,386 (19,019)	1,360 (20,311)	1,344 (20,064)	1,358 (18,631)	-1.88 (8.83); 6.79	-0.15 (-8.27); -8.14
11: Agriculture, Forestry, Fishing, and Hunting	0	0	0	3	-	-
21: Mining, Quarrying, and Oil and Gas Extraction	4	6	5	4	50.00	-33.33
23: Construction	46	46	45	52	0.00	13.04
31: Manufacturing	36	33	34	32	-8.33	-3.03
44: Retail Trade	121	118	118	115	-2.48	-2.54
441: Motor Vehicle and Parts Dealers	19	17	16	16	-10.53	-5.88
442: Furniture and Home Furnishings Store	7	9	7	7	28.57	-22.22
443: Electronics and Appliance Stores	0	3	0	0	-	-100.00
445: Food and Beverage Stores	17	16	18	16	-5.88	0.00
446: Health and Personal Care Stores	17	18	17	17	5.88	-5.56
447: Gasoline Stations	12	12	13	12	0.00	0.00
448: Clothing and Clothing Accessories Stores	11	12	12	11	9.09	-8.33
48: Transportation and Warehousing	21	18	19	27	-14.29	50.00
51: Information	16	18	17	18	12.50	0.00
52: Finance and Insurance	74	78	72	77	5.41	-1.28
531: Real Estate	68	71	67	67	4.41	-5.63
532: Rental and Leasing Services	14	12	10	8	-14.29	-33.33
54: Professional, Scientific, and Technical Services	255	253	248	241	-0.78	-4.74
55: Management of Companies and Enterprises	5	3	4	4	-40.00	33.33
621: Ambulatory Health Care Services	292	277	270	276	-5.14	-0.36
623: Nursing and Residential Care Facilities	9	15	16	15	66.67	0.00
624: Social Assistance	43	42	45	47	-2.33	11.90
71: Arts, Entertainment, and Recreation	21	20	20	19	-4.76	-5.00
721: Accommodation	4	4	4	4	0.00	0.00

722: Food Service and Drinking Places	98	98	104	96	0.00	-2.04
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	81	118	116	122	45.68	3.39

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Pre-COVID, there was a decline in the number of employers in Downtown Bakersfield (zip code 93301) of 26 businesses (a decline of 1.9 percent), though employment grew by nearly 1,300 workers (an 8.8 percent increase). Most of the decline pre-COVID was concentrated in manufacturing, retail trade, professional and management services, and ambulatory healthcare services, with growth in real estate, finance and insurance, and nursing and residential care facilities. This suggests that Downtown Bakersfield (93301) is a cluster of healthcare delivery services, but one with no net change in total business services (finance, insurance, management, professional services), suggesting anemic growth.

During COVID, the number of businesses declined by 16 between 2019 and 2020, with a net loss of 2 businesses (0.15 percent) between 2019 and 2021. Worryingly, the number of employees in Downtown Bakersfield is at its lowest level since 2014, with nearly 1,700 fewer employees in 2021, relative to 2019. This suggests that even though employers did not close, they did downsize their payroll due to the COVID business climate, which implies pressures on profit, growth, and economic viability.

During COVID, there were few industries with any positive growth. Between 2019 and 2021, the only industries with employer growth were agriculture (3 more employers; there were 0 before), construction (a gain of 6 employers), transportation and warehousing (a gain of 9 employers), management services (a gain of 1 employer), social assistance (a gain of 5 employers), and other services (a gain of 4 employers). Unfortunately, the increases in agriculture, construction, and transportation and warehousing are not typical employers in a vibrant downtown area, suggesting that the COVID-19 pandemic was especially destructive in Downtown Bakersfield (zip code 93301). Though these employers tend to be indicative of a growing economy, they tend to locate in more industrial areas, rather than downtowns. Equally problematic was the growth in social assistance employers. This is likely to locate near clients, and again is indicative of economic issues for individuals (likely the growing homeless epidemic in Kern County).

Unfortunately, the considerable loss in real estate (4 fewer businesses; a 5.6 percent decline), rental and leasing services (4 fewer businesses; a 33.3 percent decline), and restaurants/bars (2 fewer businesses; a 2.0 percent decline) all hint at an area struggling with homelessness, crime, and a reduction in foot traffic due to COVID-19. If these trends do not reverse, it could mean continued stagnation of Downtown Bakersfield, which is unfortunate given the money and pre-COVID optimism there was in this area.

Table 2.13: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93304, South Bakersfield, CA**					
Total	668 (8,670)	663 (8,252)	643 (8,032)	639 (7,648)	-4.10 (-4.82); -0.75	-3.62 (-7.32); -3.84
23: Construction	33	40	38	44	21.21	10.00
31: Manufacturing	12	10	10	10	-16.67	0.00

44: Retail Trade	212	199	194	186	-6.13	-6.53
441: Motor Vehicle and Parts Dealers	19	18	20	21	-5.26	16.67
442: Furniture and Home Furnishings Store	9	8	8	7	-11.11	-12.50
443: Electronics and Appliance Stores	7	6	6	5	-14.29	-16.67
445: Food and Beverage Stores	27	27	24	24	0.00	-11.11
446: Health and Personal Care Stores	26	25	25	23	-3.85	-8.00
447: Gasoline Stations	14	15	14	17	7.14	13.33
448: Clothing and Clothing Accessories Stores	75	67	65	56	-10.67	-16.42
452: General Merchandise Stores	9	9	10	12	0.00	33.33
48: Transportation and Warehousing	9	9	14	15	0.00	66.67
51: Information	15	13	12	14	-13.33	7.69
52: Finance and Insurance	31	30	28	27	-3.23	-10.00
531: Real Estate	27	21	22	23	-22.22	9.52
532: Rental and Leasing Services	6	6	6	4	0.00	-33.33
54: Professional, Scientific, and Technical Services	44	45	40	42	2.27	-6.67
55: Management of Companies and Enterprises	4	3	3	3	-25.00	0.00
621: Ambulatory Health Care Services	31	32	32	34	3.23	6.25
623: Nursing and Residential Care Facilities	7	7	6	6	0.00	-14.29
624: Social Assistance	13	15	13	11	15.38	-26.67
71: Arts, Entertainment, and Recreation	3	3	3	11	0.00	266.67
721: Accommodation	11	14	11	11	27.27	-21.43
722: Food Service and Drinking Places	89	92	94	92	3.37	0.00
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	68	73	68	66	7.35	-9.59

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Pre-COVID, South Bakersfield (zip code 93304) saw reductions in the number of employers (5 fewer employers), employees (418 fewer employees), and a 0.75 percent reduction in the employee-to-business ratio. This again suggests an area struggling economically, with considerable crime, socioeconomic, and demographic issues. Prior to COVID, employer losses were concentrated in manufacturing, retail trade, information, finance and insurance, real estate, and management services. There was growth in accommodation, restaurants/bars, other services, professional services, construction, and ambulatory healthcare services. Unfortunately, most of the growth in these types of employers are likely to due to poor health outcomes and/or considerable homeless issues, where employers open in these areas because this is where the clients reside. This suggests an area that is growing because of issues, not because of economic opportunities, with commensurate with reductions in employees.

During COVID, however, these negative economic trends accelerated. There was a 3.6 percent reduction in the number of employers between 2019 and 2021 (24 fewer employers), a 7.3 percent reduction in the number of employees (604 fewer employees), and a reduction in the employee-to-business ratio of 3.8 percent. Though South Bakersfield (zip code 93304) gained in construction and transportation and warehousing, which provide employment opportunities for an underprivileged part of Bakersfield, CA, there were reductions in employers that provide "quality of life" to the residents of these areas. Notably, retail trade lost 13 employers, while other services lost 7 employers. Though these do not provide high paying jobs, they provide low-cost goods and services to the nearby communities, meaning that individuals living in this zip code will have to travel farther, and likely pay higher prices, for everyday goods and services.

Interestingly, there was a considerable gain (8 employers; a 267 percent increase) in arts/entertainment/recreation in this area, suggesting that there is a demand for quality of life amenities that boomed during the pandemic.

Table 2.14: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93307, Southeast Bakersfield, CA**					
Total	749 (12,095)	764 (13,362)	775 (12,989)	793 (12,589)	2.00 (10.48); 8.31	3.80 (-5.79); -9.23
11: Agriculture, Forestry, Fishing, and Hunting	3	5	5	4	66.67	-20.00
21: Mining, Quarrying, and Oil and Gas Extraction	5	4	4	6	-20.00	50.00
22: Utilities	3	3	4	4	0.00	33.33
23: Construction	90	99	99	104	10.00	5.05
31: Manufacturing	42	40	41	40	-4.76	0.00
44: Retail Trade	143	142	144	142	-0.70	0.00
441: Motor Vehicle and Parts Dealers	35	33	35	37	-5.71	12.12
445: Food and Beverage Stores	41	37	36	34	-9.76	-8.11
446: Health and Personal Care Stores	5	4	6	6	-20.00	50.00
447: Gasoline Stations	25	29	28	28	16.00	-3.45
448: Clothing and Clothing Accessories Stores	6	5	5	5	-16.67	0.00
452: General Merchandise Stores	5	5	5	5	0.00	0.00
48: Transportation and Warehousing	74	80	93	113	8.11	41.25
51: Information	3	0	3	3	-100.00	-
52: Finance and Insurance	9	8	7	5	-11.11	-37.50
531: Real Estate	16	16	18	21	0.00	31.25
532: Rental and Leasing Services	10	10	12	10	0.00	0.00
54: Professional, Scientific, and Technical Services	17	16	17	17	-5.88	6.25
621: Ambulatory Health Care Services	10	11	9	9	10.00	-18.18
623: Nursing and Residential Care Facilities	12	11	11	7	-8.33	-36.36

624: Social Assistance	14	15	12	12	7.14	-20.00
71: Arts, Entertainment, and Recreation	5	7	6	6	40.00	-14.29
721: Accommodation	16	19	18	14	18.75	-26.32
722: Food Service and Drinking Places	64	63	63	63	-1.56	0.00
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	93	100	101	102	7.53	2.00

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Southeast Bakersfield (zip code 93307) tends to have slightly better economic outcomes than Northeast Bakersfield (zip code 9305) and Downtown Bakersfield (zip code 93301) on average, though worse than the other areas in Bakersfield. Pre-COVID, there was growth in employers (15 more employers; a 2.0 percent increase), employees (nearly 1,300 more employees; a 10.5 percent increase), and the employee-to-business ratio (a 8.3 percent increase). Prior to COVID, there was growth in construction, transportation and warehousing, arts/entertainment/recreation, accommodations, and other services, which signify increased economic investment in a relatively underfunded area of Bakersfield.

During COVID, the increase in new employers accelerated. Between 2019 and 2021, there are 29 more employers (a 3.8 percent increase). These new employers were concentrated in oil and gas extraction (2 more employers), utilities (1 more employer), construction (5 more employers), transportation and warehousing (33 more employers), real estate (5 more employers), professional services (1 more employer), and other services (2 more employers). Though the gain in transportation and warehousing is an important economic driver for this area, the broad-based growth in a variety of different industries suggests economic diversification that is important in improving economic outcomes for a relatively low-income area of Kern County. There were COVID losses in finance and insurance (3 fewer employers), healthcare services (6 fewer employers), social assistance (3 fewer employers), accommodations (5 fewer employers), and art/entertainment/recreation (1 fewer employer). Though none of these (bar finance and insurance) will have a long-term impact on the local economy, it does suggest an area that struggles to attract outside individuals to engage in leisure and hospitality amenities.

Unfortunately, the area shed a significant number of employees, losing nearly all of the employee gains made in Southeast Bakersfield since 2017. Between 2019 and 2021, there are now about 800 fewer employees (a 5.8 percent decline), which means that the employee-to-business ratio fell by nearly 1.5 workers per business. This does suggest that though employers were able to stay in business (or entrepreneurs decided to open new storefronts), there were health related COVID effects that limited the ability to retain or attract employees.

Therefore, it appears that the most detrimental impacts of COVID in certain underserved areas of Kern County are on the number of employees, rather than employers.

Table 2.15: Kern County, by NAICS Code, Changes

	2017	2019	2020	2021	2017 to 2019 (% Change)	2019 to 2021 (% Change)
NAICS Code	**Zip Code 93501, Mojave, CA**					
Total	116 (3,047)	118 (3,451)	122 (3,379)	120 (3,052)	1.72 (13.26); 11.34	1.70 (-11.56); -13.04
21: Mining, Quarrying, and Oil and Gas Extraction	3	0	0	0	-100.00	-
22: Utilities	10	9	6	6	-10.00	-33.33
23: Construction	6	8	8	7	33.33	-12.50
31: Manufacturing	14	14	15	15	0.00	7.14
44: Retail Trade	16	19	21	19	18.75	0.00
445: Food and Beverage Stores	0	4	4	4	-	0.00
447: Gasoline Stations	5	6	6	6	20.00	0.00
48: Transportation and Warehousing	9	6	9	11	-33.33	83.33
51: Information	3	3	0	0	0.00	-100.00
52: Finance and Insurance	3	3	3	3	0.00	0.00
531: Real Estate	0	3	4	4	-	33.33
54: Professional, Scientific, and Technical Services	9	9	9	9	0.00	0.00
621: Ambulatory Health Care Services	4	4	4	3	0.00	-25.00
624: Social Assistance	0	0	0	3	-	-
721: Accommodation	7	8	8	10	14.29	25.00
722: Food Service and Drinking Places	10	9	9	8	-10.00	-11.11
81: Other Services (Auto Repair, Appliance Repair, Barber, Nail, Dry Cleaner, …)	6	6	6	6	0.00	0.00

For the "Total" row, the number outside of parentheses is the total number of employers. The number inside of parentheses is the total number of employees. In the last 2 columns, the numbers separated by a semi-colon are the percent change in the employee-to-employer ratio.

Prior to COVID, Mojave, CA (zip code 93501) had minimal employer growth (2 more employers; 1.72 percent increase) but substantial employee growth (over 400 more employees; a 13.3 percent increase), with nearly 3 more employees-per-business. Even with the elimination of the oil and gas industry between 2017 and 2019, as well as considerable losses in transportation and warehousing (3 fewer employers), there was growth in construction (2 more employers), retail trade (3 more employers), and accommodation (1 more employer). Though the loss of oil and gas and transportation and warehousing is a bit problematic in Mojave, CA (zip code 93501), it does appear that the growth in the other industries suggests that there is some long-term economic optimism in the region.

During COVID, there was again minimal growth in employers (2 more employers; 1.7 percent increase). However, there was considerable employee losses, with there being almost the same number of employees in 2021 as there were in 2017 (an 11.6 percent reduction). In fact, there are nearly 4 fewer employees per business in 2021, relative to 2019, suggesting that most of the employee in-migration prior to COVID has ended (with substantial out-migration). It also appears that all of the pre-COVID trends have reversed, with considerable gains in transportation and warehousing (5 more employers) and manufacturing (1 more employer), with losses in

construction (1 fewer employer), utilities (3 fewer employers), restaurants and bars (1 fewer employer), and information (3 fewer employers). Therefore, Mojave, CA (zip code 93501) still suffers from a lack of economic diversity.

2.3 Conclusion

Overall, it appears that the impact of COVID-19 on the types and number of employers was minimal in aggregate, though decreased slightly in certain underserved areas (South Bakersfield; zip code 93304). Though the composition of the types of business changed (retail trade, accommodations, arts/entertainment/recreation, finance and insurance all saw consistent losses; manufacturing, transportation and warehousing, and other services showed consistent gains), suggesting that either individuals in Kern County continued to conduct economic activities in the face of the pandemic and/or state and federal policies were effective in precluding employer losses, there were considerable employment losses in a number of industries, especially between 2019 and 2021 (though more recent data suggests that the disemployment trends have nearly all reversed by 2023).

These trends appear overall and in underserved areas, but also in outer lying communities that are nearby to the Bakersfield MSA, suggesting that individuals are choosing to commute to better economic opportunities in the major MSA (though this comes at costs; namely, time available for leisure and children, transportation costs, and worsened health outcomes). The lack of significant employer or employee losses does suggest considerable economic resiliency in a relatively low income, low education, high poverty MSA.

It does appear that most of the employer growth was in very small businesses, with fewer than 5 employees. This does suggest that individuals chose COVID-19 as an economic opportunity to become their own boss, choosing entrepreneurship as a viable economic strategy for long-term success. It also suggests considerable domestic resources to be able to fund and finance these activities, as opening up new storefronts, especially in restaurants/bars, other services, and retail trade are relatively capital-intensive events.

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Chapter 3: COVID-19 and Unemployment: The Case for Kern County

Nyakundi M. Michieka [3]

Abstract

In this chapter, we discuss the changes in unemployment in Kern County before, during and after the COVID-19 pandemic. Employment changes in Kern County are compared to those in the state. A cursory observation illustrates that during the pandemic, Kern's unemployment rose by 5 percentage points, compared to the states' increase of 6 percentage points. Kern County however, recovered faster than California in the post COVID period.

3.1 Introduction

In this chapter, we discuss changes in the unemployment rate in California between 2019 and 2022. Figure 3.1 illustrates the unemployment rate in 2019 using data from the U.S. Bureau of Labor Statistics (2023). Kern County's unemployment rate was 7.8 percent compared to the California average unemployment rate of 4.1 percent. The figure also shows that unemployment in the Central Valley was higher, on average, than counties close to the coast, or in the Bay area.

During the pandemic, Kern County's unemployment rate rose by 5 percentage points and averaged 12.8 percent. California's unemployment rate rose by 6 percentage points (from 4.1 percent in 2019 to 10.1 percent in 2020) while the country's unemployment rose by 4.4 percentage points (from 3.7 percent to 8.1 percent) as illustrated in figure 3.2 below. The Central Valley's unemployment rate remained higher than the rest of California.

Figure 3.1: California Unemployment by County in 2019 (Pre-pandemic)

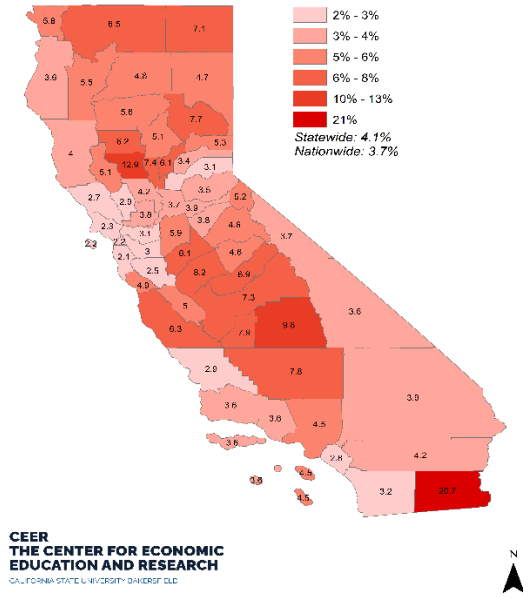
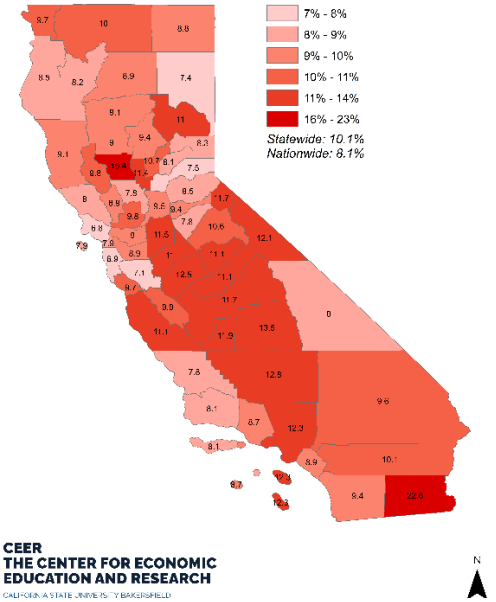


Figure 3.2: California Unemployment by County in 2020 (During pandemic)



Source: Adapted from the U.S. Bureau of Labor Statistics (2023) and prepared by Najmeh M. Kamyabi

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All GIS Figures (Figures 3.1 – 3.6) prepared by Najmeh M. Kamyabi

The post pandemic period occurred in 2021 and 2022. In 2021, the unemployment rate in Kern County was 9.9 compared to the California average of 7.3 percent. Last year (2022), unemployment was 6.9 percent in Kern County, while California's unemployment was 4.2 percent (see Figures 3.3 and 3.4). Throughout these periods, Imperial County in Southwestern California consistently recorded the highest unemployment rates. San Mateo County in the Bay area recorded the lowest unemployment rate, ranging from 2.1 to 2.4 percent in pre- and post-pandemic years, respectively.

