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Covid-19 Impacts on Women-Owned Businesses: A Systematic Literature Review and Empirical Analysis ¹

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Abstract

This research shows that women-owned businesses were impacted by the Covid-19 pandemic severely; during April, 2020, the number of women-owned businesses were 50% less than what it was during April, 2019. Businesses functioning in the wholesale and retail sectors were most affected – 83% shuttered their doors permanently during the peak of the pandemic. On a positive note, lot more female-owned businesses in the education and health services sectors have since appeared: as at end April, 2021, 25,362 new women-owned businesses have appeared in Illinois.

Introduction

Moody's Analytics³ states that Illinois is worst affected by Covid-19; in a series of papers, I have explored Covid-19 impacts on small businesses, including minority-owned businesses⁴, but did not explore the effect of the pandemic on women-owned businesses. The need to engage in such an analysis stems from the fact that women-owned businesses, on average, gain less access to

¹ Often, "literature reviews" tend to be a summary of (a convenience sample of) published studies on the topic; they rarely state how studies are selected, assessed, and integrated; the systematic review overcomes these deficiencies.

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³ See, Athiyaman, A. (2021). Some Empirical Aspects of Manufacturing Sector During the Covid-19 Pandemic:

http://www.iira.org/wp-content/uploads/2021/02/RRR_Jan2021_Feb12.pdf.

⁴ See, for example, Athiyaman, A. (2021). Covid-19 Pandemic: Effects on Minority-Owned Businesses in Illinois:

financial services than men-owned businesses⁵. Thus, the objective of the systematic review would be to explore the impacts of Covid-19 on women small-business owners in the nation. The process begins by identifying the phenomenon or phenomena of interest, relevant populations, settings, the types of evidence that will help to gain a solution, and appropriate outcomes; the type of evidence that we need would be the correlates of female-owned business closures during the various phases of the pandemic⁶.

Searching the Literature

A search for keywords was completed in peer-review, English-language journals listed in Business Source Elite; the keywords were: Covid-19, proprietress, and all hyponyms related to the top three definitions for the word “business” in WordNet (Table 1). Based on the definitions, for example, that business is a “commercial or industrial enterprise and the people who constitute it”, hyponyms such as agency, brokerage, business, firm, enterprise, franchise, dealership, and manufacturer, were paired with the moderator “small” and searched in the “author-supplied keywords” function⁷.

⁵ See, <https://www.forbes.com/sites/rohitarora/2021/03/25/credit-scores-and-average-earnings-of-women-owned-businesses-rose-yet-loan-approvals-lagged-in-2020/?sh=548039f72c80>.

⁶ See footnote 4, Figure 1, for a listing of the pandemic states.

⁷ For example, the words. “Covid-19 and small agency” were searched in the KW, author-supplied keywords, function of the Business Source Elite database.

Table 1: Search Keywords: Top Three Definitions from WordNet ⁸

<p>Business: A commercial or industrial enterprise and the people who constitute it.</p>	<p>Hypernyms: Enterprise</p> <p>Hyponyms: Agency, brokerage, carrier, common-carrier, chain, firm, house, business-firm, franchise, dealership, manufacturer, maker, manufacturing-business, partnership, processor, shipbuilder, underperformer.</p>
<p>Commercial Enterprise: The activity of providing goods and services involving financial and commercial and industrial aspects.</p>	<p>Hypernyms: Commerce, commercialism, mercantilism.</p> <p>Hyponyms: Advertising, publicizing, agribusiness, agriculture, factory-farm, butchery, butchering, construction, building, discount-business, employee-owned enterprise, employee-owned business, field, field of operation, line of business, finance, fishing, industry, manufacture, packaging, printing, publication, publishing, real-estate business, storage, tourism, transportation, shipping, transport, venture.</p>
<p>Occupation: The principal activity in your life that you do to earn money.</p>	<p>Hypernyms: Activity.</p> <p>Hyponyms: Accountancy, accounting, appointment, career, calling, vocation, catering, confectionery, employment, work, farming, land, game, biz, metier, medium, photography, position, post, berth, office, spot, billet, place, situation, profession, sport, trade, craft, treadmill, salt mine.</p>

⁸ A semantically oriented dictionary of English; see, Fellbaum, C. (2005). WordNet and wordnets. In: Brown, Keith et al. (eds.), Encyclopedia of Language and Linguistics, Second Edition, Oxford: Elsevier, 665-670.

