

10-6-2020

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### Recommended Citation

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# **Maine Employment Change During the Early Months of the COVID-19 Pandemic: A Shift-Share Analysis**

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26 September 2020

Online at <https://mpra.ub.uni-muenchen.de/103125/>  
MPRA Paper No. 103125, posted 29 Sep 2020 09:52 UTC

Maine Employment Change During the Early  
Months of the COVID-19 Pandemic: A Shift-Share Analysis

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School of Economics Staff Paper #640

Version 1.0, September 2020<sup>2</sup>

Abstract:

The Maine economy experienced an 11-percent reduction in employment from February to July of 2020, with job losses of 18 percent from February to April and a 10-percent increase from April to July. Of the employment decline of 57,100 jobs from February to July, about 85 percent of the loss is related to the performance of the U.S. economy, and 16 percent is associated with factors that are unique to Maine.

Over the period of extreme job loss from February to April and the employment gains that happened between April and July, there's wide heterogeneity in the performance of industry sectors in Maine. For example, the sectors of Health Care and Social Assistance, and Accommodation and Food Services performed worse than expected (based on employment change nationally and Maine's industry mix) from February to April, followed by a period of better than expected performance in Maine from April to July. The Retail Trade sector is one of several industries in Maine that outperformed the sector nationally between February and April, and from April to July of 2020.

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<sup>1</sup> Todd Gabe is a Professor in the School of Economics and author of the book *Pursuit of Economic Development: Growing Good Jobs in U.S. Cities and States*. This project was funded under federal award ED20PHI3070072 from the EDA University Center Economic Response and Recovery Programs to COVID-19. Gabe's research program is also funded, in part, by Hatch Multistate Grant # ME 031808 (NE 1749) from the USDA National Institute of Food & Agriculture. Professor Andrew Crawley provided helpful comments on an earlier version of this report.

<sup>2</sup> This report may be updated to clarify omissions or errors, or when data for future months are released.

## Maine Employment Change During the Early Months of the COVID-19 Pandemic: A Shift-Share Analysis

### 1. Introduction

Like most states, Maine experienced substantial job losses as a result of the COVID-19 pandemic. Between February and April of 2020, total private nonfarm employment fell by 18 percent in Maine.<sup>3</sup> Although employment then increased by ten percent from April to July, the state's employment level in July of 2020 was 11-percent lower than in February.

The overall statewide employment change numbers mask wide variation in the performance of individual sectors of the Maine economy (see Table 1 and Figure 1). For example, the Arts, Entertainment, and Recreation industry experienced a 61-percent decline in employment from February to April of 2020, while employment in the Finance and Insurance sector fell by two percent. From April to July of 2020, Arts, Entertainment, and Recreation employment increased by 45 percent—still leaving the industry at 43-percent lower employment than in February—whereas Finance and Insurance industry employment decreased by another two percent.

This report examines February to July employment change in Maine, which covers the early months of the COVID-19 pandemic that started in March of 2020.<sup>4</sup> The analysis uses a shift-

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<sup>3</sup> All of the employment figures used in this report are seasonally adjusted and use data from the U.S. Bureau of Labor Statistics (BLS). In some cases, the employment figures may be updated (at a later time) by the BLS. The employment figures do not include self-employed workers. Also, the employment numbers in the early months of the pandemic may not accurately represent workers who were initially “furloughed” and then ultimately lost their jobs.

<sup>4</sup> “Non-essential” businesses closed in Maine on March 25, public schools closed on March 31, and the Stay-at-Home order was issued on April 2, 2020.

share model of the Maine economy that separates employment growth or decline into components that are related to what happened in the overall U.S. economy, growth or decline that is due to Maine’s industry structure, and growth or decline that is “unique” to Maine’s economic performance over the period.