Figure 3.3: California Unemployment by County in 2021 (Post-pandemic)

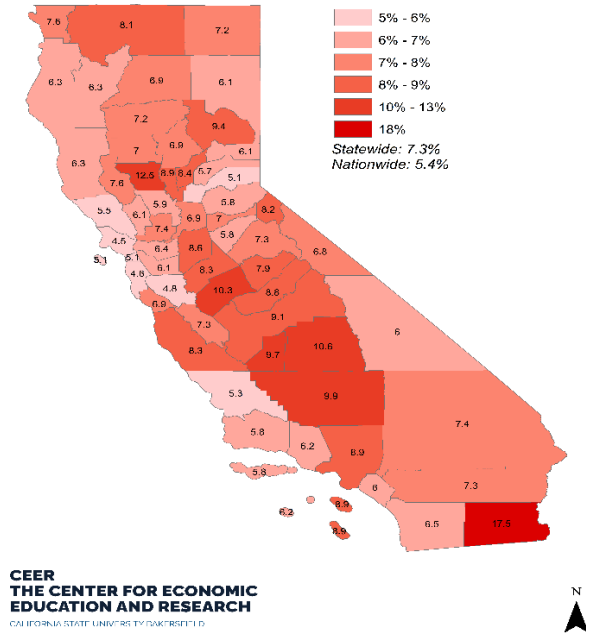
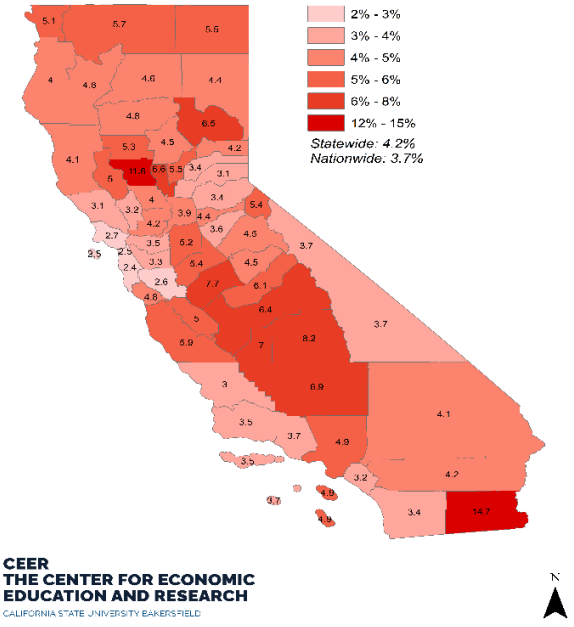


Figure 3.4: California Unemployment by County in 2022 (Post-pandemic)



Source: Adapted from the U.S. Bureau of Labor Statistics (2023) and prepared by Najmeh M. Kamyabi

The year-to-year changes in unemployment are illustrated in Figures 3.5 and 3.6. Between 2019 and 2020, the northern part of California experienced the least change in unemployment while Mono (8.4 percentage points) and Los Angeles (7.8 percentage points) Counties experienced the largest changes. The south (western) counties also witnessed large changes in unemployment, increasing by an average of 6 percentage points. Kern County's unemployment increased by 5 percentage points compared to Tulare's 3.7 and King's 4 percentage points, respectively.

An analysis of the change between 2020 to 2021 shows that Mono, Los Angeles and Imperial Counties witnessed the largest "recoveries", while the northern counties experienced the least "recoveries". Most counties in California recovered an average decrease in unemployment of 2.8 percentage points, similar to Kern County.

Figure 3.5: California Y-Y Change in Unemployment (2019 – 2020)

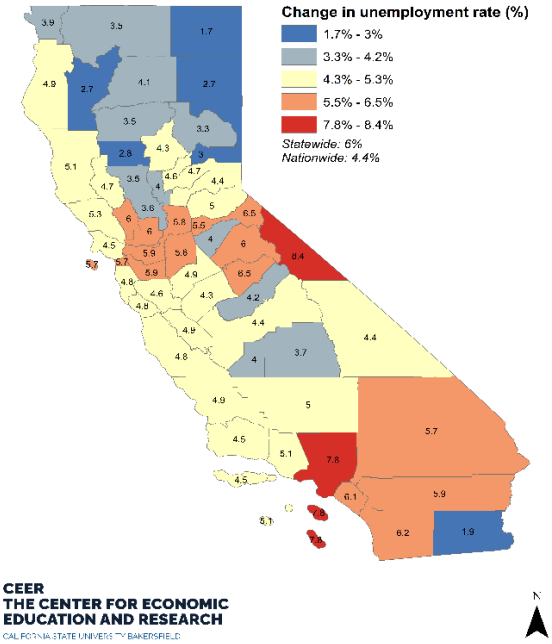
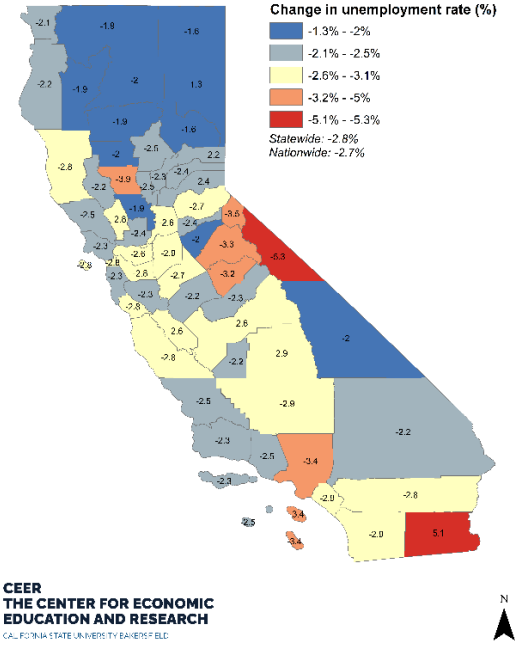


Figure 3.6: California Y-Y Change in Unemployment (2020 – 2021)



Source: Adapted from the U.S. Bureau of Labor Statistics (2023) and prepared by Najmeh M. Kamyabi

3.2 Conclusion

In 2019, before the pandemic began, Kern County's unemployment rate was 7.8 percent compared to a California average of 4.1 percent. During the pandemic, Kern's unemployment rose by 5 percentage points, compared to California's increase of 6 percentage points. In the post pandemic period, the county witnessed a quicker recovery relative to California, implying that the region was not uniquely adversely affected by the pandemic.

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Chapter 4: COVID-19 and Employment Share in by Industry: The Case of Kern County

Najmeh M. Kamyabi[4]

Abstract

This chapter analyzes employment trends by industry in Kern County and California before, during, and after the COVID-19 pandemic. The pandemic heavily impacted Kern County's agriculture and health care industries and caused a surge in employment in those industries, whereas California's diverse economy experienced varying impacts across industries. Understanding how different industries and regions respond during times of crisis can inform policymakers and businesses in developing strategies for a more resilient and adaptive economy.

4.1 Introduction

The employment landscape in the United States has been subject to significant fluctuations over the past two decades, influenced by major economic events such as the financial crisis (2007 to 2009) and the global COVID-19 pandemic. Kern County, renowned for its vast agricultural lands, has been a pillar of California's agricultural industry. The county has contributed significantly to the state's agricultural output, supplying vital crops such as grapes, oranges, and almonds. When comparing the two over the years, Kern County can be seen almost as a microcosm of California due to several factors that reflect the broader trends in the state's economy and employment landscape. Despite being a smaller region within California, Kern County exhibits similarities in employment trends, due to its significant contributions to the state's key industries.

While there may be differences in the scale and specificities of industries, the overall employment patterns in Kern County often follow the broader trends seen across California. However, there are some differences when it comes to the two. Kern County tends to be influenced by its agricultural and mining and logging industry. California’s economy is mostly influenced by its professional and business service, entertainment, and other service industries. In this chapter I will show how Kern County and California looked before the COVID 19 pandemic and how they each reacted to it. I will also compare how each responded to the Great Recession of 2007 to 2009 and see if there are any similarities in data to the COVID 19 pandemic. Before discussing the COVID 19 pandemic and the Great Recession, the broad overview of the unemployment rates from January 2000 and December 2022 shows interesting similarities and differences.

Kern County and California faced a sharp increase in unemployment rates during the Great Recession and the COVID-19 pandemic. States often have a more diverse economy compared to individual counties within them, making the impact of economic shocks much more dramatic at the county level, given the tendency for counties to rely heavily on a smaller number of industries and/or employers. Kern County and California interestingly have followed the same trend in unemployment for the most part over the last 23 years. Even though they follow the same trend, Kern County has shown much higher increases in unemployment when it comes to economic shocks like the Great Recession and COVID.

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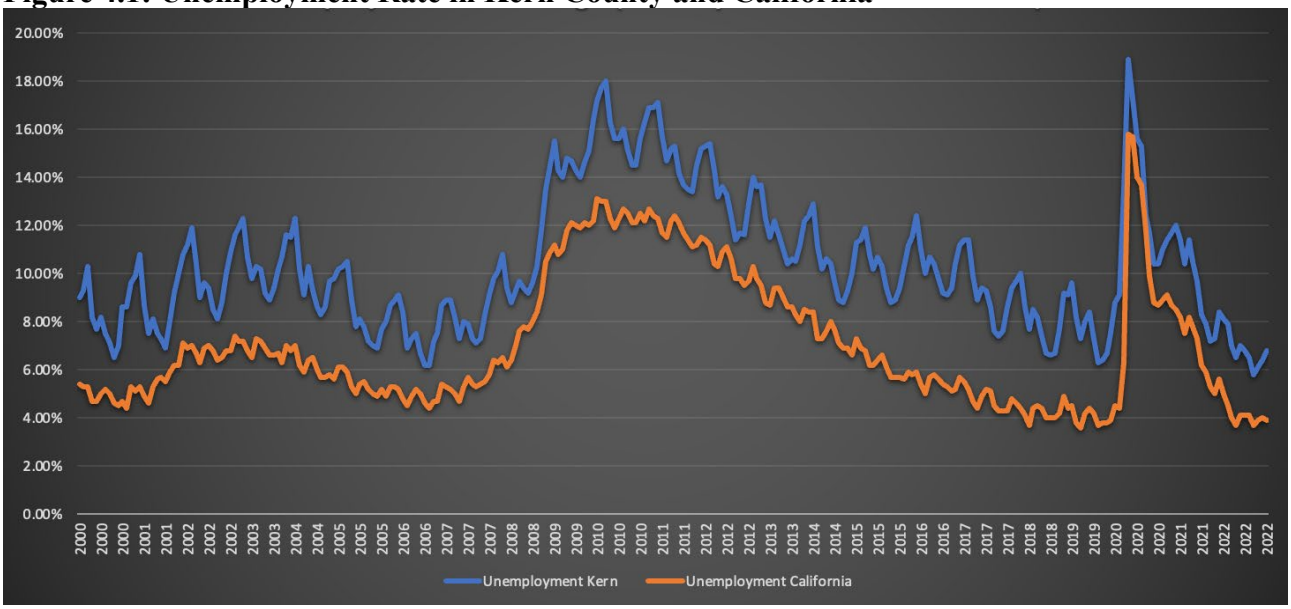
Figure 4.1: Unemployment Rate in Kern County and California



Source: U.S. Bureau of Labor Statistics (2023)

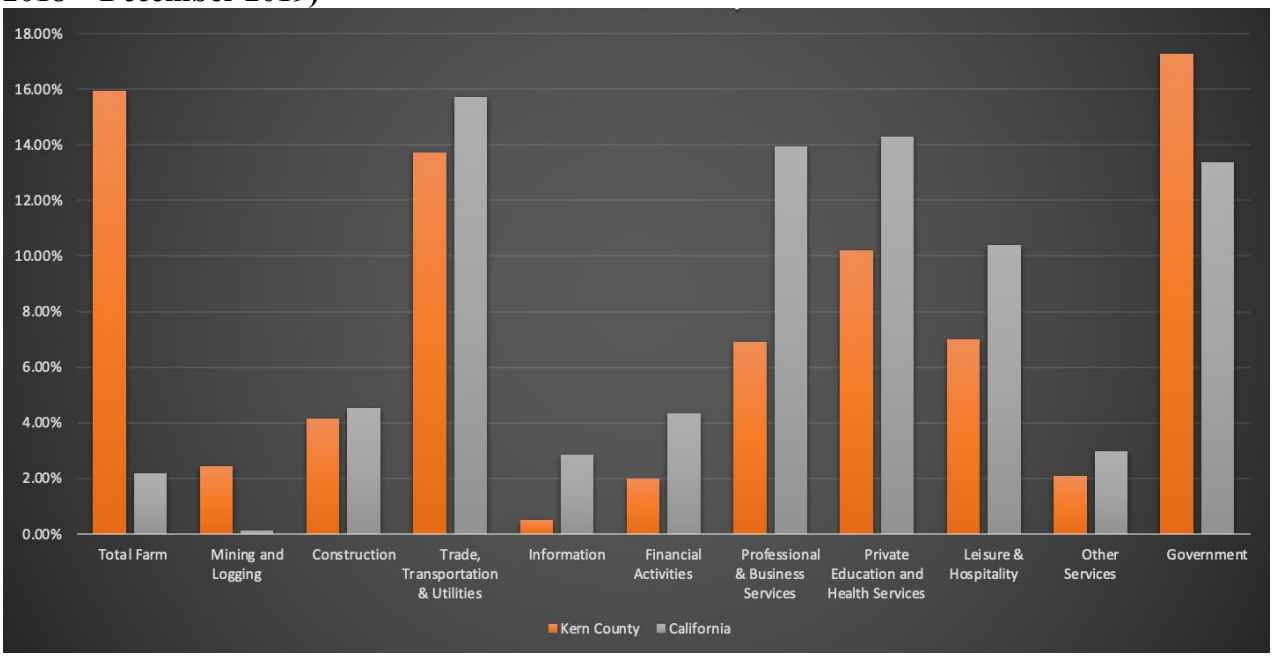
As shown in Figure 4.1, Kern County was more affected by the Great Recession than California. Figure 4.1 also shows that Kern County reached its highest unemployment rate in 2020, reaching almost 19 percent. While California also had a significant increase in unemployment in 2020, the peak was lower at 16 percent. Kern County's employment trends often mirror the broader economic conditions in California.

4.2 Data and Analysis

A. Pre COVID-19 Period: January 2018 – December 2019

Before the COVID-19 pandemic, the economy in both Kern County and California experienced a period of sustained growth and relatively low unemployment rates, as shown in Figure 4.1. From January 2018 to December 2019, the unemployment rates in both California and Kern County were generally low compared to historical averages. Figure 4.2 shows the fraction of total employment by industry. Relative to California, Kern County has a higher fraction of employees in the government, mining and logging, farming, and construction industries. Industries such as service providing, leisure & hospitality, professional & business services, and manufacturing have a higher percentage of employment in California compared to Kern County.

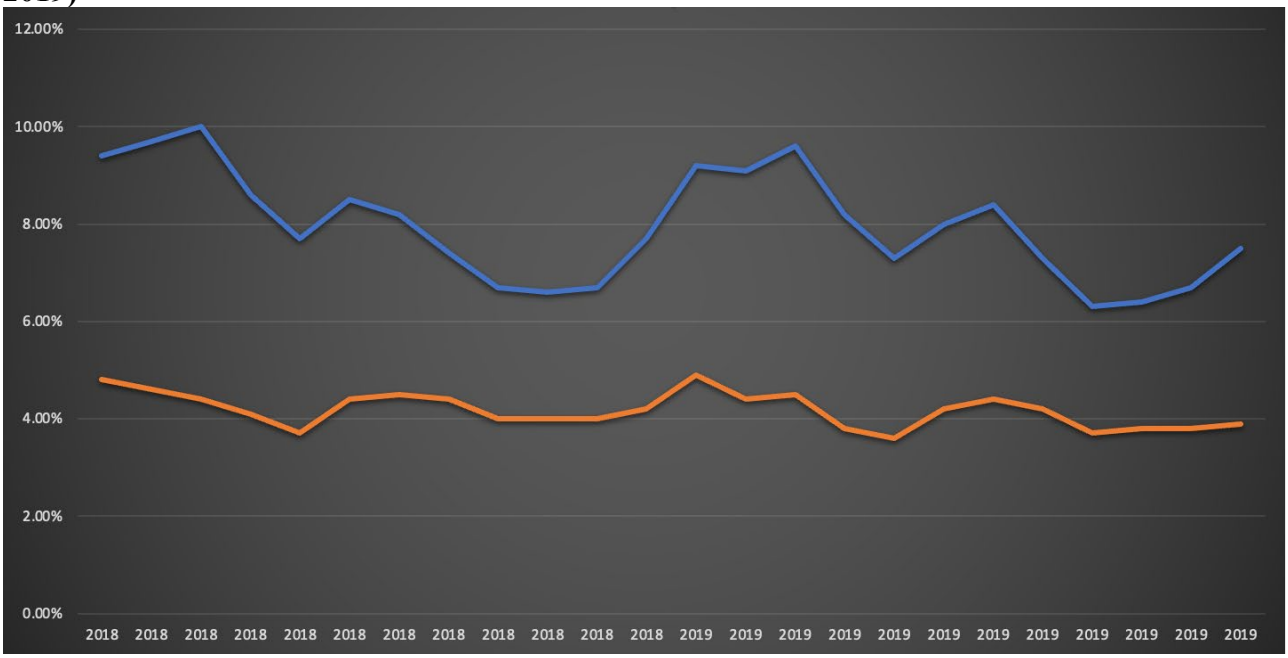
Figure 4.2: Distribution of Employment Share by Industry, Pre-Pandemic Period (January 2018 – December 2019)



Source: California Employment Development Department (2023)

California as a whole experienced an economic expansion with a relatively low unemployment rate. On the other hand, Kern County's unemployment rate during this time was somewhat higher. As shown in Figure 4.3, the unemployment rate for Kern County ranged between 6 and 10 percent. California averaged a lower unemployment rate, ranging from 4 to 5 percent

Figure 4.3: Unemployment Rate Before COVID 19 Pandemic (January 2018 – December 2019)

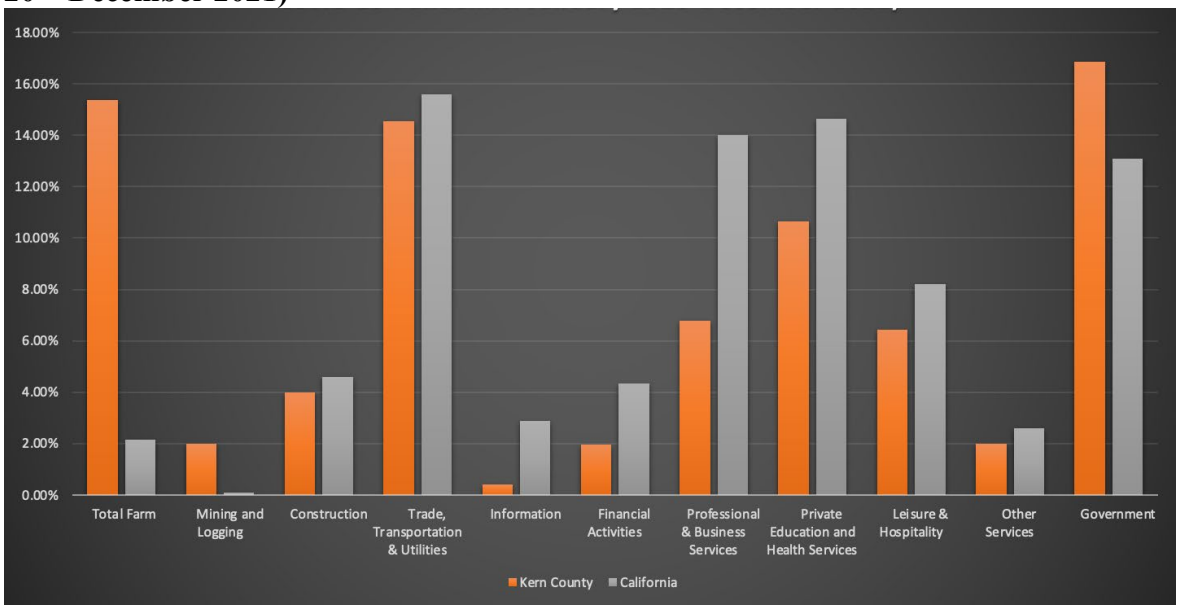


Source: U.S. Bureau of Labor Statistics (2023)

B. The COVID-19 Pandemic Period: January 2020 – December 2021

Figure 4.4 illustrates the distribution of the employment share across major industry sectors during the COVID-19 pandemic. Farming employment was one of the few industries that did not lose as many workers in the pandemic as other industries did. In fact, farming employment rose during the pandemic even though many areas adopted shelter-in-place policies, along with other social distancing policies. In addition to the farming industry, the private education and health service industry also saw an increase in employment share during the pandemic (Figure 4.5). With public schools transitioning to online learning and people getting sick and needing health services, there was a surge in need for those services, which explains why these sectors saw employment increase when most others saw a decline.

