Volume 14 Number 1 & 2 December 2022

Article History
Received 01 September 2022
Accepted 11 January 2023
DOI: https://doi.org/10.57143/JBFS130109

Can the Firm-level Strategies and Government Intervention Policies Mitigate the Harms Caused by the Covid-19 Pandemic? Firm-level Evidence from Italy

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Abstract: The purpose of this study is to identify the effects of Covid-19 on business in Italy, factors accelerating the impacts, and business strategies and government policies to combat the business impacts of the pandemic. The study uses combined data sets of the World Bank enterprise survey and the follow-up Covid-19 survey in Italy. Based on the survey, the study classifies the business impacts of Covid-19 into four types such as temporary closure, demand shock, supply shock, and fall of sales. The study applies PSM model with nearest neighbour matching method to analyze the data.The results of the study suggest that liquidity crisis, fall in credit sales, and credit purchases are the main reasons for Covid-19's impacts on Italian business. Business strategies during the pandemic such as online activity, home delivery, and remote work significantly reduce the impacts of the pandemic. Alternative financing sources and government incentives do not help firms to combat Covid-19's impacts. The results also suggest that the business impacts of Covid-19 and its contributing and combating factors significantly vary across the firm's sectors and sizes.

Keywords: Covid-19; Business-Level Strategies; Government Policy;Italy

1.0 Introduction

The world has experienced the hardest situations due to the outbreak of the Covid-19 pandemic. This outbreak first started in December in Wuhan city of Hubei province of China. Unfortunately,the pandemic has also been globalized and it spreadto almost every country all over the world. As of 9thJanuary 2023,around 668.66 million people have been infected by Covid-19 with the death of 6.7 million people. The pandemic still continues to grow at a faster rate. There is little hope that this pandemic will end soon and the situation will become normal. The global impact of Covid-19 will be higher if it continues for a long.

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The Covid-19 pandemic has brought an unprecedented impact on the global economy. The governments of the mass-infected countries imposed mandatory social distancing and advised to close the essential business to slow down the spread of the pandemic.Thispolicy has drastically affected the economic activities of the country.Baldwin and Mauro (2020)argued that the economic impact of Covid-19 on the global economy could be dramatic. The pandemic has affected all key economies including G-7 countries togetherconstitute 60% of world supply, 65%, and 41% of manufacturing production and manufacturing exports respectively. The pandemic brought a massive and far-reaching economic burdento the global economy. It disrupted the global supply chain and the global economy is experiencing a production contraction. The pandemic also drastically affected the global financial markets. McKibbin and Fernando (2020)argued that global financial markets went through a significant downturn and despite the actions of governments and central banks, the pandemic causes serious threats to the stability of the financial markets.

The covid-19 pandemic has also caused a drastic negative effect on the global business environment. The impact of Covid-19 is felt by all businesses either large or small. Some businesses had to face severe challenges and experienced the most extreme negative effect of Covid-19. The Covid-19 pandemic and subsequent health policies such as social distancing, isolations,and travel bansdeepen widespread disruptions in businesses and economies.The Covid-19 pandemic affected the global economy in several ways such as future business activity, falling tourism and travel, demand and supply-side disruptions, and disruption in production and trade. The economic fallout of the pandemic increases the risks of global economic recession which will permanently affect global economic growth. According to ILO (2020), the pandemic has already converted into an economic and labor market shock. All businesses are facing serious challenges due to the significant threat of the pandemic to sales revenue, insolvencies, and job losses.

Due to the lockdown and shutdown scenarios, Bangladesh has dealt with a number of unanticipated issues that affect the economy, education, industry, politics, and everyday life of its citizens. Due to their psychological struggles in their daily life, citizens are passing their time at home. There has been a significant increase in unemployment and poverty nationwide, in both urban and rural areas, as a result of many individuals losing their jobs and other means of income. Those with less/no access to social safety, poorer savings, or fewer alternative means of income are the most impacted, both in urban and rural environments. As a result, the country's GDP is predicted to be lower than in previous years, and the poverty rate has increased dramatically. Over the past ten years, Bangladesh's GDP has grown at a remarkable rate, with an annual growth rate of 7.9% in 2019. Due to economic downturns brought on by COVID-19 economic lockdowns,

Bangladesh's GDP is predicted to fall to 2% in 2020 (IMF 04/2020). Bangladesh's poverty rate increased to 29.5% as of today.

However, critical research questions ariseregarding the difficulties firms face during Covid-19, the financial and non-financial factors thatfuel the difficulties, and the business-levelstrategies and government policy incentives that help firms to combat the difficulties caused by the Covid-19 pandemic. Verma and Gustafsson (2020) argued that due to the breakdown triggered by the COVID-19 pandemic, there have been several theoretical, empirical, and conceptual research opportunities to comprehend the building of a new framework and the development of current theories within the business world. The introduction of a domain of research concerning COVID-19 and successive revisions to this knowledge has caused substantial empirical study prospects. They further urged that COVID-19 will result innumerous long- and short-term policy alterations and call forboth theoretical and empirical focus of researchers. Moreover, Wang et al. (2020) proposed several theoretical and managerial propositions regarding firms' survival during Covid-19 through marketing innovations but their conclusions are not supported by the empirical test. They further urged for empirical studies to test and expand the theoretical and conceptual findings. However, empirical studies identifying the effects of Covid-19 on business are almost nonexistent.

