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## Article

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# The determinants of job losses due to the COVID-19 pandemic in small Island developing states

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## ABSTRACT

This paper investigates the determinants of job losses due to the COVID-19 in the small island developing states of the Caribbean. Utilising a survey of 1979 firms in the Caribbean and a probit regression model, the study identifies the key factors that might lead a firm to retrench staff. Two of the most important factors that impacted on job losses were the ease of doing business and innovation. Investing in the ease of doing business within the Caribbean therefore seems to be not only an economic good, but a social benefit as well. The findings of the study also support another use of innovation: as a response to crises.

## IMPACT STATEMENT

This study identifies the key factors influencing job losses in Caribbean small island developing states during COVID-19. It underscores the importance of strategic investments in the business environment for both economic and social benefits. The findings also highlight the role of innovation as a vital response to crises, emphasizing its capacity to mitigate job losses and enhance resilience.

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## 1. Introduction

The coronavirus disease 2019 (COVID-19) that originated in Wuhan, China in December 2019 was officially declared a global pandemic by the World Health Organization (WHO) on March 11<sup>th</sup> 2020 (World Health Organization, 2021). As of July 19, 2021, approximately 180 million persons had contracted the virus while 4.08 million succumbed to the disease. Coupled with the direct negative impact on human life and health, COVID-19 has also had negative externalities on all facets of life, particularly the economy.

The economic impact of COVID-19 has been particularly felt within the labour market in most countries. The World Bank (2021) estimated that in 2020, lost working hours were equivalent to 255 million full time jobs, or approximately four times the losses during the 2009 global financial crisis. The outcome in 2021 was quite similar. The International Labour Organisation (2021) estimated that global working hours were 4.3 percent below pre-pandemic levels, the equivalent of 125 million full-time jobs.

The impact on the labour market in the Caribbean has been quite severe as well. Garavito et al. (2020) conducted a survey of Barbadian households in the immediate aftermath of the COVID-19 pandemic and reported that between January and April 2020 an estimated 46.3 percent of workers reported that they lost their jobs. These job losses were particularly prevalent in low-income households (more than half of all job losses) and women (one out of every three persons who lost their job was female). Most job losses were persons who previously worked in tourism, accommodation and food services

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sector, wholesale and retail trade, as well as construction. These job losses magnified already existing vulnerabilities in relation to poverty.

One of the shortcomings of these preliminary assessments is that they might not be representative of the true picture in the economy and the responses from workers cannot be matched with firm level data to see what other measures firms were employing to reduce job losses. This paper utilises a unique database from Compete Caribbean (2021), who conducted a survey of Caribbean firms to evaluate the impact of COVID-19 on their operations. This study seeks to assess the determinants of COVID-19 job losses at the firm level. An understanding of why firms reduce their labour force during a crisis can help to identify potential policy responses to assist both households and firms. The results could also be useful as a means of documenting the impact of COVID-19 in the face of similar shocks that might occur in the future.

The sectoral composition of GDP in Caribbean countries varies across the region, but there are some common trends. One significant sector is tourism, which plays a crucial role in the economies of many Caribbean nations. Tourism contributes a substantial portion of GDP in countries like the Bahamas, Jamaica, and Barbados. These countries heavily rely on tourism-related activities, such as hotels, restaurants, transportation services, and recreational activities, to drive economic growth. The World Bank's World Development Indicators database provides statistics that indicate services value added (% of GDP) was, on average, 63 percent of GDP in Caribbean Small States in 2020.

This concentration in services is largely due to the small size of Caribbean states. The size of a Caribbean state can impact its ability to diversify its economy and attract foreign investment (Armstrong & Read, 2003). Larger countries like Jamaica have a more diverse economic base and can leverage their size to establish industries such as manufacturing and services. On the other hand, smaller countries such as Grenada or St. Kitts and Nevis often face limitations in terms of resources, infrastructure, and market size, making it more difficult for them to achieve economic diversification and compete globally.

The study makes three main contributions to the literature. First, the paper provides estimates of the labour market impact of COVID-19 in a group of small island developing states. Second, using econometric techniques, the authors investigate the factors that might result in firms reducing employment during a crisis and builds on the work of Kujur and Goswami (2022). Third and finally, the authors assess the extent to which innovation and the ease of doing business by firms has been used to minimize job losses.

Overall, this study comprises of five sections. Following an introduction, the next section of the study, [section 2](#), summarises the literature on the labour market impact of crises. [Section 3](#) outlines the methodological approach used while [section 4](#) presents the results and discusses the implications. [Section 5](#) concludes with a summary of the findings and potential policy recommendations.

## 2. Literature review

The COVID-19 pandemic has had widespread effects on labour markets. The International Labour Organization (ILO) asserts that the pandemic has impacted labour markets in three key dimensions: 1) quantity of jobs 2) quality of work; and 3) effects on vulnerable groups (United Nations Sustainable Development Group, 2020). Drawing parallels to the HIV/AIDS and Ebola pandemics, there have been significant declines in productivity due to the loss of workers and workdays caused by battling the infection as well as the demands of caring (Franklyn, 2002) while the economic downturn will be felt by everyone, not simply those directly affected (World Bank, 2014).

