Impacts of 2020 and 2021 Stimulus Checks on Consumer Spending

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Abstract

In this paper, we aim to analyze the effect of COVID-19 stimulus payments and lockdowns on consumer spending habits, both in terms of spending categories and spending by income quartile. We show that spending increased dramatically in the periods directly following each stimulus check, then broke this spending down into categories to look at how post-stimulus check spending was divided between luxury and essential goods and services. We find that luxury spending increased relative to essential spending, especially after the first and third stimulus checks. In addition, on average, aggregate consumer spending in each state actually sharply increased after the imposition of a lockdown policy for that state, showing that the state shutdowns didn't prevent spending from increasing. Different income groups also had different spending reactions to the stimulus checks; after each stimulus check, the rate at which lower-income earners spent money increased faster relative to higher-income earners (the gap between the change rates of their spending increased). Overall, although we cannot extrapolate our results to establish a causal relationship between the stimulus checks and consumer spending due to omitted variables bias, we have shown that stimulus checks have a statistically significant positive correlation with the relative changes in the rate of spending of people in the bottommost quartile.

Introduction

Since late 2019 and early 2020, the COVID-19 pandemic has caused unprecedented economic and social disruption, such as the loss of life, housing crises, challenges to public health, education systems, food systems, and more. This pandemic especially posed a great challenge for the United States economy. This includes businesses closing throughout the country, people facing unemployment, and the increasing difficulty to afford goods and services. As a result, the government issued three rounds of economic stimulus checks to address the disruption the pandemic had on livelihoods and household finances. Each stimulus check differed in its payment amount and eligibility requirement.

The first stimulus check, the Coronavirus, Aid, Relief, and Economic Security (CARES) Act, was signed into law on March 27, 2020, and was paid into people's bank accounts through April 11 and 12, 2020. Single filers who earned an income under $75,000 (and $150,000 for married couples filing together) were paid the maximum amount of $1,200 per person, plus $500 per qualifying child. The CARES Act decreased payment for those who earned an income above $75,000 up to a maximum of $99,000 ($198,000 for married couples filing together).

The second stimulus check, the Consolidated Appropriations Act, was signed into law on December 21, 2020, and was issued between December 29, 2020, and January 15, 2021. Those who earned less than $75,000 in the 2019 tax year received the full stimulus check, while those who had a higher annual income of up to $87,000 received a smaller figure. The Consolidated Appropriations Act gave up to $600 per person and $600 for each qualifying child.

The third stimulus check, the American Rescue Plan, was signed into law on March 11, 2021, and was issued immediately with some payments issued during the weekend of March 13 and 14, 2021. The American Rescue Plan gave up to $1,400 per person (a maximum of $2,800

for married couples), plus an additional $1,400 per dependent, regardless of their age, for families with dependents. Single filers who earned less than $75,000 received full payment while those who exceeded this amount but did not earn more than $80,000 earned partial payment.

As a result of how this pandemic has impacted household economic circumstances and their ability to afford goods and services, we examined how the issuing of stimulus checks affected different income brackets, and how consumers spent as a result of state-imposed lockdowns, and what they spent their stimulus payments on. Ultimately, we aimed to find whether the government's efforts to alleviate economic crises, especially for lower-income earners, in the form of stimulus checks achieved their purpose and to what extent did it do so.

In our paper, we use high-frequency credit/debit card spending data from Affinity solutions, to determine how different factors such as economic and covid-policy related factors affected consumer spending during the COVID-19 pandemic and quantify the importance of these factors in explaining differences in the rates of consumer spending among different income groups on a weekly basis. Our economic factors included the distribution of stimulus checks, unemployment benefits, spending by income quartile, type of spending (on luxury or essential goods and services), and employment rates by income quartile. Our policy-related factors included the imposition of lockdowns in each state. We examined the impacts of each of these factors while holding all the other factors constant so we could work towards establishing a causal interpretation.

Literature Review

Our research builds on previous literature that has analyzed how the COVID-19 pandemic has impacted the United States economy. Recent papers utilized private sector data to analyze consumer spending in their research, and yield comparable results that align with ours in

terms of how individuals who received stimulus checks spent money. However, as our research suggests, spending differed among various groups of people according to income levels, and areas where there was an enforced lockdown. Moreover, the type of spending, whether it was on essential or luxury goods, differed after each stimulus check. Therefore, we examine previous scholarship that falls into two camps: how stimulus checks impacted the ways in which individuals managed their finances during the pandemic, and the economic activity of various sectors as a result of consumer spending disaggregated according to ZIP code, income group, and state-initiated lockdowns.