Overall, the results show that about 85 percent of Maine’s employment decline from February to July of 2020 is related to what happened in the overall U.S. economy and about 16 percent of the decline is attributed to factors that are unique to Maine. The state’s industry mix (i.e., the types of businesses that are in relative abundance or are underrepresented in Maine) had a very small impact on February to July employment change, which means that Maine’s industrial structure neither hurt or helped (by very much) the employment losses associated with the COVID-19 pandemic.

## 2. Shift-Share Analysis

Table 2 shows results of a shift-share analysis of industry employment change in Maine between February and July of 2020.<sup>5</sup> The column labeled as “National Growth Effect” is the employment change that would have occurred in Maine if the state’s economy were a “mini version” of the U.S. economy. That is, the national growth effect is based on the industry’s rate of growth or decline in the U.S. economy (e.g., U.S. employment in the Health Care and Social Assistance industry decreased by six percent) and the industry’s percentage of overall U.S. employment (e.g., the Health Care and Social Assistance industry accounted for 16 percent of total U.S. employment as of February 2020). The national growth effect of a 5,157 decrease in

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<sup>5</sup> The shift-share model used in the analysis was proposed by Hoppes (1997).

employment is, thus, interpreted as the reduction in Maine’s Health Care and Social Assistance industry if its employment change mirrored what happened nationally (i.e., decline of six percent) and if the sector’s employment share in Maine were identical to its U.S. employment share (i.e., 16 percent of the economy).

We know, however, that Maine’s economy is not a “mini version” of the U.S. economy and, thus, some of its employment change between February and July might be due to Maine’s own industry structure. This is referred to as the Industry Mix Effect, which is shown in Table 2. As an example, one way that Maine’s industry mix differs from the structure of the U.S. economy is that the Health Care and Social Assistance sector accounted for 20 percent of total Maine employment as of February 2020, compared with the industry’s share of 16 percent of total U.S. employment.

The industry mix effect of a 1,298 reduction in Maine employment in the Health Care and Social Assistance industry is interpreted as the February to July employment change in that sector due to the fact that Maine’s industrial structure (e.g., the Health Care and Social Assistance sector accounts for 20 percent of total state employment) differs from the structure of the U.S. economy (e.g., the Health Care and Social Assistance industry accounts for 16 percent of total national employment). The difference between the industry employment shares of the Maine and U.S. economies, combined with the sector’s U.S. growth rate (e.g., the Health Care and Social Assistance industry experienced a six-percent decrease in U.S. employment), determine the sign and magnitude of the industry mix effect.

For example, if Maine’s economy has a higher share of industry employment than a sector’s proportion of the U.S. economy (i.e., a surplus) and that sector is declining nationally,

the industry mix effect has a negative sign (i.e., it is less than zero). This is the case with Health Care and Social Assistance. Likewise, if the Maine economy has a lower share of industry employment than the sector's proportion of the U.S. economy (i.e., a deficit) and if that sector were growing nationally, the industry mix would also have a negative sign. If the Maine economy has a surplus in a sector that is growing nationally or a deficit in a declining industry, the industry mix effect is greater than zero. For example, Maine has a slight deficit in the Arts, Entertainment, and Recreation industry (e.g., 1.8 percent of total Maine employment, compared with 1.9 percent of U.S. employment, as of February 2020) such that—given that this sector experienced a substantial reduction in U.S. employment—Maine's industry mix effect is greater than zero for the Arts, Entertainment, and Recreation sector.

The third and final shift-share component is the Competitive Effect, which captures growth or decline that is not explained by the industry's performance nationally or Maine's industry mix. That is, the competitive effect represents growth or decline that is "unique" to the sector's performance in Maine. The competitive effect of a 1,045 decline in employment in the Health Care and Social Assistance industry is interpreted as the change in employment from February to July of 2020 that is not related to the sector's decline nationally or the fact that Maine has a surplus—i.e., Health Care and Social Assistance accounts for 20 percent of the Maine economy, compared with 16 percent nationally—in a declining industry. In other words, Maine's Health Care and Social Assistance industry experienced a reduction in employment of 1,045 workers due to conditions that are unique to Maine.