### 2.1. Main sectors negatively impacted

The United Nations Economic Commission for Latin America and the Caribbean (UN ECLAC) highlights in its COVID-19 Special Report (ECLAC, 2020) that the impact of the virus is more catastrophic on sectors of the economy where operations are dependent on assemblage. This was due to the employment of non-pharmaceutical interventions (NPIs) used in the absence of a vaccine to limit the spread of the virus. NPIs employed in Barbados during this pandemic include but were not limited to social distancing practices, shutdown of all non-essential services, prohibiting of large gatherings, closure of schools and ports

as well as the implementation of a curfew. These strategies, while necessary to control the contagion, have significantly impacted several industries. Those industries severely impacted include tourism services, hotels and restaurant, transport, and commerce. Most of these industries are major contributors to economic activity in Barbados and account for a significant portion of annual GDP (Howard, 2000; Worrell, 2017; Alvarez, 2020).

Moreover, both the UN ECLAC and the ILO report that this pandemic is affecting both supply and demand. NPIs are disrupting several supply chains, impeding production processes worldwide (United Nations Sustainable Development Group, 2020; Guan et al., 2020; ECLAC, 2020). Conversely, the impacts in the economy are changing typical demand patterns due to the effects on consumers' wages as well as their preferences. The commerce and retail industries have and will continue to struggle immensely since preferences are more tailored around essential services.

While the literature has identified the sectors considerably hampered by the pandemic, little mention is made of sectors that thrived outside of the prototypical sectors. Nevertheless, there has been a surge during infectious pandemics of health and cleaning-related industries. There has been a noticeable boom in cleaning, takeout, and delivery services (Lemieux et al., 2020; ECLAC, 2020; Dave et al., 2021). In the US, the sale of hand sanitizers increased 80.7% and 57.9% in drug stores and convenience stores respectively, during the week of February 23<sup>rd</sup> 2020, as a response to the outbreak of COVID-19 (Sabanoglu, 2020) while hazmat suit sales increased significantly during the Ebola outbreak in 2014 (Pfiefer, 2014).

## **2.2. COVID-19 and technological advances**

Crises, while catastrophic and detrimental in nature, may expedite the development and adoption of several key processes in its wake. Such processes are typically employed as a means of ameliorating the situation and may create positive externalities. While a considerable number of industries were significantly impacted, the literature suggests that several businesses have benefited, such as information and communications technology (de Vet et al., 2021; Margaro, 2021; Arora, 2020).

With the limitations of face-to-face interactions, the continuity of most jobs was only maintained using ICTs. Azuara Herrera et al. (2020) argue that the pandemic compelled the labour force of Latin American and Caribbean countries to adopt teleworking, distance training and on-demand digital platforms, something they were reluctant to do prior to the COVID-19 pandemic. These technologies will produce net-positive externalities on the labour market, but implementation will make several jobs obsolete, resulting in increased unemployment (Azuara Herrera et al., 2020).

Most of the literature on Latin America and the Caribbean has been extrapolated from Latin American countries such as Brazil. The World Health Organization (WHO) reports Brazil as the country with the third highest number of confirmed cases (World Health Organization, 2021). As of July 12, 2021, Brazil recorded 9,164 coronavirus cases per 100,000 population compared to Barbados' 1467 cases. Consequently, the impacts described may be felt to varying degrees.

## **2.3. Types of workers likely to be most affected by the COVID-19 pandemic**

Historical reports of other pandemics as well as initial coronavirus pandemic reports indicate that workers from low skilled and low-income groups suffer the most (Bottan et al., 2020; United Nations Sustainable Development Group, 2020; ECLAC, 2020). Alvarez et al. (2021) confirms and finds a positive correlation between remote working and specialized skill occupations.

The World Bank (2019) finds that the majority of the labour force of developing nations are categorized within the informal economy with 'little access to technology', staying in low-productive employment. Micro, small and medium-sized enterprises (MSMEs), therefore, will be the most unfavourably impacted (ECLAC, 2020). This situation is likely to be magnified in Barbados due to labour market rigidities (Coppin, 2006; Archibald et al., 2005; Craigwell & Warner, 2000; Unemployment in Barbados: 1980-1996, 2000).

During epidemics and pandemics women are also likely to be disproportionately affected relative to men. Azuara Herrera et al. (2020) proposes that the labour force of the most adversely impacted sectors

and business types – vendors and small business owners – are comprised predominantly of women. Alon et al. (2020) identifies the increase in needs of children during the pandemic and a woman's natural role as caretakers as the main cause of them being more impacted compared to men. Franklyn (2002) as well as Taub (2020) both argue that the extended time spent at home also exacerbates domestic abuse, particularly among women. Victims tend to suffer tremendous declines in productivity and performance output (Oni-Ojo, 2014; Wathen et al., 2015; Oliver, 2019).