Assessing the Studies

In this stage, the article abstracts were examined to ensure that they were relevant; papers that did not address the combined topic of Covid-19 impacts and women-owned small businesses were removed. The full text copies of papers that met the search criteria were obtained for analysis; information extracted from the paper includes a thematic synthesis of the key themes.

Results

Figure 1 is a flowchart of the article selection process. The limited number of peer-reviewed papers on the subject could be due to the short time that Covid-19 has been in the US – the virus became a pandemic in March, 2020⁹.

Figure 1: Article Selection Process: A Linear Representation

Number of articles identified in Business Source Elite:

- Total number of articles identified = 54
- Limiting to peer-reviewed journals = 22
- Limiting to English language publications = 17 (see Appendix 1).



Papers identified as relevant to topic area = 7¹⁰ (see Appendix 2 for a list of these references).



Additions to the review¹¹ = 1



Full texts reviewed = 8

¹¹ The US Chamber did a study on the impact of Covid-19 on women-owned enterprises and this study was added to the list of “relevant papers”.

⁹ <https://www.statnews.com/2020/03/13/national-emergency-coronavirus/>.

¹⁰ Two independent reviewers judged the relevance of the papers.

The thematic content of the papers can be called the “mediating mechanisms of Covid-19 impacts”; technically, the mediating mechanisms are intervening variables – they moderate the influence of Covid-19 (the independent variable) on small business survival (the dependent variable)¹². In the thematic analysis below, the intervening variables are highlighted, underscored.

Data from the MetLife / US Chamber of Commerce Small Business Index Survey, Quarter 2, 2020, suggest that women entrepreneurs perceived the overall business climate less optimistically than their male counterparts¹³. Since entrepreneurs’ beliefs about the external world determine their economic behavior (for example, business purchases), their perceptions about ‘business climate’ will moderate the influence of Covid-19 on business closure. Recently, Clampit et al (2021) extended this type of thinking to entrepreneur’s knowledge about business management; they posit that an entrepreneur’s ability to differentially allocate business resources to tackle environmental turbulence (dynamic capabilities of the entrepreneur, DC) moderates Covid-19 impacts on small businesses. Gomes (2021) confirms the importance of DC for business survival; also, the study by Fairlie and Fossen (2021), on a firm’s ability to source working capital, highlights the salience of DC as a determinant of business success during the

¹² Athiyaman, A. (2020). Opioid use disorder in the nonmetro regions: Some basic facts from the 2018 National Survey on Drug Use and Health (NSDUH). Rural Research Report, 30(1), 1-11. Available online: http://www.iira.org/wp-content/uploads/2020/06/Opioid_2020_draft.pdf.

Covid-19 pandemic. Another individual level variable that has been stated as an intervening variable for Covid-19 impacts on businesses is ‘mental health’ (Torres et al 2021); they posit that women entrepreneurs are more susceptible to mental stress because of external shocks such as the Covid-19 pandemic.

A few studies have explored the structural facets of business as moderators for Covid-19 impacts on business survival. Zhang., Gerlowski, and Acs (2021) claim that in states with higher “work from home” (WFH) incidents, small businesses performed better overall. Although their model failed to explore the reasons behind this empirical finding, research by Envick (2021) and Akpan et al (2020) suggest that business use of digital technology, such as virtual reality displays of products, could explain WFH influences on business survival.

Figure 2 is a summary of the thematic discussions using the NLP algorithm that was discussed in an earlier Research Brief¹⁴; the algorithm was fitted to the eight papers, their textual contents¹⁵. This was done to assess the correlation between the two approaches: manual coding of the themes versus machine coding. As shown in Figure 2, there is a positive correlation between the two approaches.

¹³ See, <https://www.uschamber.com/report/special-report-women-owned-small-businesses-during-covid-19>.

¹⁴ Athiyaman, A. (2021). Problem identification in community economic development using natural language processing. Research Brief, 3(12), August 6, 1-18. Available online: http://www.iira.org/wp-content/uploads/2021/08/problem_identification_Res_Brief12_2021_1.pdf.

