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The great trade collapse and Indian firms

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1 | INTRODUCTION

The financial crisis of 2008–09—triggered by the bankruptcy of Lehman Brothers and the virtual nationalisation of world's largest insurance company, American Insurance Group, Inc. (AIG)—soon led to a fall in both demand for goods and supply of credit which catapulted into a global trade crisis. As Richard Baldwin (2009, pp. 12) writes, "For most nations of the world [. . .] this is not a financial crisis – it is a trade crisis." In the words of Paul Krugman, "world trade acted as a transmission mechanism" which led even the countries with robust financial systems into economic distress (Evans, 2009). World Bank (2010) and/or the WTO (2010) estimate that real global output declined by 2.2%, whereas the real global trade had the same fate, but by more than five times of the global output. The collapse in global trade by over 17% between the second quarter of 2008 and the second quarter of 2009 is one of the most dramatic features of the recent "Great Recession."

Studies concerning the 2008–09 crisis have largely exploited the developed nations' data, except Paravisini, Rappoport, Schnabl, and Wolfenzon (2014) on Peru and Aisen, Álvarez, Sagner, and Turén (2013) on Chile.[1] India, an emerging nation, that has its real sector well integrated with the world trade matrix today (as a result of the liberalisation policies adopted in the 1990s) is no exception to escape the brunt of the crisis.[2] It experiences an overall decline in its gross domestic product (GDP), trade values (both exports and imports) and other important macroeconomic indicators during the crisis period. Considering the 2008–09 crisis as a natural experiment, I study the behaviour of Indian manufacturing exporters as a result of possible demand shock(s) from its major trading partners or importers using a matched data set of the manufacturing firms with the destination-specific product-level trade flows at the HS (Harmonised System) six-digit level. The result is clear—Indian manufacturing exporters suffered heavily as a result of the fall in demand from its major importers, especially the USA, as result of the 2008–09 crisis.

The current research on the likely causes of the Great Trade Collapse (GTC) of 2008–09 mainly highlights the following mechanisms by which the crisis impacts trade: (i) drop in demand (Baldwin, 2009; Behrens, Corcos, & Mion, 2013; Bems, Johnson, & Yi, 2010; Eaton, Kortum,

[1]Both the studies investigate how financial constraints, because of 2008–09 crisis, affect performance of the manufacturing firms.

[2]However, on the financial side, it is still weakly integrated into the global financial cobweb. Its financial sector, particularly the mortgage-backed securities, is loosely connected with the global markets (Kumar & Alex, 2009). For example, Indian banks do not have any direct exposure to the mortgage-backed securities, and their off-sheet activities are also quite limited.

Neiman, & Romalis, 2016; Levchenko, Lewis, & Tesar, 2010) and (ii) difficulties in the supply of finance (Aisen et al., 2013; Amiti & Weinstein, 2011; Auboin, 2009; Bricongne, Fontagné, Gaulier, Taglioni, & Vicard, 2012; Chor & Manova, 2012; Helbling, Huidrom, Kose, & Otrok, 2011; Paravisini et al., 2014).[3] Other factors, which potentially have also impacted the fall in trade during the 2008–09 crisis, are the rising trade barriers (Baldwin & Evenett, 2009; Jacks, Meissner, & Novy, 2011; Kee, Neagu, & Nicita, 2013) and the behaviour of imported inventories (Alessandria, Kaboski, & Midrigan, 2010; Altomonte, Mauro, Ottaviano, Rungi, & Vicard, 2013).

Following the literature[4], I aim to investigate how Indian manufacturing exporters adjusted to external shock(s) during the current financial crisis. In particular, I use the 2008–09 crisis as a natural experiment to investigate the role of demand (from the major importing partners, namely the USA and the European Union (EU)) on the intensive margin (amount of exports) of Indian manufacturing firms.[5] The results show that decline in export flows in case of India as a result of the 2008–09 financial crisis is due to one central issue—the sudden drop in demand (as a result of the 2008–09 crisis) for India's goods from two of its major trading partners, the USA and the EU.[6] The drop in demand may have curtailed the firms' production and export capacities which led to significant decline in the export earnings of an Indian manufacturing firm.[7]