Employees in lower paying or low skilled occupations also are more likely to have been impacted by the crisis. Cortes and Forsythe (2023) argue that the pandemic exacerbated pre-existing inequalities, with lower-paying occupations and industries being substantially affected in the US. In addition, since non-white workers were over-represented in these groups, they were more affected than white workers. Similar results are reported by Khambule (2022) who found that informal workers experienced higher levels of unemployment, poverty and vulnerability. The authors argued that this was largely due to the lack of proactively targeted and timely interventions to cushion these workers.

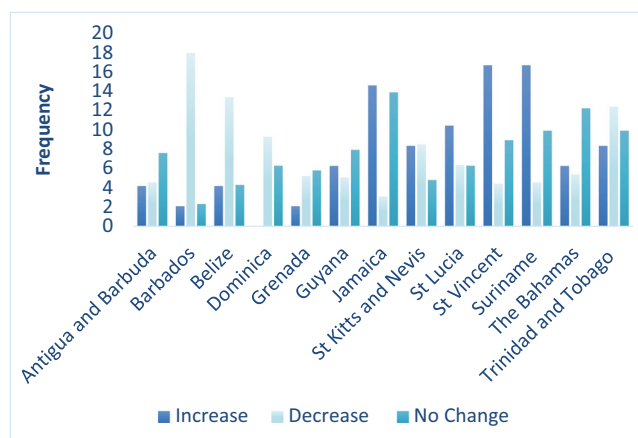
#### 2.4. Job losses due to COVID-19

Figure 1 showcases the responses of firms from CARICOM to the question, "In the advent of COVID-19, did your firm increase, decrease or kept constant their share of workers?". Several states increased their number of employees after the outbreak of COVID-19, defying the expected relationship. St Vincent never implemented curfews or any stringent lockdown procedures (Jamaican Observer, 2021) while St Lucia was the first Eastern Caribbean Island to record 100% recoveries and enjoyed early success in the fight against COVID-19 (Thorton, 2020; The Voice, 2020), which aligned with the time period when the survey was being conducted, whereby explaining the occurrence.

Suriname and Jamaica, however, both employed strict physical distancing protocols. Another explanation for the unexpected relationship in some countries could be the use of innovative responses to COVID-19 (Table 1).

Across CARICOM, 3.6% of firms used innovation to mitigate against the impacts of COVID-19 (Table 1). The highest ratios were in Suriname and Jamaica, the same countries that experienced the highest worker retention ratios during the COVID-19 crisis. Those Barbadian firms that experienced the highest job losses did not introduce any new goods or services. This suggests there is an inverse relationship between worker retention and innovation as a response to COVID-19.

The literature suggests that unskilled females are the most adversely impacted classification of workers (Azuara Herrera et al., 2020). While a few member states –Jamaica, The Bahamas, and Suriname – abides by this relationship, the majority seemingly refutes this assertion. There were no specific questions geared towards skilled and unskilled male workers in the survey, thus inferences about male workers are drawn by comparing female and total frequencies. Nonetheless, the data implies the



**Figure 1.** Number of firms reporting a change in employment as a result of COVID-19 by country.  
Source: Compete Caribbean (2021).

**Table 1.** Number of firms using innovation as a response to COVID-19.

Country	Yes	No	Total
Antigua and Barbuda	5	145	150
Barbados	0	170	170
Belize	2	155	157
Dominica	2	135	137
Grenada	5	119	124
Guyana	6	149	155
Jamaica	10	162	172
St Kitts and Nevis	2	128	130
St Lucia	5	147	152
St Vincent	4	129	133
Suriname	14	148	162
The Bahamas	8	149	157
Trinidad and Tobago	8	172	180
Total	71	1908	1979

Source: Compete Caribbean (2021).

**Table 2.** Changes in employment by skill and gender.

Country	Female Skilled			Total Skilled			Female Unskilled			Total Unskilled		
	+	-	=	+	-	=	+	-	=	+	-	=
Antigua & Barbuda	2	11	39	6	15	38	0	11	30	1	19	30
Barbados	1	25	54	1	52	48	0	19	21	1	22	51
Belize	7	30	57	5	41	33	0	13	24	1	18	51
Dominica	3	23	55	9	39	43	0	15	20	0	30	39
Grenada	2	14	45	3	26	40	0	10	26	1	18	36
Guyana	2	15	50	3	19	36	0	3	30	4	25	35
Jamaica	6	5	53	22	9	53	2	9	34	1	12	41
St Kitts & Nevis	4	25	54	5	39	37	1	11	21	2	16	47
St Lucia	3	9	1	7	24	41	1	13	23	3	18	32
St Vincent	7	6	50	25	18	54	3	14	24	7	37	23
Suriname	6	4	53	15	13	50	1	6	31	4	21	34
The Bahamas	5	4	57	25	17	61	2	11	28	2	43	25
Trinidad & Tobago	2	24	66	7	39	51	1	12	31	2	22	53

+ means increase, - means decrease and = means no change.