Figure 4.4: Distribution of Employment Share by Industry, COVID-19 Pandemic (January 2020 – December 2021)



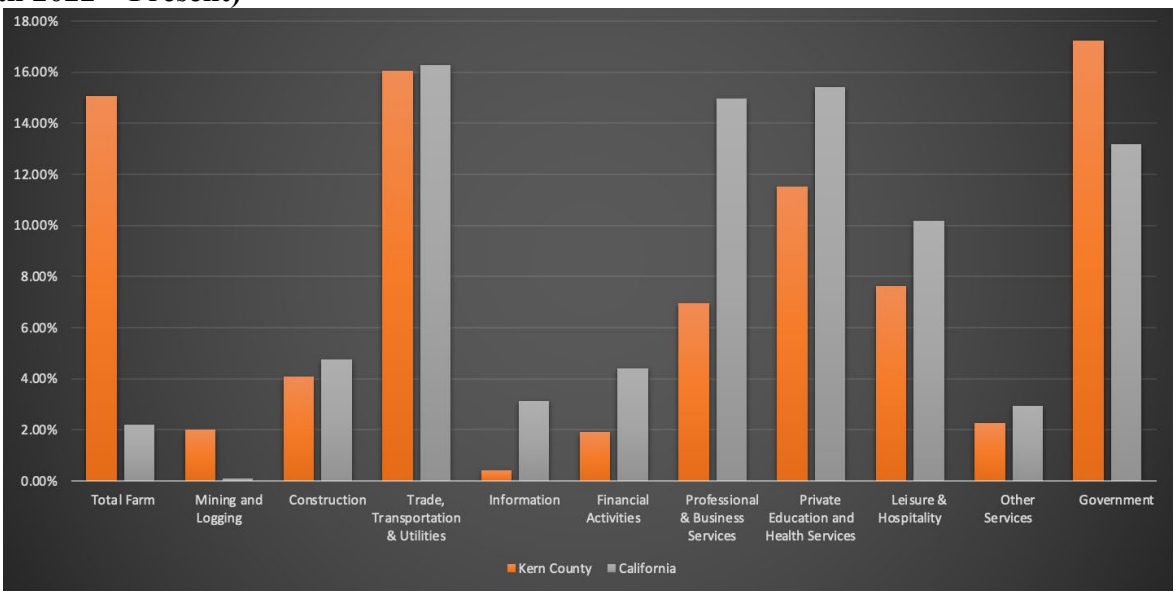
Source: California Employment Development Department (2023)

C. Post-COVID Recovery Period: January 2022 – Present

Employment in the farming industry decreased drastically in April of 2022, as all other industries did (see Figure 4.5), though this may have been a seasonal factor in farming, as employment rose immediately after. As restrictions were eased and vaccination rates increased, businesses in industries like leisure/hospitality, trade, and food service rebounded. Restaurants, hotels, and entertainment venues that were severely affected by the pandemic saw increased activity as consumer confidence improved. Even though there were some still hesitant to leave their house, many felt eager to finally be able to go out.

As shown in Figure 4.5, California had a substantial increase in employment for the leisure/hospitality industry, mirroring the same trends found in Kern County. Almost 200,000 leisure and hospitality jobs were created in California during the post-pandemic recovery period.

Figure 4.5: Distribution of Employment Share by Industry, Post-COVID Recovery Period (Jan 2022 – Present)



Source: California Employment Development Department (2023)

4.3 Conclusion

In conclusion, both Kern County and the state of California faced distinct challenges during the COVID-19 pandemic. The pandemic heavily impacted Kern County's agriculture and health care industries and caused a surge in employment in those industries, whereas California's diverse economy experienced varying impacts across industries. California's broader economic base allowed for a steadier recovery. During the recovery period, several factors influenced the performance of industries, such as the stimulus checks and how people spent those checks. Jobs adapting and going remote meant that some people could get back to work. Unexpected events, policy changes, and technological advancements can all impact the economy and all the different industries. Overall, Kern County and California each have distinct industries and problems within their economy, but in the end are dependent on each other for their own success. Understanding how different industries and regions respond during times of crisis can inform policymakers and businesses in developing strategies for a more resilient and adaptive economy.

References

California Employment Development Department (2023). "Employment by Industry Data." Available at < https://labormarketinfo.edd.ca.gov/data/employment-by-industry.html>

U.S. Bureau of Labor Statistics (2023). Available at < https://www.bls.gov/>

Chapter 5: The Impact of COVID-19 on Small Businesses in Kern County

Kelly Bearden[5]

5.1 Introduction

The impact and effects of the COVID-19 pandemic and subsequent shelter-in-place restrictions had a dramatic change on business activity in California as in most places around the world. In most cases, medium and large businesses defined as having more than 500 employees were able to absorb damages and losses generated within their industry. In limited examples, some experienced sales growth. From the onset of the pandemic, small businesses were far more vulnerable. Many had only limited financial resources and reserves. Prior to the pandemic in 2016, JPMorgan Chase reported on the precarious condition of U.S. small business finances. In a report based on banking transactions of nearly 600,000 small businesses, they concluded small businesses had enough "cash buffer" to only support 27 days of typical outflows. Labor-intensive small businesses, such as restaurants, had an even smaller cash buffer. It was usually less than 20 days. Although it varies by business, a "cash buffer" was defined by JPMorgan Chase using a standard formula to calculate the number of cash buffer days a business needs. In order to calculate cash buffer days, it is necessary to understand three concepts: cash inflow, cash outflow, and cash balance. Then compute the ratio of your average daily cash balance to your average daily cash outflow.

This widely reported vulnerability that a dramatic number of small businesses faced is believed to have contributed to the rush of governments to provide a safety net, and to implement pandemic relief programs without being fully able to vet for effectiveness or value. Reduced customer demand created by people remaining home, coupled with financial uncertainty as consumer spending decreased, lead to a drop in demand for products and services and severely impacted small business revenues. Throughout the pandemic and lockdown, many individuals were limited to working from home. At the same time, many people made significant improvements to their residence, regardless of whether they owned or rented the property. This newly developed circumstance led many small businesses in specific industries such as hardware stores, home-improvement stores, home furnishings, big-box stores, and retail chains to experience high sales and growth. Discretionary dollars that consumers would traditionally spend on travel, hospitality, and entertainment were significantly reduced. Instead, people developed a variety of hobbies, such as gardening and other home-based activities.

The migration of remote workers from high-cost urban areas to cheaper and less rural areas was an exception. This phenomenon was experienced throughout Kern County with much of the movement coming from Los Angeles, and to a lesser degree, the Bay Area. An additional pandemic shift for small businesses was to move nonexistent retail and other operations to online platforms. Those that prospered during the pandemic had to quickly adapt to online operations in order to survive. This meant a transition to an e-commerce platform and other e-commerce activities. However, like so much of the business activity it needed to be more cohesive among business size and sophistication.

A 2020 statewide survey requested by the California Small Business Development Center included many Kern County businesses among respondents and focused exclusively on the initial

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pandemic wave. It produced a quick and interesting look at business activity through July 2020. Throughout California, more than 22,000 small businesses were surveyed soon after the pandemic began in March 2020. Over 6% of firms permanently closed due to the economic impact of COVID-19. Of these firms, smaller and younger businesses were impacted greater and faced a tougher recovery. Businesses owned by women and minorities were more susceptible to the pandemic and the challenges of a recovery. Black-owned firms, Hispanic and Native-owned firms fared worse with the highest business closure rates by race. In analyzing government pandemic relief efforts for small businesses, the early pandemic benefits were received by established firms with existing financial relationships in banking and accounting. The initial programs were federal programs: the Economic Injury Disaster Loan (EIDL) program, later referred to as the COVID EIDL after the adoption of the CARES Act, and the Paycheck Protection Program (PPP). State and local programs followed next with the County of Kern's "Kern Recovers." These three inaugural programs were the best financial relief provided to small businesses, despite favoring existing firms with relationships. Many other financial relief programs later followed.

Business owners who faced a great deal of uncertainty about where the pandemic would lead them favored the PPP because this loan had forgivable features to make it an outright grant. The PPP was particularly popular with employers because the program focused on retaining employees and maintaining the workforce while getting relief to those employees. With the uncertainty, many savvy business owners sought the longer-term protection, and greater flexibility of the COVID EIDL. The loan's purpose is and was to provide disaster funds for businesses injured due to a disaster. Common with natural disasters where a business is unable to sustain itself because of the disaster loan, the COVID EIDL had several different maximum loans, depending on when the business owner applied from $ 150,000 to $ 2,000,000. The cash flow-friendly term of thirty-year repayment with a 3.75% fixed interest rate resulted in nearly four million repaying loans before the pandemic ended. The loan is underwritten to determine the actual loss attributed to the disaster, even in the absence of physical damage.

The initial wave of the pandemic for Kern County small businesses dealt with understanding the many challenges relative to financial relief, keeping a safe environment, and navigating the constant changes. Another key early finding of businesses surveyed found that 70% of them implemented some type of innovation in response to the COVID-19 Pandemic. The prior three-year average was only 30%. The most common innovation in 41% of firms was changing processes to enable social distancing. Other responses noted included curbside pick-up, delivery, and appointment-only meetings—a second finding related to the age of the business entity. Younger firms, particularly those less than five years in business were significantly more likely to innovate (13%) than older firms. The likely source of the innovation was necessity. A common innovation was small businesses pivoting to e-commerce or to the delivery of virtual services, along with changing product delivery methods. No industry experienced this as much as restaurants and other food vendors. Again, there were uneven results based on the type of dining establishment, size of the business, and owner's use of innovation. Eateries that had delivery services in place or excelled in take-out orders were well positioned for early pandemic business.

Food vendors with a drive-through window or delivery in place, such as a pizza restaurant, along with third-party delivery options for food and beverages, such as Grub Hub and Uber Eats, and those with aggressive take-out options fared the lockdown and pandemic well. Higher-end restaurants that featured sit-down dining buffets and other on-site applications were impacted significantly. Many of these food businesses closed and did not reopen. Some industries were winners and others were losers. Food businesses and entertainment venues both received special

programs from the U.S. government. The Restaurant Revitalization Fund (RRF), a program designed to support shuttered food and beverage businesses by granting the differences in sales from 2020 to 2019 in a non-repayable gift, may have been poorly conceived. A restaurant with a profit margin of 10% is usually considered successful, yet this program sought to relieve the food or business with 100% of the difference. This resulted in a total amount of $28.6 billion allocated to those who applied on the first day the program opened May 5, 2021. The design was for smaller food businesses with gross revenues of $ 500,000 or less to receive funding from a set-aside pool of $5 billion. Underserved food businesses, consisting of minority-, women-, and veteran-owned businesses were also given an exclusionary 21-day window to apply. Unfortunately, it was litigated and defeated in court, and thrown out. Many who received the grant often received a windfall amount. This included the litigious parties in Texas and Tennessee who sued on the basis on discrimination with the reserved pools based on race and gender. Only about one-third of applicants nationwide eventually received funding. The program should have capped awards and made a smaller grant to all or most food and beverage concerns, rather than those lucky enough to be selected on day one.

While it was not the intent, the smallest and often the most needy businesses, and many of those lacking resources to continue in business did not receive the funding. The Shuttered Venue Grant Operator (SVOG) grant program was far more successful. It assisted those with entertainment and cultural venues that were shut down by COVID-19. This program had $18 billion earmarked for everything from small theaters to music venues and nonprofits such as local symphonies, to name a few. The program took several months to fully become subscribed to and met the needs of many of those in this industry. Many industries that hoped to find relief lobbied for greater support. Fitness Clubs with social distancing requirements were severely impacted for a significant time during the pandemic. Although gyms could access many of the federal, state, and local programs, none were created specifically for this industry segment. The hospitality industry did well with the Restaurant Relief Fund, but the lodging and accommodation segment suffered. Many of the smaller firms and Airbnb owners who leveraged debt on their properties to make improvements suffered. Softening the blow and limiting or reducing the number of businesses that closed were programs from state and local governments. The state of California administered the California Relief Grant, a program that offered $ 5,000, $15,000, or $25,000 to small businesses depending on their sales volume. The program was effective in meeting small business needs. The Kern Recovers program was one of the first and most effective local programs, featuring a little more than $30 million for small businesses and certain small nonprofits throughout Kern County. The program was paired with personal protection equipment made available to small businesses. With grants up to $75,000, engaged local lenders processing applications and total transparency, the program exceeded programs offered by similar communities in the San Joaquin Valley, Central Coast, and other regions of California that offered a local pandemic relief program. The community response from providers, lenders, government officials and community leaders lessened the blow to small businesses. Other local programs of note in Kern were the City of Bakersfield's “B-CARES” program, and a program administered by the City of Wasco. Both were funded through the CARES Act.

During the initial response to the pandemic, business owners had a great deal of anxiety, not only dealing with the health consequences of COVID-19 but also how they could access government programs to potentially save their businesses. The PPP loan changed daily as the program was being built to save small businesses from the ground up. As it turned out, the government released additional funds and changed key rules allowing for a longer grant as the

pandemic wore on. Most employers with relationships were able to access PPP loans that were subsequently forgiven. Self-employed business owners could access funding for up to eight weeks, a total of $ 20,833 if their sole proprietor income on their federal tax return netted $ 100,000 or more. Smaller incomes produced a reduced award that was reflected earlier in the failures and difficulties by the very small, needy, and often underserved business owners suffered. With PPP2 in January 2021, and with modifications in March 2021, rules were relaxed to assist the smallest and most needy business owners. It allowed business owners to use gross sales instead of net income, a huge difference in obtaining the maximum amount for the business. This truly assisted underserved business owners until funding ran out in May 2021.

As we began to move away from the pandemic, several issues affecting small business profitability and moving forward came to light. Major issues started to affect all businesses, such as the global supply chain disruption that impacted businesses that relied on imports, and those with complex supply chains that faced challenges due to disruptions, transportation, limitations on border closures, and other countries shuttered economies. The COVID-19 pandemic's local effects on small businesses varied widely based on the regional economies. Rural tourism sectors initially did far better as they became popular work remote locations. The supply chain crisis was quite comprehensive, created initial from closed manufacturing plants unable to secure workers. In Kern County, we experienced a significant but moderate effect mainly from small business owners working with foreign vendors. Another major issue moving past the pandemic was getting workers to return to their jobs. Workforce shortages affected the greater economy and significantly impacted small businesses. California workers were able to access several employee programs and resources for coping with illness, assisting family members, and other health issues. Once underway, the pandemic led to a more mobile, decentralized workforce that questions the value of their current employment. This led to labor shortages throughout the economy. Small businesses were likewise affected and in a difficult position to compete with larger firms for employees. Many food establishments adjusted accordingly by reducing hours, closing more days, and eliminating certain meals and menu selections. While the employee crisis has recently subsided, a worker shortage is still present.

Pricing, inflation, and shortages were and continue to be a source of problems for small business owners. Shortages of products and services continue to affect many recovering businesses. Pricing products has become very tricky in this economy, as has businesses attempts to balance retaining customers with generating a profit. In the fall of 2022, several restaurant owners mentioned it was nearly impossible to charge enough for menu items to turn a profit, while retaining customers, or being forced to cheaper options. Price has been, and continues to be, quite volatile in the food segment, with many manufacturers reporting on public filings that they are charging excessive amounts because the marketplace will pay it. Local surveying using poll questions during the CSU Bakersfield Small Business Development Center's (SBDC) "Webinar Wednesday" helped gauged local reaction to the pandemic. Many of the questions were exactly those used in a series of national surveys from the National Federation of Independent Business (NFIB). The twenty-three COVID-19 Small Business Surveys were conducted from March 2020 until January 2023 by the NFIB. The methodology took an average sample of between 500-600 small businesses from a pool of 20,000 business owners for each survey. They were part of an overall list of 300,000. The periodic surveys asked the most pertinent pandemic-related questions at the time. Early, the focus was on relief programs, mainly accessibility, while later it was on small business recovery issues, some identified above.

We intended to determine how our Kern County (and Central California) audience reflected similar questions and experiences to a national poll. Over our 135 consecutive, live pandemic webinars every Wednesday from March 18, 2020, until October 31, 2022, and then on to slight business pandemic recovery. Nearly all webinars had multiple poll questions to survey our audience, and we found that from the beginning of the pandemic, relief programs winding through the small business recovery our survey response was remarkably similar to the national average. Occasionally we would find an outlier, but it was rare. We could use the basis of the NFIB survey to understand a nearly exact picture was happening in our community. The surveyed questions used on the final survey in January 2023 ask a series of questions on sale levels, worker shortage, supply chain issues, prices, local economies, interest rates, and family leave. Some final thoughts on other less popularize developments that we saw occur. The "graying" of small businesses, those owned by the baby boomer generation. Many of these business owners retired by selling or closing their businesses, rather than facing a lengthy recovery period. The recovery for small business owners continues to be rocky. The U.S. Small Business Administration (SBA) has underwritten 3,923,374 Economic Injury Disaster Loans (EIDL) for over $378B as pandemic relief.

Recent reports indicate that delinquency rates on COVID-19 EIDL loans are around 30%, which is an exceptionally high rate for any loan program. Disaster loans are typically underwritten to provide missing cash flow following a disaster, and the likelihood of repayment is a condition of approval for this type of loan. However, during the COVID-19 pandemic, there was a period when EIDL loans were granted up to $150,000 without further review due to high demand and unprecedented circumstances. In addition to relaxed underwriting standards, the EIDL program was also plagued by significant fraud, the extent of which is currently unknown. The large number of delinquent EIDL loans is deeply concerning for small business owners, as foreclosure could render them ineligible for other federal debt programs and even impact programs like Social Security.

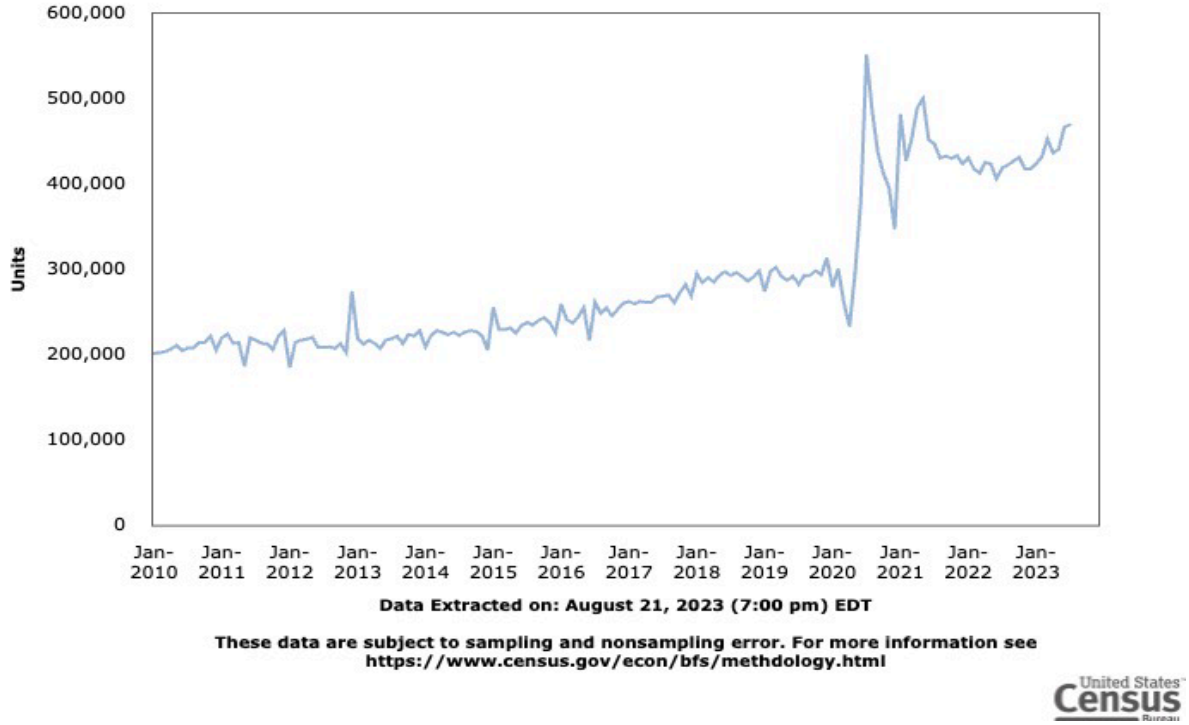
5.2 Surprises from the pandemic

Amidst the global pandemic, a surge of small business startups resulted in an unexpected boost for small business development. New small businesses boomed during the pandemic, including in Kern County. As existing businesses flocked to the SBDC to learn more about the pandemic relief programs, and how they can help save their businesses, later in the year new business owners with creative solutions and a desire for self-employment began to arrive. What are the reasons for the surge in new businesses? During typical economic downturns, new business formations decrease, and unemployment and interest rates rise. However, the COVID-19 pandemic brought about unique circumstances. Workers were predominantly remote, many older business owners retired or sold their companies, and individuals had more time and resources to explore self-employment opportunities. Lifestyle changes brought on by a work-from-home pandemic environment, a reduction in travel and entertainment options, and vacancies from early pandemic-related closures all contributed locally to new startup activity.