A feature of the shift-share model is that the three individual components—i.e., the national growth, industry mix and competitive effects—sum to the exact amount of actual

employment change. For example, Maine’s Health Care and Social Assistance industry experienced a 7,500 reduction in employment between February and July of 2020, which can be broken into a 5,157 decline for the national growth component, 1,298 decline for the industry mix and a 1,045 reduction for the competitive effect. This can be further interpreted as 69 percent of the state’s reduction in Health Care and Social Assistance employment from February to July of 2020 is related to the sector’s performance nationally, 17 percent is associated with Maine’s industry mix, and 14 percent is due to factors that are unique to Maine.

The bottom of Table 2 shows the shift-share results for total private nonfarm employment in Maine. These results indicate that, if Maine’s economy were a mini version of the U.S. economy, the state would have experienced a 48,503 reduction in employment between February and July of 2020, and that the state’s industry mix is associated with a small increase in employment. This result related to the state’s industry mix suggests that—with the exception of the Health Care and Social Assistance sector, and a few other industries—the structure of Maine’s economy had a very small impact—in fact, it was greater than zero—on its overall employment change due to the COVID-19 pandemic. Finally, the competitive effect of a 9,381 decrease in total state employment means that over 9,000 jobs were lost due to reasons that are specific to Maine. Overall, about 85 percent of the state’s total employment decline is attributed to what happened in the U.S. economy, 16 percent of the decline is associated with factors unique to Maine, and the state’s industry mix provided a negligible (but positive) impact on February to July employment change in Maine.

Looking again at the shift-share results for individual sectors, we see that Maine’s employment change was “better” than what would have been expected (i.e., positive



competitive effect) based on the sector's performance nationally and the state's industry mix in the—among others—Administrative and Support and Waste Management; Retail Trade; Transportation, Warehousing, and Utilities; and Mining and Logging sectors. In the case of Retail Trade, the sector experienced a 2,400 reduction in employment, but we might have expected a decrease of 4,663 jobs given the sector's performance nationally (i.e., national growth effect of a 3,735 decline) and the fact that Maine has a surplus in this sector that decreased nationally (i.e., industry mix effect of a 928 decline).

The Accommodation and Food Services industry experienced the largest employment reduction of 18,400 jobs between February and July of 2020, and 77 percent and 23 percent of this change is associated with the national growth and competitive effects, respectively. Maine's manufacturing sector had an 8,300 reduction in employment, with 37 percent and 63 percent of the decline attributed to the national growth and competitive effects.

Given the fact that some sectors saw employment increases from April to July, after the steep reductions between February and April, it is informative to examine a shift-share analysis that is separated into the periods of February to April, and April to July (Table 3). As was the case in the shift-share analysis of the period from February to July of 2020, the shift-share components of the changes from February to April, and April to July, sum to the exact employment change that occurred.

Focusing on the Health Care and Social Assistance sector, we see that it experienced an employment decline of 16,400 workers between February and April, where 57 percent of the decline is related to the sector's performance nationally, 14 percent (industry mix) is due to the fact that Maine has a surplus in the sector (which declined nationally), and 28 percent of the

decline (competitive effect) from February to April is associated with factors that are unique to Maine. From April to July, the Health Care and Social Assistance sector saw an employment increase of 8,900 jobs, with 46 percent, 10 percent and 44 percent of this change attributed to the national growth, industry mix and competitive effects, respectively. Whereas Maine's industry mix for the Health Care and Social Assistance sector explained part of its decline between February and April—i.e., the state had a surplus in a sector that declined nationally over this period—the industry mix is positive for the span of April to July because the state had a surplus in a sector that grew nationally (from April to July).

Maine's Retail Trade industry grew by 9,800 jobs between April and July (after a decline of 12,200 jobs from February to April) and about 22 percent of the increase is associated with factors that are unique to Maine. Likewise, Maine's Retail Trade sector had a positive competitive effect, although small in magnitude, between February and April. This means that the February to April reduction in Retail Trade employment is related to the sector's performance nationally and the fact that Maine has a surplus in Retail Trade. The state's positive competitive effects in the two periods suggest that the Retail Trade sector—both when the industry declined and increased nationally—performed better in Maine than would have been expected (based on the sector's U.S. employment change and Maine's industry mix).