In the first camp, Danziger's and Murphy's "How Did Federal Stimulus Recipients Use Their Checks?" assessed the effects of the stimulus checks on aggregate consumer spending, in addition to the other economic activities. This includes whether consumers spent, saved, or paid off debt after the receival of each stimulus check.[1] Danziger and Murphy demonstrate that the uses of stimulus payments varied by stimulus round—as 73% of the people who received the CARES Act spent the check, whereas most receivers either saved or paid down debt after receiving the Consolidated Appropriations Act and American Rescue Plan.[2] This could be explained by an increasingly optimistic outlook on economic conditions, as recipients became less likely to outright spend their stimulus payments but dedicate it towards savings or paying debt instead. Despite the usage of stimulus checks changing over time, this research does not account for stratification within the income groups that received stimulus payment, nor does it provide details on what kind of spending was being made, and what kind of debts were being paid.

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[1] "How Did Federal Stimulus Recipients Use Their Checks?," Dallasfed.org, accessed May 6, 2022, https://www.dallasfed.org/research/economics/2022/0111.
[2] Ibid.,

Our research deepens existing scholarship by accounting for these differences, and exclusively focusing on how the receival of stimulus checks impacted consumer spending. We, therefore, provide a more nuanced analysis of what exactly stimulus recipients were spending on, whether that may be essential or luxury goods. Additionally, our research focuses on consumer spending on a local geographic scale by utilizing data on different household-income levels across ZIP codes. This, therefore, provides a more detailed analysis of the different groups of consumers that have all been grouped together as households that were eligible for stimulus payments.

As for the second camp, Chetty et al. find that "stimulus payment to low-income households increased consumer spending sharply."[3] This corresponds with our research findings, as we assess how spending differs among different quartiles of income after the release of each stimulus check. Our research supports Chetty et al.'s. However, while Chetty et al. also disaggregate spending across industries—such as entertainment, groceries, healthcare, etc.—our research separates spending not according to industries but rather on whether they were considered essential or luxury goods. Our research also differs in that while Chetty et al. examines how state-ordered reopenings of economies had a marginal immediate impact on economic activity—which may be due to how consumers' health concerns persist as reopenings do not imply reduced health risks—we solely focus on state-ordered shutdowns.

Data and Descriptive Statistics

The data for this paper comes from high-frequency credit and debit card spending data from Affinity Solutions. Affinity Solutions has relationships with most of the banks and financial institutions across America, so they have access to activity on a sample of 40 million active

[3] Raj Chetty et al., "The Economic Impacts of Covid-19: Evidence from a New Public Database Built Using Private Sector Data," 2020, https://doi.org/10.3386/w27431.

cards, capturing 6 to 9 percent of all card transactions in the United States. This data is available at various levels of geographic, economic, and spending-category disaggregations.

This data is indexed to January 4-31, 2020, and seasonally adjusted. Each datapoint is represented by a seven-day moving average. This means that the spending every seven days is compared to the spending in the seven days prior and is then scaled to the previous figure. By aggregating a seven-day moving average, this reduces high-frequency fluctuations across days of the week. By adjusting the data to each season, this normalizes seasonal fluctuations for consumer spending in each week in 2020 relative to spending for the same week in 2019. Our data is also disaggregated by geography (ZIP code), income quartile, and industrial sector, which we use to determine consumer spending on both essential and luxury goods.

We also had access to unemployment insurance claims data from the Department of Labor. We focused on national-level unemployment claims, and our claims include claims for both regular unemployment insurance and Pandemic Unemployment Assistance. To create similar scales between our data for unemployment claims and our other data, we focused on the number of new unemployment claims per 100 people; by only focusing on new unemployment claims, we can compare new claims to changes in spending (new spending). The unemployment insurance claims data was only available on a weekly basis, so we only had data for every Monday, which limited our sample size when running regressions.

Methodology/Model

Exhibit 1:

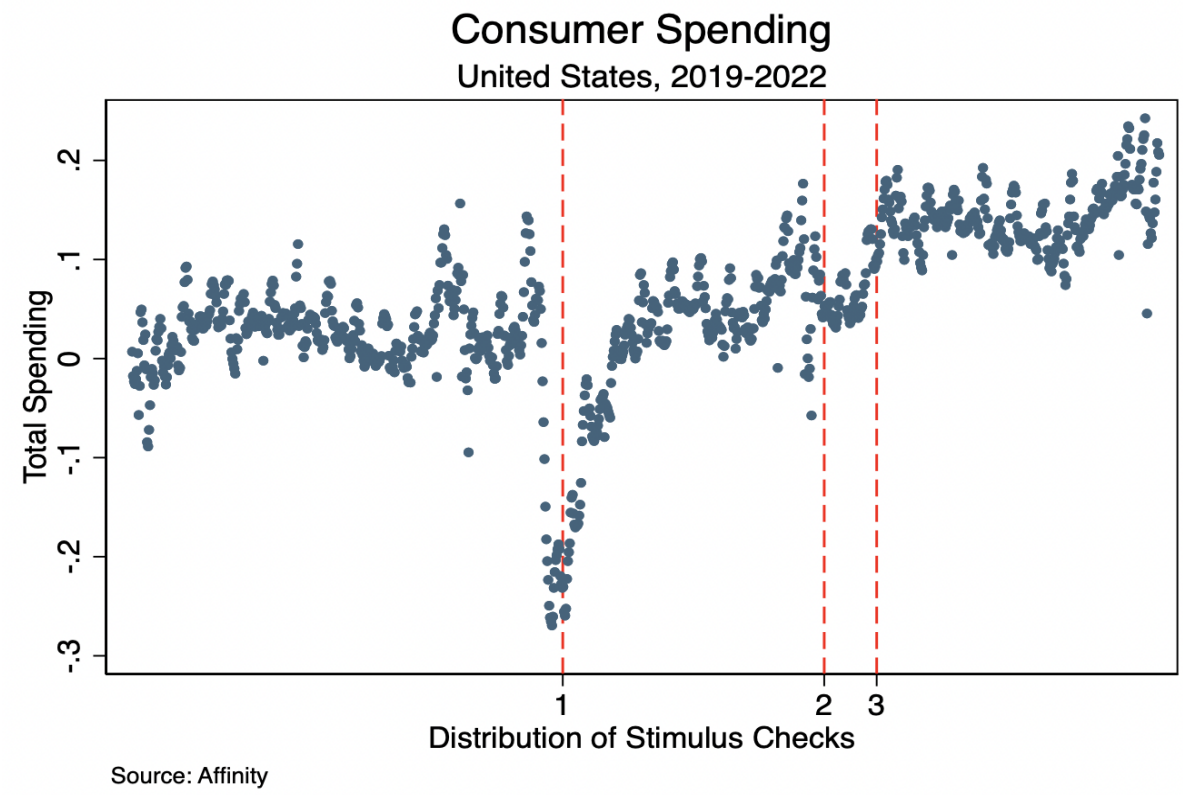

Figure 1a

Figure 1a examines the relationship between total consumer spending and the timing of when each stimulus check was released. As described above, total spending represents a seven-day moving average, so values of total spending above zero represent an increase in spending compared to the week before, and a value below zero represents a decrease in spending compared to the previous week. We can see in the scatter plot that after the first stimulus check, spending began decreasing at a slower rate than before and eventually started to increase. After the second and third stimulus checks, we can see increases in the rate of total consumer spending.

	Stimulus Check 1	Stimulus Check 2	Stimulus Check 3
Coefficient	0.022	-0.021	0.063***
	(0.03)	(0.01)	(0.01)

Constant	-0.150***	0.076***	0.086***
	(0.02)	(0.01)	(0.00)

Figure 1b

The regressions were run by setting overall spending as the dependent variable and creating a *s_indicator* variable as the independent variable; the *s_indicator* would equal 0 in the month preceding each stimulus check and equal 1 in the month following each check. By regressing overall spending on the *s_indicator*, we can find the expected correlation between each check and overall spending. We expected the coefficient to be positive for all three stimulus checks (meaning that the stimulus checks would have a positive impact on spending), and this is true for the first and third stimulus checks. The negative coefficient associated with the second stimulus check is surprising, but after considering the fact that the second and third checks were given within three months of each other and that the third check was widely anticipated, there is the possibility that people saved the money from their second check and combined it with the third check to spend on larger purchases. This hypothesis is unproven, but it is supported by the very large coefficient that is associated with the third check (compared to the first check).

Exhibit 2:

The following exhibits demonstrate the correlation between the distribution of stimulus checks and the percentage change in consumer spending compared to January 2020 for both luxury and essential goods. This was done by first creating new variables that categorized luxury goods and services as spending in apparel and accessories; arts, entertainment, and recreation; general merchandise stores; home improvement centers; and retail without groceries. Essential goods and services were categorized as spending for accommodation and food services; healthcare and social assistance; transportation and warehousing; in-person services; remote

services; and retail with groceries. After creating the two variables, we created a line graph using data from January 1, 2020, and onwards to demonstrate how consumer spending for both types of goods differed after the release of each stimulus check (Figure 2a). As the figure demonstrates, before the release of the CARES Act, spending on both essential and luxury goods and services sharply decreased, as this time was the early stages of the pandemic. As aforementioned, potential causes for this sharp decrease may include an increased number of COVID cases and an overall sense of fear among individuals in March 2020. Additionally, we find it unsurprising to see that the percent change in spending for luxury goods and services decreased more sharply than spending for essential goods before the CARES Act.

However, when the CARES Act went into effect on March 27, 2020, we can observe how the percent change in spending for both essential and luxury goods and services gradually increased and then evened out. Eventually, spending for luxury goods and services surpassed spending for essential goods and services, as it sharply increased and decreased from November-December 2020 before the Consolidated Appropriations Act went into effect. The cause for this peak warrants a deeper analysis, as the data utilized was seasonally adjusted, and therefore, we do not expect spending for major holidays to influence our results. Regardless, the levels of the percent change in spending during this time of the pandemic were greater than before the effect of the CARES Act.