Another possible contributor to new business formation was, again, pandemic relief programs. In California, the California Dream Fund was a $35 million program designed to assist underserved communities with technical assistance and start-up grants to begin businesses. The program assisted with training "would be" entrepreneurs and provided them with one-on-one business advice and business plan assistance in order to be eligible to receive either a $5,000 or $10,000 grant to start their venture. The program was a success statewide. Other local programs using stimulus funds from the final significant stimulus, the only one without bi-partisan support,

the American Rescue Plan Act (ARPA) stimulated local programs, with some offering similar programs. After the initial drop in new business formations with the inception of the pandemic in March 2020, new starts rose dramatically throughout 2020 and remained significantly elevated in 2021, 2022, and 2023. The trend continued with much higher new business formation over the three years than any other time period.

Figure 5.1: Seasonally Adjusted Business Applications



Source: Business Formation Statistics. Total for all NAICS: U.S. Total Jan-2010 to Dec 2023

Another incredible statistic came from the massive increase in business formation in the early part of this decade. The survival rates of business establishments are one most mistakenly quoted small business statistics. It seems like a regular occurrence that someone will throw a stat to reflect the negative side of the equation, and that is how fast a tiny business fails on average. Usually, the statistic seems to come out of thin air, with little basis, thought, or from a reputable source. However, the business survival analysis began in 1994 to detail the percentage of businesses that survive from each year they open. With the vast number of new businesses started in 2020, it is reasonable to assume that the survival rate is very high for companies created that year. Since the new starts dropped significantly leading into 2021, it could indicate that the longevity of these newly started firms would not be a highlight. Pandemic-born businesses in 2020 boast the highest survival rates since statistical analysis began in 1994. In the second year of the companies started in 2020, a whopping 80.9% were still in operation. This is .8% over any other year since the business survival index began, representing nearly 5% higher than the surviving business formulated in 2020. The index continued in 2022, with companies now in the third year totaling 72.5, much higher than any other year since beginning in 1994. Why have new business starts in 2020 held on with higher year two and three survival rates? Well, one can speculate. Possibly they fared so well, compared to business starts every year since 1994, because they were

beginning in a pandemic and expectations early on were guarded. If they were employed, receiving stimulus, and saving money at home, cash resources might have helped. Time was another commodity that, for many, increased. While most pandemic relief programs were limited to those in business on 2/15/2020, those who opened later could access programs such as the Employee Retention Tax Credit, a lucrative and immediate refundable credit in place until September 30, 2020.

Table 5.1: Survival Rates of Establishments

Survival rates of establishments, by year started and number of years since starting, 1994–2022, in percent

Number of years since starting	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2	80.1	78.3	77.3	75.2	76.7	78.6	79.4	79.2	79.6	79.7	79.6	79.6	79.1	79.4	79.2	80.9	79.2	–
3	68.7	66.3	64.0	63.3	66.4	68.6	69.3	68.7	68.9	69.3	69.1	68.8	68.6	68.7	70.2	72.4	–	–
4	60.2	56.7	55.5	56.5	59.9	61.6	61.9	61.2	61.4	61.8	61.4	61.2	60.7	62.1	64.1	–	–	–
5	52.6	49.8	50.2	51.7	54.8	56.0	56.0	55.3	55.3	55.8	55.4	55.0	55.5	57.4	–	–	–	–
6	46.8	45.4	46.4	47.8	50.1	51.1	50.9	50.1	50.6	50.8	50.2	50.7	51.6	–	–	–	–	–
7	43.2	42.3	43.1	44.2	46.1	47.0	46.6	46.4	46.7	46.5	46.4	47.5	–	–	–	–	–	–
8	40.5	39.6	40.1	41.0	42.8	43.0	43.3	42.9	42.8	43.2	43.6	–	–	–	–	–	–	–
9	38.2	37.1	37.4	38.3	39.7	40.5	40.4	39.7	39.9	40.8	–	–	–	–	–	–	–	–
10	35.9	34.8	35.1	35.9	37.2	37.9	37.5	37.0	37.7	–	–	–	–	–	–	–	–	–
11	33.8	32.8	33.0	33.6	34.9	35.3	35.1	34.9	–	–	–	–	–	–	–	–	–	–
12	31.9	31.0	31.0	31.7	32.6	33.2	33.2	–	–	–	–	–	–	–	–	–	–	–
13	30.2	29.3	29.3	29.7	30.7	31.5	–	–	–	–	–	–	–	–	–	–	–	–
14	28.6	27.7	27.4	28.1	39.3	–	–	–	–	–	–	–	–	–	–	–	–	–
15	27.1	26.0	25.9	26.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–
16	25.5	24.6	24.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
17	24.6	23.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18	23.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Source: Bureau of Labor Statistics – Business Survival Rates

Where 2020 was a benchmark year for business survival rates for firms created that year, in 2021 the rate reverted to the 2019 level of 79.2%.

Conclusion

The COVID-19 pandemic in March 2020 brought unprecedented uncertainty for personal safety and business survival. In response, the U.S. government passed the CARES Act, which included relief programs for small businesses. Many businesses in the hospitality industry were well-positioned to weather the pandemic with takeout, delivery, and other options. However, smaller operators were often kept out of the third-party food delivery option due to high fees, sometimes as high as 35%. Pandemic relief programs provided security to save a considerable number of small businesses. While the programs were not perfect and were not evenly distributed to small, needy, and underserved small business owners, especially initially, they improved. The pandemic highlighted the importance of technical assistance providers. Small businesses flocked to the CSU Bakersfield SBDC and other providers. Initially, most seeking assistance were existing business owners. Business advising at the SBDC reached its highest levels, with advising clients about 35% greater than any other year. The center hosted weekly webinars, a total of 135 live webinars with dedicated question-and-answer segments. All webinars were shared online and on-demand.

It was challenging to quantify the number of businesses that closed in Kern County during the pandemic. Local licensing authorities, the City of Bakersfield, or Kern County provided raw data that could have been better since it included closures, new business starts, and existing businesses that only registered to access pandemic relief requirements. The pandemic has posed several challenges for small business recovery including global supply chain crisis, worker shortage, price inflation, and higher interest rates. Although the Restaurant Revitalization Fund aimed to help small, needy, and underserved businesses, it has failed to deliver. Additionally, the COVID-19 Economic Injury Disaster Loan program, which was a huge relief for small businesses, is experiencing high rates of delinquency in repayment. There was an incredible number of new businesses formed in 2020 and beyond, with the highest number of business starts ever recorded. Moreover, the survival rates for these businesses are the highest since statistics began being recorded in 1994.

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Chapter 6: Environmental Sustainability and Industry in Kern County during COVID-19

S. Aaron Hegde[6]

Abstract

This chapter defines the environmentally sustainable industries in Kern County before providing an overview of how the region's top emitters performed during the COVID-19 pandemic. To assess this performance, five metrics, which are proxies for environmental sustainability, were tracked between 2020 and 2021. These include greenhouse gas emissions, water usage, criteria pollutants, pesticide emissions, and toxic emissions. In all metrics considered, Kern County lagged in its sustainability efforts.

6.1 Introduction

Achieving environmental sustainability in industry encompasses a diverse range of approaches. One of the fundamental aspects includes adhering to federal, state, and local government standards. Equally crucial is the active pursuit of improving procedures and minimizing emissions. To demonstrate dedication to sustainability, companies can acquire specific certifications, such as *Certified B Corporations* and *Cradle to Cradle certification*. These certifications assess a company's social and environmental performance, considering risk standards, emission prevention, social fairness, along with other factors.

To evaluate and ensure environmental sustainability across businesses and industries, companies undergo these assessments and comply with environmental regulations. Key indicators of sustainability include measuring emissions, investing in new technologies, and fostering innovation (Nezami, 2010). Additionally, companies can be considered environmentally sustainable if they actively participate in eco-industrial parks and fulfill their corporate social responsibility (Famiola, 2007). Embracing eco-friendly practices, such as reducing toxic chemical usage and conserving energy, allows companies to operate with minimal environmental impact (Arbogast, n.d.).

Companies are defined as environmentally sustainable if they achieve a number of goals. Adopting sustainable strategies and practices, reducing costs through eco-efficiency, and effectively managing operational and regulatory risks is one way (Danciu, n.d.). Furthermore, having a strategic approach to sustainability and a defined set of initiatives addressing social and environmental issues is another (Zu, 2014). By embracing these comprehensive strategies, businesses can foster a more cohesive and effective approach to environmental sustainability. Industries are environmentally sustainable depending on how their environmental footprint is in relation to greenhouse gas emissions, land use, mineral utilization, nitrogen and phosphorus release to water, pesticide emissions, toxic chemical releases, and water consumption. The greenhouse effect, driven primarily by carbon dioxide, methane, and nitrous oxide emissions, leads to climate change and higher global temperatures (U.S. EPA, 2015). With the greenhouse effect, the buildup

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of gasses causes heat from the sun to be trapped in the earth's atmosphere. As emissions increase, they intensify the natural greenhouse effect, leading to climate change and higher global temperatures. (U.S. EPA, 2015). The consequences of this phenomenon are far-reaching and include devastating natural disasters occurring with increasing frequency and intensity.

Climate change causes rising sea levels, altered precipitation patterns, and more frequent and severe heat waves. Ecosystems are significantly impacted, with changes in species migration patterns, wildlife displacement, and agricultural practices (U.S. EPA, 2015). Extreme droughts and excessive rainfall can lead to soil degradation and crop failure, while rising sea levels cause coastal erosion and disruptions to delicate ecological balances.

It is crucial to recognize that the immense increase in greenhouse gas emissions primarily stems from human activities, including the burning of fossil fuels, deforestation, agricultural practices, industrial processes, and numerous other man-made activities. To combat these emissions and mitigate their adverse effects on the environment, concerted efforts and sustainable practices are imperative at both individual and industrial levels.

To address the issue of greenhouse gas emissions, federal and state level agencies have implemented various regulations to minimize emissions. At the federal level, the Environmental Protection Agency (EPA) has issued a final rule aimed at significantly reducing the national production and consumption of hydrofluorocarbons (HFCs) by 85 percent within the next 15 years, as mandated by the American Innovation and Manufacturing (AIM) Act and Senate Bill 1206 (U.S. EPA, 2021). HFCs are man-made greenhouse gasses that have global warming potentials far greater than carbon dioxide (U.S. EPA, 2021). To achieve this reduction, HFC production and consumption allowances will be capped at 40 percent below the baseline compared to historic levels between 2024 and 2028.

At the state level, California has implemented several programs to help combat greenhouse gas emissions. Following the steps of the EPA, the California Air Resources Board (CARB) and the National Highway Traffic Safety Administration (NHTSA) worked together to implement stringent standards aimed at reducing greenhouse gas emissions from vehicles, trailers, and heavy-duty engines ("Greenhouse Gas Standards for Medium- and Heavy-Duty Engines and Vehicles," 2023). With ambitious goals, California aims to decrease statewide greenhouse gas emissions to 40 percent below 1990 levels by 2030 and an impressive 85 percent below 1990 levels by 2045, as directed in SB 32 and AB 1279 (Review Draft Climate Action Plan, 2023).

Additionally, California has established an essential framework for localized action through the California Environmental Quality Act (CEQA)-qualified Climate Action Plans (CAPs). This empowering system grants local governments the authority to effectively regulate and control activities within their jurisdictions that contribute to greenhouse gas emissions. From scrutinizing land use practices and transportation planning to monitoring industrial permitting and municipal operations, the CAPs provide communities across California with the necessary tools to proactively address their unique environmental challenges (CEQA and Target Setting for Climate Action Plans, 2018).

Because of the CAPs framework, many municipal governments, including the city of Bakersfield, have begun implementing their own climate action plans. Bakersfield’s proposal outlines their current greenhouse gas emissions proposals across industries and establishes objectives for the city to minimize its emissions in the upcoming years. By the year 2030, Bakersfield aims to reduce emissions to 27 percent below the emission levels recorded in 2019. Looking ahead, Bakersfield also plans to reach their targets of a 61 percent reduction below 2019

levels by 2040 and a remarkable 79 percent reduction by 2045 (Review Draft Climate Action Plan, 2023).

Within Kern County, specific industries have emerged as the highest greenhouse gas emitters. Electric power generation from fossil fuels produces the most emissions since it utilizes natural gas, coal, or nuclear power in large power plants (Mastrandrea et al., 2022). Because electric power generation is the primary source of greenhouse gas emissions in Kern County, the industry is targeted in the Bakersfield Climate Action Plan.

Electric power transmission and distribution, truck transportation, cement manufacturing, and petroleum refineries are other top contributors to emissions in Kern County. Electric power transmission and distribution plays a crucial role in delivering electricity from power plants to consumers (Mastrandrea et al., 2022). Transmission lines, typically owned by utilities, deliver electricity from power plant manufacturing facilities, while distribution lines transport electricity from high voltage transmission lines to low voltage distribution lines, reaching customers in cities and neighborhoods (Mastrandrea et al., 2022). California has drafted and implemented several initiatives aimed at reducing greenhouse gas emissions in the energy industry. These include the California Solar Initiative, Net Energy Metering, Emissions Performance Standard, Cap and Trade, and Self Generation Incentive Program (2022 Scoping Plan for Achieving Carbon Neutrality, 2022).

Truck transportation is also a significant greenhouse gas-emitting industry. In response, California has adopted the Advanced Clean Trucks rule, promoting the sales of new zero-emissions heavy-duty trucks by 2035, and approved regulations to phase out the sales of medium and heavy-duty combustion trucks by 2036 (California State, 2023). These measures are crucial steps towards transitioning to more environmentally sustainable alternatives, aiming to reduce the industry's carbon footprint.

In the next section, we provide an overview of GHG emissions, water usage and toxic emission discharge from Kern County's top polluters during the COVID-19 period.

6.2 Data and Analysis

For the following analysis, the amount of GHG emissions produced during COVID-19 period by Kern County's five top polluters is discussed. The industries include: (1) Electric Power Generation; (2) Cement Manufacturing; (3) Truck Transportation; (4) Electric power transmission and distribution; and (5) Petroleum refineries.

A. Greenhouse gas emissions

Table 6.1: Greenhouse gas emissions

Industry	GHG Emissions (Kgs - Millions)		Kg/$ GDP (Kern)		Kg/$ GDP (US)	
	2021	2020	2021	2020	2021	2020
Electric Power Generation (Fossil Fuel)	5, 636	10,634	0.1079	0.2364	0.0001	0.0001
Cement Manufacturing	1,581	1,929	0.0303	0.0429	0.0016	0.0019
Truck Transportation	1,991	1,555	0.0381	0.0346	0.0168	0.0182

Electric power transmission and distribution	1,221	1,057	0.0234	0.0235	0.0002	0.0012
Petroleum refineries	1,027	580	0.0197	0.0129	0.0063	0.0014

Source: IMPLAN, Environmental Protection Agency and the Federal Reserve Bank of St. Louis (FRED)

Table 6.1 shows the GHG emissions (millions of kilograms) for Kern County's top 5 emitting industries. The data is drawn from IMPLAN software, the EPA, and the Federal Reserve Bank of St. Louis (FRED). The first two columns are the emissions for each industry, measured in millions of kilograms. The middle two columns are the emissions per one dollar of Kern County GDP; the last two columns are emissions per dollar of US GDP.

In California, the largest source of electricity generation is natural gas. While the combustion of natural gas does release GHG emissions, it produces lower emissions than other non-renewable sources used to general electricity. As indicated in Table 6.1, electricity generation emissions per dollar of GDP is much higher in Kern County than in the rest of the country in both 2020 and 2021. The same applies to the other top sources of GHG emissions in Kern County. This indicates that the electricity generating sector in Kern is less sustainable than the rest of the country. Comparing years 2020 and 2021, it can be noticed that there was a decline in total emissions in every industry, though electric power transmission and distribution and petroleum refineries emissions increased during COVID-19. While figures for 2022 are not yet available, this reflects the general declining trend in these emissions.

B. Water Usage

Water is limited in availability, especially in drought prone Kern County which is a top producer of agricultural products. In 2021, agriculture accounted for 15% of Kern County's GDP. As indicated by Table 6.2 below, the industry accounts for three out of the top five users of water.

Table 6.2: Water Usage in Kern County

Industry	Total Water Usage (Cubic meters (millions)		Per $ of Output	
	2021	2020	2021	2020
Electric Power Generation (Wind)	1,014	981	1.422	1.422
Tree Nut Farming	1,004	1,046	0.538	0.538
Electric Power Generation (Fossil)	646	1,218	1.422	1.422
Fruit Farming	632	580	0.538	0.538
Vegetable and Melon Farming	430	390	0.715	0.715

Source: IMPLAN, Environmental Protection Agency and the Federal Reserve Bank of St. Louis (FRED)

Table 6.2 presents the water usage (in millions of cubic meters) by industry during the COVID-19 period (2020 and 2021). It also presents the amount of water used per dollar of output from that particular industry. Of the top five users of water the electricity generation industry used the most water (1.422 cubic meters per dollar output). The agriculture industry dominates the list,

with three out of the top five users of water. Nonetheless, the agriculture industry in Kern County has consistently improved the efficiency of its water use (though fruit, vegetable, and melon farming increased total water use during the COVID-19 pandemic). The Sustainable Groundwater Management Act (SGMA) forced the industry to develop plans to manage the groundwater. In normal years, groundwater accounts for 36 percent of the water source in Kern County, much of it used for agriculture (Water Association of Kern County 2023). While the energy generation industry is not yet sustainable in its water usage, the agriculture industry has made vast strides in becoming sustainable users of water.

C. Pollutants

Air quality is another relevant indicator of sustainable actions. It is typically measured by the concentration levels of various air pollutants. The National Ambient Air Quality Standards (NAAQS) is set by the EPA, as required by the Clean Air Act. The six pollutants are: (1) Ozone; (2) Particulate Matter; (3) Carbon Monoxide; (4) Lead; (5) Sulfur Dioxide; and (6) Nitrogen Dioxide. Table 6.3 lists the sum of these pollutants, measured in millions of kilograms, generated by the top five polluting sectors – (1) Truck transportation; (2) Electric power generation (fossil fuel); (3) Oil and gas extraction; (4) Electric power generation (wind); and (5) Tree nut farming.

Table 6.3: Pollutants in Kern County

Industry	Criteria Pollutants (Kilograms – millions)		Per $ of Output	
	2021	2020	2021	2020
Truck transportation	44.76	34.92	0.0283	0.0284
Electric power generation – Fossil fuel	11.76	24.15	0.0258	0.0259
Oil and gas extraction	51.30	20.10	0.0137	0.0137
Electric power generation – Wind	18.46	17.83	0.0258	0.0259
Tree nut farming	13.34	13.83	0.0071	0.0071

Source: IMPLAN, Environmental Protection Agency and the Federal Reserve Bank of St. Louis (FRED)

Table 6.3 lists the pollutant as a value per dollar of output by each respective industry. As can be seen truck transportation is the most polluting sector, both in aggregate and on a per dollar of output basis. Some of the pollutants generated by the truck transport industry reflects Kern County being a hub for transportation, as well as a thoroughfare for goods moving between Southern to Northern California. Also, both the agriculture industry (represented here by tree nut farming) and the oil industry rely heavily on exporting their respective commodities out of the region via truck transportation.

Pesticide emissions: The agriculture industry relies on pesticides to prevent damage to crops from various pests. Table 6.4 lists the top five top pesticide users in agriculture – (1) Tree

nut farming; (2) Vegetable and melon farming; (3) Fruit farming; (4) All other crop farming; and (5) Cotton farming.