Maine's Manufacturing industry, on the other hand, had negative competitive effects in both periods. This means that the sector's employment decline in Maine from February to April was larger than expected based on the industry's performance nationally and, between April and July, Maine's Manufacturing sector did worse than expected relative to the U.S. increase in manufacturing employment. Similarly, the Information, Finance and Insurance, Management of

Companies and Enterprises, and Educational Services sectors had negative competitive components in both periods.<sup>6</sup> Maine’s Mining and Logging, Retail Trade, and Administrative and Support and Waste Management sectors had positive competitive components between February and April, and from April to July of 2020.

Of the three sectors with the largest (positive) competitive effects between April and July—Accommodation and Food Services, Health Care and Social Assistance, and Retail Trade—the Accommodation and Food Services, and Health Care and Social Assistance industries had the largest negative competitive effects from February to April. This means that, whereas these sectors experienced larger declines between February and April in Maine than would have been expected based on national trends and the state’s industry structure, these sectors also performed better than expected from April to July. Nevertheless, the Accommodation and Food Services, and Health Care and Social Assistance industries—along with Manufacturing, Educational Services, Information, and Management of Companies and Enterprises—have negative competitive effects of more than 1,000 jobs over the entire period of February to July of 2020.

### 3. Summary

The Maine economy experienced an 11-percent reduction in employment from February to July of 2020, with job losses of 18 percent from February to April and a 10-percent increase from April to July. Of the employment decline of 57,100 jobs from February to July, about 85

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<sup>6</sup> Since the BLS figures cover “private” employment, educators in K-12 public schools and public universities are not counted in the analysis.

percent of the loss is related to the performance of the U.S. economy, and 16 percent is associated with factors that are unique to Maine.

Over the period of extreme job loss from February to April and the employment gains that happened between April and July, there's wide heterogeneity in the performance of industry sectors in Maine. For example, the sectors of Health Care and Social Assistance, and Accommodation and Food Services performed worse than expected (based on employment change nationally and Maine's industry mix) from February to April, followed by a period of better than expected performance in Maine from April to July. The Retail Trade sector is one of several industries in Maine that outperformed the sector nationally between February and April, and from April to July of 2020. Finally, the Manufacturing sector—along with services such as Information, Finance and Insurance, and Educational Services—underperformed in Maine compared to the industry nationally from February to April, and April to July of 2020.

A feature of the shift-share model is that—although it's a useful framework for separating employment change into the three “sources” of the national growth, industry mix and competitive components—it does not tell us “why” regions have positive or negative competitive effects. Given that they represent employment change that is above or below what happened nationally (i.e., unique to a region), the competitive effects in Maine are likely explained by a variety of differences between the state and other U.S. regions. These could include differences in the number of COVID-19 cases and deaths, the implementation and timing of business closures and the state's Stay-at-Home order (Gabe and Crawley 2020; Kong and Prinz 2020), the types of occupations present in the workforce (Dingel and Neiman 2020; Leibovici, Santacreu and Famiglietti 2020; Mongey, Pilossoph and Weinberg 2020, Mongey and Weinberg 2020), the

behavior of households and businesses as a result of the pandemic (Baker et al. 2020; Bartik et al. 2020), and a variety of other factors. Future research will shed more light on the characteristics of regions that explain differences in the employment change that occurred as a result of the pandemic.