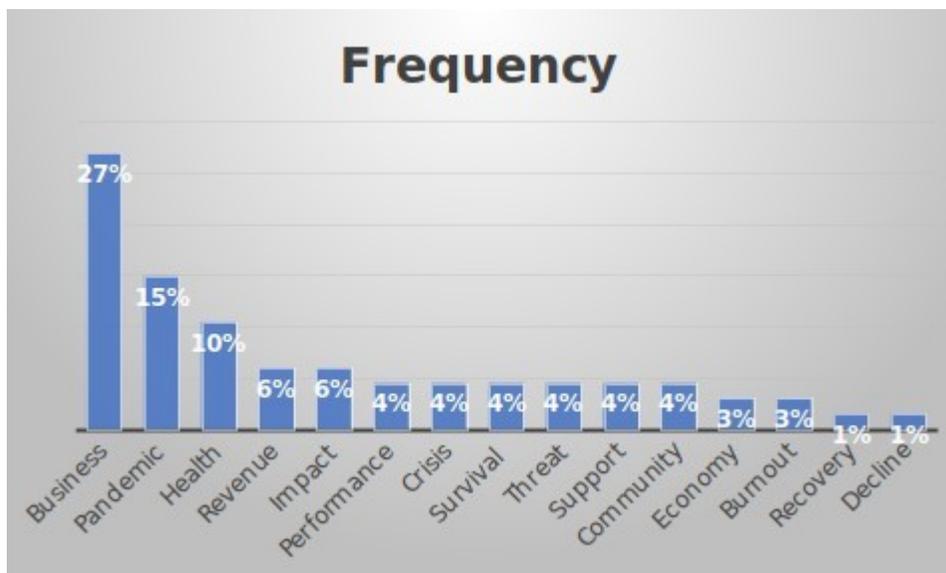
¹⁵ The subject predicate relations were limited to the following words (phrases): affect, influence, impact, and change.

Figure 2: NLP Analysis of the Literature: Covid-19 and Small Business

Example of Noun Phrases:

the/DT coronavirus/NN
a/DT strong/JJ recovery/NN
Investment/NN
optimistic/JJ revenue/NN
the/DT overall/JJ health/NN

Concepts: Frequency of Occurrence



Extracted Reviews, Some Examples:

Women-owned small businesses have been more heavily impacted by the coronavirus pandemic than male-owned small businesses, and they are less likely to anticipate a strong recovery in the year ahead, new data show.

Big data and predictive and visual analytics are critical enablers to aiding complex business decisions in the current changing business climate.

Uncertainty is a major factor that can have a truly major impact on small businesses, and this was especially evident during a pandemic.

The structured review above indicates concepts that could be used to manage Covid-19 impacts on businesses; for example, educating small business owners on technology could help minimize, if not maintain, sales revenue. However, to do that we need to know the status of female-owned businesses in Illinois; for example, the rate of female-owned business closure due to Covid-19.

Covid-19 Impacts on Female-Owned Businesses

To assess the impact of Covid-19, microdata from the Current Population Survey (CPS) were used. The CPS is fielded monthly by the US Census Bureau and the Bureau of Labor Statistics. It's

primarily used to gain information about the nation's labor force. Sixty thousand households spread across the 50 states and the District of Columbia are polled using a 4-8-4 sampling scheme¹⁶; data are collected during the calendar week that includes the 19th of the month. Results are often released for public use within two weeks of data collection¹⁷.

The following variables were extracted from the CPS for all of 2019, 2020, and for January-July, 2021. In all, the 37 months, timeseries, data matrix contained information on labor market variables (for example, "self-employed" class of worker), industry (for example, manufacturing); demographics such as age, gender, and race; and geographic variables such as respondent's state of residence (Table 2).