I focus primarily on the USA and the EU because of the following two reasons: (i) first, they are two of the largest trading partners of India and account for around 35% of India's merchandise exports (in 2008). In addition, the income elasticity of demand for India's exports is estimated to be the highest in case of the USA, which is 2.5, while for global exports, it is 1.9 (UNCTAD, 2009) and (ii) focusing on the USA and the EU will help me to establish the direct evidence of the impact of 2008–09 financial crisis on the trade collapse of the Indian exporters, whereas focusing on the world or any other group of countries or regions may not do so (since other regions were affected as a result of the crisis in the USA and the EU). Although I highlight the role of demand spillover on the decline in international trade flows (in this case exports), I do not per se belittle the role of trade friction (increase in trade barriers) or disruptions in supply of trade credit[8] in explaining the collapse. These factors may well also be important in accounting for the residual decline in trade, which my analysis does not capture. However, I control the above-mentioned factors using interactions of industry fixed effects with the year trends.

[3]The studies, which pursue the demand-side explanation as the major role behind the fall in trade, use trade data at the country level rather than at the firm level, except for Behrens et al. (2013). They use Belgian firm-level data to show that the fall in the demand for tradables, especially durables and capital goods, is the main explanation behind the fall in trade for Belgium.

[4]Specifically Baldwin (2009), who asserts that the GTC is primarily caused by a demand-side shock, amplified by "compositional" and "synchronicity" effect.

[5]Current research on 2008–09 crisis shows us that most of the activity happened at the intensive margin (Levchenko et al., 2010).

[6]The study that comes closest to this paper is by Bems et al. (2010). They use global input–output framework to quantify the US and the EU demand spillover during the global recession of 2008–09. They conclude that 20%–30% of the decline in demand in the USA and the EU is borne by the foreign countries with Asia being hit the hardest. Further, by changing the demand for all countries simultaneously, they find that demand alone accounts for 70% of the trade collapse.

[7]The only other study, which highlights the role of demand using firm-level data, is by Behrens et al. (2013). It uses data for Belgium, a OECD member country. All other studies using firm-level data for both developed and developing nation find credit channel to be the most important factor. A developing, export-oriented nation like India had a very different kind of crisis in the sense that the banks and the domestic financial system were not directly hurt as they are not directly integrated into the global system unlike the real sector.

[8]I use a proxy to explore the role of finance, especially foreign sources of finance (borrowings from foreign banks), along with demand spillover. But, the benchmark results stay the same.

To argue my hypothesis, I put together a couple of rich data sets disaggregated by product and destination, with direct information on firm-level trade and other balance sheet data. I use a data set of over 3,500 manufacturing firms from Centre for Monitoring of the Indian Economy (CMIE) PROWESS database that represents more than 70% of the economic activity of the registered Indian manufacturing sector for the years 1999–2000 to 2009–10. PROWESS provides information on important variables such as total sales, exports, imports, capital, labour, size, financial health apart from other specific firm and industry indicators. Unfortunately, this firm-level data set does not provide firm-specific trade destinations. To overcome this limitation, I complement my firm-level data set with destination-specific product-level trade flows from INDIA TRADES in order to utilise the variation across destinations. INDIA TRADES provides data for trade flows at the most disaggregated level, HS six-digit level. I match the product-level data, belonging to respective industries, using a National Industrial Classification (NIC) concordance code with the firms of those sectors. For example, the export flows of "shirt" are matched with a firm belonging to textile sector (2004 NIC 17). The main purpose of matching these two data sets is to create a measure of demand shock (my main variable of interest), which varies according to industry–time–country. It is defined as the share of exports of an industrial sector, say "shirts," to the USA to total exports of "shirts" by India. However, to control for possible endogeneity of the demand shock measure, I use average of the demand shock index in the pre-crisis period in my baseline estimations. Since using pre-crisis measure may still pick up trends, I perform an instrumental variable (IV) analysis using "total imports of a crisis-affected region, say the USA, less India' as an instrument for the demand shock index. Using total imports (of a crisis-affected region) less India" as an instrument gives a plausible identification strategy as it is unlikely to directly affect the exports of Indian manufacturing firms. The result(s) from the IV estimation(s) reiterates my OLS result(s) strongly. To the best of my knowledge, this is one of the very few papers which employs a couple of very rich disaggregated data sets (firm-level and product-level) for an emerging economy, like India, using exhaustive information before and after the trade crisis to investigate the factors inducing the drop in manufacturing firms' exports. I concentrate only on the manufacturing sector of India, leaving out the services sector, due to two reasons: (i) trade relations of service sector is completely different from that of manufacturing and (ii) analysis of the service sector with respect to the 2008–09 trade crisis would be a completely different study in itself.