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Table 1. Maine Employment Change: February to July of 2020

	February Employment	April Employment	July Employment	February to April Change	April to July Change	February to July Change
Mining & Logging	2,000	2,000	2,100	0%	5%	5%
Construction	30,200	28,700	29,600	-5%	3%	-2%
Manufacturing	53,200	45,300	44,900	-15%	-1%	-16%
Wholesale Trade	19,100	18,200	18,100	-5%	-1%	-5%
Retail Trade	80,800	68,600	78,400	-15%	14%	-3%
Transportation, Warehousing, & Utilities	18,500	16,700	17,700	-10%	6%	-4%
Information	7,400	5,700	5,500	-23%	-4%	-26%
Finance & Insurance	26,300	25,700	25,200	-2%	-2%	-4%
Real Estate & Rental & Leasing	7,000	6,800	6,500	-3%	-4%	-7%
Professional, Scientific, & Technical Services	27,700	25,500	26,600	-8%	4%	-4%
Management of Companies & Enterprises	12,200	10,700	10,600	-12%	-1%	-13%
Administrative & Support & Waste Management	28,300	25,400	27,200	-10%	7%	-4%
Educational Services	22,700	18,900	19,100	-17%	1%	-16%
Health Care & Social Assistance	107,300	90,900	99,800	-15%	10%	-7%
Arts, Entertainment, & Recreation	9,700	3,800	5,500	-61%	45%	-43%
Accommodation & Food Services	60,200	24,900	41,800	-59%	68%	-31%
Other Services	23,100	18,900	20,000	-18%	6%	-13%
<b>Total Private Nonfarm Employment</b>	<b>535,700</b>	<b>436,700</b>	<b>478,600</b>	<b>-18%</b>	<b>10%</b>	<b>-11%</b>

Note: Maine employment figures are seasonally adjusted and use data from the U.S. Bureau of Labor Statistics (BLS). In some cases, the employment figures may be updated (at a later time) by the BLS. The employment figures do not include self-employed workers.

Table 2. Shift-Share Analysis of Maine Employment Change: February to July of 2020

	February Employment	July Employment	Employment Change	National Growth Effect	Industry Mix Effect	Competitive Effect
Mining & Logging	2,000	2,100	100	-392	126	366
Construction	30,200	29,600	-600	-1,821	78	1,143
Manufacturing	53,200	44,900	-8,300	-3,093	-7	-5,200
Wholesale Trade	19,100	18,100	-1,000	-1,410	311	99
Retail Trade	80,800	78,400	-2,400	-3,735	-928	2,262
Transportation, Warehousing, & Utilities	18,500	17,700	-800	-1,927	540	587
Information	7,400	5,500	-1,900	-1,350	514	-1,064
Finance & Insurance	26,300	25,200	-1,100	-143	3	-960
Real Estate & Rental & Leasing	7,000	6,500	-500	-795	224	71
Professional, Scientific, & Technical Services	27,700	26,600	-1,100	-1,706	527	79
Management of Companies & Enterprises	12,200	10,600	-1,600	-469	-97	-1,034
Administrative & Support & Waste Management	28,300	27,200	-1,100	-4,730	1,280	2,350
Educational Services	22,700	19,100	-3,600	-1,468	-640	-1,493
Health Care & Social Assistance	107,300	99,800	-7,500	-5,157	-1,298	-1,045
Arts, Entertainment, & Recreation	9,700	5,500	-4,200	-3,695	185	-689
Accommodation & Food Services	60,200	41,800	-18,400	-14,113	-180	-4,107
Other Services	23,100	20,000	-3,100	-2,498	146	-748
<b>Total Private Nonfarm Employment</b>	<b>535,700</b>	<b>478,600</b>	<b>-57,100</b>	<b>-48,503</b>	<b>784</b>	<b>-9,381</b>

Note: Maine employment figures are seasonally adjusted and use data from the U.S. Bureau of Labor Statistics (BLS). In some cases, the employment figures may be updated (at a later time) by the BLS. The employment figures do not include self-employed workers. The analysis uses a shift-share model proposed by Hoppes (1997).