Table 2: CPS Variables

Variable Label	Variable Name	Notes
PRTAGE	Age	Continuous up to 79; Discrete: 80-84 = 80; 85+ = 85,
PESEX	Gender	Male = 1; Female = 2
PTDTRACE	Race	Discrete: 26 Categories
PEEDUCA	Educational attainment	Discrete: 16 categories
PEHRACT1	Actual hours worked	Continuous, 0 to 99 hours
PEI01COW	Class of worker	Discrete, 8 categories
PRMJIND1	Major Industry	Discrete, 14 categories
PRDTIND1	Industry	Discrete, 51 categories
GESTFIPS	State	Discrete, 56 categories
GTCBSASZ	Metro area size	Discrete, 8 categories

¹⁶ A household is in the survey for four consecutive months, left out for eight months, and then polled again for four consecutive months.

¹⁷ For more information about CPS methodology, see the publication Design and Methodology: Current Population Survey – America's Source for Labor Force Data; available online at <https://www.bls.gov/cps/>.

In CPS, the variable “class of worker” contains information about self-employed in incorporated businesses and unincorporated businesses. These two categories were combined, statistically weighted to be representative of the civilian noninstitutional population 16 and over in the metro and the nonmetro¹⁸, and the results used to estimate the rate of female-owned small business numbers in Illinois.

To estimate Covid-19 impacts, effect size (ES) was calculated as follows:

$$ES = \left(\frac{N_{b+1} - N_b}{N_b} \right) \cdot \text{Pandemic} - \left(\frac{N_{b+1} - N_b}{N_b} \right) \cdot \text{Pre - Pandemic}$$

where, N_b refers to the number of active businesses during a baseline month (for example, March, 2020), N_{b+1} is the number of functioning businesses in the following month (for example, April, 2020), pandemic state runs from March 2020, and the pre-pandemic state is the year before Covid-19, all of 2019 and January-February, 2020. Thus, for example, if the baseline number is 40 firms and 50 for the month after, for both the pandemic and pre-pandemic states, respectively, the ES would be:

$$ES = \left(\frac{50 - 40}{50} \right) \cdot \text{Pandemic} - \left(\frac{50 - 40}{50} \right) \cdot \text{Pre - Pandemic} = 0$$

¹⁸ The numbers are conditional, the variable PEHRACT1, actual hours worked during the week, was set to 15 or more to estimate the number of small businesses; this is to ensure that only active businesses are considered in the data analysis (Table 3).

The rationale for using ES is that it controls for all extraneous influences; for example, history effects¹⁹ such as seasonality, if any, for new firm starts, are controlled. Given this, any nonzero net percentage can be interpreted as the Covid-19 pandemic effect.

Table 3 shows the impact of the pandemic on women-owned businesses; the month of April, 2020, witnessed the most impact with total female-owned business numbers plunging a whopping 51%, compared to the April, 2019, numbers. In contrast, less than 25% of men-owned businesses were impacted by the pandemic during the same time period (Appendix 3).

In terms of industry, 83% of women entrepreneurs functioning in wholesale and retail services had to shutter their businesses during the peak of the pandemic: April, 2020, phase 1 of the pandemic. On a positive note, lot more female-owned businesses in the education and health services sectors have since appeared: as at end April, 2021, 25,362 new, women-owned businesses have appeared in Illinois (55,996 firms in April, 2021, compared to the baseline number of 30,634 firms, as at April, 2020); see Appendix 4.

¹⁹ Cook, T., and Campbell, D. (1979). *Quasi Experimentation: Design and Analysis Issues for Field Settings*. Chicago: Rand-McNally.

Table 3: Effect Size: The Impact of Covid-19 on Women-Owned Businesses

Time Period	Effect Size
2020	
February	-0.03
March	0.06
April	-0.51
May	0.16
June	0.19
July	-0.05
August	0.15
September	0.05
October	-0.13
November	0.08
December	0.10
2021	
January	-0.35
February	-0.25
March	0.27
April	0.72
May	-0.34
June	-0.10
July	-0.02

Summary and Conclusion

In Illinois, there are 128,158 female-owned businesses, according to the Current Population Survey. These businesses, on average, gain less access to financial services than men-owned businesses. It is now well known that Covid-19 pandemic has impacted businesses, but there is little or no empirical evidence of Covid-19 impacts on women-owned businesses. This paper bridges this gap in knowledge.