Source: Compete Caribbean (2021).

differences between men and women was negligible. This is surprising considering that women typically dominate the hardest hit industries i.e. tourism, travel and hotel (Table 2).

One reason that there was little to no noticeable changes in COVID-19 related unskilled job losses could be due to the increased need for cleaning and other related screening services. It appears that these workers were utilised for tasks such as cleaning, temperature checks and related activities.

The pandemic had a greater impact on minorities and relatively low skilled workers (Montenovo, et al., 2022). Using data on the labour market for the US, the decline in employment was largely driven by job losses among Hispanics, the youth and workers with a high school diploma or some college. The service industries or those jobs that require more personal contact and cannot be performed remotely. Montenovo et al. also argue that a relatively significant share of the job losses cannot be explained by racial, ethnic, age and educational starting points, suggesting that workers may have encountered differential treatment in relation to both layoff and recall decisions.

The disproportionate impact of COVID-19 on minorities is also supported by Dang and Nguyen using a cross country database. The authors used data from nationally representative samples from China, South Korea, Japan, Italy, the United Kingdom and four of the largest US States (California, Florida, New York and Texas). The authors report that not women were 24 percent more likely to lose their job permanently as a result of COVID-19. The authors attribute this result to the higher probability of women working in service jobs relative to men, noting that this gap is more than 10% in China and 20% in the UK. This finding is also supported by the result that female job losses were greater in countries with higher infection rates.

Not only were the job losses in relatively lower skilled occupations larger, the rate of recovery in these areas was also slower as well. Mamgain (2021) estimates that during the initial lockdowns associated with COVID-19 approximately 31 percent of the employed labour force lost their jobs. These job losses were more likely to be among females, small traders, migrant workers, daily wage labourers and



the youth. Even though some of the jobs losses were regained at the tail-end of the pandemic man, the gains were very slow for the categories of workers mentioned earlier. As a result, the authors recommended the extension of employment security to poor urban households as well as reskilling of the labour force.

### 3. Empirical methodology

The preliminary review of the survey data suggests that COVID-19 impacted on employment in the Caribbean. The severity of this impact, however, varied by industry, and to some degree the response by firms to the crisis (e.g., innovative activities). The methodology outlined in this section of the paper therefore attempts to identify the main determinants of job losses at the firm level. Understanding why firms might choose to shed labour during a crisis is important as employment has links to issues such as poverty and reduced purchasing power. An understanding of firm behaviour during a crisis can also help policymakers develop useful interventions at both the firm and household level.

This research employs the *Innovative – Firm Performance – Gender (IFPG): Issues in Enterprises in the Caribbean* (Compete Caribbean, 2021) database to assess the labour market impact of COVID-19. The survey was designed and conducted by Etude Economique Conseil (EEC Canada) on behalf of Compete Caribbean at the Inter-American Development Bank. All 1979 respondents were firms and business selected across the 13 CARICOM member states, serving as a country-wide representative sample. The database was made assessable by the Compete Caribbean Partnership Facility (CCPF) to provide current and comparable data on the region's private sector as it relates to the survey-entitled issues of gender, productivity, and innovation as well as the impact of the COVID-19 pandemic. Respondents' participation was fully voluntary through which they could either refute particular questions or the survey in its entirety. The database is available from the authors upon request.

Coupled with the IFPG database, data provided by the Central Bank of Barbados as well as Barbados' Statistical Office was also used. The main aim of this empirical research is to assess the impact of the COVID-19 pandemic on the labour market and explain why some firms would have reported greater job losses than others. The Probit regression model estimated is:

$$Covid\ Employment\ Losses_i = \beta_0 + \sum_{j=1}^k \delta_k X_{ki} + u_i \quad (1)$$

where the dependent variable represents the negative impact of COVID-19 on employment. A probit model was selected by assigning by a value of 1 to firms who opted to decrease their share of workers and 0 to firms who either increased or kept constant the total number of employees. The Probit model is appropriate in scenarios where the dependent variable takes only two possible outcomes: job losses or no job losses. It assumes that the relationship between the independent variables and the dependent variable is nonlinear and follows a cumulative normal distribution.

The set of independent variables, represented by its sum ( $\sum_{j=1}^k \delta_k X_{ki}$ ), are used to explain the decision of firms to reduce their labour force as a result of the pandemic. These were firm size, sector, innovative strategies employed, its classification as essential or non-essential, the top three obstacles they faced due to the advent of the global pandemic and the age of the institution. Factors that are expected to share a negative correlation with employment include the size and age of the firm and the implementation of innovative features.

Firm size is an important variable that will determine the severity of the impact of the coronavirus. It is expected that smaller firms will be more adversely impacted by the pandemic (ECLAC, 2020; United Nations Sustainable Development Group, 2020; Alvarez, 2020) due to their limited resources, poor crisis management (Runyan, 2006) and the hindrances to development. The legal status of firm alludes to the size of the institution. The respondents were able to choose from one of six options: the smallest being sole proprietorship and limited partnership to the largest being shareholding company with shares traded in the stock market and shareholding company with non-traded shares or shares traded privately. Previous studies confirm there exists a positive relationship between the age of a firm and its performance in time of crises (Lee et al., 2017). Archibugi et al. (2013) concludes that both size and age are key



determinants to strategic responses to crises. Smaller and younger firms are more inclined to focus on innovation while larger and more experienced firms will tend to cost-minimizing strategies.