I observe significant, strong and robust evidence of a negative demand shock resulting from the major trading partners of India (the USA and the EU) affecting the export performance of the Indian firms during the crisis of 2008–09. In addition, the results point out that the impact of the demand shock is significantly higher when the direction of trade is towards the USA, vis-à-vis the EU. In terms of sectoral effect, I find that all but basic goods, with the effect being highest in case of consumer durables followed by non-durable goods, are severely affected by the drop in demand. Next, I find, on dividing the firms by size, firms of all sizes experience a strong negative demand shock, that is, both small and large firms are equally hit, with the effect being higher for small or most vulnerable exporters. I also find that the negative effect of the demand spill from the major trading partners is concentrated only in case of the high-exposure[9] industries. My results are robust to a variety of checks, including IV analysis. Finally, I do not find any evidence of trade diversion accounting for the drop in trade flows during the crisis.

[9]I define high-exposure industries as the ones for which the mean exposure index (share of exports in total exports) is greater than the median exposure index of the entire manufacturing sector; rest belong to the low-exposure industries. I do this separately for the USA and the EU.

FIGURE 1 Total manufacturing exports of India: Major destinations.
Notes: These are major trade destinations of India. Values are expressed in US$ Million. These are total merchandise exports from India. Compiled from UN-COMTRADE Database [Colour figure can be viewed at wileyonlinelibrary.com]

The rest of the paper is organised as follows: Section 2 gives a brief background with stylised facts at both the macro and firm-level data. The various data sets that I use in the paper are described in Section 3. I explain my estimation strategy in Section 4 and the results are discussed in Section 5. Section 6 does the IV estimation. I do a battery of robustness checks in Section 7, while Section 8 provides some concluding remarks.

2 | BACKGROUND—A FIRST LOOK AT THE DATA

India, now, as a successful export-oriented developing economy is growing fast. This is a result of the liberalisation policies from the mid-1990s which has now placed India as a function of the dynamics of the significant global events. As of 2007–08, total trade flows (exports plus imports) and capital flows (inflows plus outflows) are around 55% and 65% of the GDP, respectively (Kumar, Joseph, Alex, Vashisht, & Banerjee, 2009). But, India's financial sector—particularly the mortgage-backed securities—is still not very well integrated with the global markets. Although India has experienced a significant flow of foreign institutional investments (FII) in the recent years, the financial sector is still very well guarded from the shocks of global market. For example, the Reserve Bank of India (RBI, hereinafter) or the Central Bank of India undertook an expansionary monetary policy during the time of the crisis.[10] Crowley and Luo (2011) reports similar

[10]To provide more liquidity to the credit markets, the RBI gradually reduced the repo rate from 9% (in August 2008) to 4.75%, and the reverse repo rate from 6% to 3.25%. The cash reserve ratio, which was 7.5% in 2007–08, was also reduced to 5%, thereby allowing the multiplier effect to expand the money supply. In addition, the statutory liquidity rate, a liquidity requirement for commercial banks, was also relaxed to allow them to provide more credit.

monetary easing in many economies during the crisis period. The expansionary monetary policy was primarily undertaken to meet the trade financing requirement of the traders and also to serve the debt service payments by those businesses that had existing foreign debt (Viswanathan, 2010). However, the current developments in the real sector have certainly made the Indian economy more vulnerable to global financial and economic crisis.

The 2008–09 economic/trade crisis triggered by the preceding global financial crisis had a clear and significant impact on the Indian economy as the real GDP growth rate dipped by close to 30%. Growth rates of manufacturing GDP and Index of Industrial Production (IIP) in 2008 also went down to less than one-third of the preceding year. Trade volumes also suffered heavy decline during 2009. Figure 1 plots India's total export flows along with other major destinations—EU, USA, Asia, Japan and Middle East—for the years 2006–2009. It shows that the growth rate of total exports of India declined by around 17% for the year 2009, which is almost the same as the drop in global trade during the crisis period. Exports towards major destinations—such as EU, USA and Asia—also declined during 2009, with the drop for Asia being the least. The drop in exports in 2009 is highest for the USA (10.65%), followed by the EU (7.39%) and Asia (1.31%).[11] However, as for Japan and the Middle East countries, it increased during the crisis period.[12] The RBI's report (2009) on trade balance also suggests that the export sector is hit quite badly, since a large proportion (nearly 40%) of Indian merchandise exports goes to the OECD countries.

