COVID-19 AND THE FINANCIAL SERVICES SECTOR—EVIDENCE FROM FOUR REGIONS IN THE U.S.

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ABSTRACT: How has COVID-19 impacted on the financial services sector? This paper attempts to answer the question by investigating the sector revenues across the four regions in the U.S. My findings show that there are negative impacts of COVID-19 on the sector revenues. Specifically, regions with a larger financial services sector are more likely to be affected by the pandemic. To rebuild more resilient financial systems, it is imperative to understand the key factors contributing to the differences of negative impacts on those regions. By employing multiple discriminant analysis (MDA), the results indicate that before COVID-19, labour determined revenue differences across regions, while during the pandemic, local, state, and federal taxes played the key roles. My findings and discussions aim to inform policy makers in decision-making processes during this outbreak.

JEL: A10, E10, E17, E60, G20

KEYWORDS: Covid-19; Financial services sector; revenues; labour; taxes.

ACKNOWLEDGMENTS: There are no research grants associated with the paper.

1. INTRODUCTION

The financial services sector plays an important role in the U.S. economy and represents a vital component of our nation's critical infrastructure. The sector is valued at US\$20.49 trillion in 2020, US\$22.52 trillion in 2021, and is expected to grow to US\$28.53 trillion in 2025. It contributes US\$1.5 trillion and accounts for 7.4 percent of the total GDP in 2021¹. There are numerous papers that document a sharp reduction in consumption,

¹ Source: Financial Services Sector | CISA

economics output, and revenues across industries and sectors due to COVID-19, for example, airlines (Morlotti and Redondi, 2022; Kotcharin *et al.*, 2023; Pereira *et al.*, 2023), the mining sector (Ramdoo, 2020), the manufacturing sector (Jung *et al.*, 2020; Wang and Wang, 2021; Ardolino *et al.*, 2022), the value chain sector (Bisson and Hambleton, 2020; Dekker, 2020; Meester and Ooijens, 2020). Despite the effects of COVID-19, there is not much research exploring its effect on the financial services sector.

Previous studies have shown the effect of COVID-19 on stock markets (Wagner, 2020; Zaremba *et al.*, 2020; Cao *et al.*, 2020; Onali, 2020; Rubbaniy *et al.*, 2020; Arias-Calluari *et al.*, 2021; Mazur *et al.*, 2021; Dey *et al.*, 2022; Mishra *et al.*, 2022; Yu and Xiao, 2023). However, most of these studies focus on national and international levels, and there is no clear observation of pandemic effects at regional level in the U.S. This paper attempts to fill out the research gap and provide focused analysis of the pandemic's impact on the financial services sector regionally.

Following the U.S. Census Bureau, this paper classifies American divisions into four main geographic regions: the Northeast, the Midwest, the South, and the West. This paper contributes to the literature in three ways. First, it addresses the question "How has the financial services sector performance changed across the four regions during COVID-19 vs. before COVID-19?". Using revenues as a proxy of the financial services sector performance during the period 2017-2022, my findings show that, on average, its revenues decreased by 14.16 percent during COVID-19 compared with before COVID-19, suggesting negative impacts of COVID-19 on the financial services sector. Specifically, the Northeast is impacted the greatest with a 17.37 percent decrease in revenues, followed by the West (-15.68 percent), the South (-11.58 percent), and the Midwest (-6.87 percent). This indicates that regions with larger financial services sectors are more likely to be affected by the pandemic. Secondly, to rebuild a more resilient financial system, it is imperative to understand the significant factors contributing to the differences of the negative impacts among regions. Therefore, this paper examines key factors that cause revenue differences across regions pre-COVID-19 and during COVID-19. Another noticeable contribution of this paper is utilising the multiple discriminant analysis (MDA) in differentiating revenues among these regions. MDA is one of the most appropriate methodological approaches to derive variates that best distinguishes between all independent variables in affecting the dependent variable. However, MDA remains underexplored in previous research studies.