Table 6.4: Pesticide Emissions in Kern County

Industry	Pesticide Emissions (Kilograms - thousands)		Per $ of Output	
	2021	2020	2021	2020
Tree nut farming	875.1	412.1	0.004	0.0002
Vegetable and Melon Farming	647.4	448.1	0.001	0.0008
Fruit Farming	550.8	228.7	0.0004	0.0002
All other crop farming	25.9	11.3	0.0003	0,0001
Cotton farming	11.5	5.6	0.0003	0.0001

Source: IMPLAN, Environmental Protection Agency and the Federal Reserve Bank of St. Louis (FRED)

Tree nut farming makes up the largest portion of Kern County's $8 billion agriculture industry. Table 6.4 lists the amount of pesticide emissions (kilograms) per dollar of output for each specific sector of agriculture. While tree nut farming and vegetable and melon farming are the largest producers of pesticide emissions in the aggregate, they are no worse than the other three sectors with regards to the emissions based on a per dollar of output. These values are comparable to the same values found in Fresno County, whose agriculture sector is roughly the same size as Kern County, suggesting Kern is no less efficient in agriculture.

Toxic Emissions: Toxic pollutants such as hydrogen chloride, benzene, mercury, and cadmium can be released into the environment through the air, water, or groundwater. Also known as hazardous pollutants, these are localized to specific region where they are generated. At even low levels, the toxic emissions can be very dangerous, even deadly, to human health. As seen in Table 6.5, the top five contributors to toxic emissions in Kern County are various types of electricity generators and petroleum refineries. Sufficient data is not available for petroleum refineries for the year 2020. These toxic emissions, especially on the basis of per dollar of output, are considerably higher in Kern County compared to rest of the country.

Table 6.5: Toxic Emissions in Kern County

Industry	Toxic Emissions (Kilograms - thousands)		Per $ of Output	
	2021	2020	2021	2020
Electric power generation - Wind	98.89	94.96	0.0001	0.0001
Electric power generation - Fossil fuel	62.99	117.93	0.0001	0.0001
Electric power generation - Solar	27.68	30.003	0.0001	0.0001
Electric power transmission and distribution	27.38	23.51	0.0001	0.0001
Petroleum refineries	25.92	---	0	---

Source: IMPLAN, Environmental Protection Agency and the Federal Reserve Bank of St. Louis (FRED)

Nitrogen and Phosphorus releases: Another side effect of the large agriculture industry in Kern County is the release of Nitrogen and Phosphorous (NP) into water. The five largest contributors to these are: (1) Water, sewage and other systems; (2) Vegetable and melon farming; (3) All other crop farming; (4) Grain farming; and (5) Dairy cattle and milk production. Approximately 9 percent of Kern County's $8 billion dollar agriculture industry was made up of dairy cattle and milk production. Nitrogen and phosphorous are essential nutrients for plant growth. However, too much of it concentrated in the water leads to poor water quality. Wastewater contains nitrogen and phosphorus from human waste, food, and certain soaps and detergents (EPA). Wastewater treatment plants are generally able to clean wastewater so the amount of nitrogen and phosphorus released into the water system is minimal. However, not all such plants are able to limit NP releases. Table 6.6 shows that wastewater treatment plants are the largest contributors to lowered water quality, both at the aggregate level and on a per dollar output level.

Table 6.6: NP Releases in Kern County

Industry	NP Releases (Kilograms – thousands)		Per $ of Output	
	2021	2020	2021	2020
Water, sewage, and other systems	52,611	35,189	0.1684	0.1684
Vegetable and melon farming	4, 060	2,774	0.0051	0.0051
All other crop farming	271	248	0.0033	0.0033
Grain farming	199	166	0.0199	0.0199
Dairy cattle and milk production	130	129	0.0003	0.0003

Source: IMPLAN, Environmental Protection Agency and the Federal Reserve Bank of St. Louis (FRED)

6.3 Conclusion

This chapter considered various proxies to measure environmental impact of industries in Kern County during the COVID-19 pandemic. In all the metrics considered, Kern County lags in its sustainability efforts. The industries that need to make more efforts to become sustainable, as defined by their practices and emissions, are (1) Electricity power generation (fossil fuel); (2) Cement manufacturing; (3) Truck transportation; (4) Electric power transmission and distribution; and (5) Petroleum refineries. Regarding water usage, pesticide emissions, as well as nitrogen and phosphorus releases, the agriculture industry has to do more in its efforts to be sustainable. In order to truly compare across industries, this section conducted analysis on the basis of the value of output, specifically a measure per dollar of output. Based on this analysis, the energy industry, another large part of Kern County's economy, also needs to increase its efforts to become more sustainable.

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Chapter 7: The Impact of Economic Policy Uncertainty During the COVID-19 Pandemic on Employment Across Major Industries: The Case of California and Kern County

Najmeh Kamyabi[7]

Abstract

This chapter investigates the impact of Economic Policy Uncertainty (EPU) during the COVID-19 pandemic and the impact of EPU on the number of employees or hiring across industries in California and Kern County. The results show that EPU positively impacted most industries in California. However, the magnitude of the impact is different across industries. In contrast, the effect of EPU is negative for most industries in Kern County.

7.1 Introduction

Economic Policy Uncertainty (EPU) refers to unpredictable changes in which the government, a central bank, and/or policymakers are uncertain about the adoption of policies, both current and future, and therefore fail to clarify the economic consequences for the public. When policy uncertainty increases, firms and investors will become more risk-averse and decide to postpone costly investments, thereby slowing down economic activities and lowering employment and hiring (Bernanke, 1983; McDonald and Siegel, 1986).

The COVID-19 pandemic dramatically increased EPU globally. During the COVID-19 pandemic, policymakers had to make fiscal and monetary policy decisions with little information about the future. The uncertainty about the policies during the pandemic peaked the economic uncertainty index at the highest level ever. Figure 7.1 displays the economic policy uncertainty index at the national level. As can be seen in Figure 7.1, the EPU index traditionally increases during presidential elections, wars, terrorist attacks, and recessions; all of these pale in comparison to the EPU created by COVID-19.

Additional EPU was caused during the COVID-19 pandemic by the considerable variation in both the types and timing of social distancing policies put into place at the state level in the U.S.. Becker et al. (2022) found that states with stricter lockdown policies during the pandemic experienced higher EPU.

Figure 7.2 represents California's EPU Index. It can be seen from the graph that the EPU Index in California mirrors the EPU Index of the U.S.. However, we see that state-specific events that may be muted at the national level show in state-specific EPU Indices. One of the main factors that affected the EPU of California is the electricity supply crisis in 2000 to 2001, which caused an increase in wholesale prices and created a financial crisis for California; following that, the spike of 2003 was generated by the successful recall of California Governor Gray Davis. However, just like the U.S., COVID-19 led to the highest level of EPU in California in several decades.

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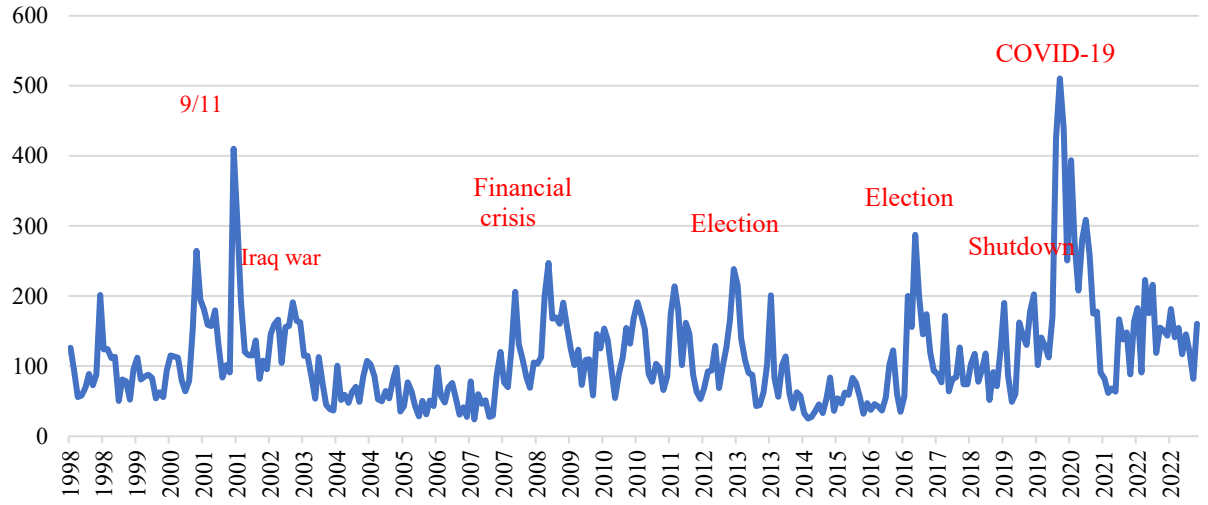
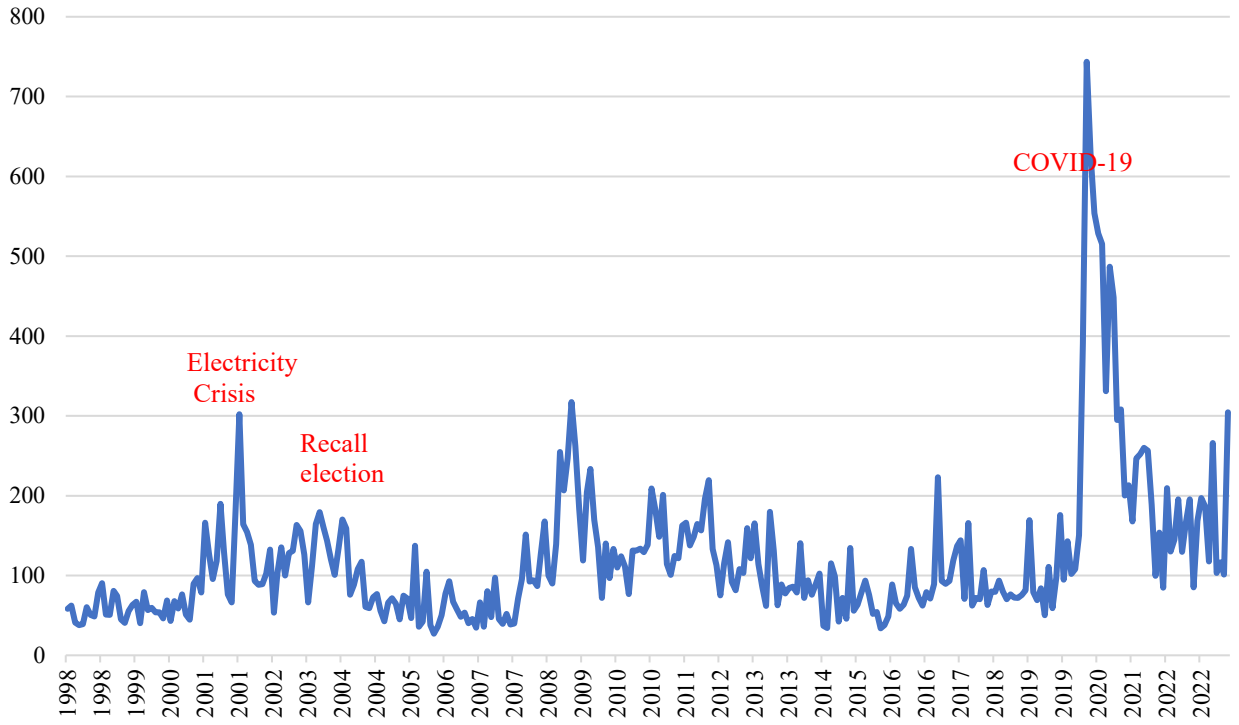
Figure 7.1. Economic Policy Uncertainty (EPU) Index for United States. Jan 1998-May 2023



Source: Economic Policy Uncertainty Index (2023). Available at < https://www.policyuncertainty.com>

Figure 7.2. Economic Policy Uncertainty (EPU) Index for California. Jan 1998-May 2023



Source: Economic Policy Uncertainty Index (2023). Available at < https://www.policyuncertainty.com>

There are many studies that investigate the impact of EPU on different components of the economy. Bernanke (1983) examines a firm's investment behavior during high levels of policy uncertainty before an election. The election winner can affect investment-related policies, including trade policies, minimum wage laws, environmental regulations, work visa policies, and taxes, among other things. Bernanke (1983) concludes that the firm will delay irreversible investments, especially if the election outcome is uncertain.

Bloom (2009, 2014), and Caggiano, G., Castelnuovo, and Figueres (2017) found that high EPU causes the postponement of many financial decisions by firms, corporations, and individuals. They conclude that high uncertainty forces investors, firms, and individuals to be more conservative, dampening economic growth and leading to higher levels of unemployment. According to Giglio et al. (2016), the effect of EPU is more substantial during recessions, as households are more willing to postpone investments because of decreased disposable income.

This research attempts to estimate the impact of EPU during the COVID-19 pandemic on employment across major industries in California and Kern County using monthly data from January 2017 to May 2023.

The findings of this study show that most of the industries at the state level have been positively impacted by EPU, though the magnitude of the impact is different across industries. In contrast, the effect of EPU in Kern County is negative for most industries.

7.2 Data and Analysis

The data consist of monthly data of the EPU Index, GDP, and the number of employees for 16 major industries, including 1: Farming, 2: Mining, and Logging (ML), 3: Construction, 4: Wholesale trade, 5: Retail trade, 6: Transportation, Warehousing and Utilities (TWU), 7: Information, 8: Art, Entertainment, and Recreation (AER), 9: Accommodation, and Food services (AFS), 10: Manufacturing, 11: Government, 12: Finance and Insurance (FI), 13: Real Estate, Rental and Leasing (RERL), 14: Professional and Business Services (PBS), 15: Private Educational Services (PES), and 16: Health Care and Social Assistance (HCAS).

The data on employment was obtained from the Employment Development Department, State of California. The EPU index is the combination of the EPU at the national level and California ($EPU_{Composite}$), which is publicly available.

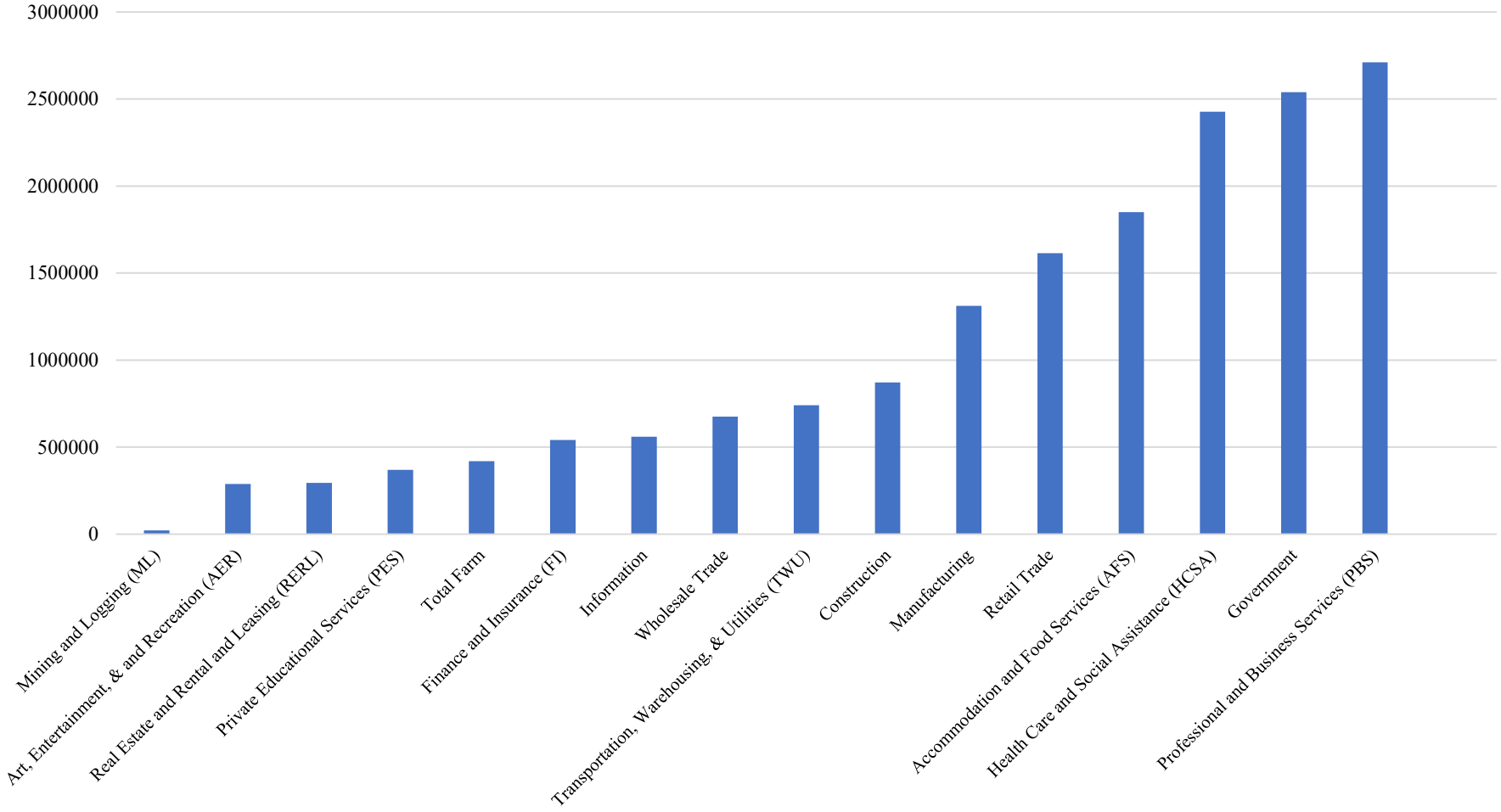
Figures 7.3 and 7.4 represent the average number of employees in the 16 different industry sectors California and Kern County outlined earlier, respectively. Table 1 and Table 2 provide more details on the descriptive statistics for the number of employees for the 16 industry sectors in California and Kern County, respectively.

To estimate the potential impact of EPU on the number of employees across industries, we performed the analysis in Equation 1.

$$\ln(\text{number of employees})_{it} = \beta_0 + \beta_1 \ln EPU_{t-1} + \beta_2 \ln GDP_{t-1} + \beta_3 COVID19 + \varepsilon_t \qquad (1)$$

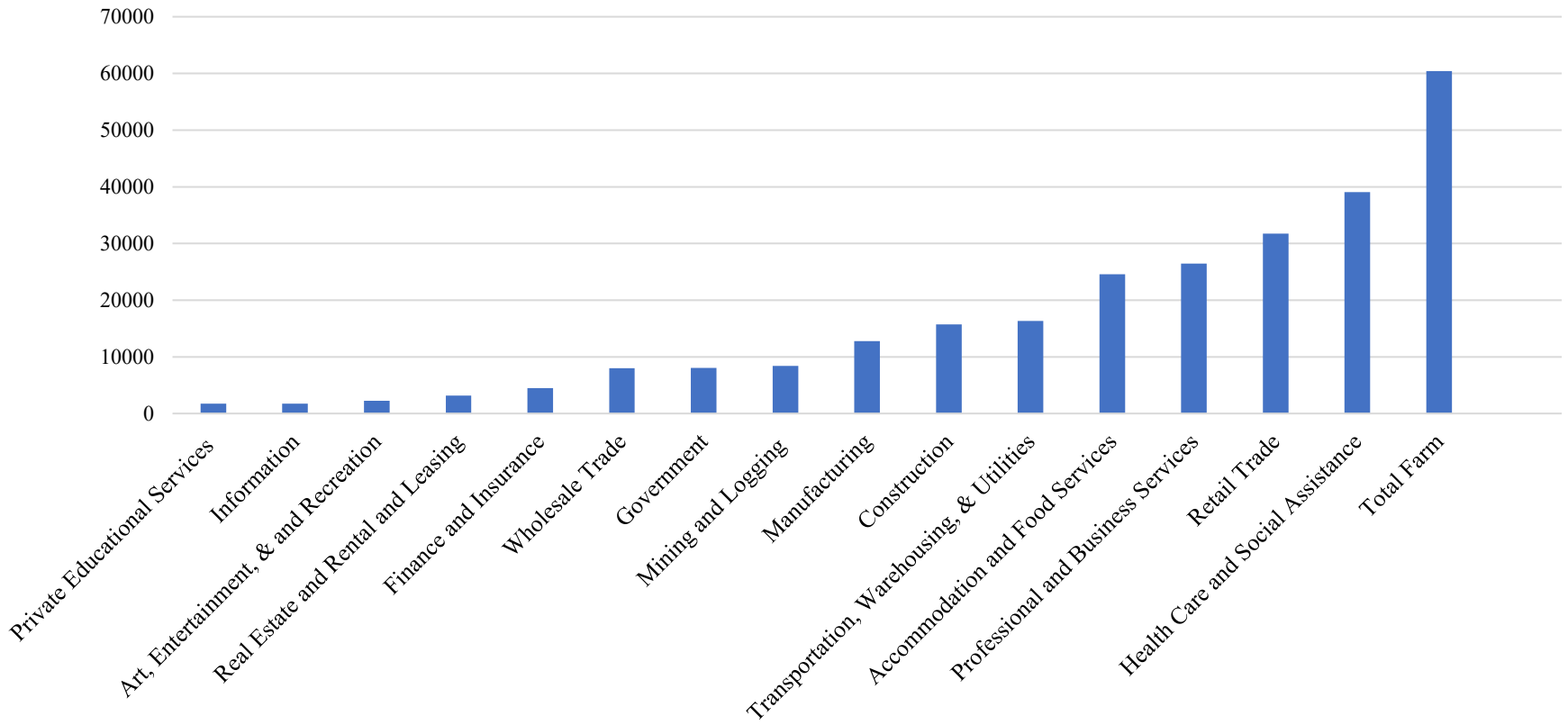
where the dependent variable is the number of employees in industry *i*. We also include variables for GDP, EPU, and the months that we were formally in the COVID-19 pandemic.