This study is an attempt to unveil all these research issues. We classified the business impacts of Covid-19 into four categories such as temporary or permanent closure of business, demand shock, supply shock, and reduction in sales revenue. Based on the Covid-19 survey of the World Bank on Italy, the study first describes the difficulties stated above firms face during Covid-19. The descriptive statistics also examine the impacts across firm sizes and sectors as the impacts of Covid-19 on business vary across firm sizes and sectors. Small and medium-sized firms face higher negative impacts of the pandemic than large firms do whereas service sectors experience the hardest hit of Covid-19. The study then identifies the factors that contribute to Covid-19's impact on business in Italy. Finally, the study examines the effects of business and financial strategies of the firms as well as government policy incentives to combat the business impact of Covid-19.

The remainder of the study is structured as follows. The next section discusses the Covid-19 literature and the contribution of this paper. Section three describes the data and methodology used to analyze the data. The next section discusses the results of the analysis. Finally, section five comprises conclusions andpertinent policy suggestions based on the study.

2.0 Literature Review

As the first organized effort to explain the economic impact of Covid-19 on the global economy, Baldwin and Mauro (2020) compiled an e-book containing

14 chapters of discussions by different authors that discuss the macroeconomic effect of the pandemic and relevant policy issues. Most of these contributions are based on past experience, real-time data, and intuitive policy perspectives whereas few studies used simulation-based modeling. The different chapters of the book discuss different aspects of Covid-19's impact on the economy such as trade, supply chain, finance, banking, travel, tourism, and regional sensitivities.

According to di Mauro (2020), macroeconomic flu first causes output to fall and then rapidly recapture to catch up with the shortage but the pandemic may result in a long recession if it lasts long. Boone et al. (2020) argued that the Covid-19 pandemic impacts the global economy through supply shock, demand shock, and low consumption of goods and services due to uncertainty. Baldwin and Tomiura (2020) added that demand and supply shock together will significantly impact trade in goods and services in the global market. Carlsson-Szlezak et al. (2020) argued that the pandemic will severely affect the flow of goods and services which consequently causes a global recession.Guerrieri et al. (2020) argued that the economic shocks associated with the Covid-19 pandemic may offer three options for the business such as shutdown, layoff, and existence in the market. The COVID-19 catastrophe is really complicated, causing not only changes in current business strategies, but also the need to comprehend and assess the economic, business, and social shifts. Managers need further thinking of new strategies, and reorganization on several fronts to offset the COVID-19 crisis.

Lee et al. (2020) argued that businesses promptly adopt new strategies tosafeguard strategic strength during the COVID-19 crisis. Chesbrough (2020)inferred that business firms are adopting pandemic-responsive procedures and strategies that are customer-centric and governance-supported. Furthermore,Kim (2020) claimed that businesses are being forced to produce new products or services and to adapt them dramatically to remain competitive and productive in the changing market environment caused by the pandemic. According to Donthu and Gustafsson (2020), although some companies struggle, a number of internet-based companies prosper due to the change of pattern of consumption and the demand of the people. They are online entertainment, food supplies, online shopping , online training and remote services.

Wang et al. (2020) point out that firms have to focus on enhancing and strengthening their online business through proactive marketing innovations, as people stay isolated at home and avoid physical contact to evade infection. The fast-growing internet platforms provide opportunities for firms to make transactions online and transform traditional businesses into online business models. Thus the Covid-19 pandemic makes e-commerce increasingly popular. Sheth (2020) further explained that consumers are not able to go to the grocery store or shopping centers because of the complete lockdown. Instead, the store

is at home. Work and education do likewise. The strange habits of physically going to brick-and-mortar places are broken in the home delivery of everything. Carnevale and Hatak (2020) focused on the employment effects of Covid-19. They argued that the COVID-19 pandemic has also brought several significant challenges in human resource management practices that include adjustment to fluctuating work environments such as shifting to remote work or implementing new workplace policies and procedures to limit human contact.

Hypothesis 1: business or firm-level strategy during the pandemic (e.g. online activity, home delivery, and remote work) significantly combat the impacts of Covid-19 on business

Bartik et al. (2020) found that the pandemic has already caused mass layoffs and closures within a few weeks and the higher the duration of the pandemic, the higher the risk of closure. The closure occurs due to the financial fragility of the small business and the majority of small businesses seek funding from different aid programs for their survival. Zhang et al. (2020) found that the great uncertainty of the pandemic and its associated economic losses caused the financial market to be highly volatile and unpredictable. SMEs will particularly face severe challenges in their sustainable business operations. According to Abiad et al. (2020), Covid-19 affects business and economic activities through various channels such as a temporary fall in domestic consumption, low investment in future business activities, reduction in business and tourism travel, the spillover of low demand across the sectors and economics, and supply-side disruptions of production and trade. Besides, the pandemic also causes low cash flow and liquidity problems for firms,especially for small and medium enterprises. Depending on the industry type, firms experience lower sales revenue resulting in low cash flow and higher demand for working capital which consequently creates liquidity pressure for the firms.

Hypothesis 2a: Financial problems intensify Covid-19's impact on business

Hypothesis 2b: Alternative financing sources substantially compensate for Covid-19's impact on business

Since the Covid-19 pandemic has beendisrupting global economies, appropriate stabilization policy measures are mandatory to combat the effect of the pandemic. The scope and design of the policy hinder the channels through which the pandemic affects economic activities(Balleer et al., 2020). Bénassy-Quéré and di Mauro (2020) gathered 38 chapters discussing different monetary and fiscal policies related to individual country perspectives or Europe as a whole to mitigate the negative effect of the pandemic. They claimed that the Covid-19 crisis represents a challenge to European unity and another crash test for the euro. Appropriate

policy responses to flatten the economic recession curve and to safeguard the most impacted groups from the economic fallout are the demand of the time due to this pandemic. Ozili and Arun (2020) argued that higher fiscal policy spending compensatesfor the effects of the pandemic by reviving economic activities. According to Bartik et al. (2020), the majority of the businesses planned to seek funding through coronavirus aid, relief, and the economic security act to restart their business activities.

