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**The Role of Export Incentives and Bank Credit on the
Export Survival of Firms in India During COVID-19**

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Abstract: *The aim of this study is threefold. First, we analyse the relationship between export incentives on firm survival during the coronavirus disease (COVID-19) crisis; second, we explore the nexus between bank dependency and survival in the export market; and finally, we test the complementarity and substitutability effect of export incentives and bank dependency on export market survival. We use firm-level information on Indian firms from 2016 to 2022, covering 4 years of the pre-pandemic period and 2 years of the post-pandemic period. We find that both export incentives and bank dependency improve the probability of export market survival in the post-pandemic period. These results are applicable to both the manufacturing and services sector, stand-alone firms, and business group affiliates. Our results remain robust while employing alternative proxies for the primary variable of interest and different methodologies.*

Keywords: Export incentives; bank dependency; survival; export

1. Introduction

International trade is considered as an engine of economic growth. However, the coronavirus disease (COVID-19) pandemic has had a catastrophic effect on the global economy, with levels of trade and production witnessing the largest decline since World War II (Baldwin and Di Mauro, 2020). The global trade volume shrank by 21% between March and April 2020. In the context of an emerging economy like India, exports of commodities contracted by 3.3% during the first 2 years of the pandemic (2020–2022). Manufacturing and services exports contracted by 6% and 1%,¹ clearly indicating that India's trade performance was also affected by the onset of the pandemic. From a firm's perspective, gains from trade integration are associated with their survival in the international market (Besedes and Prusa, 2010). Pre-pandemic firm-level studies have identified various firm-level factors (size, age, experience, ownership, financial obstacles, differentiated products, and productivity) that help them to survive in the export market (Reddy and Sasidharan, 2023). Longer involvement in the export market is associated with improved efficiency and product quality through knowledge flows, sales growth, risk diversification, and access to global networks (Esteve-Pérez et al., 2007). For the internationalised firms (exporters), the pandemic-induced demand and supply shock added further pressure to global market survival. Therefore, it is crucial to explore the determinants of the survival of exporting firms during the COVID-19 pandemic. Despite its policy significance, we are unaware of the outcome of the pandemic on the export market survival of firms in the context of developing countries. Given the availability of nationally representative firm-level data during the pandemic, it provides an opportunity to reasonably assess the significance of the factors which enabled the export market survival of firms from an emerging economy perspective.

In this study, we examine the role of two crucial factors – government support and bank dependency – on the survival of exporters in the context of the COVID-19 pandemic. In the standard trade models (Melitz and Redding, 2014), firms export only if the gains from trade outweigh the cost. Since exporting involves additional costs (due to the establishment of distribution networks and other sunk costs), the demand shock (due to COVID-19) made exporting difficult for many firms. From the supply side, due to intense lockdowns, firms experienced shortages of raw materials, labour, and other

¹ During the period (April 2020–March 2021), India's exports were 7.8% lower than the level of exports in 2018–19 and 4.7% lower with respect to 2019–20 (National Statistical Office, 2021).

inputs. Therefore, policymakers resorted to various measures² to help cushion the shock for firms. Given these support measures, we hypothesise that such incentives may have helped firms to survive in the export market at the onset of COVID-19.³

Further, the COVID-19 pandemic has added to the existing woes of firms reeling under enormous financial constraints. Various studies have shown that firms which experienced cash flow shortages were pushed into a severe financial crunch at the time of the pandemic (Ling et al., 2021). The World Bank Enterprise Survey showed that the cash flows of most firms decreased drastically (Adian et al., 2020). Previously, various theoretical models (Muûls, 2008; Manova, 2010) showed how financial constraints affect international trade. For instance, Manova (2010) showed that financial constraints affect exports through both decisions to export and export intensity. Therefore, the pandemic-induced financial conditions may hinder firms' domestic and foreign market survival dynamics. A possible channel for addressing this issue is by providing necessary external finance. In this context, the Reserve Bank of India (RBI) introduced several programmes to improve credit supply.⁴ Given these policy developments, we hypothesise that bank-dependent firms are more likely to reap the benefits of such programmes and survive the perils of the crisis. Therefore, we explore whether bank dependency during the pandemic enabled exporters to survive.

Our next set of analyses is motivated by the amendment of the RBI Act, 1934 in 2016. It formalised the Monetary Policy Committee, comprising members from the RBI and government nominees, to attain economic goals (RBI, 2017). This allowed the government's monetary policy and fiscal agencies to work together towards economic goals. The onset of the pandemic provided us with an opportunity to test whether such policies are complementary or substitutes for fiscal initiatives. The available evidence documents the interconnection between monetary policy and fiscal policy (Rossi and Zubairy, 2011; Hachula, Piffer, and Rieth, 2020). Therefore, we attempt to disentangle

² The government provided several relaxations and extensions of compliance deadlines to address exporters' pandemic-related hardships (Government of India, 2020). However, we cannot explicitly capture them since our data set cannot clearly identify whether it was COVID-19 related support or if they were already beneficiaries of this government support.

³ The existing evidence on export-related programmes and trade shows an inconclusive result. One set of studies has argued that export-promotion programmes have a significant effect on international trade (Volpe Martincus and Carballo, 2010; Van Biesebroeck, Konings, and Volpe Martincus, 2016). Muûls (2008) showed that export survival is dependent on firms' ability to face recurrent export costs. Another set of studies showed that their effects are short-lived (Cadot et al., 2015).

⁴ For instance, the Long Term Repo Operation for banks to borrow money from the RBI over a longer period.

whether incentives to promote export (fiscal policies) and credit availability (due to monetary expansion) are complementary or substitutes for export market survival.

To study our objectives, we first obtain firm-level information from the Centre for Monitoring Indian Economy (CMIE) Prowess database. One advantage of our data is that it contains detailed information on the fiscal benefits received by firms. Therefore, we can identify the government support (both cash and cash equivalent) received specifically for export activities. Further, our data also help to track firms' borrowing from financial institutions. We collect information on short- and long-term bank borrowing – key information required for our empirical analysis.

For the econometric analysis, we estimate the panel probit model. We first document that, controlling for firm-level factors, government support during the pandemic period is positively correlated with export survival. Next, we show that bank-dependent firms are more likely to survive compared with their counterparts. This implies that finance is an integral part of firm export survival. This result suggests that policymakers should enhance credit availability, especially to export firms facing financial constraints, to mitigate the effects of pandemic. However, we find an absence of complementarity and substitutability effects of incentives and bank loans on the export survival of our sample firms. Further, our result holds for both the manufacturing and services sectors, and for a subsample based on ownership (business group affiliates and stand-alone firms).