My findings are interesting in three ways. (1) COVID-19 has negative impacts on the financial services sector regionally, specifically bigger regions are more likely to be impacted. (2) Before COVID-19, labour played a key role in determining revenue differences across regions, while during COVID-19, local, state, and federal taxes were the significant contributors to these differences. This is likely because on the micro level, individual business firms may attempt to maintain their net revenues by providing more output to counter increases in taxes. This is especially true in the short term when such firms may be unable to raise their prices. Additionally, small competitive firms will have little or no ability to increase their prices in response to tax increases. This suggests that taxes are the main factors in differentiating the impacts of COVID-19 on the sector revenues across regions. To my understanding, this is a novel finding since there is no similar report in the previous literature. (3) My findings and discussions can inform policy makers aiming to address these impacts across the regions and states to rebuild more resilient regional economies. My findings contribute to the scant evidence of the impact of the COVID-19 pandemic on the financial services sector.

The paper is organised as follows: Section 2 provides the literature review, Section 3 discusses the data and methodology, Section 4 presents the empirical results, Section 5 provides the discussions, and Section 6 includes the conclusions.

2. LITERATURE REVIEW

The extant literature review has documented the negative impacts of the COVID-19 pandemic across industries and sectors. For instance, Ramdoo (2020) reported that the mining sector has not been spared from the negative consequences of the outbreak. The unprecedented crisis created employment reduction in the mining sector because: (1) tight working conditions at mine sites place workers in the frontline in terms of health and safety risks, prompting the industry to quarantine them; and (2) they are temporarily laid off at mines and across supply chains as national lockdown restrictions take effect. These led to the sector production and revenue decline. Similar to the mining sector, manufacturing and industrial operations have been severely impacted by the pandemic (Jung *et al.*, 2020; Dwivedi *et al.*, 2020; Dubey *et al.*, 2021; Ivanov and Dolgui, 2021; Wang and Wang, 2021; Ardolino *et al.*, 2022). Mandatory lockdown, social distancing, and remote work restrictions are among the main reasons. As a result, there have been significant drops in employment, production, and

revenues. Similar results of COVID-19's negative consequences are reported in the other industries and sectors, for example, airlines (Morlotti and Redondi, 2022; Pereira *et al.*, 2023), food and beverage (Belhadi *et al.*, 2021; Borsellino *et al.*, 2020; Kumar and Kumar Singh, 2021), value chain sector (Bisson and Hambleton, 2020; Dekker, 2020; Meester and Ooijens, 2020). However, there is not much exploration of the COVID-19 crisis effect on the financial services sector, even though it is an important and fast-growing sector that requires more research attention.

Previous studies have shown the effect of COVID-19 on stock markets across countries, for example, Australia (Chiah et al., 2022), Canada (Apergis et al., 2022), India (Behera et al., 2022), Malaysia (Xie and Zhou, 2022), United States (Martins and Cró, 2022; Mishra et al., 2022), G20 countries (Caporale et al., 2022), G7 countries (Narayan et al., 2021). COVID-19 restrictions and vaccination played an important role on the stock markets. While the COVID-19 vaccination rate had significant impact on stock markets, the COVID-19 restriction policy played a partially mediate role (Yu and Xiao, 2023). Both government policy and the COVID-19 vaccination supported the stock market recovery in the pandemic (Behera et al., 2022). These studies focus on national and international levels, and there is no clear observation of pandemic effects at the regional level in the U.S. This study provides in-depth analysis of the pandemic's impact across regions in the U.S. Following the COVID-19 negative consequences, it is important to understand the key factors that caused the negative impact differences on each region. This helps policy makers in their decision-making process to rebuild more resilient regional economies.

3. DATA, SAMPLE, AND METHODOLOGY

Data and Sample

Annual data are collected on Economic Impact Analysis for Planning (IMPLAN). Revenues; labour; labour income; local and state spending; federal government spending; local, state and federal taxes; and capitalisations are collected for 51 jurisdictions. Based on the U.S. Census Bureau, the U.S. is divided into four main geographical regions, including

the Northeast, the Midwest, the South, and the West.² The list of the states in each region is provided in Table A1 in the Appendix.

Following the Centers for Disease Control and Prevention (CDC), the year 2020 is chosen as the start of the COVID-19 pandemic. Therefore, the period from January 2020 to December 2022 is selected as during COVID-19 period. Based on this period, the length of the sample is extended and divided into two sub-periods:

- (1) Pre-COVID-19: January 2017–December 2019 (153 observations)
- (2) During COVID-19: January 2020–December 2022 (153 observations)

My investigation is conducted annually and includes 306 observations.