When the release of the second stimulus payment, the Consolidated Appropriations Act, went into effect on December 27, 2020, until the release of the third stimulus payment, the American Rescue Plan, spending for both luxury and essential goods remained relatively constant with a few fluctuations. When the American Rescue Plan went into effect on March 11, 2021, the percent change of spending for luxury goods began to surpass percent change of

spending for essential goods, which remains relatively constant from the second payment and onwards. Although there is little evidence for what could be the cause of this increasing gap between both types of spending, we do know that from previous literature, consumers were less likely to spend their second and third stimulus payments. One aspect that might have some influence on consumer behavior is how individuals did not expect the issuing of the first stimulus payment, but did expect the issuing of the second and third stimulus payments. However, the causal mechanism for why spending on luxury goods increased after the American Rescue Plan remains unclear.

Figure 2a

In Figure 2b, we further demonstrate the difference between the percent change in consumer spending on luxury and essential goods and services. We do so by first creating a new variable with the difference between essential spending from luxury spending. The following

figure reemphasizes our findings from Figure 2a. When consumer spending is below, spending on essential goods and services is greater than spending on luxury goods and services. When spending increases above 0, spending on luxury goods and services is greater than spending on essential goods and services. From this figure, we observe how spending on essential goods and services increases. However, spending on luxury goods and services surpassed essential goods after the Consolidated Appropriations Act and American Rescue Plan.

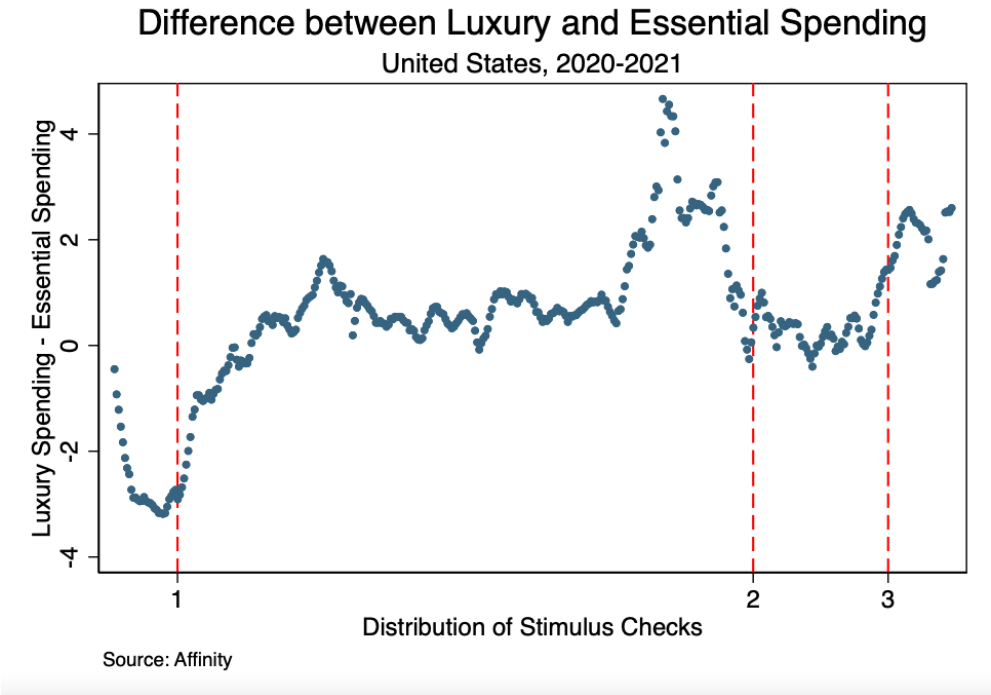

Figure 2b

The model for this regression analysis is:

$$\widehat{diff\ in\ luxury\ and\ essential\ spending}_i = \hat{\beta}_0 + \hat{\beta}_1 s\_indicator + \varepsilon$$

where $diff\ in\ luxury\ and\ essential\ spending_i$ represents the difference in the percent change in consumer spending for both luxury and essential goods and services, $s\_indicator$ is in an indicator variable which represents the distribution of stimulus payments thirty days before it

was issued and thirty days after it was issued, and ε represents possible sources of error, such as the number of COVID-19 cases during the months of the issuing of each stimulus payments.

The coefficients for our regression are demonstrated in Figure 2c, which accurately reflects the graphs we included above. With the CARES Act, there is a 1.634 unit increase in the difference between spending on luxury and essential goods and services thirty days before and thirty days after the CARES Act was issued, and a 1.443 unit decrease in the difference between spending on luxury and essential goods and services thirty days before and after the Consolidated Appropriations Act was issued, and a 1.557 increase in the difference between spending on both luxury and consumer spending and goods thirty days before and thirty days after the American Rescue Plan was issued. Unfortunately, because $s\_indicator$ was not statistically significant, the possibility that stimulus checks had no impact on the difference in spending for both luxury and essential goods and services remains.