Our study consolidates the existing strand of literature in the following ways. Previous studies on firm survival primarily focused on sunk cost, experience, finance, and innovation (Albornoz, Fanelli, and Hallak, 2016; Carrère and Strauss-Kahn 2017; D'Amato, Sangiácomo, and Tobal, 2015; Dai, Liu, and Lin, 2020). However, studies on government support in this stream of literature are confined to export market entry, value added, productivity, and employment (Munch and Schaur, 2018; Bernard and Jensen, 2004). As mentioned, the role of government incentives for the survival of exporting firms during the pandemic-induced trade crisis has not received adequate attention. Therefore, we contribute to the literature by exploring the role of government support on firms' export survival in the context of an emerging economy – India. Further, investigation of such issues helps policymakers to understand the effectiveness of export incentive programmes.

Moreover, we use unexplored information on government incentives granted to Indian firms. Under the heading of ‘fiscal benefit’, our data source provides information on incentives that are specifically assigned for exporting firms. These schemes include duty drawbacks, concessions on import duties, tax exemptions, and excise rebates, amongst others. Therefore, we can directly connect our measure of incentives with firm exports and avoid ambiguity on the use of government aid. Additionally, existing studies on the adverse effects of COVID-19 on trade largely focus on the macroeconomic effects (Vidya and Prabheesh, 2020; Vidya, 2022). Such analysis can only provide an overview of the economic condition. However, we employ micro-level data that help to unravel firm-specific aspects of exporting firms during the pandemic.

Finally, our study contributes to the literature that highlights the importance of access to external finance (Ayyagari et al., 2021; Wu and Huang, 2022). Since bank loans are the main source of borrowing in India (Aleem, 2010; Allen et al., 2012), the RBI has implemented several policies to boost credit availability in the economy. Therefore, our study helps to understand the monetary policy transmission to exporters during the pandemic crisis.

The remainder of the paper is organised as follows. Section 2 explains the data and variables. Section 3 provides the empirical framework of the study. Section 4 presents our findings. Finally, section 5 concludes the study.

2. Data and Variables

Our firm-level data set is drawn from CMIE Prowess. This data set has detailed information on the Indian corporate sector. CMIE Prowess compiles information from the firm’s annual reports and balance sheets. We obtain data for 2016–2022, which accommodates the 4 years prior to the pandemic and 2 years into the post-pandemic period. Since this study focuses on the firm’s export survival, we rely only on firms that were exporting prior to the pandemic. Following the standard practice of sample selection criteria, we dropped the observations with negative sales, bank borrowings, cash flow, and export incentives. After the data cleaning process, our sample has 32,668 observations.

The dependent variable in our analysis is the export survival (*Survival*) measure. To construct the variable, we create a dummy variable that takes the value of 1 if a firm is exporting and 0 if the firm is not exporting that year.

One of the main explanatory variables is government incentives for export. To measure that, we create a dummy variable that takes the value of 1 if a firm received export incentives in the form of cash or cash equivalents. These are usually in the form of duty drawbacks, excise rebates, import licences, or concessions in import duty and tax exemptions (*Incentive*).⁵ Another main explanatory variable is the measure of bank dependency, calculated as the ratio of total bank borrowing to total debt (Guariglia, Spaliara, and Tsoukas, 2016; Da Silva Fernandes, Kontonikas, and Tsoukas, 2019). The total bank borrowing includes both short-term and long-term borrowings (*BDep*). Further, to take into account the effect of the COVID-19 pandemic, we create a dummy variable that takes the value of 1 for the pandemic period (2021 and 2022) and 0 otherwise (*Covid*).

As other controls, we include *Size*, which takes the value of 1, 2, 3, and 4 if the firm belongs to micro, small, medium, and large, respectively.⁶ We operationalise firms' experience by including firm age (*Age*) as the log of the number of years since incorporation; *Debt* is defined as the log of total debts; *Cashflow* as the profit after tax minus depreciation and amortisation; and *ROA* as the ratio of profit after tax to total assets. To capture foreign ownership, we follow the RBI's definition of foreign firms as those firms with more than 10% foreign promoters' share. Based on this information, we create *Foreign*, a dummy variable that takes the value of 1 if the foreign promoters' shareholding is more than 10%, and 0 otherwise. Table 1 reports the descriptive statistics of the variables used in the empirical analysis. In our sample, 38.5% of the firm-year observations do not survive according to our definition. Further, 33.4% of the firms are reported to have received export incentives.

⁵ Although our data set helps to segregate government support specifically for export from other types of support, a further bifurcation of export support into different types (duty drawbacks, excise rebates, import licenses, concessions in import duty, and tax exemptions) is not available in our data set. Therefore, we are unable to capture the differential impact of various export support measures in this study.

⁶ For the size classification, we follow the definition of the Government of India's Ministry of Micro, Small & Medium Enterprises. Micro firms have investment in plant and machinery or equipment not greater than ₹10 million and annual turnover not more than ₹50 million, while small firms have investment in plant and machinery or equipment not greater than ₹100 million and annual turnover not more than ₹500 million. Medium-sized firms have investment in plant and machinery or equipment not greater than ₹500 million and annual turnover not more than ₹250 million. Large firms have investment greater than ₹500 million and turnover above ₹2,500 million.