Variables

To be consistent with Mairesse and Jaumandreu (2005), Gunay (2012), Fang (2016), Cui *et al.* (2018), Mahnken and Hadrich (2018), Velayudhan (2018), and Wang *et al.* (2019), performance of the financial services sector is measured by its revenues.

Following the previous research, I employ labour; labour income; local and state spending; federal government spending (GS); and local, state, and federal taxes as independent variables. I control for the size of the financial services sector in each state. Variable definitions are provided below.

Dependent Variable:

Revenues: Annual Revenue of the U.S Financial Investment Industry (in million dollars).

Independent Variables:

Labour: Total employment data (labour supply) follows the same definition as the Bureau of Economic Analysis Regional Economic Accounts (BEA REA) and the Bureau of Labor Statistics Census of Employment and Wages (BLS CEW) data, which are full-time/part-time annual averages. One job lasting 12 months = two jobs lasting six months each = three jobs lasting four months each. A job can be either full-time or part-time. Similarly, a job that lasts one quarter of the year would be 1/4

² Source: <u>United States Map Defines New England</u>, <u>Midwest</u>, <u>South</u> (<u>businessinsider.com</u>)

job. Note that a person can hold more than one job, so the job count is not necessarily the same as the count of employed persons.

Labour Income: Annual labour income which consists of two parts. First, Employee Compensation, is the total payroll cost of wage and salary to the employer payments to employees. This includes wages and salaries, all benefits (e.g., health, retirement), and payroll taxes (both sides of social security, unemployment insurance taxes, etc.). It is also referred to as Fully Loaded Payroll. The second part of Labour Income is Proprietors' Income (PI), which consists of payments received by self-employed individuals and unincorporated business owners. More specifically, it represents the current-production income of sole proprietorships, partnerships, and tax-exempt cooperatives. It includes the capital consumption allowance and is recorded on Federal Tax form 1040C. PI excludes dividends, monetary interest received by nonfinancial business, and rental income received by persons not primarily engaged in the real estate business. Note that Labour Income can be negative if there is a net loss to the proprietor (in million dollars).

Local and State Spending: Annual local and state spending (in million dollars).

Federal Government Spending: Annual federal government spending (in million dollars).

Local, State and Federal Taxes: Annual local, state, and federal taxes (in million dollars).

Control Variable:

Capitalisation (size): Annual market capitalisation of the financial services sector in each state (in million dollars).

Multiple Discriminant Analysis (MDA)

Why is MDA utilised in this study?

Following Altman (1968) and Hair et al (2006), MDA is utilised to examine factors that play key roles in revenue differences among four regions pre-COVID-19 and during COVID-19.

Why is MDA appropriate?

MDA derives variates that best distinguish between all independent variables in affecting the dependent variable. MDA is an appropriate methodological approach because my goal is to investigate main factors contributing to revenue differences across regions before and during COVID-19. Dependent and independent variables meet all the assumptions below.

What are the MDA assumptions?

Assumption for Dependent Variable:

MDA requires dependent variables to be categorised. Dependent variables are revenues and can be categorised based on groups (four regions equivalent to four groups).

Assumptions for Independent Variables: (1) data comes from multivariate normal distribution, (2) variance matrices of predictor variables must be equal, (3) independent variables should not be highly correlated, and (4) there is linearity of discrimination function.

Limitation: Violation of the first assumption of independent variables leads to a low level of classification accuracy.

How does the MDA model work?

MDA includes six stages. Stage 1 includes evaluating differences between average scores for a priori group on independent variables, determining independent variables account for most of the differences between groups and classifying observations into groups. Stage 2 is to determine the sample size that is appropriate. Stage 3 is to choose dependent and independent variables that meet the above assumptions. Pretests are conducted. Stage 4 is to estimate MDA and assess fit. Stage 5 is to interpret the results, and Stage 6 is to validate the results.