Figure 7.3. The average number of employees-California (Jan 2017-May 2023)



Source: California Employment Development Department (2023)

Figure 7.4. The average number of employees-Kern County (Jan 2017-May 2023)



Source: California Employment Development Department (2023)

Table 7.1: Descriptive statistics, Employment by Industry, California

Variable	Mean	Std. Dev.	Min	Max
Total Farm	418903.9	10900.74	366100	437400
Mining and Logging (ML)	21033.77	1562.27	18900	23000
Construction	871696.1	38285.01	741900	920400
Wholesale Trade	675632.5	24844.92	612900	702200
Retail Trade	1615039	67553.55	1320300	1676300
Transportation, Warehousing, & Utilities (TWU)	740813	80106.63	618600	870800
Information	560227.3	31378.46	502600	620100
Art, Entertainment, & and Recreation (AER)	288418.2	57701.91	137900	344100
Accommodation and Food Services (AFS)	1850638	255617.5	1062000	1718000
Manufacturing	1311868	31187.81	1207400	1347900
Government	2539292	57112.85	2418900	2622500
Finance and Insurance (FI)	540850.6	4562.22	531400	548700
Real Estate and Rental and Leasing (RERL)	294440.3	11601.91	268000	312600
Professional and Business Services (PBS)	2710623	116440.1	2466600	2914500
Private Educational Services (PES)	369754.5	18980.5	328700	404500
Health Care and Social Assistance (HCSA)	2426557	107538.2	2243800	2680200

Table 7.2. Descriptive statistics, Employment by Industry, Kern County

Variable	Mean	Std. Dev.	Min	Max
Total Farm	60412.99	9010.803	38800	76600
Mining and Logging (ML)	8414.286	870.5283	6900	9600
Construction	15725.97	625.4267	14300	16800
Wholesale Trade	7976.623	303.4434	7300	8600
Retail Trade	31762.34	1294.628	26400	34500
Transportation, Warehousing, & Utilities (TWU)	16319.48	4184.371	10600	23100
Information	1764.935	233.2642	1400	2100
Art, Entertainment, & and Recreation (AER)	2264.935	465.3143	900	2800
Accommodation and Food Services (AFS)	24559.74	2248.231	16800	28900
Manufacturing	12753.25	483.84	11900	13900
Government	8067.532	613.5405	6600	9200
Finance and Insurance (FI)	4472.727	216.2092	4000	4800
Real Estate and Rental and Leasing (RERL)	3185.714	133.4899	3000	3400
Professional and Business Services (PBS)	26457.14	1131.653	24800	28700
Private Educational Services (PES)	1740.26	217.1949	1300	2100
Health Care and Social Assistance (HCSA)	39081.82	2950.768	33900	45200

7.3 Results

A. California Results

Table 7.3 presents results for California using the regression in equation (1). The coefficient for GDP is positive, suggesting that economic growth leads to higher employment. We observe different magnitudes with respect to the impact of GDP on the number of employees across industries, with the most considerable effects in AER and AFS. For instance, a 10 percent increase in GDP leads to a 6.4 increase in the number of employees in AER. The same increase in GDP leads to employment changes of 4.2 percent in AFS, 2 percent in information and TWU, but only 1.5 percent in PES, 1.4 percent in RERL, 1.2 percent in construction, 1.1 percent in HCSA, and less than 1 percent in other industries.

The EPU Index had an unexpected and surprising impact across industries. Our finding shows that increases in EPU lead to employment increases in construction (0.026), TWU (0.118),

information (0.059), PBS (0.035), PES (0.021), and HCSA (0.046) industries. One possible explanation could be that some industries become more innovative when EPU increases, which promotes competition and productivity (Correa, Ornaghi 2014). In contrast, we find that EPU reduces employment in the ML, wholesale trade, retail trade, AFS, government, FI, and RERL industries.

Regarding the impact of the COVID-19 pandemic, Table 7.3 indicates that COVID-19 decreased employment in the manufacturing sector, with no changes in employment or increases in employment in all other industries. In the TWU industry, COVID-19 had a sizable positive impact on employment.

Table 7.3: State of California- Results

Dependent variable: Number of employees	Constant	Ln GDP	Ln EPU	COVID-19	R^2
Ln Total Farm	13.0038***	0.0407***	0.0022	0.0385**	0.5251
Ln Mining and Logging (ML)	10.2819***	0.0195	-0.0525*	-0.0422	0.4384
Ln Construction	13.7305***	0.1219***	.0269**	0.0407***	0.5349
Ln Wholesale Trade	13.6349***	0.0658***	-0.0332***	0.0305	0.7780
Ln Retail Trade	14.5855***	0.1018***	-0.1245***	0.0260**	0.8488
Ln Transportation, Warehousing, & Utilities (TWU)	13.1918***	0.2021**	0.1187*	0.0676*	0.2305
Ln Information	13.2338***	0.2020***	0.0598***	0.0476**	0.6131
Ln Art, Entertainment, & and Recreation (AER)	13.6007***	0.6437***	0.0019	0.0113	0.9114
Ln Accommodation and Food Services (AFS)	15.0273***	0.4222***	-0.0271*	0.0606**	0.9332
Ln Manufacturing	14.1773***	0.0714***	0.0051	-0.0426*	0.8635
Ln Government	14.8911***	0.0568***	-0.0297*	0.0262***	0.7234
Ln Finance and Insurance (FI)	13.2411***	.0088	-0.0530*	0.0045	0.4036
Ln Real Estate and Rental and Leasing (RERL)	12.8264***	0.0773***	-0.0160*	0.0242	0.8447
Ln Professional and Business Services (PBS)	14.8405***	0.1342***	0.0355***	0.0220*	0.6204
Ln Private Educational Services (PES)	12.9658***	0.1572***	0.0213*	0.0060	0.8333
Ln Health Care and Social Assistance (HCSA)	14.6392***	0.1179***	0.0466*	0.0308*	0.3593

B. Kern County Results

The estimation results for Kern County are reported in Table 7.4. As expected, economic growth broadly increases employment at the industry level in Kern County. However, like our results from California in Table 7.3, we observe different magnitudes with respect to the impact of GDP on the number of employees across industries, with the biggest impacts on the TWU and Farm sectors. For example, a 10 percent increase in GDP leads to a 7 increase in the number of employees in TWU, while employment increases by 5 percent in the farm sector.

With respect to the impact of EPU on employment at the industry level in Kern County, we observe a negative impact of EPU on employment in most of the industries, with the highest value in AER (-0.18) and information (-0.14) followed by ML (-0.09), FI (-0.059), retail trade (-0.052), AFS (-0.050), manufacturing (-0.026), RERL (-0.021), and wholesale trade (-0.019). However,

EPU did increase employment in a small subset of few industries, which were TWU (0.195), HCSA (0.070), and PBS (0.019).

Table 7.4: Kern County- Results

Dependent variable (number of employees)	Constant	Ln GDP	Ln EPU	COVID-19	R^2
Ln Total Farm	11.4260***	0.5083***	0.1097	0.1387*	0.3271
Ln Mining and Logging (ML)	9.3945***	0.0890	-0.0943**	-0.0991*	0.3138
Ln Construction	9.8680***	0.1069***	0.0069	-0.0066	0.6276
Ln Wholesale Trade	9.1680***	0.0313*	-0.0194**	0.0381***	0.7732
Ln Retail Trade	10.7051***	0.1486***	-0.0521*	0.0289*	0.5070
Ln Transportation, Warehousing, & Utilities (TWU)	10.1063***	0.7012***	0.1954**	0.1294*	0.3431
Ln Information	8.1104***	0.0828	-0.1463***	-0.1000**	0.6453
Ln Art, Entertainment, & and Recreation (AER)	9.5895***	0.3941***	-0.1812***	-0.1388*	0.7292
Ln Accommodation and Food Services (AFS)	10.9673***	0.2535***	-0.0506*	-0.0129	0.6877
Ln Manufacturing	9.5940***	0.0036	-0.0264***	-0.0303***	0.6078
Ln Government	9.4437***	0.2465***	0.0179	-0.0204	0.6499
Ln Finance and Insurance (FI)	8.5034***	0.1176***	-0.0586***	0.0169	0.3579
Ln Real Estate and Rental and Leasing (RERL)	8.2553***	0.1403***	-0.0214**	-0.0144	0.5047
Ln Professional and Business Services (PBS)	10.3522***	0.1236***	0.0193*	0.0027	0.4368
Ln Private Educational Services (PES)	8.2556***	0.3813***	0.0077	0.0293	0.5384
Ln Health Care and Social Assistance (HCSA)	10.5552***	0.1641***	0.0703***	0.0124*	0.3170

7.4 Conclusion

This chapter estimates the impact of EPU on the number of employees across industries in California and Kern County using monthly data from January 2017 to May 2023. The findings indicate that most of the industries in California have seen increases in employment due to higher levels of EPU. However, the magnitude of the impact is different across industries. In contrast, the higher levels of EPU reduce employment for most industries in Kern County. Possible explanations for the increases in employment due to higher levels of EPU in California could be a competition, innovation, and/or R&D response from higher levels of EPU. Given the more substantial negative effect on industries at the county and local level, this suggests local businesses may suffer more during periods of high economic policy uncertainty; similarly, counties may have fewer industries to support them, so the detrimental impacts of EPU may be larger.

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Chapter 8: Resilience and Industry in a post-COVID World

S. Aaron Hegde[8]

Abstract

Several industries were affected by the pandemic, but few excelled. In this chapter, we provide an overview of the sectors of the economy that continue to thrive post-pandemic period. Of the ten major industries in Kern, three thrived during the pandemic – *tree nut farming, truck transportation,* and *limited-service restaurants*.

8.1 Introduction

The world economy came to a stop in March of 2020 due to the spread of the novel COVID-19 virus. Most countries shut down immediately, with commerce coming to a grinding halt, with many localities and states issuing stay-at-home orders, in which businesses were required to shut down their operations. This order was issued in California on March 19, 2020. In the U.S., a few industries were identified as being essential and allowed to operate, albeit with major precautions. In California, essential sectors included food and agriculture, healthcare/public health, law enforcement and public safety, energy, transportation and logistics, (Luna, 2020). While 'non-essential' industries and businesses were required to be locked down, the essential businesses could continue to operate. Upon the development of vaccines, and once a certain threshold of immunizations within the population was reached, the stay-at-home order was lifted on June 15, 2021. The regional and national economic output during these fifteen months of lockdown decreased dramatically. Table 8.1 displays the economic output of the top ten industries in Kern County over a five-year period between 2016 and 2021. All industries were on an upward trend with regards to their economic output until 2019, when there was a slight decrease in output industries, such as the oil and gas industry, and sectors within the agricultural industry.

Table 8.1: Economic Output Kern County (2016-2021)

Annual Total Economic Output by Industry- Kern County ($ Billions)							
Industry	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Change '19-'20**
Petroleum Refineries	5.114	5.069	5.277	4.221	2.496	4.419	-41%
Oil & Gas extraction	2.002	2.379	3.650	2.935	1.470	3.736	-50%
Support activities for ag & forestry	1.851	1.921	1.885	2.194	1.787	2.043	-19%
Tree nut farming	**1.621**	**1.518**	**1.829**	**1.699**	**1.943**	**1.865**	**+14%**
Other real estate	1.494	1.591	1.789	1.702	1.641	1.700	-4%
Hospitals	1.379	1.473	1.528	1.594	1.592	1.640	-0.2%
Truck transportation	**0.955**	**1.026**	**1.113**	**1.146**	**1.231**	**1.577**	**+7%**
Limited-service restaurants	**0.927**	**0.981**	**1.031**	**1.130**	**1.228**	**1.576**	**+9%**
Wholesale petroleum & petroleum products	1.078	1.087	1.109	1.214	1.096	1.310	-10%
Fruit farming	1.115	1.065	1.375	1.126	1.078	1.174	-4%

Source: IMPLAN

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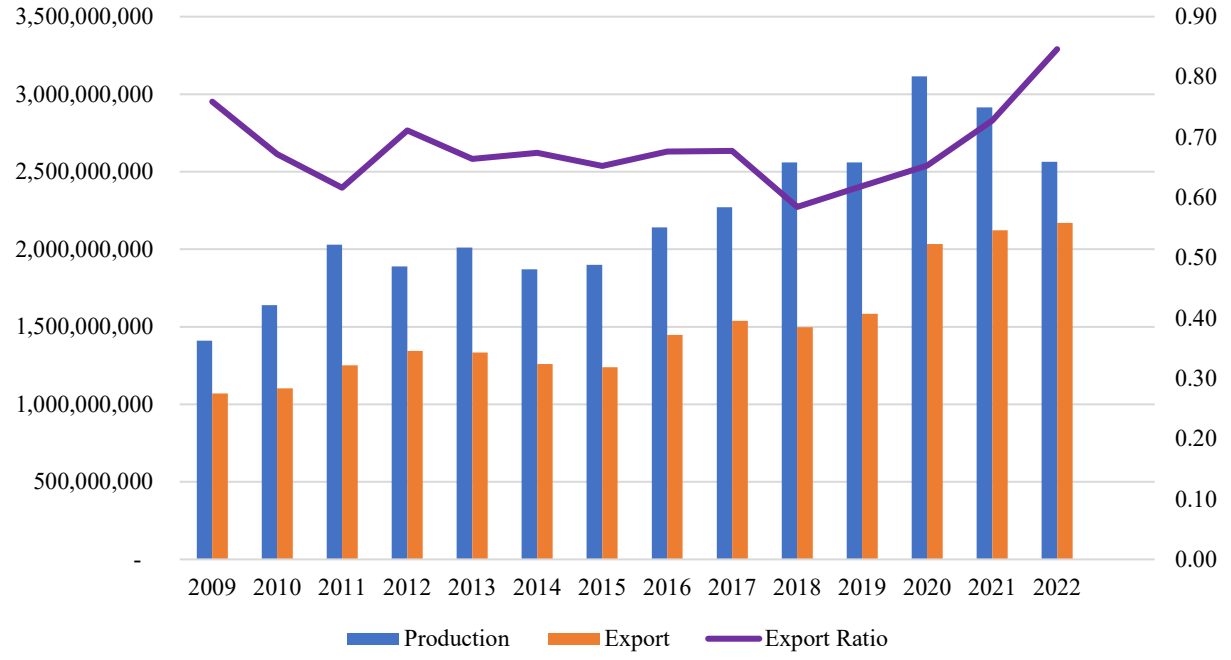
Every industry, except for *Tree Nut Farming, Truck Transportation, and Limited-Service Restaurants*, saw a decline in economic output in 2020, or during the peak of the pandemic. The petroleum industry especially saw drastic decreases of GDP by 40 to 50 percent. Since transportation activities declined, demand for gasoline decreased by 14 percent compared to 2019 - a twenty-five year low for gasoline consumption in the US (EIA, 2021). Even though energy was an exempt sector, U.S. production of petroleum fell by 8 percent, mostly due to lower oil prices (EIA, 2021). The next section will provide an overview of what transpired in the agricultural industry during the pandemic years.

8.2 Agricultural Production

Being one of the exempt industries, agricultural production in Kern County continued to operate as it did prior to the pandemic. In this section, we focus on one particular aspect of the *Tree Nut Industry* - the almond industry. In a typical year, almonds are one of the top three crops produced in Kern County. The value of almond production was as follows for the years 2019 through 2021: (1) $1.643 B – 2019; (2) $1.144 B – 2020; and (3) $1.185 B – 2021. This suggests that there was no discernable decrease due to COVID in the value of the almond crop. The same can be said about the amount of almonds produced during those years. Figure 8.1 shows the amount of almonds produced in California between 2009 and 2022. The left axis represents almond production and exports in pounds (lbs). The right axis measures the fraction of almonds that are exported.

Figure 8.1: Almond Production and Export (lbs), 2009 – 2022



Source: USITC and ERS, USDA

Approximately two-thirds of the almonds produced in the US are exported, though this figure is higher in Kern County. Hence, the export market and the transportation sector are critical to the almond industry. Table 2 displays almond production in Kern County for the years 2016

through 2021, where Kern County is usually responsible for about a third of total California almond production. While California had record production in 2020, Kern County's output that year was lower than the in 2019, which was a record year.

Table 8.2: Almond Production and Prices – Kern County

Year	2016	2017	2018	2019	2020	2021
Millions lbs	518	528	512	590	566	520
Average P (per lb)	$2.46	$2.34	$2.35	$2.71	$1.95	$2.18

Source: Author's Calculation from ERS, USDA data

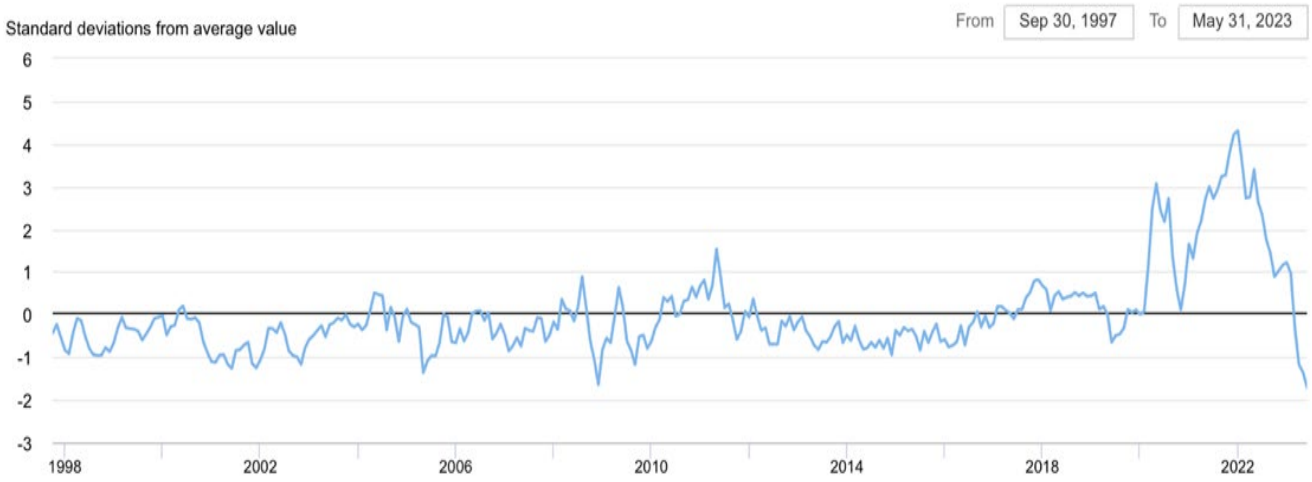
The pandemic did not have any discernable impact on almond industry production in Kern County, undoubtedly helped by the exempt status for agriculture. From Figure 8.1, it also seems that there were no issues with the export of almonds during the pandemic. However, when the data is disaggregated, which is done later in this report, one can notice the impact of the pandemic on the almond industry in Kern County.