Table 1: Descriptive Statistics

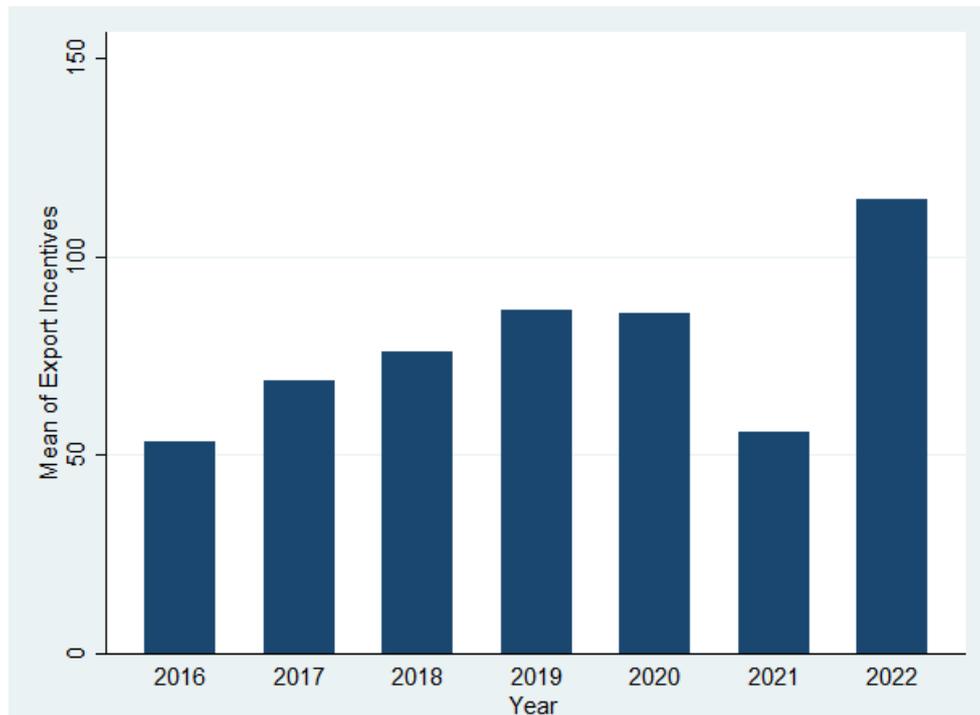
Variable	Obs	Mean	Std. Dev.	Min	Max
Survival	32,668	0.615	0.487	0.000	1.000
Export intensity	32,668	0.187	0.300	0.000	1.000
Incentive	32,668	0.334	0.472	0.000	1.000
Incentive2	32,668	0.869	1.600	0.000	9.439
BDep	32,668	0.567	0.383	0.000	1.068
BDep2	32,668	4.266	2.738	0.000	14.143
Covid	32,668	0.113	0.316	0.000	1.000
Age	32,668	3.265	0.532	0.000	5.069
Size	32,668	3.104	0.871	1.000	4.000
Debt	32,668	5.607	2.181	0.095	15.430
Cash flow	32,668	0.088	0.127	0.000	14.235
ROA	32,668	0.057	0.121	-0.438	13.706
Foreign	32,668	0.031	0.174	0.000	1.000

ROA = return on assets, Std. Dev. = standard deviation.

Notes: This table provides summary statistics of the variables employed in the empirical analysis. *Survival* is a dummy variable that takes the value of 1 if a firm is exporting and 0 otherwise. *Export intensity* is measured by the ratio of total exports to total sales. One of the main explanatory variables is government incentives for exports. *Incentive* is a dummy variable that takes the value of 1 if a firm received export incentives in the form of cash or cash equivalents and 0 otherwise. *BDep* is a bank dependency variable measured as the ratio of total bank borrowing to total debt. *BDep2* is the log of bank borrowing. *Covid* is a dummy variable that takes the value of 1 for the pandemic and 0 otherwise. *Size* takes the values 1, 2, 3, and 4 if the firm is micro, small, medium-sized, and large, respectively; *Age* is the log of the number of years since the firm was incorporated; *Debt* is the log of total debts; *Cashflow* is the profit after tax minus depreciation and amortisation; and *ROA* is the ratio of profit after tax to total assets. *Foreign* is a dummy variable that takes the value of 1 if the foreign promoters' shareholding is more than 10% and 0 otherwise.

Source: Authors.

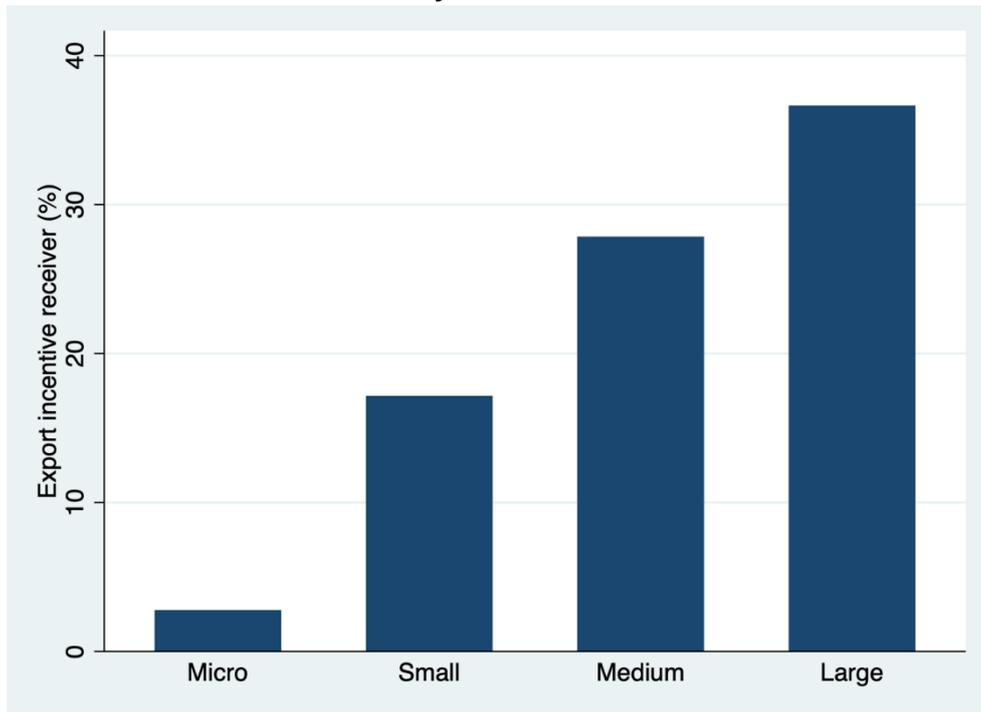
Figure 1: Mean of Export Incentives by Year
(₹ million)



Note: The financial year (April to March) is used.
Source: Authors' calculation from CMIE Prowess data.