A structured literature review on the topic, Covid-19 impacts on women-owned businesses, revealed that the impact of the pandemic on business survival is moderated by both individual-level variables and structural variables. Perceptions about business climate, the entrepreneur's ability to differentially allocate business resources to tackle environmental turbulence, and the mental health of the entrepreneur are the

individual-level moderators of the pandemic on business survival. Structural factors associated with business survival include the “work from home” directive and business use of digital technology. Although these intervening variables could each be assessed for their influence on business survival, this paper adapted a macro approach to modeling the impacts: it was assumed that the effects of these variables are factored into changes in business numbers over time.

This approach resulted in a mathematical specification that expressed Covid-19 impacts on business survival in terms of percentage change, after controlling for extraneous sources of influences. The results of model calibration revealed that women-owned businesses were impacted by the Covid-19 pandemic severely; during April, 2020, the number of women-owned businesses were 50% less than what it was during April, 2019. Businesses functioning in the wholesale and retail sectors were most affected – 83% shuttered their doors permanently during the peak of the pandemic. Appendix 4 shows the impact of the pandemic, sector-wise.

In conclusion, the research indicates concepts that could be used to manage Covid-19 impacts on businesses; for example, educating small business owners on technology could help minimize, if not maintain, sales revenue.

Appendix 1: Keyword Search Results from Business Source Elite: A Sample

The screenshot shows the EBSCOhost search interface. At the top left is the EBSCOhost logo. The search bar contains the text "Covid-19 and small business". To the right of the search bar are options for "KW Author-Supplied Keywords" and a "Search" button. Below the search bar are two rows of "AND" operators and "Select a Field (optional)" dropdown menus. To the right of these are "Create Alert" and "Clear" buttons. At the top right is the Western Illinois University logo. Below the search bar are links for "Basic Search", "Advanced Search", and "Search History".

Refine Results

Current Search

Boolean/Phrase:
KW Covid-19 and small business

Limiters

Scholarly (Peer Reviewed) Journals

Language

english

Limit To

Full Text

Scholarly (Peer Reviewed) Journals

Search Results: 1 - 17 of 17

Date Newest Page Options Share

- 1. Small business under the COVID-19 crisis: Expected short- and medium-run effects of anti-contagion and economic policies.**
By: Kawaguchi, Kohei; Kodama, Naomi; Tanaka, Mari. Journal of the Japanese & International Economies. Sep2021, Vol. 61, pN.PAG-N.PAG. 1p. DOI: 10.1016/j.jjie.2021.101138.
Academic Journal [Find It @ WIU Libraries](#)
- 2. Performance stability among small and medium-sized enterprises during COVID-19: A test of the efficacy of dynamic capabilities.**
By: Clampitt, Jack A; Lorenz, Melanie P; Gamble, John E; Lee, Jim. International Small Business Journal: Researching Entrepreneurship. Aug2021, p1. DOI: 10.1177/02662426211033270.
Academic Journal [Ahead of Print](#) [Find It @ WIU Libraries](#)

Appendix 2: References Used in the Structured Review

Akpan, I. J., Soopramanien, D., & Kwak, D.-H. (Austin). (2020). Cutting-edge technologies for small business and innovation in the era of COVID-19 global health pandemic. *Journal of Small Business & Entrepreneurship*, 1–11

Clampit, J. A., Lorenz, M. P., Gamble, J. E., & Lee, J. (2021). Performance stability among small and medium-sized enterprises during COVID-19: A test of the efficacy of dynamic capabilities. *International Small Business Journal: Researching Entrepreneurship*, 1.

Envick, B. (2021). The Small Business Continuity Template: A Strategic Design Tool to Sustain Recurring Revenue during Times of Crisis. *Global Journal of Entrepreneurship (GJE)*, 5, 107–120.

Fairlie, R., & Fossen, F. M. (2021). Did the Paycheck Protection Program and Economic Injury Disaster Loan Program get disbursed to minority communities in the early stages of COVID-19? *Small Business Economics*, 1–14

Fallon, N. (2020). Why COVID-19 Is Hurting More Women-Owned Businesses. US Chamber of Commerce. Accessed online: <https://www.uschamber.com/co/start/strategy/covid-19-impact-on-women-owned-businesses>.

Gomes, A. (2021). Surviving as a small surveying business during and after the COVID-19 pandemic. *Journal of Building Survey, Appraisal & Valuation*, 10(1), 6–17.