The government of Italy adopted the emergency package of 25 billion euros after the first wave of the pandemicto strengthen the healthcare system and support business firms to come back. The government emergency package consists of various forms of financial support to companies and households including cash incentives, tax deferrals, relief and state-backed guarantees for certain borrowers, as well as broader access to temporary layoff schemes for employees in most business sectors (Fioruzzi et al., 2020). According to Verma and Gustafsson (2020), appropriate policy reforms are criticalto tackling global market distortion resulting from Covid-19. Governmental and industrial policymakers should play a dominant role in articulating short, medium, and long-term policies and they should be compliant with the evolution of the COVID-19 crisis. Kuckertz et al. (2020) argued that policymakers should pay special focus toimplementmeasures to shield start-ups and adopt or discard policies in the future on the basis ofassembledknowledge from crises.The economy requires short, medium, and long-term policy plans for its rebalance and reboot (Michie, 2020).

Hypothesis 3: Government incentives and policies significantly contribute to combating Covid-19's impacts on business

Several studies argued that the impacts of Covid-19 significantly vary across firm sizes and sectors. According to Fernandes (2020), service industries experience the hardest hits of the Covid-19 pandemic compared to theirmanufacturing counterpart. Islam and Fatema (2020a) found that the tourism and travel industry are severely affected by the pandemic due to strict travel bans to control the spread of the disease. McKinsey and Company (2020) argued that the pandemic impacts different sectors differently and every industryis adapting to life during the pandemic. ILO (2020) holds that SMEs will drastically experience the severity of the pandemic. According to Bartik et al. (2020), small businesses are severely affected by Covid-19 due to their fragile financial capability and lack of access to finance.

Addo et al. (2020) argued that the impacts of The COVID-19 crisis on service sectors are mixed.While some service sectors such as retail, tourism, and aviation have been badly affected by the pandemic due to the closure of services to mitigate the risk, other sectors like food retailers and grocery stores are experiencinghigher

demand resulting from stocking up for long periods of isolation. Eggers (2020) argued thatwhen external crises like the Covid-19 pandemicput markets at risk, SMEs are hit with great force due to theirso-called liability of smallness and resource scarcity.

Hypothesis 4: Business or firm-level strategies and policies to combat the impact of Covid-19may vary across the firm's sizes and sectors.

The above research hypotheses need tobe addressed in the Covid-19 literature field. Based on the firm-level Covid survey of the World Bank, the study identifies the factors responsible for Covid-19's impact on business, alternative business strategies, and probable government policy incentives to mitigate the pandemicimpacts. The study then examines the effectiveness of the business strategies and government policies to compensate for the negative impact of Covid-19.

3.0 Data Description and Methodology

3.1 Data description

This study uses a combined dataset of the World Bank Enterprise Survey[3](ES) and the Covid-19 survey done in Italy in 2020. The World Bank Covid-19 survey is the follow-up survey of World bank ES completed in October 2019. The ES aims at gaining an understanding of firms' experience in the private sector in Italy. The survey useda stratified random sampling method and it is stratified at three levels such as the firm's region, size, and sector. The survey was done on a total of 760 firms of which 492 are manufacturing firms and the rest are service firms from 5 different regions and three different firm sizes (small, medium, and large). The Covid-19 survey of the World Bank aims at understanding the impact of the Covid-19 pandemic on the private sector in Italy. The follow-up survey was conducted on all of the firms sampled in the standard enterprise survey using stratified random sampling from May 27, 2020, to June 30, 2020. However, the Covid-19 pandemic forced some firms to shut down and cause the re-location or dislocation of several firms. That is why the Covid-19 survey includes a total of 453 firms which consists of 277 manufacturing and 176 service firms from different regions and firm sizes. Both of the datasets are arranged using a standard identification number named 'idstd.'

3.2 Variable Specification

Based on the Covid-19 literature and Covid-19 survey, the study identifies four different impacts of Covid-19 on business such as temporary or permanent

[3] The enterprise survey was a joint project of the European Bank for Reconstruction and Development (EBRD), the European Investment bank (EIB), and the World Bank group.

closure, demand shock, supply shock, and falling sales revenue. These four binary variables are the dependent or outcome variable of the statistical analysis. The first objective of the study is to identify the financial issues that accelerate Covid-19'simpact on firms. These financial factors include threedummies such as liquidity crisis, reduced credit sales, and reduced credit purchases. The study then identifies the effects of alternative financing sources such as bank loans, equity finance, delayedpayments, government grants, and overdue to mitigate the impacts of Covid-19. In the next part of the analysis, the study examines whether business strategies and government policy during the pandemic help businesses to combat the harms caused by Covid-19. The business or firm-level strategy variables include online business activity, home delivery, and remote work arrangement whereas government policy variables include cash transfer for business, deferral of credit payments, access to new credit, fiscal exemptions, and wage subsidies. All of the variables are dummies. A detailed description of the variables used in the statistical analysis is provided in the appendix.