8.3 Transportation Bottlenecks

The pandemic severely disrupted trade in the international agriculture sector. A study by Carter et al. (2021) estimated that supply-chain logjams, especially at California ports, led to a loss of approximately $2.1B in export between May and September of 2021. The study also found that the three California ports – Long Beach, Los Angeles, and Oakland – were among the least efficient in the world. It also estimated that 8 out of 10 shipping containers returned empty to Asia, rather than carrying agricultural exports. This was mainly due to the long waits at California's ports. Due to COVID labor shortages at the ports, it took longer to unload ships, resulting in longer wait times and more ships anchoring in port waters. The number of ships waiting peaked in early 2022 at 109, from a pre-pandemic average of 2 or 3 (Miller, 2022). There was also a shortage of shipping containers, which increased the cost of shipping from $4,000 per twenty-foot equivalent unit (TEU) to $12,000 per TEU. For Kern County farmers, this problem was exacerbated by continuing issues with the *Truck Transportation* industry. Prior to the pandemic, the trucking industry, an integral part of the supply-chain, had an increasingly aging workforce. As the pandemic spread, many drivers had to be out sick, reducing the number of trucks available to transfer commodities between ports and destination points within the country.

Rather than wait for trucks to fill their empty containers with agricultural commodities, the shipping lines chose to return to Asia with empty containers. Given the shortage of shipping containers and the increased demand for them in Asia, due to the increased consumption by home-bound US consumers, the ocean-liners found the speed of returning to Asia more profitable. Every day that a ship was delayed in returning to Asia would cost the freighters more money. Given these challenges with exporting, California farmers needed to turn to domestic exports. American consumers' fruit consumption per capita had trended slightly lower over the last two decades. However, with more households being home-bound, food made and consumed at home (FAH), including fruit consumption, increased. The same issues with the trucking industry kept much of the fruit and nuts from California ending up on shelves across the country. Transportation issues, both within the trucking and shipping industries, led to significant constraints within the supply chain.

Figure 8.2: Global Supply Chain Pressure Index



Source: Bureau of Labor Statistics; Harper Peterson Holding GmbH; Baltic Exchange; IHS Markit; Institute of Supply Management; Haver analytics; Refinitiv; author's calculations

Figure 8.2 displays the Global Supply Chain Pressure Index (GSCI) compiled by the Federal Reserve Bank of NY. The index tracks the state of global supply chains. As can be seen, it is relatively stable until the start of the pandemic. The index started to increase around April of 2020 and peaked around October of 2021. This would impact all aspects of international trade, including agricultural goods.

Table 8.3: Monthly volume of exports and percent change YoY (2019 to 2022) – LA and SF Ports

LA Port Monthly Volume of Almond Exports (lbs)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2019	7,862,194	9,114,645	8,412,874	6,880,085	6,633,548	8,052,815	7,027,545	7,947,166	10,358,989	15,272,102	13,868,953	13,075,178
2020	10,610,292	12,347,619	11,699,583	7,134,208	7,750,276	10,591,516	9,005,641	12,610,790	16,766,559	18,376,108	16,740,707	17,298,139
2021	9,158,710	11,622,539	11,748,837	12,447,287	9,430,926	10,502,490	7,869,958	12,002,826	15,818,881	17,824,557	12,789,371	10,924,047
2022	9,680,881	13,412,468	12,799,026	12,504,380	16,327,420	18,278,215	14,601,790	11,145,595	16,281,157	14,879,630	16,793,648	15,102,748

LA Port Monthly Year over Year percentage change in volume of exports

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2020	35.0%	35.5%	39.1%	3.7%	16.8%	31.5%	28.1%	58.7%	61.9%	20.3%	20.7%	32.3%
2021	-13.7%	-5.9%	0.4%	74.5%	21.7%	-0.8%	-12.6%	-4.8%	-5.7%	-3.0%	-23.6%	-36.8%
2022	5.7%	15.4%	8.9%	0.5%	73.1%	74.0%	85.5%	-7.1%	2.9%	-16.5%	31.3%	38.3%

SF Port Monthly Volume of Almond Exports (lbs)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2019	54,724,031	54,439,283	50,969,520	41,998,054	41,167,743	41,912,570	34,766,829	30,737,455	56,073,551	79,663,615	76,164,801	64,597,581
2020	51,804,273	56,411,347	50,058,409	38,132,082	40,748,526	42,372,438	48,629,313	44,783,895	79,021,412	106,126,528	87,333,872	84,345,800
2021	60,530,670	73,735,876	69,389,554	73,259,691	62,041,877	54,571,247	64,265,344	53,177,696	60,049,583	77,053,573	75,463,571	49,515,686
2022	48,895,943	62,977,500	72,941,904	73,635,385	74,389,205	80,530,234	48,018,085	57,023,993	55,242,045	63,686,466	51,339,614	62,750,940

SF Port Monthly Year over Year percentage change in volume of exports

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2020	-5.3%	3.6%	-1.8%	-9.2%	-1.0%	1.1%	39.9%	45.7%	40.9%	33.2%	14.7%	30.6%
2021	16.8%	30.7%	38.6%	92.1%	52.3%	28.8%	32.2%	18.7%	-24.0%	-27.4%	-13.6%	-41.3%
2022	-19.2%	-14.6%	5.1%	0.5%	19.9%	47.6%	-25.3%	7.2%	-8.0%	-17.3%	-32.0%	26.7%

The impact of this supply chain pressure was seen in almond exports, especially when considered on a monthly basis. As can be seen in Table 8.3, disaggregated monthly export data tells a slightly different story than the aggregated annual export data from Figure 8.1. The months of June through December 2021 at the LA port saw a decline in the volume of almond exports compared to same months in 2020. SF ports saw a similar decline in the volume exported through its port from September 2021 through February 2022. As previously explained, the brunt of the supply chain issues impacted almond exports during the latter part of 2021. It was during this time that the waiting period for ships off the ports was nearing its peak, the cost of shipping containers was also at a peak, as was the Global Supply Chain Pressure Index. Even with these constraints, the *Tree Nut Farming* industry managed to maintain itself (see Table 8.1) and be relatively successful.

8.4 Industry and Resilience

The literature on what makes a company or an industry successful is very expansive. However, the literature on what makes industries successful in a post-COVID world is still nascent. Nauk et al. (2021) argue that business success requires resilience across six dimensions: (1) Financial; (2) Operational; (3) Technological; (4) Organizational; (5) Reputational; and (6) Business-model.

Financial resilience is maintaining sufficient liquidity and capital positions to deal with inconsistent revenue and expenditures. *Operational resilience* requires industries to be able to withstand any disruptions in production and to have supply chains that are sufficiently sustainable to "…maintain operational capacity and the provision of goods and services to customers…" (Nauk et al., 2021). *Technological resilience* requires industries to invest in current information technology that is able to handle rapid changes in production and sales operations. For many industries, this may involve investing in artificial intelligence (AI). Land O' Lakes, an agricultural company, invested in automation and AI to streamline its supply chain such that many systems within the organization were linked to provide efficient movement of goods (Solis, 2021). This led to increasing the company's productivity by 25 percent, at the same time offering real-time information to its producers and retailers (Solis, 2021). Such automation also helps industries better track of their inventory. However, not many industries have been quick to adopt such technology. According to a McKinsey survey of global executives, only 58 percent said that their companies had incorporated AI into at least one process or product (Solis, 2021). *Organizational resilience* arises out of a diverse workforce where everyone is included in the operation and can contribute equally. *Reputational resilience* is ensuring the industry is regularly viewed in a positive light and any threats to that reputation are dealt with immediately. Finally, *business-model resilience* is when industries can pivot as needed to meet consumer demand, competition from other related industries, and any changing regulations. The *Tree Nut Farming* industry had the financial and operational resilience to keep producing during the pandemic. It was helped by regulations that allowed agriculture to be an exempt industry during COVID-19. Over the years the industry has built up reputational and business-model resilience as well. The almond industry is supported by the Almond Board of California which "… supports the almond growing community by developing global market demand for almonds as well as investing in research to help improve [their] farming and processing practices" (ABC, 2022).

Sperry et al. (2022) found that driver shortages is the number one concern in the trucking industry. During the pandemic, as households increased their shopping online, the *truck transportation* industry saw drastic increases in freight volume. However, driver shortages led to

some disruption in the supply chain. In order to prevent future such disruptions, the trucking industry also needs to manage how it moves freight in response to retailers changing views on their inventory. Prior to the pandemic, most retailers had *just-in-time* inventory. Due to supply chain disruptions, many retailers found themselves lacking product and being forced to ration their sales. Emerging from the pandemic, many of the same retailers are considering reverting to the practice of maintaining sufficient inventory again.

Figure 8.3: Food Expenditures by Outlet

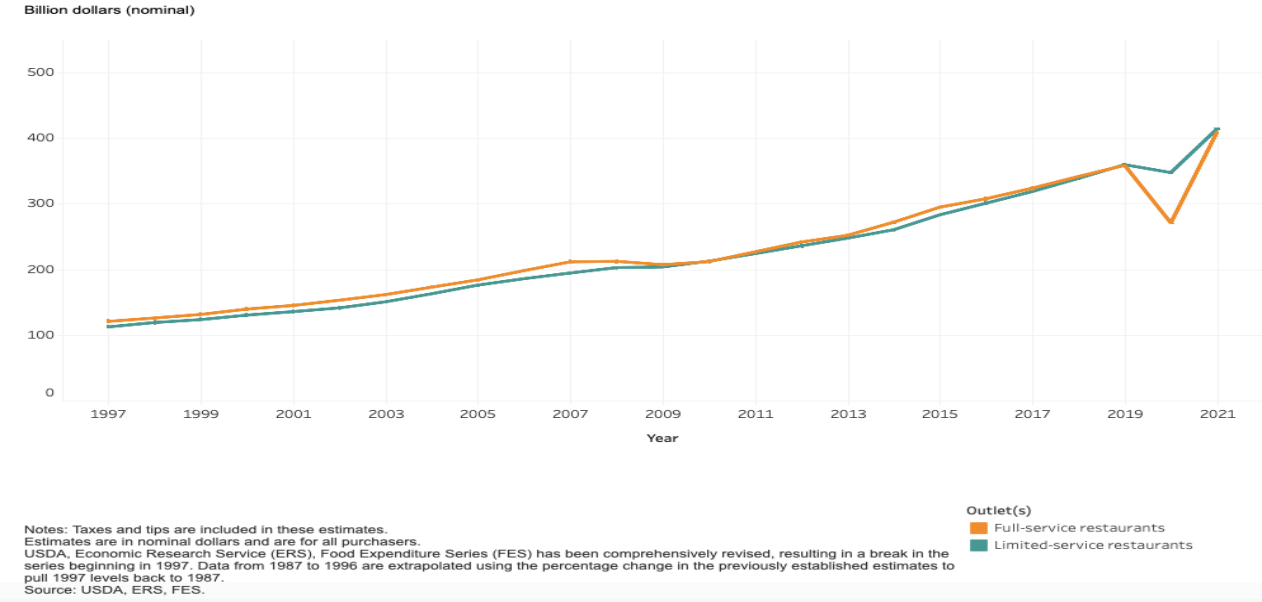


Figure 8.3 shows food expenditures by outlet: full-service restaurants (FSR) versus LSR restaurants. During the peak of the COVID-19 pandemic, FSRs saw a large decline in sales, noticeable by the dip in Figure 8.3. However, LSRs maintained their trajectory, with a minimal loss in revenue. Going forward, this industry can expect to see continuing growth in sales revenue as more of the food dollar is spent on FAFH.

8.5 Conclusion

Of the ten major industries in Kern County, three thrived during the pandemic – *tree nut farming, truck transportation,* and *limited-service restaurants*. For these industries to continue to grow post-COVID, they need to be resilient financially, operationally, and technologically, while being able to meet the demands of their industries, as well as being able to pivot in the face of competition. These three industries in Kern County have shown to be resilient in many of these dimensions as they survived the pandemic and are poised to do the same over the next decade or so. While this analysis considers the industry at an aggregate level, there were many individual businesses from these industries that did not make it through the pandemic, suggesting that a lack of industry struggle does not mean that there was not individual organizational struggle.

Three industries that thrived during the pandemic. *Tree net farming* increased by producing 14-percent more between 2019 and 2020. However, in 2022, post pandemic period, almond production fell, back to near 2019 levels. The long-term viability of this industry will be called into question, however, related to two factors: (i) trade pressures and conflict with countries, such as China, where we ship a disproportionate amount of almonds; and (ii) climate change, where

changes in precipitation and temperature, will impact almond and tree nut production. These long-term challenges suggest that, unless the price of almonds reverts back to pre-pandemic levels or higher, tree nut farming may have significant challenges and hurdles.

Secondly, *truck transportation* grew by 7-percent between 2019 and 2020, and grew by 37-percent between 2019 and 2022. The supply chain bottlenecks produced by the COVID-19 pandemic, especially in Asia with "zero-COVID policies" have opened the door for a renaissance in the truck and transportation sector, which Kern County is poised to take advantage of. As a geographic link between Northern and Southern California, Kern County can take advantage of the reshoring of domestic manufacturing to provide a transportation, warehousing, and resting hub for the world's 5th largest economy. Given the considerable low cost land, the opening of inland ports (such as in Mojave, CA) will provide additional infrastructure and capacity to continue to ship large volumes of goods by road. Presuming similar trends, if Kern County can maintain its comparative advantage in transportation and warehousing, by 2025 this sector would contribute $1.92 billion to Kern County GDP (a 67-percent increase since 2019) and $2.51 billion by 2030 (a 119-percent increase since 2019). This growth would completely offset the loss in GDP from petroleum refineries, as well as create high-skilled jobs in logistics.

Lastly, *limited-service restaurants* (where a customer's interaction with the staff ends when the customer receives their food or beverage) saw 9-percent growth between 2019 and 2020. Given the issues noted in employment in the food service and restaurant sector in Chapter 2, limited-service restaurants, which saw sustained growth in food expenditures during the COVID-19 pandemic, are poised to potentially take advantage of growth in restaurant. This suggests that restaurants that limit the labor cost impact will have a price advantage, relative to full-service restaurants, as well as meet consumer demand for quick, easily obtainable food. Coupled with the growth in food delivery services (DoorDash, UberEats, etc.), limited-service restaurants are poised to continue to grow. In fact, if limited-service restaurants continue to grow and dominate the food market, we could see growth of over 130-percent, by 2030, relative to 2019 numbers. This would increase limited-food service contributions to GDP to over $2.5 billion annually, again nearly negating GDP losses in the oil and gas extraction industry.

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Chapter 9: Post-Pandemic Business Opportunities in Kern County: How Working from Home will Shape the Economy

Rich Ryan[9]

Abstract

The COVID-19 pandemic changed economic activity in the Bakersfield–Kern community. At the start of the pandemic, residents worked from home shopped online. In this chapter, we investigate whether these patterns changed in the post-pandemic period. Using cellphone location data, survey responses, and online job postings, we document a permanent shift towards working from home, both in Kern County and the national economy.

9.1 Introduction

The COVID-19 pandemic changed economic activity in the Bakersfield–Kern community. Understanding what changes are temporary and what are permanent will allow community members to assess future opportunities. Based on data from cellphone locations, survey responses about work, and data from online job postings, a few key patterns stand out:

- Data that track cellphone locations in Kern County suggest that residents are returning to activities like shopping at grocery stores, eating at restaurants, and visiting parks. Bakersfield–Kern residents are leaving their home like they would before the COVID-19 pandemic.
- Unlike these activities, more people are working from home. This change seems permanent. Data suggest that the pattern of working from home will continue.
- People make more and more of their purchases online. If people make 100 retail purchases in 2023, then 15 of them will be made online. The habit of making purchases online is back on trend.
- Patterns in Bakersfield–Kern are broadly consistent with patterns across California and the United States. Between 5 and 10 percent of new job openings in Southern California offer the ability to work remotely at least one day a week.

Where people work and spend their time has implications for business opportunities. For instance, businesses that rely on foot traffic from nearby workers at lunch will have a more difficult time post-pandemic. Zoned office space will be less important than zoned residential space. High-speed, affordable internet may be nearly essential. Given that Bakersfield–Kern is situated in the center of California, it is well positioned to recruit workers who will only travel to work a few days out of the month to places like Los Angeles and San Francisco, especially given the cost of living in these places..

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9.2 Patterns in Kern Mobility

In response to the COVID-19 pandemic, Google provided data on where people go to help public-health researchers interested in the spread of the virus. Given that where a person goes affects the types of goods, services, and structures a person will buy, these data can inform us about where economic activity will take place. For example, traveling to work for many people involves purchasing a coffee on the way and purchasing lunch from a local restaurant. Given social mobility restrictions targeting employment, traveling to work is likely to be most affected by COVID-19.

The mobility data are based on the locations of individuals' cellphones. Individual trips to grocery stores are added up across locations for each day and compared to the median number of daily trips for the baseline 5-week period between January 3, 2020 and February 6, 2020. Google reports the data as the percent away from the baseline on a daily basis. We report data on a weekly frequency by taking weekly averages of daily values.

The broad categories for trips away from home are listed below along with the description provided by Google:

- **Retail and recreation:** Mobility trends for places like restaurants, cafes, shopping centers, theme parks, museums, libraries, and movie theaters.
- **Grocery and pharmacy:** Mobility trends for places like grocery markets, food warehouses, farmers markets, specialty food shops, drug stores, and pharmacies.
- **Parks:** Mobility trends for places like national parks, public beaches, marinas, dog parks, plazas, and public gardens.
- **Transit stations:** Mobility trends for places like public transport hubs such as subway, bus, and train stations.
- **Workplaces:** Mobility trends for places of work.
- **Residential:** Mobility trends for places of residence.

Though Google discontinued access to the data in October 2022, a few patterns are informative. The most striking pattern has to do with trips to workplaces. The upper, left-hand panel of Figure 9.1 reports trips to places of work relative to the 5-week baseline, pre-pandemic period. Workplace trips are highlighted for Kern County, Fresno County, and for the entire US. The series in gray depict data for all other counties in California.

As of the fourth quarter of 2022, workers in Kern and Fresno made far fewer trips to workplaces. If people made 100 trips to work on the eve of the pandemic, by the fourth quarter of 2022 they were making only 80 trips. The correlation between the Kern and Fresno series is .987. The pattern in Kern and Frenso exhibits remarkable correlation with the US average. The correlation between the Kern series in red and the US series in blue is .965.

The correlation suggests that US patterns, which are more reported upon, may be informative about patterns in Kern. Questions about work like those asked by the Bureau of Labor Statistics through the Current Population Survey may be informative for the Bakersfield–Kern area. Questions about telework will be incorporated into the monthly Current Population Survey, which is used to determine the national unemployment rate.

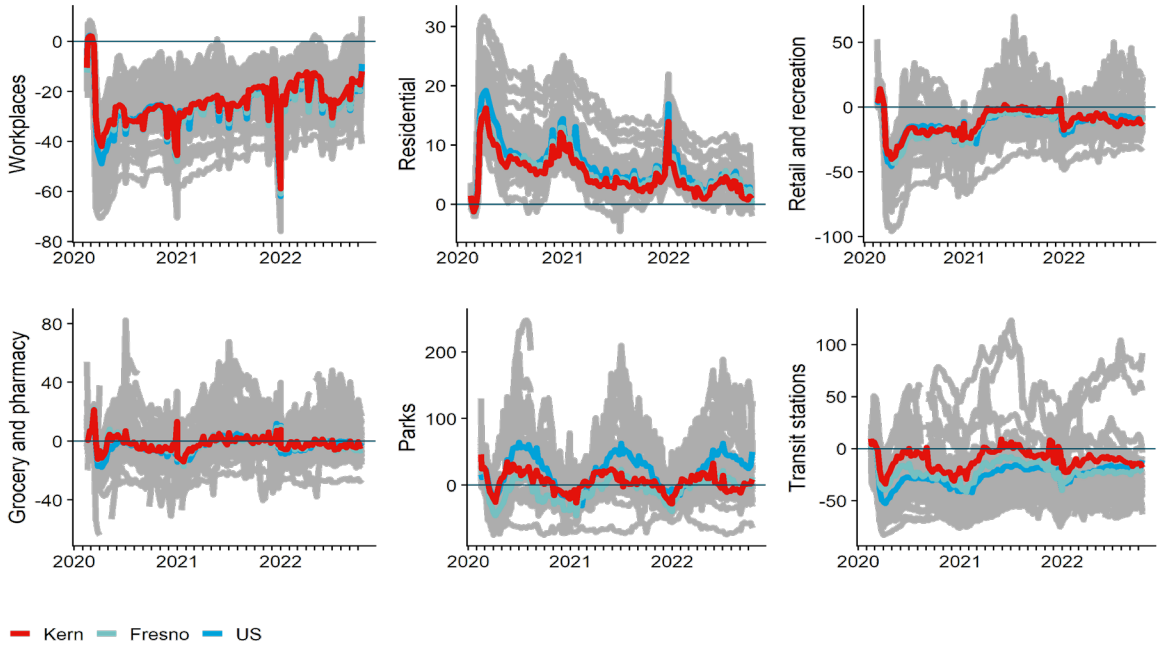
Beyond traveling to work, the Google data report movement elsewhere; the panel below workplace trips reports trips to grocery stores and pharmacies. Outside of the onset of COVID-19, people made regular trips to grocery stores and pharmacies in Kern and Fresno. Given that groceries and medications are items people cannot do without, and given the relative income of these areas, it is likely that individuals chose to make these trips themselves instead of relying on delivery services. As can be seen in the gray lines, some counties did experience reductions in trips

to grocery stores and pharmacies, which could be accomplished by purchasing services from firms like Instacart and DoorDash.