Another control variable used in the regression model is innovation. The IFPG questionnaire notes that innovation can be derived in a multiplicity of ways. It can occur due to the introduction of new or improved goods, services, business processes, marketing strategies, distribution process and organizational structure. The UN Innovation Network (2020) establishes that for most firms employing innovative strategies were a means for their survival particularly due to the many production disruptions that would have affected global supply chains.

In 2016, the Pan American Health Organization (PAHO) defined essential services as activities necessary to maintain the health, welfare and functioning of a municipality and goes on to list specific statutory bodies, food providers and health care providers amongst others as examples. They further explain that non-essential services are those that are likely to be closed during a pandemic, as they are not necessary for the municipality's survival. Barbados – similar to most nations – has given precedence to the continuation of essential services while being exceeding stringent with the operations of non-essential ones. Consequently, it is imperative to factor this variable into the overall impact of the pandemic whereby expecting essential businesses to experience gains and non-essential ones to suffer losses.

Beyond the classification of non-essential and essential services, the type of sector would also affect the overall trajectory of the labour market and the economy. Enterprises whose activities depend heavily on physical interaction will suffer exponentially (ECLAC, 2020) compared to those which are more flexible in nature.

There are a number of alternative approaches that could have been used instead of the one outlined above. These alternative approaches are grouped under three broad areas: 1. time series; 2. qualitative; and, 3. firm perception studies. Instead of the microeconomic approach pursued in this study, other studies have utilised a macroeconomic data to estimate the impact of COVID-19 on job losses. Such an approach would involve estimating an employment equation, estimated using a VAR approach, and augmenting this equation with a COVID-19 dummy variable. The advantage of this approach is that it is relatively simple to implement, as the coefficient on the dummy variable would show the shift in the employment equation that would have resulted from the pandemic. The shortcomings, however, are numerous. These include the lack of long employment series for the Caribbean, uncertainty regarding the appropriate start and end dates for the COVID-19 pandemic in the Caribbean, and the difficulty of attributing any shift in the employment function only to COVID-19. Another alternative to the approach used in this study would be use a qualitative approach through either interviews or focus groups. Such an approach is useful to provide a deep dive into a problem, but it would not have been financially feasible for the authors to utilise such an approach to cover all the countries and firms utilised in this study. Another approach that could have been utilised is to use firm perceptions of the impact that COVID-19 had on employment within their business. The advantage of this approach is that it provides a direct estimate of lay-offs that might have occurred due to the pandemic, but like the qualitative approach it is difficult to disentangle the effects of COVID-19 from other factors that might be influencing firm sales and their propensity to shed labour.

## 4. Results

### 4.1. Econometric findings

The descriptive statistics provided in the previous section give a good picture of the job losses that occurred in the Caribbean in the wake of COVID-19, they do not explain why some firms decided to reduce their labour force and others did not. The study therefore estimates a binary choice model of the decision to reduce labour, estimated using a Probit model and the results are provided in Table 3. The model's LR statistic is statistically significant, indicating that the coefficients in the model cannot all be set to zero and therefore provide some additional evidence beyond just a model with an intercept. The Pseudo R-squared for the model is 0.207, which given the use of micro-econometric data suggests that the model does have reasonable predictive abilities. This is further supported by the ROC curve provided in Figure 2. This provides an assessment of the ability of the model to distinguish between true signals

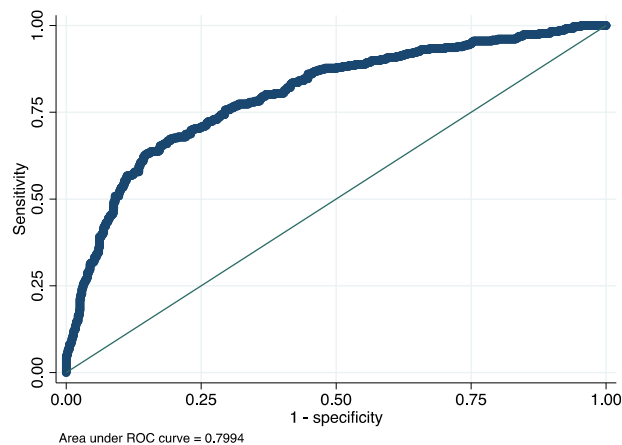
**Table 3.** Probit model of job losses in the Caribbean.