3.3 Econometric Method

The study applies the Propensity ScoreMatching (PSM) method developed byRosenbaum and Rubin (1983) to compare the business impacts of Covid-19 on the private sector of Italy. PSM can beaneffective statistical tool to disentangle whether the impacts of Covid-19on business are a reflection of differences in specific business issues such as finance, business strategy, and government policy. PSM is a non-parametric statistical method that is widely applied to estimate the causal effects in the presence of treatment. It compares the outcomes between the treated and non-treated groups balancing several observed characteristics (covariates) between the groups. This method is best suited for observational data and spans a diverse set of policy fields (Phillipson et al., 2019). The study estimates the propensity score using a logit model assuming Covid-19 impacts dummies as outcome variables. The magnitude of the difference of Covid-19 impact on business between treatment and control groups can be estimated as follows:

$$\tau_{ate} = E[y_i, (w= 1)] - E[y_i (w=0)] \ldots\ldots\ldots\ldots\ldots (1)$$

Where τ indicates the Covid-19 impact difference between the treatment and control groups. Hereyi is the outcome variable of firm i and w indicates treatment variables. The propensity score of an individual firm is estimated as:

$$\rho= P(D=1|X_j) = e^{\lambda}xi/(1+ e^{\lambda}xi) \ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Here, ρ indicates the probability of being treated and x_i is the covariates (observed characteristics). This study uses the firm's age, quality certification of top managers' experience, and membership of the firm as covariates. The study

applies the Nearest NeighbourMatching technique within a specific caliper to estimate the propensity score.

Covid-19 literature suggests that the impact of the pandemic on business varies across firm sizes and sectors. The study identifies the moderation effect of firm size (large/medium/small) and sector (manufacturing/service) using interaction terms in the treatment effect models which tells whether the effect of treatment varies across firm size and sector(Islam & Fatema, 2020b).The interaction terms can be included in the PSM model as follows:

$$\tau_{ate} = E[y_i, (w.z= 1)] - E[y_i (w.z=0)] \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where z denotes moderation variables such as firm size and sector.

4.0 Analysis and Discussions

The descriptive statistics of the Covid-19 survey data of Italy summarised in table 1 provide interesting insights into the data. The statistics suggest that around 65% of all firms experience demand shock and supply shocks whereas the shares of the firms facing sales reduction and temporary closing are around 75% and 52% respectively. However, statistics based on firm sector and size provide more critical insights. The results suggest that the business impacts of Covid-19do not substantially vary between the manufacturing and service sector of Italy whereas the impact substantially varies among firms of different sizes. According to the statistics, Covid-19 has the highest average impact on small firmsin Italy followed by medium and large firms in case of a supply shock, demand shock, and sales reduction. Further to this, the difference in the impact is substantial among the firms, especially between small and large firms where 63% of small firms are temporarily closed in comparison to that 50% and 40% for large and medium firms respectively.

Table 1: Descriptive Statistics

	All Firms		**Manufacturing**		**Services**		**Large**		**Medium**		**Small**	
	Mean	N	mean	N	mean	N	mean	N	mean	N	mean	N
temporary close	0.523	367	0.542	238	0.488	129	0.506	79	0.395	124	0.628	164
sales reduction	0.735	419	0.758	264	0.697	155	0.632	87	0.702	131	0.801	201
demand shock	0.663	419	0.659	264	0.671	155	0.529	87	0.634	131	0.741	201
supply shock	0.623	419	0.629	264	0.613	155	0.471	87	0.603	131	0.701	201
online activity	0.181	419	0.159	264	0.219	155	0.207	87	0.221	131	0.144	201
home delivery	0.131	419	0.068	264	0.239	155	0.092	87	0.107	131	0.164	201
remote work	0.475	419	0.564	264	0.323	155	0.816	87	0.565	131	0.269	201
liquidity crisis	0.628	419	0.606	264	0.665	155	0.414	87	0.542	131	0.776	201
credit sales	0.294	419	0.288	264	0.303	155	0.253	87	0.198	131	0.373	201
credit purchase	0.255	419	0.254	264	0.258	155	0.195	87	0.191	131	0.323	201
bank loans	0.217	263	0.206	160	0.233	103	0.111	36	0.239	71	0.231	156
equity finance	0.103	263	0.113	160	0.087	103	0.194	36	0.056	71	0.103	156
delay pay	0.129	263	0.144	160	0.107	103	0.083	36	0.211	71	0.103	156
govt. grants	0.106	263	0.094	160	0.126	103	0.056	36	0.07	71	0.135	156
overdue	0.091	419	0.064	264	0.135	155	0.034	87	0.069	131	0.129	201
cash transfer	0.449	216	0.441	136	0.463	80	0.289	45	0.37	54	0.547	117
credit deferral	0.417	216	0.463	136	0.338	80	0.356	45	0.407	54	0.444	117
new credit	0.329	216	0.324	136	0.338	80	0.311	45	0.333	54	0.333	117
fiscal exemption	0.255	216	0.287	136	0.2	80	0.244	45	0.296	54	0.239	117
wage subsidy	0.495	216	0.529	136	0.438	80	0.556	45	0.463	54	0.487	117

The business responses to the Covid-19 pandemic also vary between sectors and firm sizes. 47.5% of all firms work remotely whereas 13% of firms provide home delivery and 18% of the firms adopt online activity. These shares substantially differ across firm sectors and sizes. Service firms have a high share to adapt home delivery (24%) and online activity (21.9%) compared to manufacturing firms (6.8% and 15.9% respectively). The share of manufacturing firms allowing remote work is very high (56.4%) compared to the share of service sectors (32.3%). The statistics by firm size show that the share of medium firms adopting online activity is highest (22%) followed by large (20%) and small firms (14.4%) whereas small firms have the highest share (16.4%) using home delivery followed by medium (10.7%) and large firms (4.2%). The rationale might be that the small and medium-sized firms adopted the home delivery option for their survival, unlike large firms for which the home delivery option might not be a viable option due to their largevolume of business. A very high portion of large firmsadopts a remote work strategy during the Covid-19 pandemic in Italy whereas this share is 56.5% in medium firms and 26.9% in small firms.