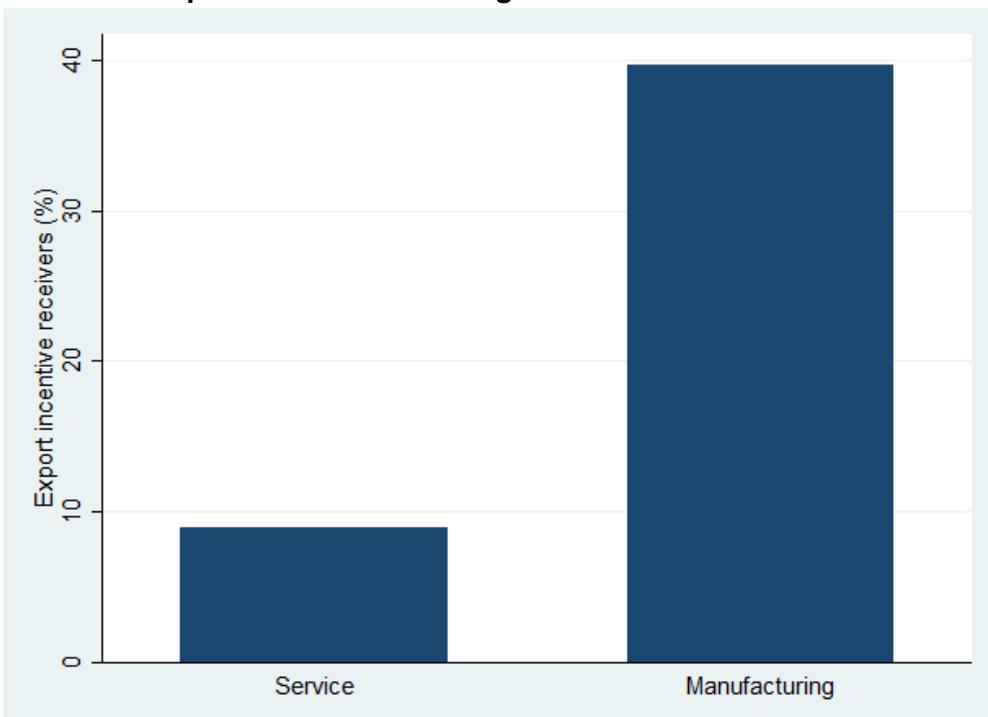
Figure 1 presents the mean value of export incentives that firms received during the study period. It shows that there is steady growth in incentives in the pre-pandemic period. In 2021, we observe a decline in export incentives due to the onset of the pandemic. However, there is a substantial increase in 2022, reflecting the initiatives to offset the adverse effects of the crisis amongst exporting firms. Going further, we consider the types of firms that received support during the pandemic period. We first plot the percentage of firms that received support by firm size (Figure 2). We divide our sample firms into micro, small, medium-sized, and large categories. The figure indicates that large firms received more export incentives from the government. This result may be because a major chunk of exporting firms comprises large firms. In addition, certain incentives such as tax exemptions are greater for bigger firms. Further, Figure 3 presents the percentage of firms that received export incentives in the manufacturing and service sectors. Along the expected lines, incentives are pumped more into the manufacturing sector. Finally, Figure 4 illustrates the share of firms that received government support based on ownership (business group affiliates and stand-alone firms). We find that business group affiliates are the major recipients of such incentives.

Figure 2: Export Incentives Received during the Post-pandemic Period by Firm Size



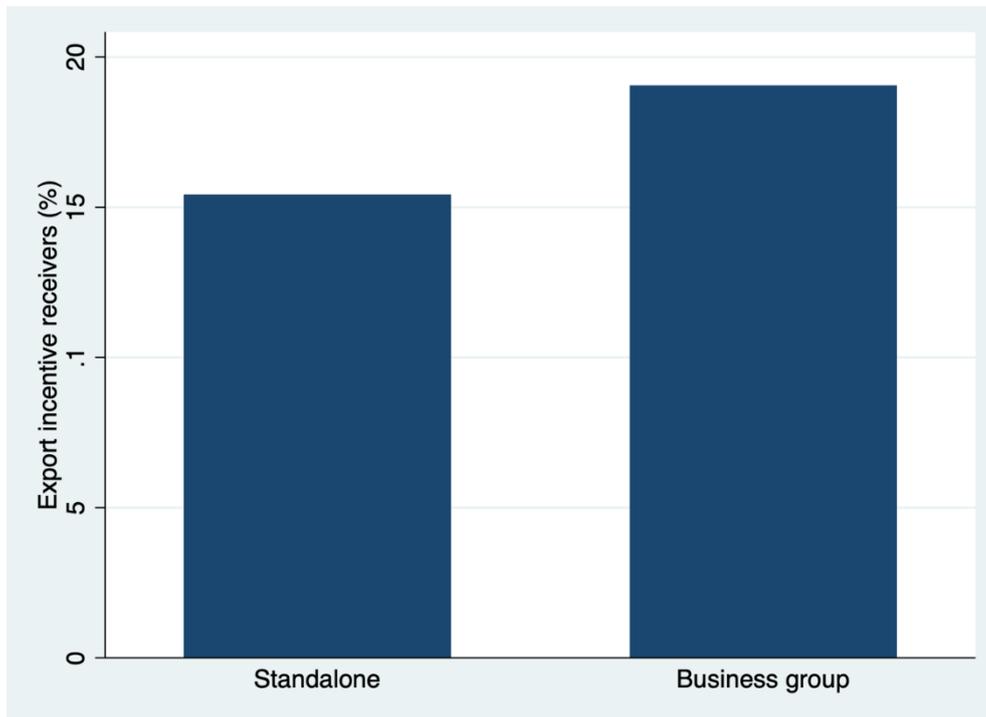
Source: Authors' calculation from CMIE Prowess data.

Figure 3: Export Incentives Received by Firms in the Post-pandemic period – Manufacturing and Services Sectors



Source: Authors' calculation from CMIE Prowess data.

Figure 4: Export Incentives Received by Firms in the Post-pandemic Period by Ownership – Business Groups vs Stand-alone Firms



Source: Authors' calculation from CMIE Prowess data.

3. Empirical Framework

We begin our empirical analysis by investigating the role of government incentives in export survival during the post-pandemic period. More specifically, we estimate the following panel probit model:

$$Pr(Survival_{i,t} = 1) = \alpha + \beta Incentive_{i,t} + \gamma COVID_t + \delta Incentive_{i,t} * COVID_t + Controls + \theta_i + \varphi_j + \mu_t + \epsilon_{i,t} \quad (1)$$

where $Survival_{i,t}$ captures the export survival of firm i at time t . $Controls$ are the set of firm-specific explanatory variables. θ_i , φ_j , and μ_t are the firm-specific, industry-specific, and time-invariant unobserved factors, respectively. The main interest of our analysis is the coefficient of interaction term (δ). A positive and significant δ implies that government support in terms of export incentives helped the survival of exporters during the pandemic period.