Variable	Coefficient Estimate	Marginal Effects
Any obstacle to doing business since COVID	0.015 (0.008)*	0.005 (0.003)*
Practices of competitors in informal sector		
Minor obstacle	0.168 (0.106)	0.054 (0.034)
Moderate obstacle	0.298 (0.113)***	0.095 (0.036)***
Very severe obstacle	0.232 (0.153)	0.074 (0.049)
Macroeconomic environment as obstacle to doing business	−0.171 (0.104)*	−0.055 (0.033)*
Telecommunications as obstacle		
Minor obstacle	−0.168 (0.098)*	−0.054 (0.031)*
Moderate obstacle	−0.239 (0.132)*	−0.076 (0.042)*
Access to finance as obstacle		
Minor obstacle	−0.271 (0.169)	−0.086 (0.054)
Moderate obstacle	−0.332 (0.135)**	−0.106 (0.043)**
Major obstacle	−0.331 (0.097)***	−0.105 (0.031)***
Access to electricity as obstacle		
Major obstacle	−0.339 (0.001)***	−0.108 (0.033)***
Very severe obstacle	−0.546 (0.128)***	−0.174 (0.041)***
Transportation as an obstacle		
Major obstacle	−0.196 (0.116)*	−0.062 (0.037)*
Access to land		
Major obstacle	−0.358 (0.109)***	−0.114 (0.033)***
Very severe obstacle	−0.383 (0.125)***	−0.122 (0.040)***
Political environment		
Minor obstacle	−0.249 (0.100)**	−0.079 (0.032)**
Major obstacle	−0.400 (0.123)***	−0.128 (0.039)***
Very severe obstacle	−0.349 (0.155)**	−0.111 (0.049)**
Tax rates		
Very severe obstacle	0.172 (0.104)*	0.055 (0.033)*
Business licensing and permits		
Minor obstacle	0.326 (0.105)***	0.104 (0.033)***
Very severe obstacle	0.286 (0.143)**	0.091 (0.046)**
Customs and trade regulations		
Moderate obstacle	−0.597 (0.161)***	−0.190 (0.052)***
Major obstacle	−0.405 (0.133)***	−0.129 (0.043)***
Very severe obstacle	−0.423 (0.142)***	−0.135 (0.045)***
Inadequately trained labour force		
Major obstacle	−0.183 (0.098)*	−0.058 (0.031)*
Crime, Theft and Disorder		
Major obstacle	−0.141 (0.106)	−0.044 (0.034)
Services	−0.137 (0.087)	−0.044 (0.028)
Private shareholding company	0.529 (0.179)***	0.169 (0.057)***
Sole proprietorship	0.337 (0.169)**	0.107 (0.054)**
Partnership	0.408 (0.186)**	0.130 (0.059)**
Limited partnership	0.307 (0.205)	0.098 (0.065)
No overdraft	0.165 (0.109)	0.053 (0.035)
Age	−0.097 (0.070)	−0.031 (0.022)
Innovations reduced energy use		
No	0.418 (0.158)***	0.134 (0.050)***
Introduced new good since COVID	−0.591 (0.366)*	−0.188 (0.117)*
Introduce new methods of producing goods		
No	0.206 (0.154)	0.066 (0.049)
Since COVID reduced material use		
No	−0.289 (0.164)*	−0.092 (0.052)*
Does not have a website	0.165 (0.094)*	0.053 (0.030)*
Does not have a social media presence	0.164 (0.087)*	0.052 (0.028)*
Percentage of sales paid online	0.010 (0.006)*	0.003 (0.002)*
Female top manager	−0.224 (0.106)**	−0.072 (0.034)**
Wages	−0.173 (0.038)***	−0.055 (0.012)***
Direct exports	−0.003 (0.002)	−0.001 (0.001)
Local market share	0.012 (0.006)**	0.004 (0.002)**
Intercept	2.436 (0.668)***	—
observations	1220	
LR	306.420***	
Pseudo R2	0.207	

\*\*\*, \*\* and \* indicates significance at the 1, 5 and 10 percent level of significance.

(sensitivity) and false signals (specificity). Normally a cut-off value of 0.5 is used, with this value being equivalent to the toss of a coin. The area under the ROC for our model is 0.8 which suggests that it can reasonably discriminate between signals.

Given that the model provides a reasonable description of the decision to reduce the labour force by firms, this section of the paper provides a description and discussion of the coefficient estimates. One of



**Figure 2.** Area under ROC Curve.

the most important factors that could lead to job losses is the ease of doing business (Canare, 2018). If firms find it difficult to operate during a crisis, this could amplify challenges being faced by the firm. This hypothesis is supported by the first variable in the table, which is a dummy variable that asked firms if they faced obstacles to doing business since the start of COVID-19. This variable was positive and statistically significant and provides a broad indicator of the impact that doing business. The positive coefficient also supports the notion that firms facing greater obstacles to doing business were more likely to reduce their labour force.