Table 3a. Shift-Share Analysis of Maine Employment Change: February to April of 2020

	February Employment	April Employment	Employment Change	National Growth Effect	Industry Mix Effect	Competitive Effect
Mining & Logging	2,000	2,000	0	-252	81	171
Construction	30,200	28,700	-1,500	-4,472	191	2,782
Manufacturing	53,200	45,300	-7,900	-5,629	-13	-2,258
Wholesale Trade	19,100	18,200	-900	-1,640	362	378
Retail Trade	80,800	68,600	-12,200	-9,847	-2,446	93
Transportation, Warehousing, & Utilities	18,500	16,700	-1,800	-2,368	664	-95
Information	7,400	5,700	-1,700	-1,177	448	-971
Finance & Insurance	26,300	25,700	-600	-180	3	-424
Real Estate & Rental & Leasing	7,000	6,800	-200	-970	273	497
Professional, Scientific, & Technical Services	27,700	25,500	-2,200	-2,316	716	-600
Management of Companies & Enterprises	12,200	10,700	-1,500	-379	-79	-1,042
Administrative & Support & Waste Management	28,300	25,400	-2,900	-6,786	1,836	2,050
Educational Services	22,700	18,900	-3,800	-2,110	-919	-771
Health Care & Social Assistance	107,300	90,900	-16,400	-9,374	-2,360	-4,666
Arts, Entertainment, & Recreation	9,700	3,800	-5,900	-5,490	274	-685
Accommodation & Food Services	60,200	24,900	-35,300	-28,859	-367	-6,074
Other Services	23,100	18,900	-4,200	-5,658	331	1,127
<b>Total Private Nonfarm Employment</b>	<b>535,700</b>	<b>436,700</b>	<b>-99,000</b>	<b>-87,507</b>	<b>-1,005</b>	<b>-10,488</b>

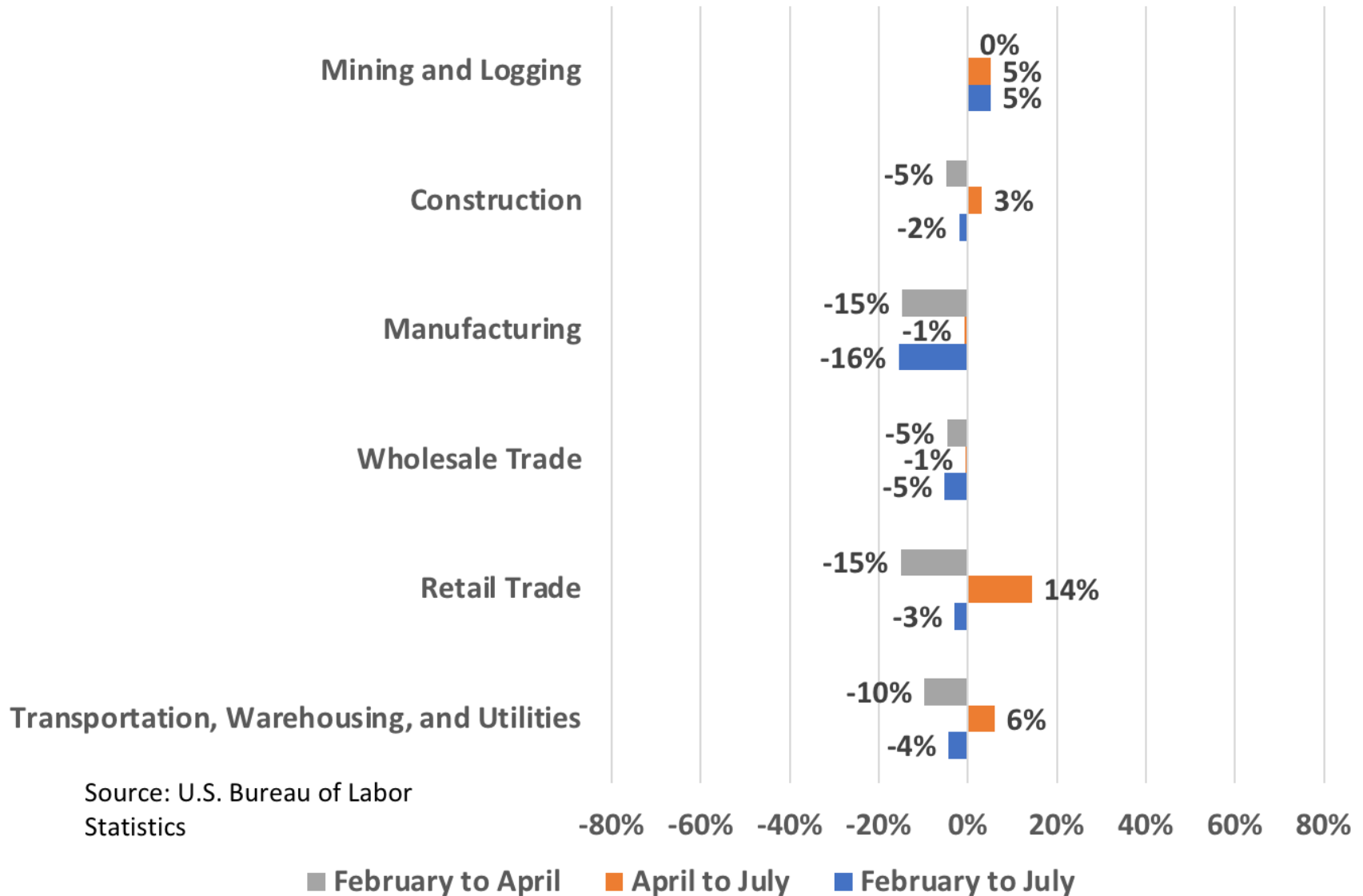
Note: Maine employment figures are seasonally adjusted and use data from the U.S. Bureau of Labor Statistics (BLS). In some cases, the employment figures may be updated (at a later time) by the BLS. The employment figures do not include self-employed workers. The analysis uses a shift-share model proposed by Hoppes (1997).