	Stimulus Check 1	Stimulus Check 2	Stimulus Check 3
Coefficient of Luxury-Essential	1.634^{***}	-1.443^{***}	1.557^{***}
	(0.18)	(0.21)	(0.13)
Constant	-2.680^{***}	1.766^{***}	0.453^{***}
	(0.12)	(0.15)	(0.09)

Figure 2c

Exhibit 3:

Figure 3a examines the relationship between the rate of total consumer spending of the lower quartile, median range, and upper quartile of income earners over time, with an emphasis on the rates of spending immediately before and after each stimulus check, represented by the vertical dashed lines, was released. The rate of spending is represented by a seven-day moving average, so values above zero represent an increase in the rate of spending compared to the week

before, and values below zero represent a decrease in the rate of spending compared to the previous week. From the scatter plot, we see that the rate of spending increases for all three groups immediately after the release of each stimulus check. By ocular regression, we also see that the change in the rate of spending before and after each stimulus check for the lower quartile of income earners is larger than the change in spending before and after each stimulus check for the upper quartile of income earners.

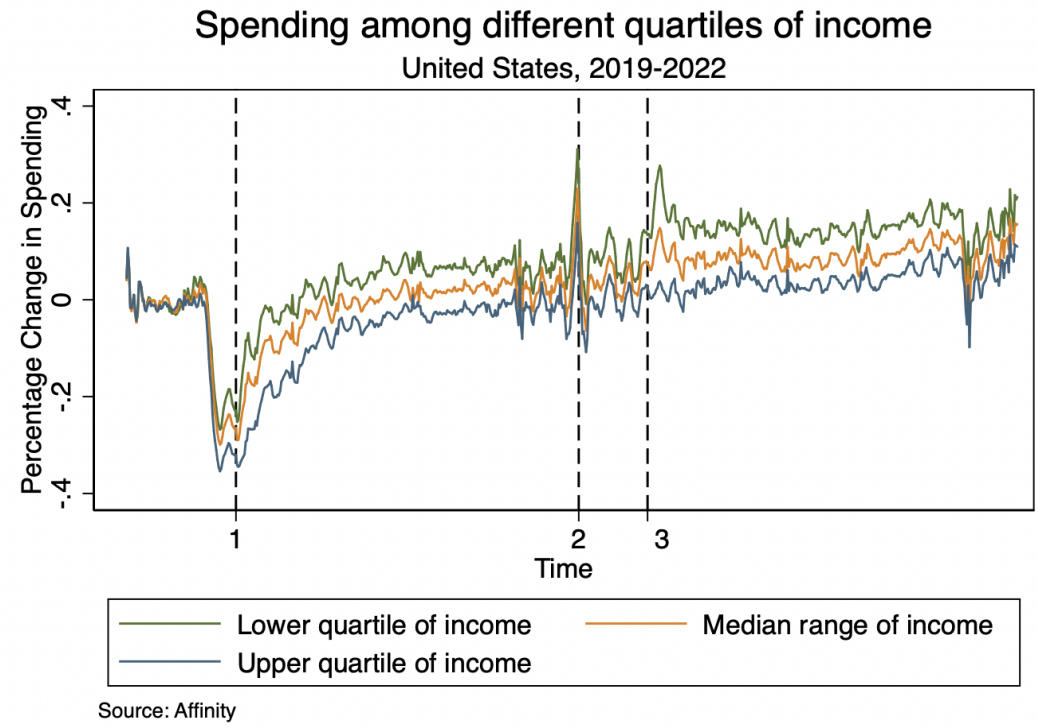

Figure 3a

	Stimulus Check 1	Stimulus Check 2	Stimulus Check 3
First Quartile Coefficient	**0.070****	**0.035***	**0.101*****
	(0.02)	(0.01)	(0.01)
First Quartile Constant	-0.156***	0.075***	0.087***

	(0.02)	(0.01)	(0.01)
Median Range Coefficient	**0.034**	**0.025**	**0.054*****
	(0.02)	(0.01)	(0.01)
Median Range Constant	-0.188***	0.025**	0.041***
	(0.02)	(0.01)	(0.01)
Top Quartile Coefficient	**-0.008**	**0.016**	**0.016****
	(0.03)	(0.01)	(0.01)
Top Quartile Constant	-0.241***	-0.016	-0.002
	(0.02)	(0.01)	(0.00)

Figure 3b

The regression we ran to test our hypothesis for this exhibit was :

$$diff\ \ in\ \ \ q1\ \ and\ \ q4\ \ \widehat{spending_i} = \widehat{\beta_0} + \widehat{\beta_1} s\_indicator + \varepsilon$$

where $diff\ in\ q1\ and\ q4\ spending_i$ represents the difference in the rate of consumer spending for lower quartile income earners and upper quartile income earners, $s\_indicator$ is in an indicator variable which represents the distribution of stimulus payments thirty days before it was issued and thirty days after it was issued, and ε represents possible sources of error, such as the number of COVID-19 cases during the months of the issuing of each stimulus payment.