In the second set of analyses, we explore the relationship between export survival and bank dependency using the following model:

$$Pr(Survival_{i,t} = 1) = \alpha + \beta BDep_{i,t} + \gamma COVID_t + \delta BDep_{i,t} * COVID_t + Controls + \theta_i + \varphi_j + \mu_t + \epsilon_{i,t} \quad (2)$$

where a positive δ suggests that higher bank borrowing helps exporting firms survive during the pandemic period. A negative value of δ implies that the debt burden may have exacerbated during the crisis.

To analyse the role of complementarity or substitutability of bank borrowings and fiscal incentives on export market survival, we estimate the following specification:

$$\begin{aligned} Pr(Survival_{i,t} = 1) &= \alpha + \beta_1 Incentive_{i,t} + \beta_2 BDep_{i,t} + \beta_3 COVID_t + \beta_4 Incentive_{i,t} * COVID_t \\ &+ \beta_5 BDep_{i,t} * COVID_t + \beta_6 Incentive_{i,t} * BDep_{i,t} + \delta Incentive_{i,t} * BDep_{i,t} \\ &* COVID_t + Controls + \theta_i + \varphi_j + \mu_t \\ &+ \epsilon_{i,t} \end{aligned} \quad (3)$$

where a positive (negative) value for δ indicates that both government support and bank loans are complementary (substitute) for each other.

4. Findings

4.1. Main Findings

In this section, we discuss our empirical findings. We investigate the role of government support on firms' export survival (Equation (1)). Table 2 presents the estimates of our probit model (odd columns). In column 1, the estimated equation includes incentives, a dummy for the pandemic, and an interaction term between export incentives and the pandemic dummy. Column 3 includes industry and time fixed effects. Column 5 includes other firm-specific variables as additional controls. Across all specifications, we observe that the coefficient of the interaction term is positive and statistically significant. Consistent with our expectations, export incentives increase the survival prospects of firms during the pandemic. Since the coefficient magnitudes of non-linear models like probit cannot be used for direct interpretation (Ai and Norton, 2003; Greene, 2010), we report marginal effects of explanatory variables on the dependent variable in the even columns. The marginal effects on the interaction term suggest that firms which received incentives were 16% more likely to survive during the pandemic. This finding highlights the significance of government incentives on the survival of firms in the export market

during the crisis period. Further, the coefficient of the COVID-19 crisis dummy captures the survival for firms that did not receive incentives. As expected, the negative and statistically significant coefficient suggests that firms that did not receive the support are less likely to survive in the export market. Finally, the coefficient of *Incentives* is positive and it highlights the significance of government measures in enhancing export market participation irrespective of the crisis/non-crisis period.

In the second set of analyses, we investigate the nexus between bank dependency and export survival by estimating Equation (2). Table 3 reports the estimation results of various specifications. We find a positive and statistically significant coefficient for the interaction of the bank dependency measure and the COVID-19 dummy. This result indicates that bank-dependent firms are more likely to survive the COVID-19 crisis. Our marginal effect suggests that one standard deviation increase in the bank dependency measure improves firms' survival by 4%. Our findings are in line with previous studies which report that survival was higher for more bank-dependent firms in the United Kingdom during the 2007–2009 financial crisis (Guariglia, Spaliara, and Tsoukas, 2016).

Table 2: Export Survival and Government Support

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Survival		Survival		Survival	
	Coeff	ME	Coeff	ME	Coeff	ME
Incentives*Covid	0.840*** (0.0658)	0.210** (13.09)	0.657*** (0.0685)	0.151** (9.72)	0.693*** (0.0681)	0.159** (10.30)
Covid	-	-	-	-	-1.411***	-
	1.999*** (0.0461)	0.499** (49.87)	1.429*** (0.0492)	0.327** (30.42)		0.324** (30.05)
Incentives	0.254*** (0.0310)	0.063** (8.23)	0.355*** (0.0336)	0.081** (10.64)	0.378*** (0.0334)	0.087** (11.41)
Age					0.0300 (0.0294)	0.007 (1.02)
Size: Small					0.241*** (0.0524)	0.056** (4.55)
Size: Medium					0.272*** (0.0573)	0.063** (4.69)
Size: Large					-0.0373 (0.0640)	-0.009 (0.58)
Debt					- 0.0275*** (0.00829)	- 0.006** (3.32)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Survival		Survival		Survival	
	Coeff	ME	Coeff	ME	Coeff	ME
Cash flow					-0.291 (0.518)	-0.067 (0.56)
ROA					0.0371 (0.533)	0.009 (0.07)
Foreign					-0.458*** (0.0870)	- 0.105** (5.27)
Constant	0.522*** (0.0189)		0.219 (0.504)		0.108 (0.515)	
Firm dummies	No		Yes		Yes	
Industry dummies	No		Yes		Yes	
Time dummies	No		Yes		Yes	
Observations	32,668		32,668		32,668	

Coeff = coefficients, ME = marginal effects, ROA = return on assets.

Notes: This table reports the relationship between a firm's export survival and government support during the pandemic period. Robust standard errors and test statistics are reported in parentheses for coefficients and marginal effects, respectively. *** and ** indicate significance at the 1% and 5% levels, respectively.

Source: Authors.

Finally, we explore the complementarity or substitutability of bank borrowings and fiscal incentives using Equation (3). In this set of analyses, we bring the triple interaction of the COVID-19 dummy, incentives dummy, and bank dependency measure into our model. In Table 4, we find a negative coefficient for the triple integration term, which suggests substitutability between incentives and bank borrowings; however, the results are statistically insignificant. In other words, our analysis did not find any evidence of significant complementarity and substitutability effects.

Table 3: Export Survival and Bank Dependency

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Survival		Survival		Survival	
	Coeff	ME	Coeff	ME	Coeff	ME
BDep*Covid	0.521*** (0.0829)	0.131** (6.31)	0.475*** (0.0853)	0.110** (5.58)	0.465*** (0.0849)	0.107** (5.49)
Covid	-	-	-	-	-1.413***	-
	1.958*** (0.0572)	0.491** (36.72)	1.442*** (0.0600)	0.333** (24.53)	0.0597 (0.0597)	0.327** (24.09)
BDep	0.266*** (0.0359)	0.067** (7.46)	0.193*** (0.0380)	0.045** (5.08)	0.170*** (0.0379)	0.039** (4.50)
Age					0.0406 (0.0293)	0.009 (1.39)
Size: Small					0.244*** (0.0525)	0.057** (4.61)
Size: Medium					0.290*** (0.0572)	0.068** (5.01)
Size: Large					0.0384 (0.0638)	0.009 (0.60)
Debt					- 0.0265*** (0.00827)	- 0.006** (3.21)
Cash flow					-0.142 (0.507)	-0.033 (0.28)
ROA					-0.0154 (0.523)	-0.004 (0.03)
Foreign					-0.413*** (0.0872)	- 0.096** (4.75)
Constant	0.446*** (0.0255)		0.154 (0.475)		-0.0148 (0.485)	
Firm dummies	No		Yes		Yes	
Industry dummies	No		Yes		Yes	
Time dummies	No		Yes		Yes	
Observations	32,668		32,668		32,668	

Coeff = coefficients, ME = marginal effects, ROA = return on assets.

