Analyzing PPP and EIDL Loan Programs

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The aim of this report is to analyze data of PPP and EIDL loan programs which were established by the US government to help businesses cope with the Covid-19 pandemic. With the Paycheck Protection Program (PPP) money was given as loans to companies to ensure that the employees would be getting paid during this period of economic uncertainty. Economic Injury Disaster Loans (EIDL) similarly provides economic relief to businesses that are experiencing a temporary loss of revenue due to a declared disaster. PPP is more focused on payroll, while EIDL can be used for a broader range of working capital needs.

The data for both programs are available in the SBA website (PPP, EIDL). We processed them, to ensure that we can handle them with the available memory and kept only the necessary information (eg. State in which the loan was given, its amount etc.). We aggregated the number of loans and the total amount of money by state and by NAICS code, which is a standard code used by Federal statistical agencies in classifying business establishments. After that we used data from the US Census's Annual Business Survey to get information about how many people are employed and in how many businesses in each state. Connecting these data enables us to "normalize" the loans given, so that they are not area-size dependent. For example, we can compare a state with another that has double the population and see that more money was given on average to people of the smaller state.

In Figure 1, darker color indicates that on average in these states more money was given as loans per employee. Specifically, some key takeaways from this are that the most benefitted employees were in North Dakota (ND) with an average amount of 754.86 dollars per employee, Vermont (VT) with 749.8, Alaska (AK) with 744.93, South Dakota (SD) with 611.14 and Maine (ME) with 535.83.

In Figure 2, we present how many loans (counts) were given in each state per business. For example, in Mississippi (MS) there are 0.27 loans per business, in North Dakota 0.25 and South Dakota 0.23. These are the highest values, whereas in Arizona (AZ) and Pennsylvania (PA) we observe the lowest with 0.11 loans per firm.

Figure 1 - Normalized Total Amount per number of employees by State.

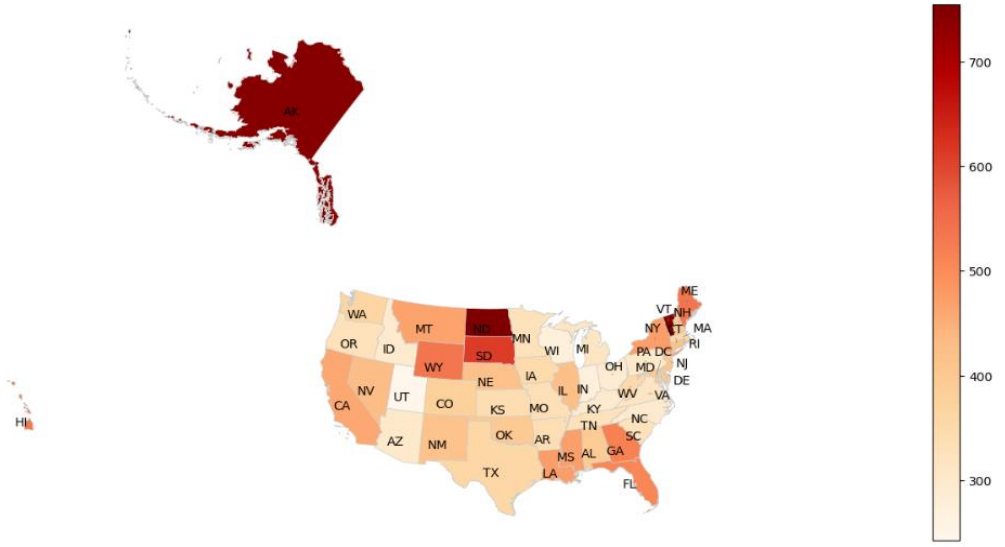
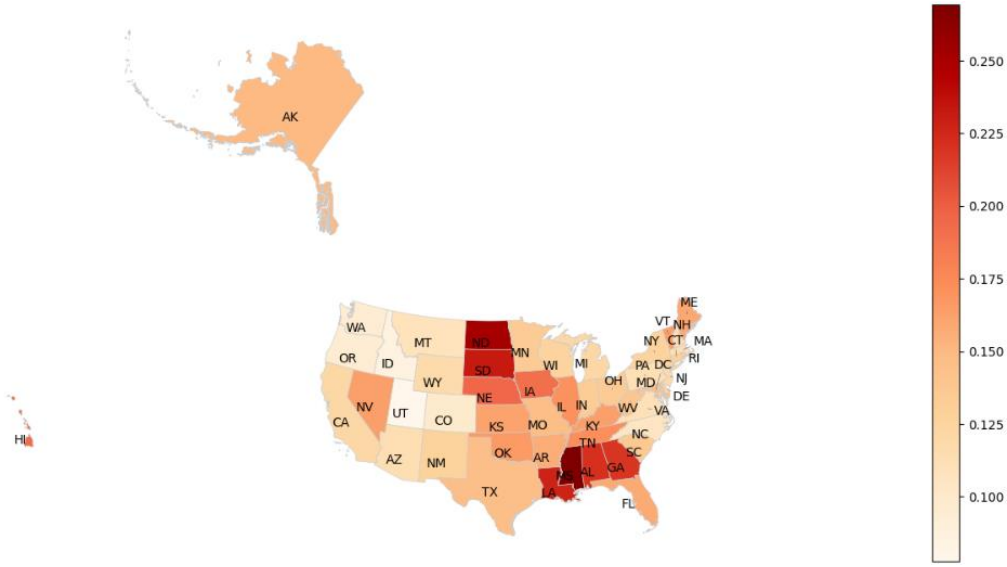