Next, I look at the impact of the crisis at the firm level. Figure 2 compares average exports (deflated by the Wholesale Price Index number), divided into four different size quartiles, across all manufacturing sectors for the same time period as before. It also shows similar drop in export earnings across all the size quartiles for the year 2009. These diagrams indicate that macro and the micro-level exports of Indian manufacturers behaved in the same manner during the 2008–09 crisis.

3 | DATA

3.1 | Firm-level data—PROWESS

The firm-level analysis is primarily based on the PROWESS database which is constructed by the CMIE, a government of India-sponsored agency. This database contains information primarily

[11]If we consider the drop in the growth rate of Indian exports, it is highest for the EU (around 31%) followed by the USA (around 17%). However, a closer look would tell you that the drop in exports towards the USA is much larger if we take the year 2008 into account; it stagnated from that year on. The increase in exports to the USA for the year 2008 was merely 6%, whereas the same was 77% for the year 2007.

[12]The increase in India's exports, during the crisis period, to the Middle East and Japan could be due to the following reasons: (i) first, the effect of the 2008–09 crisis, which originated in the USA, is not global. This is contrary to the popular belief that all the countries or regions were affected similarly. This also points out my strategy of concentrating on the USA and the EU as the regions from where there could be a possible demand spillover on Indian manufacturing exports is credible; (ii) there could also be a fundamental shift in the world trade axis. According to some estimates, the growth in trade between the Middle East and Asian countries is on average 3% to 5% during the period 2005 and 2012, with the increase between the Middle East and India being the highest. The reasons could be many. One of the crucial reasons is the fall in costs of trade, such as financing, risk mitigation, logistic, insurance and communications, between these two regions. Another probable reason is the demand for energy in the emerging economies, particularly India, which may have led to the growth in trade even during the crisis period; and finally (iii) soaring commodity prices in the USA and the EU may have caused the growth in trade between Asian nations and also between Asia and the Middle East. However, I do control for "exposure indices" of both Japan and the Middle East in column (1) of Table 7 to explore whether there is a possible trade diversion effect from the USA and the EU to the Middle East and both Japan in case of India. My results do not support such hypothesis.

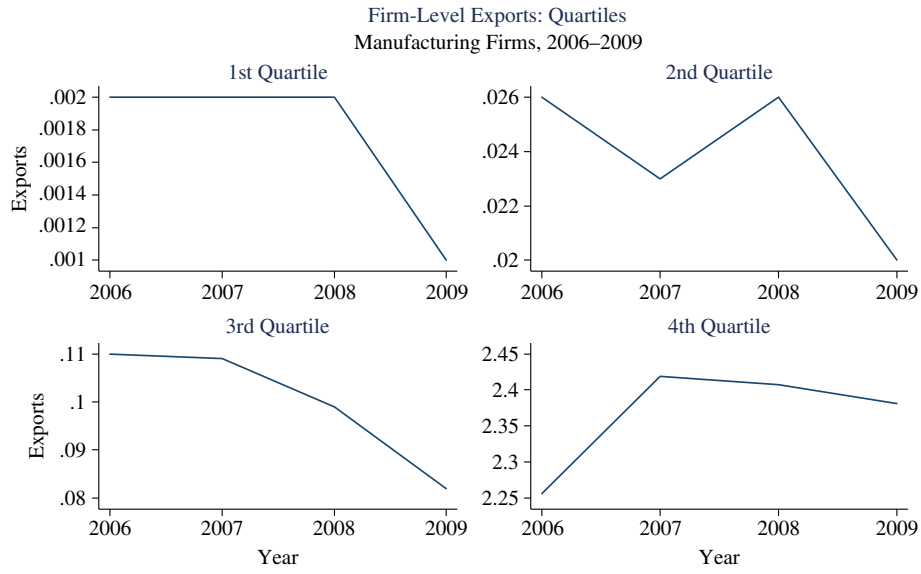

FIGURE 2 Firm-level manufacturing exports: quartiles.

Notes: Figures represent average real exports (deflated by the Wholesale Price Index) over all exporters operating in the manufacturing sector in a particular year. Quartiles are defined according to the total assets of a firm. If a firm's total asset falls below the 25th percentile of the total assets of that particular industry in the base year (2000), then the firm belongs to the 1st quartile. Similarly, if a firm's asset is within 25th–50th, 50th–75th and over 75th percentile, then it would fall into 2nd, 3rd and 4th quartiles, respectively. [Colour figure can be viewed at wileyonlinelibrary.com]

from the income statements and balance sheets of the listed companies and publicly traded firms. Below, I outline the features of this data set in detail.