The descriptive statistics clearly show that the liquidity crisis is the main financial problem firms face during the Covid-19 pandemic in Italy. Approximately 62.8% of the firms stated that they face liquidity issues. Althoughthe magnitude of liquidity issues does not substantially vary between the manufacturing (60.6%) and service (66.5%) sectors, a significant disparity is visible among firms of different sizes. A large portion of small firms (77.6%) face liquidity problems whereas the average share of medium and large firms facing liquidity problems is 54.2% and 41.4% respectively. The statistics also report that small firms face higher problems regarding the fall of credit sales and credit purchases compared to large and medium firms whereas significant difference does not exist between manufacturing and service firms regarding these issues.

In the case of alternative sources of finance, the statistics suggest most of the firms (21.7%) use bank loans as alternative financing whereas the share of firms using other sources is around 10%. Although alternative financing sources used do not substantially vary between manufacturing and service firms, there is a large variation across firms of different sizes regarding the use of different financing sources.

Further to this, the results also suggest that around 50% of the firms receive wage subsidies as government support to the business in response to the Covid-19 pandemic. The share of firms receiving cash transfer and credit payment deferrals is 44.9% and 41.7% respectively. Firms receiving new credit and fiscal exemptions incentives are low i.e. 32.9% for new credits and 25.5% for fiscal exemptions. The receipts of different government incentives by the firms to confrontthe adverse effects of the pandemic on the Italian economy substantially

differacross firms of different sectors (manufacturing and service) and of different sizes (large, medium, and small).

TABLE 2: BASIC TREATMENT EFFECT ANALYSIS RESULTS

VARIABLES	TEMPORARY CLOSE	SALES REDUCTION	DEMAND SHOCK	SUPPLY SHOCK
online activity	-.138* .074	-.108 .071	-.165** .076	-.104 .073
home delivery	-.174** .073	-.224*** .078	-.253*** .072	-.218*** .084
remote work	-.036 .063	-.136** .056	-.181*** .052	-.156*** .057
liquidity crisis	.269*** .066	.534*** .051	.552*** .048	.469*** .052
credit sales	.355*** .063	.256*** .037	.251*** .048	.350*** .048
credit purchase	.320*** .064	.297*** .036	.355*** .043	.373*** .046
bank loans	.034 .092	-.091 .060	.060 .052	.136*** .050
equity finance	.129 .089	-.140 .091	-.216* .117	-.288** .126
delay pay	-.050 .105	.038 .043	.022 .068	.009 .074
govt. grants	-.006 .193	-.119 .075	.024 .066	-.083 .134
overdue	.140 .145	.160** .075	.206** .083	.248*** .065
cash transfer	-.013 .074	.120** .059	.254*** .067	.208*** .068
credit deferral	.085 .076	.104** .056	.129** .067	.111 .076
new credit	.101 .086	.090 .061	.067 .072	.206*** .069
fiscal exemption	-.098 .086	-.030 .075	.014 .081	.004 .095
wage subsidy	.174*** .085	-.032 .067	-.078 .072	-.092 .070

*Note(s): The table summarizes the coefficients of PSM estimation results using the average treatment effect (ate) with their standard errors. In each cell, the first number is the coefficient of PSM estimation and the number below is the corresponding standard error. *, **, and *** indicates that the coefficients are statistically significant at the 10%, 5%, and1% level respectively.*

The effect of financial problems, alternative financing sources, business-level strategies, and government policy interventions over the businesses were examined using the Propensity Score Matching method. The aggregate results of the PSM model were provided in table 2. The analysis results suggest that liquidity crisis, reduction in credit sales, and credit purchase are the three critical factors that contributed to acceleratingCovid-19's impacts on business. These factors negatively affect firms to close temporarily, reduce firms' sales revenue, and cause demand and supply shocks during this pandemic. The magnitude of the effect is different but the effect is statistically significant in all cases.

Among the three firm-level strategies adopted during the pandemic, home delivery has the most substantial effect to combat Covid-19 impacts on businesses. It reduces temporary business closures during the pandemic, helps to compensate for reduced sales, and tackles demand and supply shocks for firms. Remote work strategy contributes to sales recovery and shocks adjustment but it does not significantly reduce the temporary closure of the firms. The results also show that online business activity significantly reduces business closure and demand shock but does not contribute to combat other impacts of Covid-19 on business in Italy.

Among the alternative sources of financing, equity finance significantly reduces demand and supply shocks caused by Covid-19 in Italy. The results also suggest that the overdue facilities of the businesses from different parties intensify the consequences of Covid-19 on Italian business firms. Rather than resisting Covid-19's impact, the overdue facility significantly contributes to sales reduction as well as demand and supply shocks during the pandemic. According to the analysis results, no other sources of financing has a significant effect to mitigate the impact of Covid-19 on business except bank loan which increases supply shock significantly.

The last part of the aggregate analysis examines the effectiveness of government policies in combating the harms of the pandemic on businesses. The results suggest that government incentives to firms during the pandemic do not significantly reduce Covid-19's adverse impact on Italian business, rather they intensify the effect of the pandemic on business. According to the analysis of our results, cash incentives from the government have a positive association with sales reduction, demand shock, and supply shock whereas credit deferral facility significantly contributes to both sales reduction and demand shock.