Torrès, O., Benzari, A., Fisch, C., Mukerjee, J., Swalhi, A., & Thurik, R. (2021). Risk of burnout in French entrepreneurs during the COVID-19 crisis. *Small Business Economics*, 1–23.

Zhang, T., Gerlowski, D., & Acs, Z. (2021). Working from home: small business performance and the COVID-19 pandemic. *Small Business Economics*, 1–26

Appendix 3: Effect Size: The Impact of Covid-19 on Men-Owned Businesses

Time Period	Effect Size
2020	
February	0.08
March	-0.02
April	-0.23
May	0.29
June	-0.05
July	0.01
August	-0.20
September	0.16
October	0.01
November	-0.11
December	-0.01
2021	
January	0.26
February	-0.11
March	0.12
April	0.23
May	-0.33
June	0.09
July	0.19

Appendix 4: Women-Owned Businesses in Illinois by Sectors

year	month	1. Agriculture, forestry, fishing, and hunting	2. Mining	3. Construction	4. Manufacturing	5. Wholesale & retail	6. Transportation & warehousing	7. Information	8. Financial activities	9. Prof. & bus. serv.	10. Educational & health serv.	11. Leisure & hospitality	12. Other services	All
2019	Jan	3,891			7,076	14,453	8,544	3,304		24,335	32,573	13,965	18,847	126,987
2019	Feb	3,725			7,166	11,500	9,122	3,334	3,789	30,159	43,001	13,579	17,358	142,734
2019	Mar	6,732		3,958	13,241	18,987	10,515		4,052	25,971	29,016		23,801	136,272
2019	Apr	3,156	3,161	7,754	3,969	21,422	10,027		6,640	25,258	38,708	4,004	23,602	147,699
2019	May	2,959	3,200	7,417		14,410			3,544	15,559	48,639	13,599	36,251	145,579
2019	Jun		3,236	11,771		11,736	5,373	3,598	9,839	2,944	32,587	12,983	34,180	128,246
2019	Jul		2,981		4,076	4,252	5,196	4,053	7,603	3,981	28,704	18,996	44,021	123,864
2019	Aug				14,705		4,217	4,064	7,626	11,801	27,294	15,662	39,855	125,225
2019	Sep	6,463			14,624	8,547	4,070		6,936	15,347	23,599	11,018	35,345	125,950
2019	Oct	9,355		2,867	17,066	15,082	7,587		6,698	20,858	26,094	18,762	31,833	156,200
2019	Nov	6,597			14,372	17,019	3,899		17,359	21,610	29,929	7,557	18,760	137,103
2019	Dec	3,535			7,113	24,961		3,246	19,464	34,112	29,203	4,086	23,659	149,379
2020	Jan			4,293	3,418	13,474		3,303	19,291	47,130	46,785		22,759	160,453
2020	Aug	8,012			5,020	6,820	5,633		10,943	19,679	38,324	16,632	23,799	134,861
2020	Sep	6,811			8,120	3,319	14,789		24,111	37,112	27,783	8,814	10,870	141,728
2020	Oct	16,981		7,627	7,968	6,908	12,473		14,443	38,012	30,117		22,288	156,818
2020	Nov			3,935	8,090	11,087	8,319		29,626	46,684	30,346		11,872	149,959
2020	Dec			3,893	4,318	12,372	8,500		26,136	66,082	37,621	5,093	14,415	178,429
2021	Jan			3,928		7,953	3,914		14,967	39,122	48,043	3,429	7,255	128,609
2021	Feb			4,111	4,237				12,731	31,406	40,505	8,746	7,299	109,035
2021	Mar			7,083		13,611			17,217	34,535	43,035	13,416	11,688	140,584
2021	Apr	3,471		6,882	7,603	18,885	3,703		16,956	38,959	55,996	21,166	8,899	182,520
2021	May	3,529		6,807	3,467	12,005	12,480		15,426	30,261	34,448	17,118	11,865	147,407
2021	Jun	3,717		3,407		14,468	16,994		15,428	26,400	27,864	19,483	15,679	143,438
2021	Jul	3,945		4,726		7,271	16,449		7,241	30,227	32,382	14,719	11,199	128,158