Our regression output was consistent with our hypothesis; we see that the first quartile of income earners has the highest coefficient which can be interpreted as the change in the rate of spending before and after the stimulus checks was maximum for the lowermost quartile of income earners, followed by the median range of income earners, and the smallest change in the rate of spending before and after the stimulus checks was observed in the fourth quartile of income earners.

Exhibit 4:

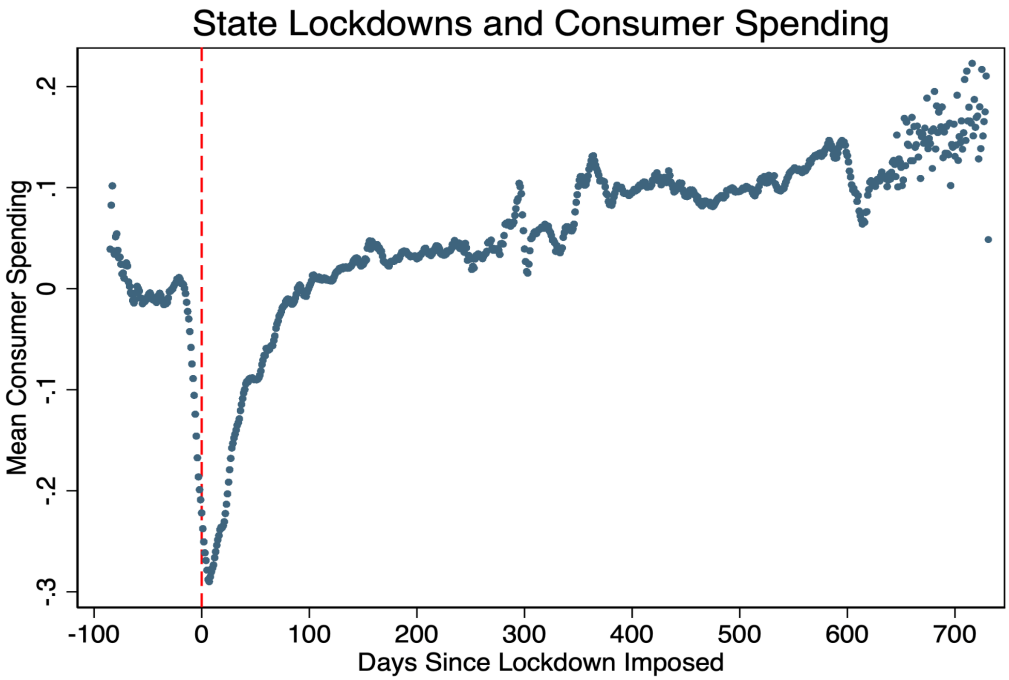

Figure 4a - Association between days since a state lockdown was imposed and mean consumer spending in that state. These data are recentered so that regardless of when a state imposed its lockdown, the start of the lockdown policy takes place at day zero.

Figure 4a combines the Affinity consumer spending data with state policy milestones to examine the impact of a state's decision to shut down on spending in that state. The state policy milestone data includes the date each states' lockdown policy went into effect and subsequently was lifted. We can see a sharp increase in consumer spending associated with the imposition of a lockdown policy, so it's clear that a state shutdown didn't prevent spending from increasing. This could be attributed to increased shopping online and purchases of goods like computers, home exercise equipment, toilet paper, etc. all of which were purchased in large quantities during the

transition to remote work and school, and life in general. However, the relationship between a state's shutdown decision and consumer spending is likely overstated due to omitted variables bias. The lockdown timing for various states was often associated with rises in COVID-19 cases, which may have accounted for an increase in spending associated with rising COVID-19 cases and high death rates. Additionally, the timing of the release of the stimulus checks or other COVID-19 related policy measures may have overlapped with the timing of state shutdown periods which could also cause us to overestimate the strength of the relationship between a state shutting down and consumer spending.

	Percentage point change in spending
Days since lockdown	0.003***
	(0.00)
Constant	-0.481***
	(0.00)

Figure 4b - This is the regression output we get when we regress mean consumer spending on the timing of each state's lockdown.