Notes: This table reports the relationship between a firm's export survival and bank dependency during the pandemic period. Robust standard errors and test statistics are reported in parentheses for coefficients and marginal effects, respectively. *** and ** indicate significance at the 1% and 5% levels, respectively.

Source: Authors.

Table 4: Complementarity and Substitutability of Government Support and Bank Dependency

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Survival		Survival		Survival	
	Coeff	ME	Coeff	ME	Coeff	ME
Incentives*BDep*Covid	-0.208 (0.167)	-0.052 (1.24)	-0.126 (0.174)	-0.029 (0.73)	-0.110 (0.172)	-0.025 (0.64)
Incentives *Covid	0.882*** (0.116)	0.219** (7.66)	0.670*** (0.121)	0.153** (5.55)	0.700*** (0.120)	0.160** (5.84)
BDep*Covid	0.410*** (0.107)	0.102** (3.82)	0.397*** (0.111)	0.091** (3.59)	0.379*** (0.110)	0.087** (3.44)
BDep	0.250*** (0.0360)	0.062** (7.01)	0.189*** (0.0381)	0.043** (4.98)	0.164*** (0.0379)	0.037** (4.34)
Covid	-	-	-	-0.367**	-1.584***	-
	2.159*** (0.0710)	0.537** (32.58)	1.608*** (0.0746)	(22.13)	(0.0742)	0.363** (21.87)
Incentives	0.244*** (0.0311)	0.061** (7.88)	0.355*** (0.0336)	0.081** (10.64)	0.378*** (0.0334)	0.087** (11.41)
Age					0.0266 (0.0294)	0.006 (0.90)
Size: Small					0.228*** (0.0526)	0.053** (4.29)
Size: Medium					0.258*** (0.0574)	0.059** (4.43)
Size: Large					-0.0462 (0.0642)	-0.011 (0.72)
Debt					-	-
					0.0269*** (0.00832)	0.006** (3.23)
Cash flow					-0.119 (0.512)	-0.027 (0.23)
ROA					-0.0969 (0.526)	-0.022 (0.18)
Foreign					-0.438***	-
					(0.0870)	0.100** (5.05)
Constant	0.386*** (0.0268)	-0.0132 (0.0296)	0.0863 (0.501)	0.125*** (0.0329)	0.00372 (0.509)	0.053** (4.29)
Firm dummies	No		Yes		Yes	
Industry dummies	No		Yes		Yes	
Time dummies	No		Yes		Yes	
Observations	32,668	32,668	32,668	32,668	32,668	32,668

Coeff = coefficients, ME = marginal effects, ROA = return on assets.

Notes: This table reports the complementarity and substitutability effect of government support and bank dependency on export survival during the pandemic period. Robust standard errors and test statistics are reported in parentheses for coefficients and marginal effects, respectively. *** and ** indicate significance at the 1% and 5% levels, respectively.

Source: Authors.

4.2. Subsample Analysis

We extend our analysis to two sets of subsamples. First, we divide our sample into the manufacturing and services sectors. Although the pandemic has adversely affected both sectors, the intensity of the effect was not uniform. The Economic Survey of India noted that while the manufacturing sector contracted by 9.4% during financial year 2020–21, the services sector contracted by 8.8% during the same period (Government of India, 2021). The differential effect on the sectors is expected since the exchange of or trade in commodities in services is easier, especially during lockdowns. This could be one reason we find that government incentives were more channelled to the manufacturing sector (Figure 3). Table 5 reports our estimation result on the subsample of the manufacturing and service sectors. Columns 1–4 estimate Equation (1), and the coefficient of the interaction (COVID-19 dummy and export incentives) is positive and significant in both sectors. The result indicates that export incentives are an important factor for export survival in the manufacturing and service sectors. While examining the relative magnitude of their marginal effects, we find that government support improves the probability of export survival by 10.3% and 19.6% in the manufacturing and service sectors, respectively. Further, we present the relationship between bank dependency and survival for both the manufacturing and services sectors (columns 5–8). The result implies that our main variable of interest depicts a positive and significant coefficient, i.e. bank dependency improves the likelihood of export survival in the post-pandemic period. While looking at the magnitude of the effect, our marginal effect suggests a 7.1% and 5.4% higher probability of survival in the manufacturing and services sectors, respectively.