Based on these MDA results, the next step is to calculate the Relative Eigen Value to arrive at the Potency Value of each function. There are three Eigen Value functions since there are four regions. The Relative Eigen Value and Potency Value are computed as follows:

$$\kappa_{\rm X} = \frac{\lambda_{\rm X}}{\sum_{N=1}^3 \Sigma \lambda_N}$$

and

$$\iota_{x} = r^{2} * \kappa_{x}$$

where κ is the Relative Eigen Value, λ *is* Eigen Value of Function, ι is Potency Value, *r* is discriminant loading, and χ runs from 1 to 3.

The last step is to calculate the Potency Index to determine the key role factors in revenue differences across regions:

$$v = x_{=1}^{3} \Sigma v$$

where v is Potency Index, ι is Potency Value and χ runs from 1 to 3.

4. EMPIRICAL RESULTS

Descriptive Statistics

Table 1 reports 14.16 percent decrease in average revenues of the financial services sector during COVID-19 compared with pre-COVID-19, suggesting there is negative impact of the pandemic on the financial services sector. Specifically, there is greatest decrease in the revenue in the Northeast (-17.37 percent), followed by the West (-15.68 percent,) the South (-11.58 percent), and the Midwest (-6.82 percent). This indicates that bigger regions are more likely to be impacted by the pandemic. T-tests are performed to test the difference between the average revenues of each region during COVID-19 vs pre-COVID-19. The results are significant.

Table 1. Pre Covid-19 vs. During Covid-19: Financial services sector revenues based on regions (in millions).

	Northeast	Midwest	South	West	Total
Pre-COVID-19	\$27.14	\$10.26	\$13.04	\$14.18	\$64.63
During COVID-19	\$22.43	\$9.56	\$11.53	\$11.96	\$55.47
Change in dollars	-\$4.71	-\$0.70	-\$1.51	-\$2.22	-\$9.15
	(0.04)**	(0.02)**	(0.03)**	(0.03)**	(0.03)**
Change in %	-17.35%	-6.82%	-11.58%	-15.66%	-14.16%

Note: T-tests are performed to test the difference between the average revenues of each region during COVID-19 vs pre-COVID -19. P-values are in the parentheses. *, **, *** represent significance at 90%, 95% and 99%, respectively.

Table 2 shows the average of labour; labour incomes; state and local spending; federal government spending; local, state, and federal taxes; and capitalisation (size) of the financial services sector in each region during COVID-19 compared to pre-COVID-19. The Northeast region shows that there is a decrease in the labour (-36.36 percent), federal government spending (-33.77 percent), and taxes (-1.17 percent). However, there is an increase in labour income (19.46 percent) during COVID-19 vs pre-COVID-19. Similar results are found in the Midwest and the South regions. On the other hand, the West region shows similar results for the labour, labour income, state and local spending, federal government spending, and capitalisation except for the taxes (increased by 13.03 percent). As reported in Table 2, the Northeast region has the biggest financial services sector (US\$1,773.98 million), followed by the West (US\$670.84 million).

MDA Results

Before employing MDA, pretests are performed. Correlation test results show that there is no correlation between independent variables. T-tests are performed to test the difference between the average revenues of each region pre-COVID-19 and the difference between the average revenues of each region during COVID-19. The results are reported in Table 1 and are statistically significant.

Table A2 and Table A3 report the results from estimating MDA pre-COVID-19. Table 3 shows the potency index and ranking of each variable. Labour is ranked as number one. This indicates that before COVID-19, labour is the main factor that discriminates revenues of the financial services sector across regions. This is no surprise since there is a relationship between labour and the sector revenues and labour plays an important role in determining the level of revenues.