Table 3: Treatment Effect Analysis Results Interacted With Firm Sector

Variables	Temporary Close	Sales Reduction	Demand Shock	Supply Shock
liquidity*manufacturing	.232*** .058	0.323*** 0.046	0.326*** 0.05	0.3*** 0.058
liquidity*service	.052 .098	0.294*** 0.038	0.288*** 0.05	0.24*** 0.057
creditsales* manufacturing	.412*** .087	0.277*** 0.036	0.215*** 0.06	0.31*** 0.062
creditsales*service	-.064 .109	0.157** 0.073	0.239*** 0.07	0.2* 0.1
creditpurchase*manufacturing	.329*** .089	0.225*** 0.056	0.233*** 0.06	0.24*** 0.071
creditpurchase*service	.011 .118	0.269*** 0.028	0.355*** 0.03	0.39*** 0.029
onlineact*manufacturing	-.184** .096	0.016 0.068	-0.177 0.13	-0.1 0.123
onlineact*service	-.111 .137	-0.13** 0.062	-0.172*** 0.06	-0.1 0.065
homedel*manufacturing	-.242** .118	0.063 0.077	-0.016 0.01	-0 0.075
homedel*service	-.046 .150	-0.23** 0.096	-0.212** 0.09	-0.2** 0.09
remotework*manufacturing	.004 .075	-0.06 0.062	-0.182*** 0.07	-0.1* 0.07
remotework*service	-.223*** .082	-0.25*** 0.064	-0.158** 0.06	-0.1* 0.063
bankloans*manufacturing	.077 .081	0 0.073	-0.019 0.09	0.17*** 0.053
bankloans*service	.045 .120	-0.1 0.084	0.068 0.06	0.09 0.074
equityfinance*manufacturing	.238*** .041	-0.08 0.061	-0.344** 0.15	-0.4** 0.14
equityfinance*service	.315 .299	0.084*** 0.018	0.137*** 0.02	0.10** 0.044
delaypay*manufacturing	-.177 .151	-0.04 0.073	-0.015 0.08	0.04 0.083
delaypay*service	.241*** .121	0.08*** 0.018	0.144*** 0.02	0.06 0.097
govtgrants*manufacturing	.091 .235	-0.03 0.024	0.049 0.06	-0.1 0.12

govtgrants*service	-.341*** .064	-0.43*** 0.106	-0.365*** 0.11	-0.30*** 0.112
overdue*manufacturing	.339 .147	0.25*** 0.028	0.243** 0.11	0.29** 0.113
overdue*service	.068** .161	0.135 0.11	0.235** 0.11	0.21 0.14
cash*manufacturing	-.015 .101	0.053 0.073	0.111 0.08	0.17** 0.081
cash*service	-.072 .089	0.079 0.083	0.148* 0.09	0.05 0.093
creditdeferral*manufacturing	.109 .084	0.116** 0.059	0.139** 0.06	0.18*** 0.062
creditdeferal*service	-.130 .211	0.106** 0.047	-0.009 0.15	-0.1 0.143
newcredit*manufacturing	.117 .107	0.111 0.085	0.139** 0.06	0.20*** 0.069
newcredit*service	.218*** .069	-0.1 0.139	-0.009 0.15	-0.1 0.142
fiscalexmp*manufacturing	.161* .086	0.188*** 0.043	0.238*** 0.05	0.30*** 0.051
fiscalexmp*service	-.411*** .048	-0.3* 0.168	-0.227 0.17	-0.30*** 0.081
wagesub*manufacturing	.192** .095	0.093 0.071	0.042 0.09	0.06 0.086
wagesub*service	.132 .124	-0.12* 0.076	-0.197** 0.1	-0.20* 0.108

*Note(s): The table summarizes the coefficients of PSM estimation results using the average treatment effect (ate) with their standard errors. In each cell, the first number is the coefficient of PSM estimation and the number below is the corresponding standard error. *, **, and *** indicates that the coefficients are statistically significant at the 10%, 5%, and1% level respectively. In the first column (variables), * indicates combined effects.*

As the Covid-19 literature suggests that the effect of the Covid-19 pandemic on business varies across firms' sizes and sectors, the study investigated the moderating effects of the firm sector. The results summarized in table 3 indicate significant differences between manufacturing and service firms. The results show that liquidity crisis, fall of credit sales, and credit purchase result in sales reduction, demand shock, and supply shock in both manufacturing and service sectors but these factors significantly cause temporary closure in the manufacturing sector only. The results also suggest that online activity and home delivery significantly reduce temporary business closure in the manufacturing sector whereas working remotely significantly decreases service firms' temporary shutdown. It is also

evident that the alternative business strategies help service firms to check sales reduction, demand shock,and supply shock except for the remote work strategy that significantly reduces demand and supply shock in both sectors.The effect of alternative financing sources to combat Covid-19 impact on business substantially variesbetween manufacturing and service firms in Italy. It is the governmentgrants that positively contribute to combatingthe business impact of Covid-19 in the service sectors. For all other cases, where the effects are significant, alternative financing sources deepen the Covid-19 effect on the firms. The results also suggest that the effects of governmentincentives in combating Covid-19 impact vary between sectors but the fiscal exemptions and wage subsidies are the policies that reduce the pandemic impacton service sectors. In all other cases, government incentives fuel the pandemic's impacton both sectors.

Table 4: Treatment Effect Analysis Results Interacted With Firm Size

Variables	Temporary Close	Sales Reduction	Demand Shock	Supply Shock
liquidity*large	.301***	0.249***	-0.145	0.083
	.071	0.036	0.134	0.167
liquidity*medium	-.004	0.265***	0.296***	0.249***
	.078	0.041	0.048	0.058
liquidity*small	.284**	0.334***	0.373***	0.356***
	.117	0.036	0.04	0.043
creditsales*large	.188	-0.027	-0.251	0.039
	.142	0.139	0.184	0.219
creditsales*medium	.232***	0.272***	0.336***	0.343**
	.085	0.03	0.046	0.151
creditsales*small	.325***	0.281***	0.292***	0.355***
	.095	0.032	0.043	0.045
creditpurchase*large	.216***	-0.054	-0.247	0.058
	.052	0.072	0.163	0.165
creditpurchase*medium	.164	0.19***	0.237***	0.276***
	.115	0.071	0.08	0.08
creditpurchase*small	.262***	0.278***	0.362***	0.383***
	.098	0.038	0.035	0.047
onlineact*large	-.381**	-0.237*	-0.23*	0.148***
	.178	0.128	0.127	0.052
onlineact*medium	-.328**	-0.014	-0.128	-0.01
	.135	0.088	0.133	0.131
onlineact*small	.115	0.117	0.051	-0.02
	.124	0.073	0.053	0.016
homedel*large	-.366***	-0.492***	-0.501***	-0.253
	.113	0.149	0.132	0.314
homedel*medium	-.430***	-0.142	-0.217	-0.388***
	.090	0.129	0.193	0.126
homedel*small	.092	0.089	0.146*	0.19**
	.261	0.076	0.076	0.081