Table 5: Manufacturing and Service Sectors

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Manufacturing		Services		Manufacturing		Services	
	Coeff	ME	Coeff	ME	Coeff	ME	Coeff	ME
Incentive*Covid	0.452*** (0.0838)	0.103** (5.43)	0.859*** (0.155)	0.198** (5.60)				
BDep*Covid					0.344*** (0.113)	0.079** (3.05)	0.221 (0.140)	0.051 (1.58)
Covid	-	-0.274**	-	-0.361**	-	-0.275**	-	-0.361**
	1.201*** (0.0663)		1.566*** (0.0721)		1.199*** (0.0817)		1.553*** (0.0873)	
Incentive	0.391*** (0.0385)	0.089** (10.25)	0.366*** (0.0687)	0.084** (5.36)				
BDep					0.178*** (0.0507)	0.041** (3.51)	0.160*** (0.0568)	0.037** (2.83)
Age	0.0236 (0.0382)	0.005 (0.62)	0.0290 (0.0460)	0.007 (0.63)	0.0422 (0.0383)	0.010 (1.10)	0.0193 (0.0454)	0.004 (0.43)
Size: Small	0.277*** (0.0942)	0.065** (2.89)	0.235*** (0.0637)	0.054** (3.69)	0.283*** (0.0954)	0.067** (2.92)	0.241*** (0.0633)	0.056** (3.80)
Size: Medium	0.381*** (0.0964)	0.088** (3.84)	0.168** (0.0755)	0.039* (2.22)	0.401*** (0.0974)	0.094** (4.00)	0.195*** (0.0749)	0.046** (2.61)
Size: Large	0.0750 (0.104)	0.018 (0.72)	-0.180** (0.0882)	-0.043* (2.03)	0.149 (0.105)	0.036 (1.42)	-0.113 (0.0872)	-0.027 (1.30)
Debt	-0.0231* (0.0122)	-0.005 (1.89)	-	-0.006* (2.49)	-0.0217* (0.0122)	-0.005 (1.77)	-	-0.006* (2.47)
			0.0277** (0.0111)				0.0272** (0.0110)	
Cash flow	-0.182 (0.731)	-0.042 (0.25)	-0.226 (0.736)	-0.052 (0.31)	-0.00977 (0.706)	-0.002 (0.01)	-0.150 (0.727)	-0.035 (0.21)
ROA	-0.197 (0.752)	-0.045 (0.26)	0.116 (0.760)	0.027 (0.15)	-0.286 (0.728)	-0.066 (0.39)	0.102 (0.751)	0.024 (0.14)
Foreign	-	-0.096**	-	-0.119**	-	-0.085**	-	-0.115**
	0.419*** (0.108)		0.516*** (0.148)		0.370*** (0.109)		0.495*** (0.145)	
Constant	0.0652 (0.519)		0.337 (0.214)		-0.0783 (0.499)		0.409* (0.212)	
Firm dummies	Yes		Yes		Yes		Yes	
Industry dummies	Yes		Yes		Yes		Yes	
Time dummies	Yes		Yes		Yes			
Observations	20,936		11,732		20,936		11,732	

Coeff = coefficients, ME = marginal effects, ROA = return on assets.

Notes: Columns 1–4 report the relationship between a firm’s export survival and the government’s export incentives during the pandemic period for the manufacturing and service sectors separately. Columns 5–8 report the relationship between a firm’s export survival and bank dependency during the pandemic period for the manufacturing and service sectors separately. Robust standard errors and test statistics are reported in parentheses for coefficients and marginal effects, respectively. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors.

In the second set of subsample analyses, we divide our sample based on ownership (business group affiliates vs stand-alone firms). Generally, business group-affiliated firms have certain peculiarities compared with stand-alone firms, such as relaxed financial constraints (Almeida et al., 2011; Bena and Ortiz-Molina, 2013; Gopalan, Nanda, and Seru, 2014). Therefore, the impact of the pandemic on export survival is likely to differ amongst these groups of firms. To explore those dimensions, we estimate Equations (1) and (2) on the subsamples and we report the results in Table 6. The interaction terms turn out to be positive and statistically significant for both groups. These findings indicate that government support and bank borrowings really helped stand-alone and business group firms to survive in the international market. Further, to understand their differential effect on each group, we rely on marginal effects. Export incentives have a prominent effect on stand-alone firms. They increase the survival probability of stand-alone and business group firms by 17.7% and 8.8%, respectively. The result is qualitatively similar while employing the bank dependency measure. The marginal effect of the interaction term is 11.6% and 7.6% for stand-alone and business group firms, respectively.

Table 6: Business Group Affiliation and Stand-Alone Firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Stand-alone firm		Business group		Stand-alone firm		Business group	
	Coeff	ME	Coeff	ME	Coeff	ME	Coeff	ME
Incentive*Covid	0.778*** (0.0834)	0.179** (9.44)	0.437*** (0.126)	0.084** (3.49)				
BDep*Covid					0.498*** (0.104)	0.116** (4.82)	0.398** (0.163)	0.077* (2.45)
Covid	-1.502*** (0.0583)	-0.346** (26.98)	-0.852*** (0.0931)	-0.165** (9.15)	-1.522*** (0.0757)	-0.354** (20.54)	-0.868*** (0.104)	-0.168** (8.33)
Incentive	0.435*** (0.0368)	0.100** (11.95)	0.279*** (0.0870)	0.054** (3.22)				
BDep					0.180*** (0.0419)	0.042** (4.30)	-0.00728 (0.101)	-0.001 (0.07)
Age	0.0386 (0.0336)	0.009 (1.15)	0.261*** (0.0712)	0.050** (3.72)	0.0474 (0.0336)	0.011 (1.41)	0.264*** (0.0710)	0.051** (3.77)
Size: Small	0.215*** (0.0550)	0.050** (3.85)	0.363** (0.171)	0.070* (2.14)	0.218*** (0.0551)	0.052** (3.91)	0.379** (0.171)	0.074* (2.24)
Size: Medium	0.252*** (0.0613)	0.058** (4.04)	0.393** (0.181)	0.076* (2.19)	0.268*** (0.0612)	0.063** (4.32)	0.441** (0.180)	0.086* (2.47)
Size: Large	-0.00592 (0.0694)	-0.001 (0.09)	0.0339 (0.198)	0.006 (0.17)	0.0718 (0.0692)	0.017 (1.04)	0.122 (0.197)	0.023 (0.62)
Debt	- 0.0299*** (0.00970)	-0.007** (3.08)	-0.000770 (0.0182)	-0.000 (0.04)	- 0.0290*** (0.00964)	-0.007** (3.00)	-0.00256 (0.0182)	-0.000 (0.14)
Cash flow	-0.233 (0.570)	-0.054 (0.41)	-0.0602 (1.396)	-0.012 (0.04)	-0.0504 (0.555)	-0.012 (0.09)	-0.242 (1.406)	-0.047 (0.17)
ROA	0.0891 (0.590)	0.021 (0.15)	-0.444 (1.422)	-0.086 (0.31)	-0.0108 (0.576)	-0.003 (0.02)	-0.220 (1.430)	-0.043 (0.15)
Foreign	-0.597*** (0.116)	-0.137** (5.16)	-0.133 (0.151)	-0.026 (0.88)	-0.516*** (0.118)	-0.120** (4.39)	-0.145 (0.151)	-0.028 (0.96)
Constant	-0.131 (0.430)		-1.507 (1.166)		-0.184 (0.432)		-1.692 (1.119)	
Firm dummies	Yes		Yes		Yes		Yes	
Industry dummies	Yes		Yes		Yes		Yes	
Time dummies	Yes		Yes		Yes		Yes	
Observations	26,578		6,079		26,578		6,079	

Coeff = coefficients, ME = marginal effects, ROA = return on assets.