Besides the general measure of the impact of the ease of doing business on job losses, the authors also considered the impact of competition from informal firms, the macroeconomic environment, telecommunications, access to finance, transportation, access to land, the political environment, tax rates, business licensing and permits, customs and trade regulations, an inadequately trained labour force as well as crime, theft, and disorder. Those firms that indicated that the practices of competitors in the informal sector was an obstacle to doing business were more likely to reduce their labour force. This suggests that the severity of competition forces firms in the formal sector to reduce jobs as a means of competing with more nimble firms in the informal sector. In addition to competition from informal competitors the results also suggest that tax rates as well as the process of obtaining business licences and permits can exacerbate the impact of crises on job losses. These results suggest that governments should focus on reducing any bottlenecks that firms might face as they attempt to retool in the middle of the crises. Such policy interventions are particularly useful as they tend not to require major investments by the government, which might also be suffering from liquidity shortages at the same time. The other doing business measures all seem to reduce the likelihood of a firm making the decision to reduce their labour force.

A priori it was expected that service companies would experience more job losses due to the dependence of these economies on tourism and the significant impact that COVID-19 had on the region's tourism industry. The services dummy variable, however, was not significant at normal levels of testing. One of the potential explanations for this result was the support that was provided to the tourism industry by regional governments during this period. Many countries would have provided transfers to tourism establishments to maintain their employees, offered credit support, as well as reduced taxes and electricity tariffs (Srinivasan, Munoz, & Chensavasdijai, 2020). The various types of corporate structures were all positive and statistically significant. These included privately held shareholding companies, sole proprietorships, and limited partnerships. These companies are less likely to be able to access equity financing and may have therefore suffered from liquidity challenges (Moore et al., 2009). There are costs, however, associated with adjusting the labour force (Sharpe, 1994). These costs are related to hiring, training, and firing employees. The presence of these costs, therefore, might dampen fluctuations in the labour force. Smaller firms are more likely to experience greater cyclical variation of sales and therefore might have more procyclical variations in employment.

One of the possible ways firms could have responded to the COVID-19 pandemic is to innovate within their organisations. Such innovations could not only increase the likelihood of the firm surviving the crisis but also maintain jobs. Several measures of innovations are considered in the analysis: energy use, new goods, new methods of producing goods and new methods of using materials. In general firms that did not introduce innovations to reduce cost were more likely to experience job losses. Firms that introduced new goods were also able to minimise job losses. These results could have occurred since the introduction of new goods allowed firms to diversify their product offerings and appeal to changing customer demands. Contrary to a priori expectations firms that introduced innovations to reduce material use experienced an increase in job losses during the COVID-19 pandemic. While this innovation reduces the cost of production, it does not increase demand for the product. These investments reduce the cost of production per unit but in during a crisis where borders are closed all firms would be affected by supply shortages.

It should be expected that firms with a greater online presence would be more resilient to the effects of the COVID-19 pandemic. As would be expected, firms without a website were more likely to experience job losses. Due to the effects of lockdowns, customers would not be able to access physical locations and hence sales of the firm would be likely to fall. In addition to a website, the social media presence of firms has also become a critical part of the marketing toolkit of firms. With individuals working from home, and other physical distancing protocols in place, it should be anticipated that individuals would use social media more often to offset the lack of face-to-face human interactions. The marginal effect for the social media presence of the firms was similar to the marginal effect of a website. These results imply that a company's social media presence has become just as important as a website. The percentage of sales of the firm paid online, however, seems to have been positively associated with job losses as these firms might have suffered from supply chain shortages.

Gender has been previously identified as an important determinant of firm behaviour during a crisis. Female-led firms are more likely to face financial constraints due to credit rationing (Naranchimeg & Bernasek, 2013) and the organisational culture (Dwyer et al., 2003). In the Caribbean, the results suggest that female-led firms are less likely to experience job losses. This suggests that these female-led firms in the Caribbean have implemented alternatives to retrenchment during the COVID-19 pandemic.

The other demographic variables considered in the study included age, wages, export status and local market share. The age of the firm was a statistically insignificant determinant of retrenchment by firms. This is surprising as previous literature has noted that younger firms are likely to be more affected by the crisis and hence more likely to engage in retrenchment (ECLAC, 2020) but could be due to small firms being more nimble and better able to adapt to the crisis. Engagement in direct exports was not significant, suggesting that these firms substituted to the domestic market. The local market share was statistically significant and positive, indicating that firms with a greater domestic market share were more likely to engage in retrenchment. These firms seemed to have used retrenchment as a reaction to the downturn in firm sales. Not surprisingly, firms with a larger wages bill were more likely to retrench staff, potentially as a means of addressing liquidity challenges posed by the pandemic.

## 4.2. Discussion

The econometric results reported in the previous section provide numerous areas for policy intervention to preserve jobs during a crisis. By and large governments have a significant influence over the ease of doing business. Both the speed and time it takes to get business done can be critical during a crisis. Given the declining demand for goods and services firms need to be agile to retool and take advantage of any opportunities for survival. Caribbean governments, however, are usually well behind the leaders in this regard.