remotework*large	.027 .135	-0.221*** 0.045	-0.323*** 0.056	-0.164 0.112
remotework*medium	0.134* 0.077	-0.131 0.083	-0.133 0.093	-0.082 0.065
remotework*small	.087 .089	0.106* 0.062	0.035 0.079	0.115 0.071
bankloans*large	.241 .201	0.084*** 0.017	0.144*** 0.022	0.084*** 0.017
bankloans*medium	-.041 .111	0.034 0.069	0.148*** 0.024	0.213*** 0.027
bankloans*small	.009 .135	-0.076 0.065	-0.095 0.099	0.091* 0.053
equityfinance*large	0.2 .505	-0.036 0.045	-0.688** 0.302	-0.618** 0.302
equityfinance*medium	.368*** .033	-0.129 0.149	-0.065 0.15	0 0.15
equityfinance*small	.243*** .084	0.015 0.072	-0.3 0.3	-0.437 0.31
delaypay*large	.363*** .032	0.08*** 0.017	0.141*** 0.021	0.205*** 0.025
delaypay*medium	.009 .089	0.068* 0.039	0.087*** 0.033	0.049 0.098
delaypay*small	.038 .124	0.046 0.151	-0.023 0.176	0.015 0.176
govtgrants*medium	-.241** .126		-0.392*** 0.061	
govtgrants*small	-0.195* 0.112	-0.011 0.102	0.099 0.102	0.118 0.105
overdue*large		0.144* 0.088	0.216** 0.088	0.258*** 0.088
overdue*medium	-.113 .180	0.277*** 0.023	0.346*** 0.024	0.346*** 0.062
overdue*small	.363*** .088	0.224*** 0.035	0.279*** 0.065	0.245*** 0.091
cash*large	.203 .150	-0.185 0.117	0.296 0.279	-0.19 0.209
cash*medium	-.348*** .061	-0.074 0.185	0.214*** 0.065	0.194 0.134
cashs*mall	-.062 .120	0.177*** 0.062	0.34*** 0.023	0.191*** 0.073
creditdeferal*large	.286*** .064	0.13* 0.066	0.074 0.071	0.148*** 0.053
creditdeferal*medium	-.083 .115	0.201*** 0.039	0.229*** 0.047	0.234*** 0.043
creditdeferal*small	.023 .104	0.13** 0.058	0.162*** 0.059	0.167* 0.095
newcredit*large	.252*** .079	0.125 0.376	0.074 0.071	0.106 0.391

newcredit*medium	.072 .189		0.125 0.149	0.229*** 0.047	0.292*** 0.041
newcredit*small	.161 .104		0.104** 0.047	0.162*** 0.059	0.199*** 0.062
fiscalexmp*large	.192*** .059		0.009 0.216	0.042 0.22	0.074 0.22
fiscalexmp*medium	-.296** .149		-0.146** 0.067	-0.123* 0.068	-0.09 0.137
fiscalexmp*small	-.101 .140	0.1	 0.132	0.176 0.133	0.19 0.134
wagesub*large	-.145 .151		-0.2*** 0.077	-0.227*** 0.08	-0.227*** 0.08
wagesub*medium	-.033 .134		-0.208 0.138	-0.079 0.111	-0.074 0.113
wagesub*small	.210*** .073		0.141 0.114	0.127** 0.062	0.127** 0.068

*Note(s): The table summarizes the coefficients of PSM estimation results using the average treatment effect (ate) with their standard errors. In each cell, the first number is the coefficient of PSM estimation and the number below is the corresponding standard error. *, **, and *** indicates that the coefficients are statistically significant at the 10%, 5%, and1% level respectively.In the first column (variables), * indicates combined effects.*

Our results of analysis summarised in table 4 take firm size as the moderating factor to provide interesting insights. The findings suggest that financial problems such as liquidity crisis, reduced credit purchases, and sales show mixed pandemic impact on medium and small firms whereas in a few cases, they affect large firms significantly. On the other hand, business strategies during the pandemic significantly help large firmsto fight the pandemic's effects except for a few cases.The results also suggest that bank loans and delayed payment accelerates the impact of the pandemic on large and small firms respectively. The results also suggest that equity finance increases the closure of medium and small firms whereas government grants significantly reduce shutdowns of medium and small firms. Further analysis regarding government incentives suggests that credit deferrals, new credit, and fiscal exemption opportunities increase the temporary shutdown of large firms whereas fiscal exemption and cash incentives reduce the temporary closure of medium firms. In case of sale reduction, demand shock, and supply shock government incentives usually affect medium and small firms but they intensify Covid-19's impact. It is only wage subsidies that significantly lessen these effects on large firms.