Notes: Columns 1–4 report the relationship between a firm's export survival and the government's export incentives during the pandemic period for stand-alone and business group firms separately. Columns 5–8 report the relationship between a firm's export survival and bank dependency during the pandemic period for stand-alone and business group firms separately. Robust standard errors and test statistics are reported in parentheses for coefficients and marginal effects, respectively. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors.

4.3. Robustness Check

To check the consistency of the empirical results, we resort to five sets of robustness checks. First, instead of using a dummy variable as a proxy for export incentives, we employ the log of the amount of export incentives received (*Incentive2*). We estimate Equation (1) using the new measure and report our findings in Table 7. In columns 1–2, the positive coefficient and marginal effects suggest that the results are qualitatively similar to our main findings. That is, export incentives improve firm survival in the international market. In other words, a 1% increase in incentives will enhance the likelihood of survival by 3.7%. Second, we replace our dependent variable in Equation (1) from a dummy variable with a continuous measure (export intensity), which is measured by the ratio of total exports to total sales (*Export Intensity*).⁷ Given that the new measure is a continuous variable, we estimate a panel regression and report our result in column 3. We find a positive and significant coefficient for the interaction term, which aligns with our main findings.

Table 7: Robustness Check I

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Survival		Export intensity	Survival		Survival	
Variables	Coeff	ME	Coeff	Coeff	ME	Coeff	ME
Incentive2*Covid	0.157*** (0.0165)	0.036** (9.57)					
Incentive*Covid			1.201* (0.673)			0.638*** (0.0695)	0.146** (9.28)
BDep2*Covid				0.0580*** (0.0107)	0.013** (5.44)		
BDep*Covid						0.342*** (0.0879)	0.078** (3.89)
Firm characteristics	Yes		Yes		Yes		Yes
Firm dummies	Yes		Yes		Yes		Yes
Industry dummies	Yes		Yes		Yes		Yes
Time dummies	Yes		Yes		Yes		Yes
Observations	32,668		32,678	32,668		32,668	

Coeff = coefficients, ME = marginal effects.

Notes: This table presents the results of robustness checks. Columns 1–2 use an alternative proxy for export incentives. Column 3 uses export intensity as a dependent variable rather than a dummy variable. Columns 4–5 use an alternative proxy for bank dependency. In columns 6–7, we employ both export incentives and bank dependency measures together. Robust standard errors and test statistics are reported in parentheses for coefficients and marginal effects, respectively. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors.

⁷ Export intensity is winsorised at 1% on both sides to avoid outliers.

Third, we use the log of bank borrowing (*BDep2*) instead of *BDep* in Equation (2). Columns 4–5 report the coefficient and marginal effects of the estimation, and the results are qualitatively similar to our main findings. Fourth, we include both export incentives and bank dependency measures together in the model. Since both the monetary authority and government are working simultaneously to reduce the effect of the pandemic on the economy, exploring the role of one on export survival without controlling for the other may create bias in the estimation. Therefore, we include both the incentive measure and bank dependency measure together in our model. The results are reported in columns 6–7, and the findings remain qualitatively similar to our main findings. All our results remain consistent with existing studies that explore the role of fiscal and monetary policy during the crisis (Fu and Chang, 2021; Belghitar, Moro, and Radić, 2022; Wei and Han, 2021; Moessner and de Haan, 2022).

As a final analysis, we address the issue of self-selection bias in opting for government incentives. Following Urata and Baek (2022), we resort to the propensity score matching technique to address the issue. In this method, we estimate the propensity score for each firm based on their characteristics using the logit model and classify them into control and treatment groups (*Incentive* is our treatment variable). Then, we focus on the average treatment effect on the treated (ATT), i.e. on our outcome variable. Table 8 reports the ATT for the pre-COVID-19 (Panel A) and post-COVID-19 periods (Panel B). We find a positive ATT for both periods. Moreover, when we compare the magnitude, the ATT during the post-COVID-19 period is higher than in the pre-COVID-19 period. These results indicate that government support is essential for exporting firms during the pre- and post-COVID-19 periods. However, its importance is more prominent during the latter period. Finally, the post-estimation test satisfies our balancing test.

Table 8: Robustness Check II

	Panel A: Pre-COVID-19				Panel B: Post-COVID-19			
	Treated	Controls	Difference	T-stat	Treated	Controls	Difference	T-stat
ATT	0.714	0.641	0.073	9.05***	0.363	0.178	0.186	8.07***
Post-estimation test								
Age	3.348	3.349	-0.001	-0.14	3.464	3.441	0.023	0.87
Size: Small	0.165	0.175	-0.010	-1.80*	0.069	0.070	-0.001	-0.09
Size: Medium	0.369	0.352	0.017	2.50**	0.249	0.247	0.002	0.10
Size: Large	0.457	0.465	-0.008	-1.07	0.680	0.681	-0.001	-0.05
Debt	5.843	5.871	-0.028	-0.94	6.404	6.290	0.114	1.14
Cash flow	0.087	0.089	-0.001	-1.24	0.112	0.142	-0.030	-1.75
ROA	0.056	0.057	-0.001	-1.56	0.083	0.112	-0.028	-1.72
Foreign	0.032	0.032	0.000	-0.04	0.085	0.077	0.008	0.66

ATT = average treatment effect on the treated, COVID-19 = coronavirus disease, ROA = return on assets.

Notes: Panels A and B report the ATT using the propensity score matching technique. Government support is the treatment variable and export is the outcome variable.

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors.

5. Conclusion

International trade is an integral part of economic growth and development. However, the recent COVID-19 pandemic significantly affected the global economy, including the export of goods and services. During this period, governments introduced several programmes to support firms that were in grave danger. Given that, we first investigated the relationship between government export incentives and firms' survival in the export market in the context of an emerging country – India. We found that firms which received government support were more likely to survive in the export market during the pandemic. Our second set of analyses examined the relationship between bank dependency and export survival. Our empirical analysis found that bank-dependent firms were more likely to survive in the market than their counterparts. Our third set of analyses investigated the complementarity and substitutability of export incentives and bank dependency on export survival; however, the results were insignificant. Further, we carried out two subsample analyses. First, we divided firms into the manufacturing and service sectors; second, we separated stand-alone and business group-affiliated firms. The results were qualitatively similar to our main findings for each group. Our estimation results remained consistent for alternative proxies for export incentives, bank dependency, and survival measures.

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