The highest ranked Caribbean country in the Ease of Doing Business Rankings of the World Bank<sup>1</sup> was Jamaica at 71 out of 190 countries. St. Lucia was the only other Caribbean country to be ranked with the top 100. The other Caribbean islands were all ranked 105 (Trinidad) and lower, with the lowest ranked country being Grenada at 146. While the ease of doing business might be an important determinant for growth in the Caribbean (Ruprah et al., 2014), the study also shows that enhancing the ease of doing business can also be an important policy response to crises. The obstacles flagged as being

important in this study and under the control or influenced by governments in the region include the political environment, tax rates, licensing and permits, as well as customs and trade regulations. There is also a double-dividend of addressing the ease of doing business issues related to these areas. During the crisis, there is the benefit of reducing job losses, but after the crisis these areas also support business competitiveness and economic growth. Investing in the ease of doing business within the Caribbean therefore seems to be not only an economic good, but a social benefit as well.

The findings of the study also support another the use of innovation as a response to the COVID-19 pandemic. The paper suggests that both process and product innovations introduced before and during the crisis can reduce job losses. These innovations reduced the cost of doing business during the crisis as well as allowed the firm to diversify their product line. Firms that introduced new goods during the period of the pandemic were 18 percent less likely to retrench workers, while firms that did not introduce innovations to save energy prior to the pandemic were 13 percent more likely to trim their labour force during the crisis. These findings are not surprising but suggest that one approach firms can use during crises is to invest in innovations.

The findings of the study also support the importance of investments in ICTs as an important part of a firm's investment. Both a firm's social media presence and the existence of a website reduced the number of jobs lost during the COVID-19 pandemic. Surprisingly, the ability to pay for goods online was not an important determinant of the job losses. There are many reasons why this might be the case. Maybe the e-commerce platform is not user-friendly, it could also occur if most customers only have limited access to the internet. Many firms have invested significantly to boost their online presence, particularly during the COVID-19 pandemic.

## 5. Conclusions

This research investigates the determinants of job losses due to the COVID-19 on the labour market in the Caribbean. Utilising a survey of 1979 firms in the Caribbean and a Probit regression model, the study identifies the key factors that might lead a firm to retrench staff. The ease of doing business was found to be an important factor influencing job losses. Firms facing obstacles to doing business since the start of COVID-19 were more likely to reduce their labour force. Competition from informal firms, tax rates, business licensing, and permits were also found to exacerbate the impact of crises on job losses. Government interventions to reduce bottlenecks were suggested to alleviate these issues. Privately held shareholding companies, sole proprietorships, and limited partnerships were more likely to reduce jobs while firms that introduced innovations to reduce costs or introduced new goods were less likely to experience job losses. However, firms that introduced innovations to reduce material use experienced increased job losses. Firms without a website or social media presence were more likely to experience job losses. Female-led firms were found to be less likely to experience job losses during the pandemic. Other demographic variables, such as firm age, export status, local market share, and wages, were also considered. Firm age was not a significant determinant of retrenchment, and firms with a larger domestic market share and higher wages were more likely to engage in job losses.

One of the possible ways firms could have responded to the COVID-19 pandemic is to innovate within their organisations. The results of the study support the benefits of innovation as it relates to job losses. In general firms that did not introduce innovations to reduce cost or new goods were more likely to retrench staff. There are costs, however, associated with adjusting the labour force (Sharpe, 1994). These costs are related to hiring, training, and firing employees. The presence of these costs, therefore, might dampen fluctuations in the labour force, particularly for smaller companies. The findings of this study do support this literature, with the marginal effect of being a sole proprietor being smaller than for any other corporate structure.

As would be expected, firms without a website were more likely to experience job losses, as customers would not be able to access physical locations and hence sales of the firm would have likely fallen. In addition to a website, the social media presence of firms seems to have also become a critical part of the marketing toolkit of firms, with the marginal effect for the social media presence of the firms being almost similar to the marginal effect of a website.

In addition to firm characteristics, managerial characteristics such as gender also proved to be important. This suggests that these female-led firms in the Caribbean seem to have implemented alternatives to retrenchment during the COVID-19 pandemic. The other demographic variables considered in the study included firm age, wages, export status and local market share were also key predictors of the decision to retrench staff.

The econometric results provide numerous areas for policy intervention to preserve jobs during a crisis. While COVID-19 had a significant impact on tourism within the Caribbean, the impact on job losses was limited due to the policy response by Caribbean governments. Numerous nations extended financial aid to support tourism businesses by ensuring the retention of their workforce. This assistance also included providing credit support, reducing taxes, and offering lower electricity tariffs. By and large governments have significant control over the ease of doing business. Both the speed and time it takes to get business done can be critical during a crisis. However, the highest ranked Caribbean country in the Ease of Doing Business Rankings of the World Bank<sup>2</sup> was Jamaica at 71 out of 190 countries. St. Lucia was the only other Caribbean country to be ranked with the top 100. The other Caribbean islands were all ranked 105 (Trinidad) and lower, with the lowest ranked country being Grenada at 146. Investing in the ease of doing business within the Caribbean therefore seems to be not only an economic good, but a social benefit as well.

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## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Notes

1. <https://www.doingbusiness.org/en/rankings?region=latin-america-and-caribbean>.
2. <https://www.doingbusiness.org/en/rankings?region=latin-america-and-caribbean>.

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