Table 3b. Shift-Share Analysis of Maine Employment Change: April to July of 2020

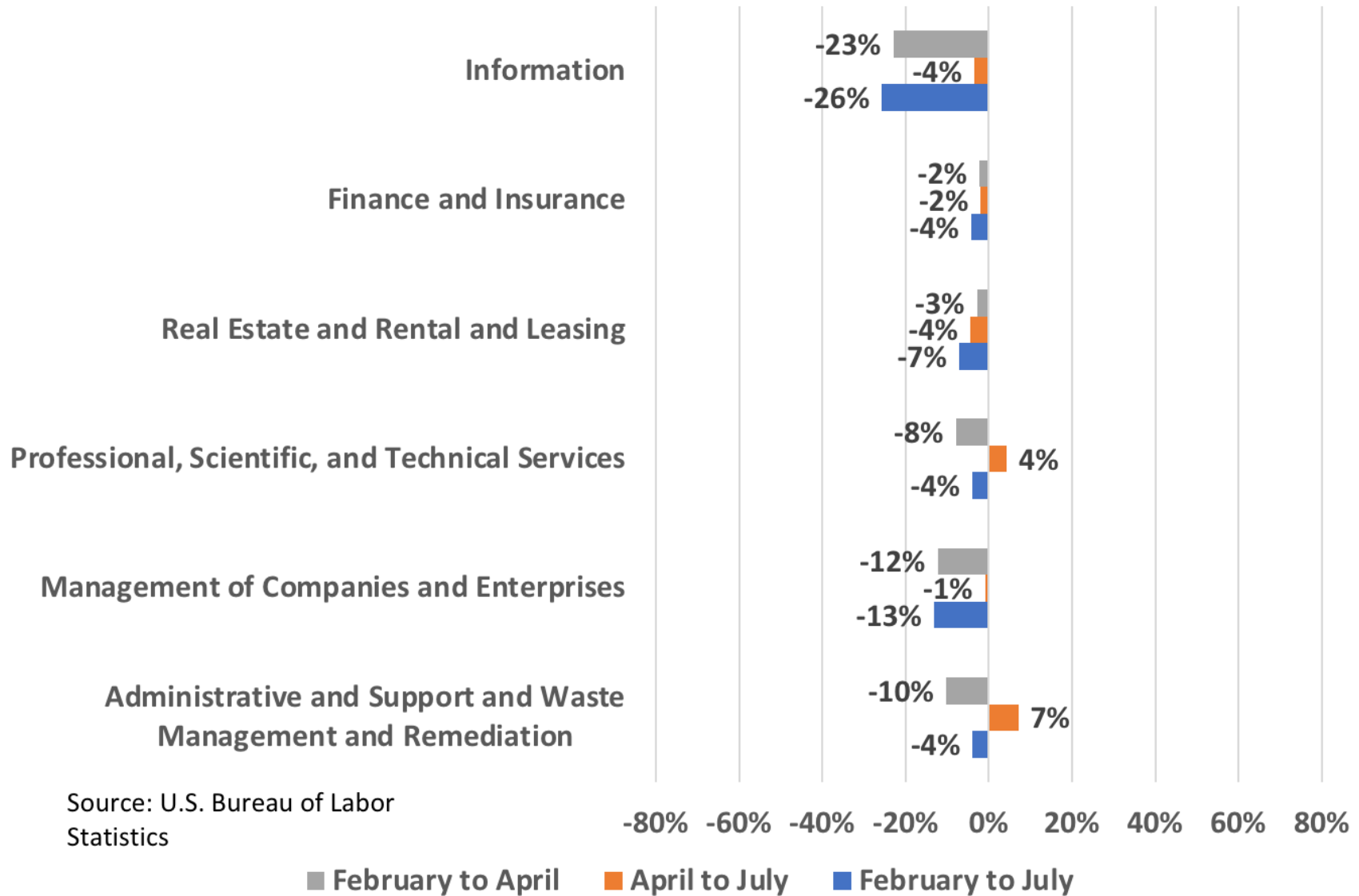
	April Employment	July Employment	Employment Change	National Growth Effect	Industry Mix Effect	Competitive Effect
Mining & Logging	2,000	2,100	100	-137	33	204
Construction	28,700	29,600	900	2,583	227	-1,910
Manufacturing	45,300	44,900	-400	2,471	-50	-2,821
Wholesale Trade	18,200	18,100	-100	224	-41	-283
Retail Trade	68,600	78,400	9,800	5,956	1,686	2,159
Transportation, Warehousing, & Utilities	16,700	17,700	1,000	431	-114	684
Information	5,700	5,500	-200	-169	77	-108
Finance & Insurance	25,700	25,200	-500	36	0	-536
Real Estate & Rental & Leasing	6,800	6,500	-300	171	-35	-436
Professional, Scientific, & Technical Services	25,500	26,600	1,100	594	-182	689
Management of Companies & Enterprises	10,700	10,600	-100	-88	-11	-1
Administrative & Support & Waste Management	25,400	27,200	1,800	2,003	-372	169
Educational Services	18,900	19,100	200	626	260	-686
Health Care & Social Assistance	90,900	99,800	8,900	4,110	912	3,878
Arts, Entertainment, & Recreation	3,800	5,500	1,700	1,748	-304	256
Accommodation & Food Services	24,900	41,800	16,900	14,367	-2,363	4,896
Other Services	18,900	20,000	1,100	3,078	85	-2,063
<b>Total Private Nonfarm Employment</b>	<b>436,700</b>	<b>478,600</b>	<b>41,900</b>	<b>38,004</b>	<b>-193</b>	<b>4,089</b>

Note: Maine employment figures are seasonally adjusted and use data from the U.S. Bureau of Labor Statistics (BLS). In some cases, the employment figures may be updated (at a later time) by the BLS. The employment figures do not include self-employed workers. The analysis uses a shift-share model proposed by Hoppes (1997).

Figure 1a: Maine Employment Change, February to July 2020



**Figure 1b: Maine Employment Change, February to July 2020**



**Figure 1c: Maine Employment Change, February to July 2020**