The PROWESS database contains information of about 11,500 publicly listed companies of which almost 5,000 are in the manufacturing sector. Firms in the data set are placed according to the four-digit 2004 NIC level but are reclassified at the two-digit level in order to facilitate the matching with the destination-specific HS six-digit level trade flows, described in detail later in this section. The database has a relatively wide coverage, accounting for more than 70% of the economic activity in the organised industrial sector, 75% of corporate taxes and 95% of excise duty collected by the Indian Government (Goldberg, Khandelwal, Pavcnik, & Topalova, 2010). I consider only those firms which have positive values of "total sales." This allows me to have around 3,500 firms across all the manufacturing sectors for the estimation. To understand how representative the sample of firms are of the manufacturing sector, I calculate a simple proportion of total exports of all the manufacturing firms in PROWESS to total manufacturing exports for the year 2006; the ratio is around 0.33% or 33%. In terms of trade flows, this is a fairly reasonably picture for the coverage of the PROWESS firms.

CMIE uses an internal product classification that is based on the HS and NIC schedules. There are total of 1,886 products linked to 108 four-digit NIC industries across the 22 manufacturing sectors (two-digit NIC codes) spanning the industrial composition of the Indian economy. The US manufacturing data contain approximately 1,500 products as defined by the Standard Industrial Classification (SIC) codes; therefore, the definition of product in this case is slightly more detailed. Around 20% of the firms in the data set belong to the chemical industries followed by food products and beverages (12.81%), textiles (10.81%) and basic metals (10.46%).

The data set rolls out details of each year's balance sheet of the firms, thereby providing information on vast array of firm-level characteristics regarding the total sales, exports, imports, cost, wages, production factors employed, other kinds of expenditures, gross value added, assets and other important firm and industry characteristics. Majority of the firms in the data set are either private Indian firms or affiliated to some private business groups, whereas a small percentage of firms are either government or foreign-owned. In terms of export flows, coke, refined petroleum and nuclear fuel sector have the highest exports followed by tobacco products, food products, textiles and beverages. The database covers large companies, companies listed on the major stock exchanges and many small enterprises. Data for big companies are worked out from balance sheets while CMIE periodically surveys smaller companies for their data. However, the database does not cover the unorganised sector.[13] I use data for the years 1999–00 to 2009–10. The variables are measured in Indian Rupees (INR) million, deflated to 2005 using the industry-specific Wholesale Price Index.[14] Table 1 presents descriptive statistics for all variables used.

3.2 | Trade flows data—INDIA TRADES

INDIA TRADES presents destination-wise official foreign trade statistics of India. This is the most comprehensive database on India's trade that is collected by the Directorate-General of Commerce Intelligence and Statistics (DGCI&S) from the various customs' ports. The database is detailed up to HS eight-digit level of classification. INDIA TRADES follows the HS of classification. India exports and imports about 10,000 commodities to and from nearly 200 countries/regions. INDIA TRADES provides both yearly and monthly statistics regarding trade flows. The database provides quantity, value and unit value with respect to each of the products exported or imported, according to each of the destination. The annual series is available for about fifteen years. It also enables a comparative analysis of India's export performance in specific markets vis-a-vis its competitors. The trade flows are given in INR Million.

To get a sense of how complete the coverage of firms in PROWESS is, in terms of total exports as compared to the product-level export flows data in INDIA TRADES, I compare industry-level total exports in the INDIA TRADES data set against total exports (summed across firms) in that industry as reported in PROWESS. An average industry exports (summed over all firms in that industry) in PROWESS explains around 36% of exports from the same industry category of INDIA TRADES. However, the ratio varies from 18% (leather) to as high as 60% (beverages) across 22 NIC 2004 two-digit industries.

3.3 | Matching PROWESS with INDIA TRADES

My main objective is to create a variable which will reflect the extent of demand for Indian goods in the crisis-affected zones, that is, the USA and the EU. To overcome the disadvantage of the PROWESS database regarding the unavailability of destinations of products, I match the firm-level data set with the product–destination-specific data set. I explain below in detail all the steps undertaken in order to match these two data sets. The key assumption that I make before matching these data sets is "the firms' export destinations in a particular industry are proportional to the national export destinations."

[13]The sample of firms in the PROWESS database is not a very good representative of small firms; the small firms belong primarily to the unorganised sector. Since India has a reasonable proportion of firms belonging to the unregistered sector, the effect of the financial crisis of 2008–09 here can be considered as a lower bound.