Figure 2 - Normalized counts per number of businesses by State.

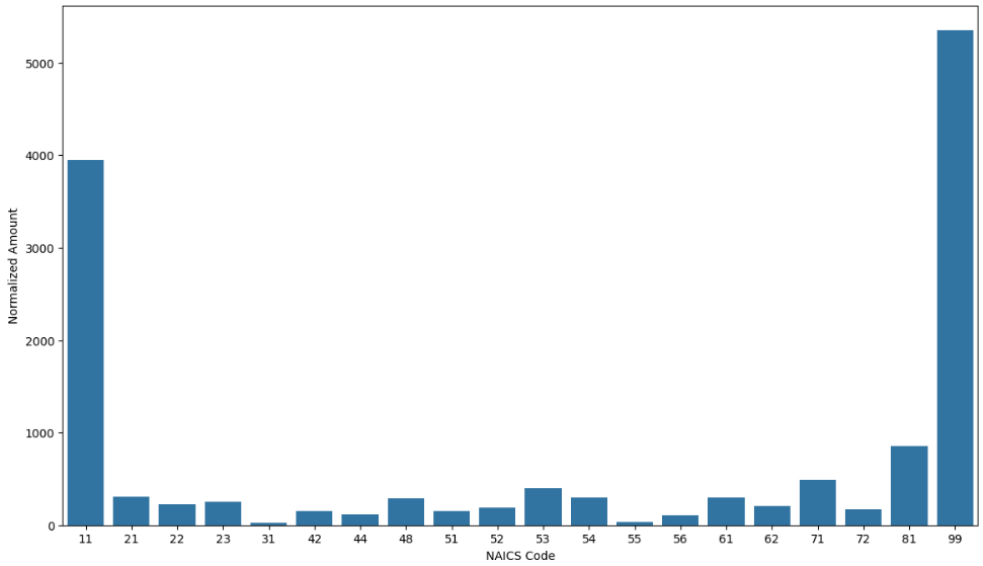


There are some differences in Alaska and Vermont which rank lower in the normalized counts and in some south-east states which rank higher. This probably happens because on average a firm in Alaska and Vermont employs 8 people and a firm in Mississippi around 14. This means that although in Mississippi there was a higher number of loans (counts), the money (total amount) was spread to more employees.

Furthermore, we can examine how the loans were distributed across different types of businesses. From Figure 3 it seems that most money went to companies and consequently employees working in Agriculture, forestry, fishing and hunting (NAICS=11) and to Industries not classified (NAICS=99). A relatively small but notable amount went to Arts, entertainment, and recreation (71), which includes

businesses heavily impacted by Covid. The least helped companies seem to be Manufacturing (31) and Management of companies and enterprises (55). Full details about the labels that each NAICS represents are available in the appendix.

Figure 3 - Bar plot of normalized Amount per employee per NAICS Code.



Finally, the consumer spending differences between North Carolina and Michigan provide no strong indication of correlation with the amount of loans in those states. In NC the programs distributed 297.58 dollars per employee whereas in MI 313.17. There is a difference however it is quite small, and we could not say that the increased spendings have a direct connection with the loans received. This requires deeper research and probably more data to reach safe conclusions.

Summarizing, we got some key insights on how the PPP and EIDL loans were distributed to different states and businesses. There is potential for future work on this, as one could extend these ideas or provide new ones. For example, we could examine the connection between loans given and the payroll of companies. Larger companies with more employees would need more money to pay them.

Appendix

Table: NAICS – Label correspondence.

NAICS Code	NAICS Label
72	Accommodation and food services
56	Administrative and support and waste management and remediation services
11	Agriculture, forestry, fishing and hunting
71	Arts, entertainment, and recreation
23	Construction
61	Educational services
52	Finance and insurance
62	Health care and social assistance
99	Industries not classified
51	Information
55	Management of companies and enterprises
31	Manufacturing
21	Mining, quarrying, and oil and gas extraction
81	Other services (except public administration)
54	Professional, scientific, and technical services
53	Real estate and rental and leasing
44	Retail trade
48	Transportation and warehousing
22	Utilities
42	Wholesale trade