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	Pre- COVID-19	During COVID-19	Change (in dollars)	Change	Pre- COVID-19	During COVID-19	Change (in dollars)	Change (in %)
Variables		Northe	ast	(111 / 0)		Midw	est	(111 / 0)
Labor	0.11	0.07	-0.04	-36.36%	0.06	0.03	-0.03	-50.00%
Labor Income	\$9.71	\$11.60	\$1.89	19.46%	\$2,149.56	\$2,647.96	\$498.4	23.19%
State and Local Spending	\$943.26	\$1,253.13	\$309.87	32.85%	\$380.29	\$473.90	\$93.61	24.62%
Federal Government Spending	\$552.20	\$365.76	-\$186.47	-33.77%	\$208.83	\$147.44	-\$61.39	-29.40%
Local, State and Federal Taxes	\$54.59	\$53.95	-\$0.64	-1.17%	\$24.53	\$20.40	-\$4.13	-16.84%
Capitalization (size)	\$1,362.86	\$1,773.98	\$411.12	30.16%	\$553.87	\$670.84	\$116.97	21.19%
		Sout	n			Wes	t	
Labor	0.07	0.04	-0.03	-42.86%	0.07	0.05	-0.02	-28.57%
Labor Income	\$2,455.14	\$3,171.11	\$715.97	29.16%	\$3,322.12	\$4,196.70	\$874.58	26.33%
State and Local Spending	\$461.74	\$602.16	\$140.42	30.41%	\$482.66	\$654.91	\$172.25	35.69%
Federal Government Spending	\$265.34	\$179.03	-\$86.31	-32.53%	\$288.59	\$187.15	-\$101.44	-35.15%
Local, State and Federal Taxes	\$28.39	\$25.93	\$2.46	-8.67%	\$24.95	\$28.20	\$3.25	13.03%
Capitalization (size)	\$669.83	\$852.40	\$182.57	27.26%	\$696.52	\$927.08	\$230.56	33.10%

Table 2. Pre-COVID-19 vs. During COVID-19: Variable comparison based on regions (in millions).

Variables	Potency	Potency	Potency	Potency	Donk
variables	Value 1	Value 2	Value 3	Index	канк
Labor	0.42695	0.00610	0.00082	0.43387	1
Labor Income	0.05080	0.01509	0.00060	0.06649	5
State and Local Spending	0.15534	0.01093	0.00075	0.16702	2
Federal Government Spending	0.12799	0.00895	0.00048	0.13742	3
Local, State and Federal Taxes	0.01563	0.00323	0.00048	0.01934	6
Capitalization	0.07425	0.00502	0.00056	0.07983	4

Table 3. Pre-COVID-19: Potency Index

The results from estimating MDA during COVID-19 are documented in tables A4 and A5. Table 4 shows the potency index and ranking of each variable. Before COVID-19, labour determines the revenue differences among regions, while local, state, and taxes play the key roles during the pandemic. This suggests that taxes are significant factors in the varying impacts of COVID-19 on the sector revenues across regions. This is because (1) On the micro level, individual business firms may attempt to maintain their net revenue by providing more output to counter increases in taxes. This is especially true in the short term (during this pandemic) when such firms may be unable to raise their prices; and (2) Small competitive firms will have little or no ability to increase their prices in response to tax increases.

Robustness Test

Earnings before interest and tax (EBIT) is used as another proxy of the financial service sector's performance. EBIT is obtained from IMPLAN database and is defined as annual EBIT of financial services sector (in million dollars). The results are not reported here but confirm the key role of labour in differentiating the sector revenues before COVID-19, while taxes are the main contributors during the outbreak.

Variables	Potency	Potency	Potency	Potency	Donk
variables	Value 1	Value 2	Value 3	Index	Kalik
Labor	0.25142	0.00031	0.00013	0.25186	2
Labor Income	0.04448	0.00101	0.00051	0.04600	5
State and Local					
Spending	0.02031	0.00046	0.00051	0.02128	6
Federal					
Government					
Spending	0.05705	0.00132	0.00143	0.05980	4
Local, State and					
Federal Taxes	0.25335	0.01560	0.01074	0.27969	1
Capitalization	0.22048	0.00502	0.00061	0.22611	3

Table 4. During COVID-19: Potency Index

Additional Robustness Test

Second sample data is collected between January 2014 to December 2016 from IMPLAN. The same methodological approach MDA is employed, and the results persist. This confirms the critical role of labour in discriminating sector revenues among regions pre-COVID-19.

5. DISCUSSION

Possible Explanations of Sector Revenue Decreases Among Regions During the COVID-19 Crisis

Why the COVID-19 crisis has negative impacts on sector revenues across regions can be explained in three ways. First, the unprecedented crisis lockdown has had sweeping consequences for employment. Strict rules, social distancing, and furlough off are among the main reasons (Ramdoo, 2020; Wang and Wang, 2021; Ardolino, 2022). The Midwest experienced the greatest employment reduction, -40.10 percent compared with before COVID-19, followed by the South (-36.58 percent), the Northeast (-32.76 percent), and the West (28.75 percent) (Table 2).