The model for running the regression output in Figure 4a is as follows:

$$\widehat{Mean\ Consumer\ Spending} = \widehat{\beta_0} + \widehat{\beta_1}\, timing + \varepsilon$$

- Y = Mean Consumer Spending = a seven day moving average of the average consumer spending in each state
- X_1 = timing = the number of days since the start of a state's lockdown period
- ε = possible sources of error include the impact on spending of the number of COVID cases in each state and by the timing of the stimulus checks being sent out

This regression model was run for timing between zero and one hundred days following a state's shutdown policy. We can see from the regression output that the value of $\widehat{\beta_1}$ is 0.003. This value tells us that on average, each day following the start of a state's lockdown period is associated with a 0.3 percentage point increase in consumer spending. This value of $\widehat{\beta_1}$ is a positive number close to zero. This makes sense because we can see from the scatter plot that total consumer spending is a negative value when timing is zero, and it slowly becomes less negative and eventually is positive later on after the shutdown. The value of $\widehat{\beta_0}$ is -0.481, which tells us that right when a state locks down, spending is expected to be -0.481 units below the seven-day moving average. The values for $\widehat{\beta_1}$ and $\widehat{\beta_0}$ are both statistically significant because the p-values are equal to zero. In the future, if we ran another regression, we might look for ways to account for the different amounts of time the lockdowns lasted since states lifted their shutdown policies at different times.

Results

For our fifth exhibit, we first ran a difference-in-difference regression to estimate the effects of overall spending and the stimulus checks on the difference in spending between the bottom 25% of earners (henceforth referred to as "Q1") and the top 25% of earners (henceforth referred to as "Q4"). Here is the regression equation and an explanation of each variable:

$$\widehat{difference\_q1q4} = \widehat{\beta_0} + \widehat{\beta_1}(spend\_19\_all) + \widehat{\beta_2}(s\_indicator) + \widehat{\beta_3}(interact\_stimulus\_spending) + \varepsilon$$

- Y = *difference_q1q4* = difference in the percentage change in spending between first and fourth quartile income groups (Q1 minus Q4)

- X_1 = *spend_19_all* = percent change in all consumer spending (weekly average)
- X_2 = *s_indicator* = indicator variable that equals 0 for 30 days before the stimulus checks and equals 1 for 30 days afterwards
- X_3 = *interact_stimulus_spending* = an interaction variable that multiplies $spend\_19\_all \times s\_indicator$
- ε = possible sources of error: different unemployment rates between different income groups, other governmental benefits

Our original data had the rate of change of overall spending and the rate of change of Q1 and Q4 spending, and we knew the dates of all three stimulus checks. To create the *difference_q1q4* variable, we subtracted the percentage change in spending of Q4 from the percentage change in spending of Q1. To create the *s_indicator* variable, we created an indicator variable that equals 0 for the 30 days before each stimulus check and equals 1 for the 30 days after each stimulus check, and all other data (all other days) were dropped from the data.

```
. reg difference_q1q4 spend_19_all s_indicator interact_stimulus_spending;
```

Source	SS	df	MS	Number of obs	=	183
				F(3, 179)	=	56.85
Model	.165096016	3	.055032005	Prob > F	=	0.0000
Residual	.173278856	179	.000968038	R-squared	=	0.4879
				Adj R-squared	=	0.4793
Total	.338374872	182	.001859203	Root MSE	=	.03111

difference_q1q4	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
spend_19_all	-.0266728	.0244322	-1.09	0.276	-.074885	.0215394
s_indicator	.059434	.0046598	12.75	0.000	.0502389	.0686292
interact_stimulus_spending	.038145	.0365216	1.04	0.298	-.0339233	.1102133
_cons	.0890909	.0031796	28.02	0.000	.0828165	.0953653

```
. su difference_q1q4
```

Variable	Obs	Mean	Std. Dev.	Min	Max
difference~4	398	.1077225	.0335336	.035	.239

As seen in the regression output, the y-intercept is positive 0.089, and a summary of *difference_q1q4* shows that all y-values are positive. This means that people in Q1 (the lowest

income earners) are consistently increasing their spending at a faster rate than the people in Q4 (the highest income earners). If we use Q4 spending as a constant baseline for Q1 spending (meaning that Q1 spending is measured in its difference from Q4 spending), then an increase in (positive) *difference_q1q4* means that the people in Q1 have increasing rates of spending. The y-intercept of 0.089 means that if there was no change in overall spending and there were no stimulus checks, people in Q1 would be increasing their spending at a rate that is 8.9 percentage points faster than the change in spending for people in Q4.

The coefficient of *s_indicator* is statistically significantly positive. This means that in the 30 days after each stimulus check, Q1 spending increased at a faster rate than in the 30 days prior to the stimulus check, suggesting that people in Q1 were spending (relatively) more after the stimulus check than before it. The exact value of 0.0594 for $\widehat{\beta_2}$ means that the spending of people in Q1 is expected to increase 0.0594 percentage points faster than the spending of people in Q4 in the month after the release of the stimulus checks (compared to the month before the release of the checks).