Table 5: Treatment effect analysis with temporary closure as a dependent variable and other impacts of covid-19 as the treatment variable

Variables	Coef. St.err.
sales reduction	0.439*** 0.066
demand shock	0.254*** 0.059
supply shock	0.279*** 0.061
sales*manufacturing	0.315*** 0.059
sales*service	0.076 0.102
sales*large	-0.003 0.109
sales*medium	-0.087 0.077
sales*small	0.298*** 0.07
demandshock*manufacturing	0.239*** 0.06
demandshock*service	0.101 0.069
demandshock*large	0.157 0.18
demandshock*medium	-0.085 0.079
demandshock*small	0.224*** 0.062
supplyshock*manufacturing	0.266*** 0.062
supplyshock*service	0.074 0.094
supplyshock*large	-0.09 0.136
supplyshock*medium	-0.018 0.082
supplyshock*small	0.217** 0.088

*Note(s): The table summarizes the coefficients of PSM estimation results using the average treatment effect (ate) with their standard errors. In each cell, the first number is the coefficient of PSM estimation and the number below is the corresponding standard error. *, **, and *** indicates that the coefficients are statistically significant at the 10%, 5%, and1% level respectively.In the first column (variables), * indicates combined effects.*

Finally, the study identifies the effects of sales reduction, demand shock, and supply shock on the temporary closure of the firms due to Covid-19 in aggregate as well as across sectors and firms sizes. The results of the analysis summarised in table 5 provide critical insights for policy factors such as reduced sales, demand shock, and supply shock significantly caused firms shutdown duringthe Covid-19 pandemic where reduced sales have the highest impact followed by supply shock and demand shock.Further to this, the findings suggest that these factors significantly affect manufacturing firms only whereas among firms of different sizes these factors causethe shutdown of the small firms only.

5.0 Conclusion

The world is passing its hardest time of this century due to the outbreak of the Covid-19 pandemic. The pandemic causes drastic effects on the global economy which is unprecedented in terms of death and destruction, business shocks, and shutdowns. Social distancing andisolation, travel bans, and other health-related restrictionsslowed down the infections but fueled the consequences of this pandemic. Businesses either small or large experienced adverse effects ranging from sales drop to have been shutdown, supply chainshave broken down, and international trade came to a halt globally during these turbulent times of Covid-19. As economists around the globe suggest that the global economy will undergo a severe global economic recession in the century if the pandemic lasts long.Italy has experienced one of the hardest hits of Covid-19. A long-term lockdown during the pandemic causes a severe negative impact on its business and economic activities. The government of Italy has taken several policy initiatives to revive its critical businesses in the general and troubled economy in particular. However, there is a lack of research to pinpoint the impacts of Covid-19 in Italy in connection to the factors that triggered the most loss during the pandemic and how the responses of firms and businesses from the private sector and the government intervention policies (through stimulus packages) helped to combat the impact of Covid-19 over the business sectors and economy at large. This study is an attempt to fill up these research gaps. The study uses combined data fromthe world bank ES and the follow-up Covid survey in Italy. It applies the PSM model with nearest neighbour matching method to analyze the data. The study also identifies the moderating effects in connection to firm sizes and sectors to assess whether the results significantly differ across the different firm sizes and business sectors.

The results of the study provide crucial policy suggestions in the research area of the business impacts of Covid-19. The study identifies liquidity crisis, reduction of credit sales, and credit purchase as the significant factors contributing to the impact of the pandemic. The firm-level strategies and business policies during the pandemic such as online activity, home delivery, and remote work have

significant effects to fight back against the pandemic's business effects in Italy. The aggregate analyses do not support that alternative financing sources and government incentives effective to tackle Covid-19's impacts on business. The study also evidence that the pandemic's business impacts and their contributing factor vary across the firm's sectors and sizes. Small firms are most severely affected by Covid-19. Alternative financing and government incentives do help the firm to tackle the adverse effects of Covid-19 but on the mixed scale over the firm sizes and business segments. This study is a country-specific analysis. Therefore, further research using a panel of countries of different regions may provide more crucial policy insights.

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Appendix

Detailed Description Of The Variables

Research Focus	Variables	Description
Covid-19's Impacts	Temporary close	Takes value of 1 if the firm is temporarily closed due to Covid-19 pandemic, otherwise 0
	Reduced sales	Takes value of 1 if the firm's sales decreases due to Covid-19 pandemic, otherwise 0
	Demand shock	Takes value of 1 if the firm experiences demand shock due to Covid-19 pandemic, otherwise 0
	Supply shock	Takes value of 1 if the firm experiences supply shock due to Covid-19 pandemic, otherwise 0
	Liquidity crisis	Takes value of 1 if the firm experiences liquidity crisis due to Covid-19 pandemic, otherwise 0
Factors responsible for the pandemic's impacts	Credit sales	Takes value of 1 if the firm's credit sales decrease due to Covid-19 pandemic, otherwise 0
	Credit purchase	Takes value of 1 if the firm's credit purchase decrease due to Covid-19 pandemic, otherwise 0
Business strategies	Online activity	Takes value of 1 if the firm started or increased business activity online during Covid-19 pandemic, otherwise 0
	Home delivery	Takes value of 1 if the firm started or increased delivery or carry-out of goods or services during Covid-19 pandemic, otherwise 0
	Remote work	Takes value of 1 if the firm started or increased remote work arrangement for its workforce during Covid-19 pandemic, otherwise 0
Alternative financing sources	Bank loans; Equity finance; Delay pay; Govt. Grants; Overdue	Takes value of 1 if the firm uses bank loans/ equity finance/delay pay/govt. grants/overdue facilities to deal with cash flow shortages during Covid-19 pandemic, otherwise 0
Government incentives	Cash transfer; Credit deferral; New credit; Fiscal exemption; Wage subsidy	Takes value of 1 if the firm received any national or local government support in the form of cash transfer/credit deferral/new credit/ fiscal exemption/wage subsidy during Covid-19 pandemic in response to the crisis, otherwise 0