[14]I thank Hunt Allcott for sharing this data with us, used in Allcott, Collard-Wexler and O. Connell (2014).

TABLE 1 Summary statistics

	Mean	Median	Standard deviation	Min	Max
Dependent variable					
Exports	55.07	0.07	969.70	0	102,655.6
Independent variables: industry-level determinants					
$exposure_{IN}^{USA}$	0.13	0.12	0.07	0.001	0.69
$exposure_{IN}^{EU}$	0.19	0.17	0.08	0.002	0.58
$exposure_{CH}^{USA}$	0.13	0.07	0.13	0.003	0.75
$exposure_{CH}^{EU}$	0.05	0.02	0.06	0.0002	0.33
$exposure_{IN}^{JAPAN}$	0.02	0.01	0.01	0.001	0.07
$exposure_{IN}^{MIDDLE\ EAST}$	0.13	0.12	0.07	0.04	0.44
$exposure_{IN}^{CHINA}$	0.03	0.02	0.03	0.001	0.15
$Imports_{India}^{USA}$	1,605,506	1,579,853	335,451.9	1,169,784	2,137,902
$Imports_{India}^{EU}$	1,443,092	1,441,814	468,930.2	864,726.7	2,241,604
Independent variables: firm-level determinants					
Capital	209.20	15.91	2,180.84	0.33	186,145.4
Wages and salaries	13.51	1.64	86.09	0.01	6,241.13
GVA	225.68	17.02	2,853.19	0.02	193,500.2
TFP	4.29	2.51	25.70	0.002	3,292.88
Foreign bank borrowings	8.58	0	76.22	0	3,407.66
Assets	367.89	34.92	3,375.55	0.28	251,249.4
Age	26.77	20	50.23	1	95
Ownership	0.95	1	0.22	0	1
Other independent variables					
Interbank call rate	6.32	6.07	1.72	3.24	9.15

Notes: "Exports" is the total exports of an average Indian manufacturing firm. "$exposure_{IN}^{USA}$," "$exposure_{IN}^{EU}$," "$exposure_{IN}^{JAPAN}$," "$exposure_{IN}^{MIDDLE\ EAST}$" and "$exposure_{IN}^{CHINA}$" are defined as the "exposure indices" of the USA, the EU, Japan, the Middle East and China, respectively. A "exposure Index" is calculated as the total exports of an industrial sector directed towards a region (say, USA) as a proportion to the total exports of that sector. "$exposure_{CH}^{USA}$" and "$exposure_{CH}^{EU}$"are shares of Chinese imports by the USA and EU in total imports, respectively. $Imports_{India}^{USA}$ and "$Imports_{India}^{EU}$are total imports minus imports from India by the USA and EU, respectively. "Capital" is the amount of capital used by a firm. "Wages and Salaries" is the total amount of wages and salaries paid by a firm. It is an indicator of labour cost. "GVA" is the gross value added by a firm. It is defined as total sales minus total expenditure on raw materials. "TFP" is the total factor productivity of a firm. It is estimated using Levinshon and Petrin (2003) methodology. "Foreign Bank Borrowings" is the total amount of borrowings done by a firm from foreign bank(s). "Assets" is the total assets of a firm. "Age" is age of a firm. "Ownership" is a binary indicator. It takes "1" if the firm is domestic and "0" for foreign ownership. "Interbank Call Rate" is the interest rate that commercial banks charge each other for short-term loans.

The classification of the firms' in the PROWESS database is on the basis of NIC 2004, whereas the data in INDIA TRADES are in HS code. To facilitate such kind of matching between trade flows and firm-level data, Debroy and Santhanam (1993) provide us with a document which matches the HS code items with the industrial groups (classified according to NIC). The concordance list that they made is available at the 1987 NIC. Therefore, before matching the firm level with the trade flows data, I do the following: I first match 1987 NIC codes with the NIC 1998 codes, which is the next revision of the industrial group classification, and then match the NIC

1998 codes with NIC 2004 classification, which is the current version or the version in which the firm-level data set is provided.