As people and policymakers learned about COVID-19, people spent less time at home. This fact can be seen in the top panel of the second column in Figure 9.1. By the beginning of the fourth quarter of 2022, the data suggest a return to baseline—at least for Kern and Fresno and for the US on average. These patterns fit with our notion of the COVID-19 pandemic. Data on time spent at residence suggest that work patterns have been disrupted to an even greater extent.

Pattens in retail and recreation point towards a return to pre-pandemic trends. The upper-right panel in the third column of Figure 9.1 suggests that the number of weekly trips made in 2021 to retail places geared towards recreation totaled roughly the number of a trips made in the baseline period. Yet, there is a notable decline in 2022 relative to 2021. This could be a feature of the data collection, as Google warns. It could also reflect concerns about the broader economy, where individuals may have felt that they could not spend as much on trips.

Figure 9.1: Google mobility data, weekly, February 15, 2020 through October 15, 2022



Note: Gray lines depict counties in California other than Kern and Fresno.

In summary, data shared by Google on where people took their cellphones suggest that trips to workplaces were most affected by COVID-19. At the beginning of the fourth quarter of 2022, the number of trips people made to workplaces were down over 10 percent. This change could indicate a shift in where work is done, which has implications for businesses that rely on daily commutes. It also has implications for local finances, which may depend heavily on commercial real-estate values.

9.3 Data and Analysis

Data on retail sales and working from home suggest working from home will continue. Data on mobility from Google suggest that patterns in the national data may be informative for

patterns in Kern, given the high correlations between the series shown previously. Two major patterns in the national data may suggest the future of business:

1. People have returned to their pre-pandemic trend of purchasing goods and services online.
2. More people are working from home, a trend that may not return to the pre-pandemic norm.

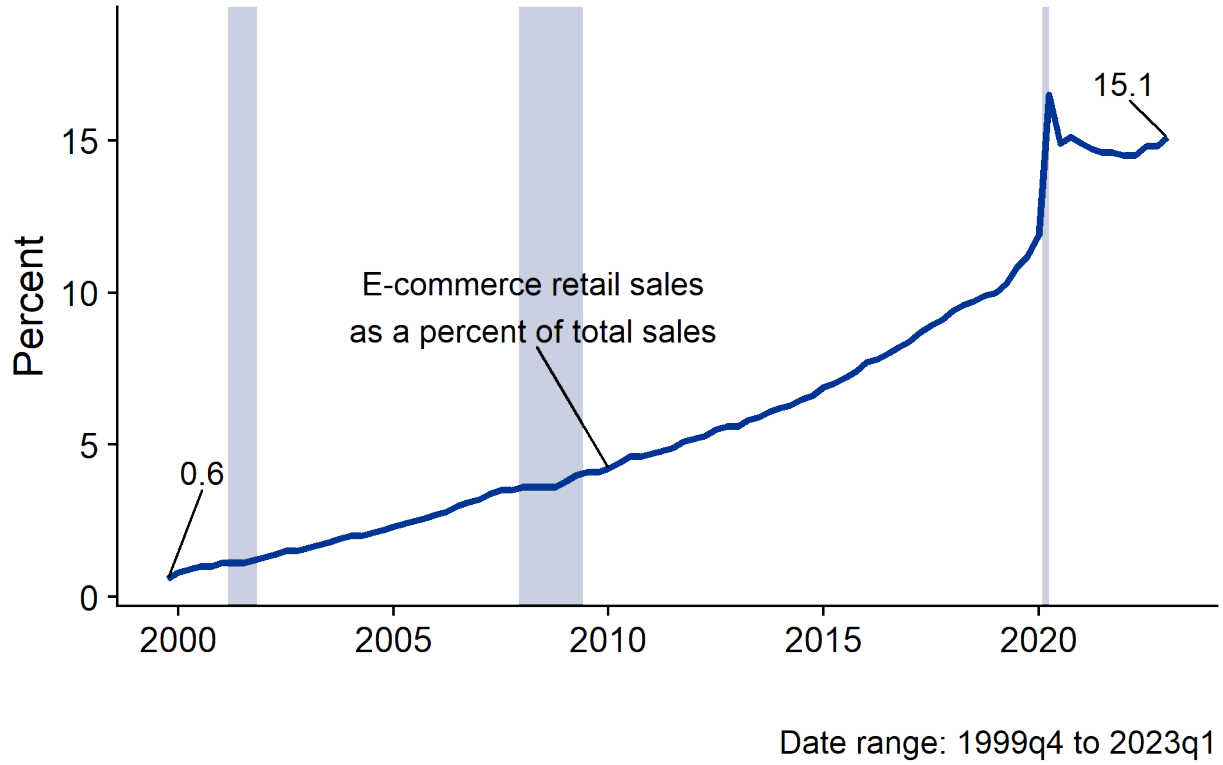
The share of goods and services purchased online has steadily increased. This trend can be seen in Figure 9.2. In the fourth quarter of 1999, less than 1 percent of retail sales were made online. By the first quarter of 2023, more than 15 percent of retail sales were made online. This general rise was drastically altered by the COVID-19 pandemic. When people spent more time at home and made fewer trips to retail establishments during the pandemic, which is visible in Figure 9.1, people made more online purchases, which is visible in Figure 9.2, where these trends begin around the start of the COVID-19 recession dates.

From the first quarter of 2009, the increase in share of retail purchases made online has been growing at a remarkably steady pace. This trend can be seen in Figure 9.3, which plots the log share of retail purchases made online. A linear trend for this period fitted to pre-COVID data tells us that the share had been growing steadily by 2.4 percent per quarter or around 10 percent per year. Put another way, if 10 percent of retail sales were made online one year, then the model predicts that 11 percent will be made online the following year. During COVID-19, there was considerable acceleration in retail purchases made online. Similar to mobility patterns, this increase in the rate in which consumers are making online purchases has slowed as the pandemic era has ended, meaning that online purchases are growing at pre-pandemic rates.

The pattern for online retail sales, however, differs remarkably for the pattern for working from home. Figure 9.4 depicts one measure of the percentage of days worked from home. The first datum in Figure 9.4 reports the percentage of days worked from home, on average, for a respondent in the American Community Survey. As compiled by Barrero, Bloom, and Davis (2021) in the Survey of Working Arrangements and Attitudes, on the eve of the COVID-19 pandemic in January 2019, less than 5 percent of days were worked at home. By May 2020, when The Survey of Working Arrangements and Attitudes was starting to be collected, people worked nearly 62 percent of days from home. As workers and policymakers managed the COVID-19 recession, the percentage of days worked from home fell to 36.8 by January 2021 and then leveled off to 28.1 percent in June 2023. These are the latest available data, but survey results are updated regularly at WFH Research.[10]

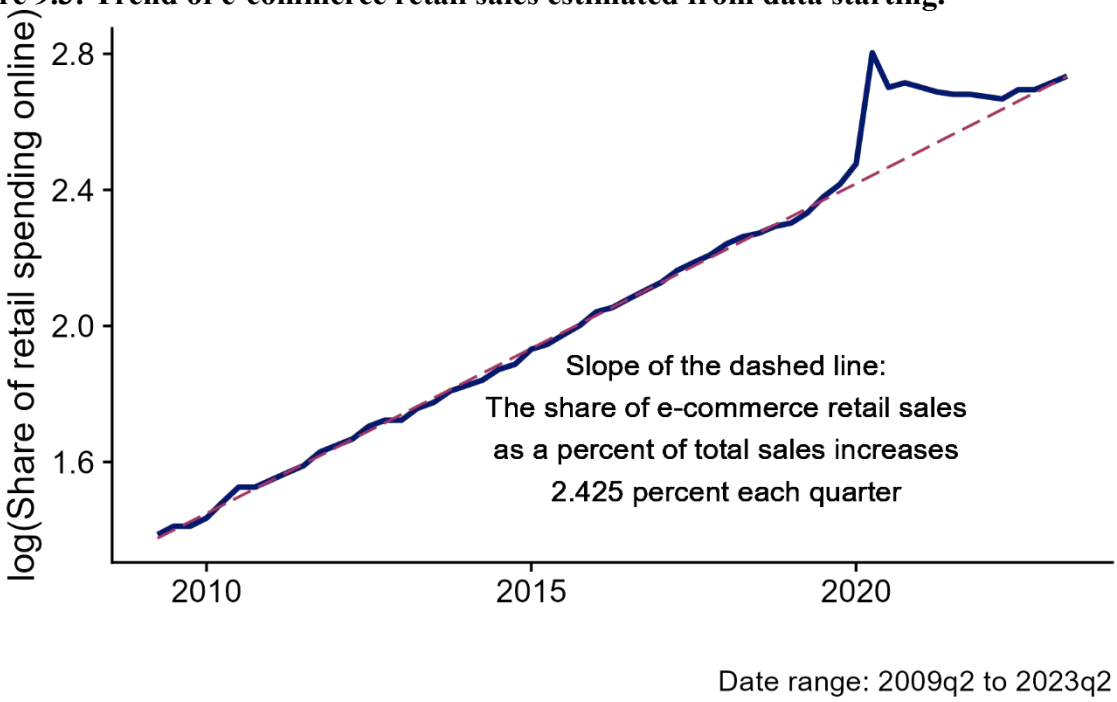
[10] Figures 9.2, 9.3, and 9.4 were inspired by this tweet by Nick Bloom.

Figure 9.2: E-commerce retail sales as a percent of total sales, from 1999q4.



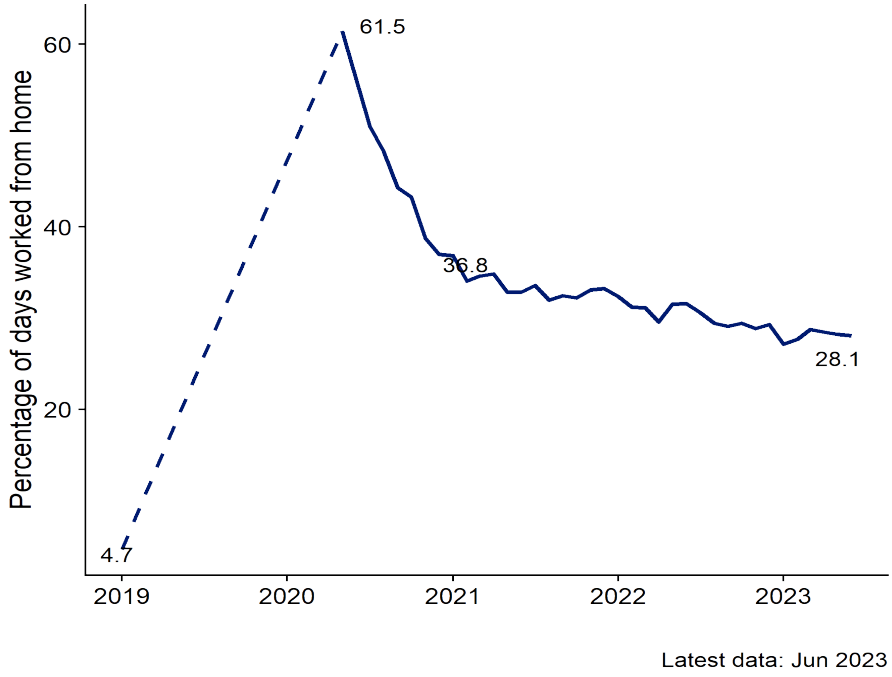
The data are quarterly and seasonally adjusted. Shaded areas indicate US recessions.
Source: US Census Bureau, e-commerce retail sales as a percent of total sales [ECOMPCTSA], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/ECOMPCTSA.

Figure 9.3: Trend of e-commerce retail sales estimated from data starting.



Source: Authors' calculations using the data series in Figure 9.2.

Figure 9.4: Percentage of days worked from home.



Source: Data from Barrero, Bloom, and Davis (2021).

The WFH research group also provide data on labor demand, which can be informative about the type of work that will be done in the future (Hansen et al. 2023). One source that allows us to infer labor demand is online job postings. Online job postings are catalogued by Lightcast, a firm that scrapes more than 51,000 online job postings daily. Sources for job postings include online job boards and company websites. The WFH research group developed a "large language model that 'reads' job ads and determines whether it offers the ability to work remotely at least one day a week."[11]

Figure 9.5 depicts the number of monthly online job postings over time for select California counties. Each county series is indexed to 100 in January 2020, which is indicated by the black, horizontal line. By indexing the data, we can compare series over time and across counties of various sizes. We highlight Kern, Fresno, San Luis Obispo, Los Angeles, and San Francisco counties by using colorful lines; other CA counties are depicted with gray lines.[12]

Labor demand in Kern and Fresno Counties exhibit similar patterns. One feature that stands out is the seasonal cycle, in part related to the substantial agricultural sector in both counties. While absent in the early COVID-19 pandemic period, the seasonal cycle becomes apparent in late 2020, which makes it challenging to determine whether labor demand has increased relative to the pre-pandemic period. What is clear, however, is that labor demand in Kern and Fresno over the period has been relatively stronger than in Los Angeles, especially from mid 2020 through the end of 2022.

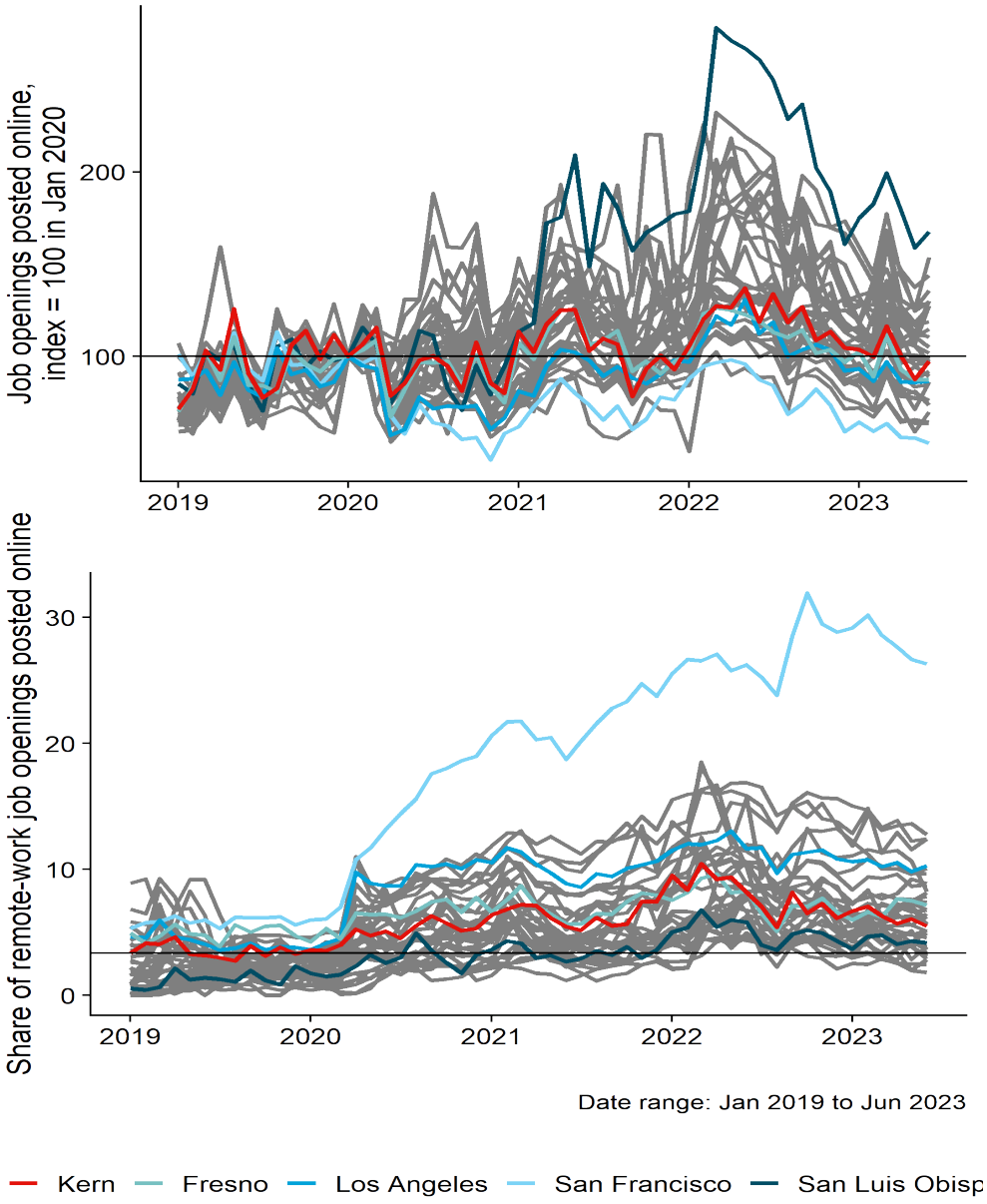
Given patterns in labor demand, has the demand for online and hybrid work increased? The bottom panel of Figure 9.5 depicts the share of online job postings that "say the job allows one or more remote workdays per week." At the start of the COVID-19 pandemic, there was a noticeable spike in job openings offering one or more remote workdays per week. This feature was especially pronounced in San Francisco and Los Angeles Counties. Enthusiasm for remote work in San Francisco County stands out, despite overall demand in San Francisco County being notably depressed relative to demand in January 2019. Lack of enthusiasm for remote work in San Luis Obispo County also stands out, despite a relative increase in labor demand there.

To a lesser extent, the share of remote-work job openings increased in Kern and Fresno at the outset of the pandemic and increased steadily through the early part of 2022 before turning downward. This downturn is perhaps due to cooling enthusiasm about remote work. Nevertheless, the relative demand for remote work is higher in Kern in June 2023 than in January 2019. This feature can be seen by the horizontal black line, which equals the share of remote-work job openings in January 2019 in Kern.

Figure 9.6 shows the geographic variation in the demand for remote work. The demand for remote work in California radiates out from two central points—one located around the Bay Area and one located in Southern California. In general, across the United States there is considerable variation in the demand for remote and/or hybrid jobs.[13] California stands out in this regard: there is relatively strong demand for remote and/or hybrid jobs across the state.

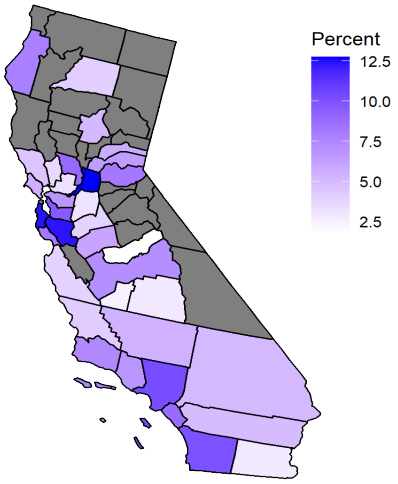
[11] Documentation can be found at https://wfhmap.com/.
[12] In small counties with few online job postings, the series reports a three-month moving average. Counties with fewer than 1,000 observations are omitted.
[13] See, for example, the map at https://wfhmap.com/.

Figure 9.5: Online job openings (top panel) and share of online job openings that offer remote/hybrid work arrangements (bottom panel).



Source: See Hansen et al. (2023). Note: Data begin in January 2019.

Figure 9.6: Percent of online job openings that offer remote/hybrid work in CA counties.



Note: Data from San Francisco County are omitted as an outlier.

9.4 Conclusion

In summary, while the U.S. economy is on trend for shopping online, there seems to be a permanent shift towards working from home. These patterns are informative about where people will work, shop, and live. Patterns in the national data are consistent with Kern County mobility patterns. All the data suggest people will spend more days working from home.

Working from home directly affects Bakersfield–Kern residents and businesses. The Bakersfield–Kern community is also indirectly affected. Close to Los Angeles and San Francisco, more people may be willing to commute to these cities if they only need to spend a few days of each month at the office and take advantage of the relatively lower cost-of-living in Kern County.

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