The coefficient for *spend_19_all* was not statistically significant from 0. This means that we cannot reject the possibility that overall national spending has no impact on the rate of increase of Q1 spending (compared to Q4 spending). Similarly, the coefficient of *interact_stimulus_spending* (which equals *spend_19_all* × *s_t*) is not statistically significant either. This means that the correlation between *spend_19_all* and *difference_q1q4* was the same both before and after the stimulus check; in other words, the release of the stimulus check did not change how overall national spending affected the rate of increase of Q1 spending.

We were also concerned that the impact of unemployment benefits might overlap with the impact of the stimulus checks, as there are numerous reports showing that lower-income

households/workers were more likely to be unemployed and also received the full value of the stimulus checks. Therefore, we ran another difference-in-difference regression that is the same as the one described above, except *spend_19_all* was replaced by *initclaims_rate_combined*, which is the number of new unemployment benefits claims per 100 people per week (and the interaction variable was also changed accordingly). Here are our results:

Source	SS	df	MS	Number of obs	=	27
				F(3, 23)	=	8.77
Model	.027414856	3	.009138285	Prob > F	=	0.0005
Residual	.023963619	23	.001041896	R-squared	=	0.5336
				Adj R-squared	=	0.4727
Total	.051378476	26	.001976095	Root MSE	=	.03228

difference_q1q4	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
initclaims_rate_combined	.0048542	.0073272	0.66	0.514	-.0103033	.0200117
s_indicator	.0517819	.0205815	2.52	0.019	.0092057	.0943581
interact_stimulus_unemployment	.0085813	.0131686	0.65	0.521	-.0186601	.0358227
_cons	.0816932	.0126954	6.43	0.000	.0554308	.1079556

This regression only had 27 observations because unemployment benefits data was only available on a weekly basis, so when the unemployment benefits and spending datasets were merged, only the data points of every Monday were preserved.

The constant of 0.0817 means that if there were no new unemployment insurance claims and no stimulus check, people in Q1 would be increasing their spending at a rate that is 8.17 percentage points faster than the change in spending for people in Q4.

Similarly to the previous regression, the coefficient of *s_indicator* is statistically significantly positive, meaning that the release of the stimulus check is still correlated with increased rates of spending by people in Q1 (to be exact, the spending of people in Q1 is expected to increase 0.0518 percentage points faster than the spending of people in Q4 in the month after the release of the stimulus checks).

The coefficients for neither *initclaims_rate_combined* nor *interact_stimulus_unemployment* were not statistically significant from 0. This means that we cannot reject the possibility that the number of new unemployment claims has no impact on the rate of increase of Q1 spending (compared to Q4 spending). Also, the correlation between *initclaims_rate_combined* and *difference_q1q4* was the same both before and after the stimulus check; in other words, the release of the stimulus check did not change how the number of new unemployment claims affected the rate of increase of Q1 spending.

Both of our regressions show that the rate of spending statistically significantly increased after each stimulus check for the lowest quartile of earners; the stimulus checks still had a statistically significant positive impact on the rate of increase of Q1 spending, even when controlling for the effects of overall national spending and the number of the unemployment claims. The two regressions also showed that the rate of overall spending and the number of unemployment benefit applications (a proxy for unemployment benefits as a whole) did not have statistically significant impacts on the rate of spending for the lowest quartile of earners. This allowed us to conclude that there is a positive correlation between stimulus checks and the rate of spending for the lowest quartile of earners.

Conclusion

We originally hypothesized that consumer spending would have decreased in the period following a state's decision to lockdown. This was not the case. When centralizing all states around their lockdown dates, spending actually increased in the period directly after the lockdown. We also expected that following a stimulus payment, spending on essential goods would increase relative to luxury goods. Again, we disproved our original hypothesis and found that luxury goods spending actually increased relative to essential spending after each check.

Finally, we expected that the difference in spending rates among households in low-income zip codes relative to households in high-income zip codes would increase after each stimulus check. We ended up proving this hypothesis correct, finding that the rate at which lower-income earners spent money increased faster relative to higher-income earners (the gap between the change rates of their spending increased). These findings have extremely important implications for the future of economic policy. The empirical evidence we have presented suggests that stimulus checks may prompt increases in consumer spending. This could be a useful policy tool for boosting spending during recessions in the future. Additionally, our evidence from exhibit 5 suggests that lockdowns during the COVID-19 pandemic did not in fact cause consumer spending to decrease dramatically. On the contrary, spending continued to increase just after a state shut down. This suggests that a stay-at-home order like the ones put in place during the COVID-19 pandemic may not be as economically detrimental as many had suggested. In the course of our analysis, we have come up with several questions that we would like to explore in the future: What role did other government policies, especially business subsidies like the Paycheck Protection Program, play in the changes in spending? Why did luxury good spending increase (relative to essential good spending) after stimulus checks 2 and 3? How did spending following the release of a stimulus check differ by race and partisanship?

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