Secondly, business closures due to the COVID-19 crisis would be another cause for sector revenue reductions. More than 700,000 businesses closed in the second quarter of 2020, accounting for nearly three million jobs out of 20 million gross job losses³. Lastly, there was a drastic reduction in customer demand for these businesses because health concerns dissuaded customers from visiting businesses that had person-toperson contact (Fairlie and Fossen, 2022). In addition, there is a large percentage of banks reported tightening credit standards for most loan types based on the Fed's July 2020 survey. Given tightened standards, there is a demand decline for most loans (Li *et al.*, 2021). As a result, these COVID-19 consequences lead to negative impacts on the sector revenues.

Implication Plans on Economics Recovery

It is critical to create a safe working environment for workers to go back to work. There must be minimum standards regarding health and safety to protect workers across industries and sectors. It is also important for labour unions to ensure the appropriate working conditions in such future circumstances. In addition, temporary income should be provided to support workers across all sectors. This incentive is to encourage them to go back to work during COVID-19. Along with that, financial support should be provided to businesses to reduce their financial risk and recover their business, especially local and small businesses. Tax relief and refund would be great tools to help companies as well as households during the recovery process (Ramdoo, 2020). They should carefully consider any tax relief to companies that are in more serious financial distress. Tax relief and refund packages should be tailored to respond to the labour situation in each industry and sector.

The COVID-19 pandemic has severely impacted not only the U.S. but other countries, including Australia and New Zealand (Chiah *et al.* (2022; Hammond *et al.*, 2022; Bhutkar, 2023). In Australia, the virus forced many companies to reduce their FIFO and DIDO workers due to mandatory restrictions on travel within the country. This led to a reduction in the labour market and, as a result, lowering productions and revenues (Ramdoo, 2020). The above plans can be applicable for other countries, like Australia and New Zealand, for their recovery, especially if they have geographic state divisions like the U.S. However, the level of adjustment and adaptation can be flexible based on their situation.

³ Source: <u>The Fed - Business entry and exit in the COVID-19 pandemic: A</u> <u>preliminary look at official data (federalreserve.gov)</u>

6. CONCLUSION

This paper investigates the effect of the COVID-19 pandemic on the financial services sector across regions in the U.S. My findings show that there are negative impacts of COVID-19 on the sector revenues across regions. Particularly, bigger regions are more likely to be impacted. This is possibly due to employment reduction, business closures, and customer demand decline.

To rebuild a more resilient financial system, it is imperative to understand the key factors contributing to the differences of negative impacts of COVID-19 among regions. By employing MDA, this study examines key factors that caused revenue differences across regions pre-COVID-19 and during COVID-19. It is noteworthy that before COVID-19, labour discriminated the sector revenues across regions, while local, state, and federal taxes were the main contributors during the outbreak.

This paper provides better understanding of the pandemic's effects on regional economies in the U.S. My findings have implication for what the government will do next during this outbreak (e.g., President Biden's proposed US\$1.9 trillion Coronavirus stimulus package).

This paper opens doors for potential research in the future. Their research should focus on how to rebuild more resilient regional economies in the U.S. in general and worldwide at large. Policies and available tools should be discussed and tailored based on each economy.

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APPENDIX

Table A1. List of States in Each Region.

Regions	States
The Northeast	Maine, New Hampshire, Vermont,
	Massachusetts, Rhode Island,
	Connecticut, New York, New Jersey, and
	Pennsylvania.
The Midwest	Ohio, Michigan, Indiana, Wisconsin,
	Illinois, Minnesota, Iowa, Missouri,
	North Dakota, South Dakota, Nebraska,
	and Kansas.
The South	Delaware, Maryland, Virginia, West
	Virginia, Kentucky, North Carolina,
	South Carolina, Tennessee, Georgia,
	Florida, Alabama, Mississippi, Arkansas,
	Louisiana, Texas, Oklahoma, and
	Washington D.C.
The West	Montana, Idaho, Wyoming, Colorado,
	New Mexico, Arizona, Utah, Nevada,
	California, Oregon, Washington, Alaska,
	and Hawaii.