After putting both the data sets into NIC 2004 classification, I proceed as follows, to create a region-specific export exposure or demand shock index which I can use to explore the effects of drop in demand in the crisis-affected regions on Indian exports. First, using the concordance list provided by Debroy and Santhanam (1993), I match all the relevant product lines (HS six-digit level) for each of the industrial categories at 2004 NIC. I then sum all the HS code items belonging to each of the industrial group (let us say for textile products) to estimate the total amount of exports of each industrial group (textile products) with respect to two major destinations of India's export flows, that is, the USA and the EU, or the regions of interest. In essence, I use the INDIA TRADES data set to construct industry-level measures of exposure of Indian exports to specific destinations. In other words, the product-level export flows data are summed up to the industry level to create such a measure of demand shock, which varies according to destinations. I follow the same procedure for total exports of India. In the end, I am able to match around 90%–95% of the HS six-digit level products with each of the NIC two-digit level industrial chapters. These industry-level measures are then matched with firms in the firm-level data set, PROWESS, based on the identified industry of the firms. Therefore, the estimations that I will eventually run uses firm-level total exports as reported in PROWESS to see whether the industry-level measure of destination exposure influences firm-level total exports.

I acknowledge the fact that it would be ideal to have firm-level information on exposure to different export destinations, as this kind of industry-level exposure measure is likely to leave a lot of intra-industry heterogeneity, due to heterogeneity across firms in export destinations, unexplained. Since there is no such data set in case of India which gives firm-level trade destinations, this is a workable second-best strategy.

4 | EMPIRICAL STRATEGY

Motivated by the stylised facts, I now examine whether export flows of the Indian manufacturing firms are affected due to the drop in demand from the crisis-ridden countries, the USA and the EU. To understand the role of demand shock, as a result of the 2008–09 crisis, on Indian manufacturing firms' export earnings, I use the following fixed effects type specification using ordinary least squares (OLS):

$$\ln(y_{ijt}) = \alpha_1\left(D_{crisis} \times exposure^d_{jt}\right) + \alpha_2\left(D_{crisis} \times exposure^d_{jt}\right) * Z_{ijt} + X^d_{ijt} + firmcontrols + \theta_j + \gamma_t + \varepsilon_{ijt},$$

where y_{ijt}, the dependent or the left-hand side variable, denotes the exports of a firm i belonging to an industry j at time t. One of the crucial determinants of export performance of an average Indian manufacturing firm during the crisis is how drop in demand is transmitted on/from its trading partners. To test for this proposition, I match the firm-level data with the HS six-digit product-level destination-specific data on trade flows (explained in previous section) to create an index, which can potentially reflect the extent of demand prevailing in those economies. I term it as "exposure index" ($exposure^d_{jt}$). It is defined as the share of exports of an industrial sector or product category directed towards countries affected by the crisis (the USA and/or the EU) to the total exports of that sector. For example, if we consider the "textiles" sector, then the "exposure index" for the "textiles" sector, say for the USA, is the total amount of textile exports to the USA, relative to the

total exports of "textiles." To elaborate, I write the "exposure index" in the following way:

$$exposure^{d}_{jt} = \frac{exports^{d}_{jt}}{exports^{total}_{jt}} = \frac{exports\ to\ destination\ d(=USA)\ at\ time\ t\ for\ product\ j}{total\ exports\ to\ the\ World\ at\ time\ t\ for\ product\ j}.$$

This proportion will give us a respectable idea about the extent of demand prevailing for any product category relative to total demand for that product in a certain region, in this case in a crisis-affected zone. I acknowledge that this may not be the best measure of trade exposure as it varies at the industry level and not at the firm level but given the available data one can only construct such a meaningful trade exposure measure at the industry level, and not at the firm level.

Next, to understand whether the 2008–09 crisis has had any effect on the demand for that product, I interact the "exposure index" ($exposure^{d}_{jt}$) with a dummy variable, "crisis dummy." I define "crisis dummy"—D_{crisis}—as a year dummy variable, which is equal to 1 if the year is equal to 2008 and 2009. This measure would signify the amount of demand attached to a certain product in a crisis-affected region during the crisis time. I term this interaction, $D_{crisis} \times exposure^{d}_{jt}$, as "crisis-exposure index." My demand shock index varies by industry j destination d and time t. I calculate this index at the two-digit NIC 2004 level.[15] I expect my coefficient of interest α_1 to be negative or less than zero, that is, $\alpha_1 < 0$; drop in demand as a result of the 2008–09 crisis in the USA and/or the EU will exert a negative effect on the exports.