Table A2. Pre-COVID-19: Eigen Values Function from Estimating MDA

Function	Eigen Value	Relative Eigen value	% of Variance	Cumulative %	Canonical Correlation
1	0.252	0.977	97.5	97.5	0.448
2	0.005	0.019	2.1	99.6	0.073
3	0.001	0.004	0.4	100.0	0.033

Variables	Discriminant	Squared	Relative	Potency
variables	Loadings	Loadings	Eigen Value	Value 1
Labor	0.661	0.437	0.977	0.42695
Labor Income	-0.228	0.052	0.977	0.05080
State and Local	0 300	0 1 5 9	0.977	0 15534
Spending	0.399	0.139	0.977	0.15554
Federal				
Government	-0.362	0.131	0.977	0.12799
Spending				
Local, State and	0.125	0.016	0.977	0.01563
Federal Taxes	0.125	0.010	0.977	0.01505
Capitalization	0.276	0.076	0.977	0.07425
Variables	Discriminant	Squared	Relative	Potency
v ur lubico	Loadings	Loadings	Eigen Value	Value 2
Labor	-0.567	0.321	0.019	0.00610
Labor Income	0.890	0.792	0.019	0.01509
State and Local	0.758	0.575	0.019	0.01093
Spending	01100	0.070	0.017	0101070
Federal		· · · ·		
Government	-0.686	0.471	0.019	0.00895
Spending				
Local, State and	0.412	0.170	0.019	0.00323
Federal Taxes	0.514	0.0(1	0.010	0.00500
Capitalization	-0.514	0.264	0.019	0.00502
Variables	Discriminant	Squared	Kelative	Potency Volue 2
Lahan	Loadings			value 5
Labor	-0.452	0.204	0.004	0.00082
State and Local	0.388	0.131	0.004	0.00000
State and Local	0.433	0.187	0.004	0.00075
Fodoral				
Government	0 3/18	0 121	0.004	0.00048
Spending	-0.340	0.121	0.004	0.000+0
Local State and				
Federal Taxes	-0.247	0.120	0.004	0.00048
Capitalization	0.375	0.141	0.004	0.00056

Table A3. Pre-COVID-19: Loading Factors from Estimating MDA	

Function	Eigen Value	Relative Eigen value	% of Variance	Cumulative %	Canonical Correlation
1	0.351	0.967	41.25	52.4	0.224
2	0.008	0.022	1.2	67.3	0.056
3	0.004	0.011	0.2	100.0	0.022

Table A4. During COVID-19: Eigen Values Function from EstimatingMDA

Variables	Discriminant	Squared	Relative	Potency
variables	Loadings	Loadings	Eigen Value	Value 1
Labor	0.510	0.260	0.967	0.25142
Labor Income	-0.215	0.046	0.967	0.04448
State and Local				
Spending	0.145	0.021	0.967	0.02031
Federal				
Government				
Spending	0.243	0.059	0.967	0.05705
Local, State and				
Federal Taxes	-0.512	0.262	0.967	0.25335
Capitalization	-0.478	0.228	0.967	0.22048
Variables	Discriminant	Squared	Relative	Potency
v al lables	Loadings	Loadings	Eigen Value	Value 2
Labor	0.120	0.014	0.022	0.00031
Labor Income	-0.215	0.046	0.022	0.00101
State and Local				
Spending	0.145	0.021	0.022	0.00046
Federal				
Government				
Spending	0.245	0.060	0.022	0.00132
Local, State and				
Federal Taxes	-0.842	0.709	0.022	0.01560
Capitalization	-0.478	0.228	0.022	0.00502
Variables	Discriminant	Squared	Relative	Potency
	Loadings	Loadings	Eigen Value	Value 3
Labor	-0.110	0.012	0.011	0.00013
Labor Income	0.215	0.046	0.011	0.00051
State and Local				
Spending	0.215	0.046	0.011	0.00051
Federal				
Government	0.0.00	0.100	0.011	0 001 40
Spending	-0.360	0.130	0.011	0.00143
Local, State and	0.000	0.076	0.011	0.01074
Federal Taxes	-0.988	0.976	0.011	0.010/4
Capitalization	0.236	0.055	0.011	0.00061

Table A5. During COVID-19: Loading Factors from Estimating MDA