A primary concern with this demand shock index is the potential endogeneity or problem of reverse causality. There is a certain probability that the contemporaneous drop in total exports of a firm (for a certain product category) due to some other reasons—say, increase in transportation cost at the same time (which is nothing to do with the crisis)—may also influence the drop in the export flows rather than an actual drop in demand for that product in the crisis-affected zone. To avoid that such factors do not play a role in the estimations, I compute an average of the "exposure index" in the pre-crisis years, 1999–00 and 2000–01, and then interact with the D_{crisis} to create a potentially more clear and exogenous measure of the "crisis-exposure index" ($D_{crisis} \times exposure^{d}_{jt}$). So, in effect, the demand shock measure that I use in my estimations goes as follows:

$$exposure^{d}_{j1999,2000} = Avg\left(\frac{exports^{d}_{j,1999-2000}}{exports^{total}_{j,1999-2000}}\right)$$
$$= Avg\left(\frac{exports\ to\ destination\ d(=USA\ or\ EU)\ at\ 1999\ and\ 2000\ for\ product\ j}{total\ exports\ to\ the\ World\ at\ 1999\ and\ 2000\ for\ product\ j}\right).$$

This is arguably a more exogenous measure and will potentially subvert some of the problems relating to the issue of reverse causality and produce clear and true estimates of the effect of the 2008–09 crisis. The demand shock index now varies across industry j and destination d (not time t) and is interacted with the "crisis dummy" or D_{crisis}. Finally, it should be worth mentioning here that I assume changes in the "exposure index" ($exposure^{d}_{jt}$) reflect average change in aggregate demand conditions in the USA and the EU.[16] I also use an external instrument for the "exposure index" ($exposure^{d}_{jt}$), explained in detail in Section 6.

[15] I also calculate the demand shock index at the four-digit level, but the results do not change.

[16] I refer the "exposure index" (to the USA and the EU) and "demand shocks" interchangeably. While the latter can affect "exposure index," in principle there are other US and EU-related factors that can affect Indian export "exposure index" too. Though, in principle, I do not control for these other factors in my estimations, but I do the following: (i) I use share of Chinese imports in total US imports to explore whether changes other factors, related to demand, affect Indian exports; and (ii) I perform an IV analysis, where I use a variable which arguably portrays the demand condition (in the USA and the EU) more explicitly.

Additionally, it could also be the case that a firm's exports and the proportion of goods directed towards the crisis regions, the USA and the EU, are correlated with a firm's characteristics of exporting to these destinations. I carefully address this issue by sequentially including several firm-level characteristics to the baseline specification and allowing it to vary with "$D_{crisis} \times exposure^{d}_{jt}$" Z_{ijt} is a vector of firm characteristics—capital employed, labour, gross value added (GVA) and total factor productivity (TFP). To attenuate problems originating from simultaneity bias, I use these variables in their first differences.

X^{d}_{ijt} includes all the individual terms (as well as double interactions in case of triple-interaction terms) of the interactions. *firmcontrols* includes age of a firm, age squared, ownership indicator—domestic or foreign, and the size of the firm. I use total assets of a firm as the size indicator. I condition my estimations on an extensive set of fixed effects—both industry and year—to control for any other unobservable characteristics. Since my main variable of interest is at the industry or product level, I use a battery of industry fixed effects, θ_j. θ_j will control for any kind of export promotion policies by the Indian government targeting a certain sector, an industry's dependence on finance (both internal and external), other forms of comparative advantage specific to a particular industry, specialised knowledge of the distribution network, trade restrictiveness indices, transport costs and other effects, such as the average effect of the crisis on India's bilateral exports, or any differential effect that the crisis may have at different levels of industry share. I interact these industry fixed effects with time trends to control for such factors which vary over time.[17] γ_t, or the time-specific fixed effects, would control for the adjustment of the inventories by an industry because of the crisis. It will also consider the impact of the shock(s) to aggregate demand and credit conditions in each of the importing countries over time, as well as bilateral exchange rate fluctuations. Since I have multiple firm observations from the same industry-year—corresponding to the same degree of industry-specific "crisis exposure," or in other words, group of firms that experience the same "crisis exposure" within each such cluster, I cluster my standard errors at the industry-year level. ε_{ijt} is the usual error term.

While estimating the equation above, one issue which can potentially influence my results is the problem of attrition bias. However, this is not much of a problem in case of export market as the exit rates are very low, that is, around 5%–7% and second, I clearly observe the firms that stop exporting.

5 | RESULTS

5.1 | Benchmark results—drop in demand

Table 2 presents my benchmark results—effect of the export "exposure index" or destination-specific demand shock on firm-level export earnings. In other words, I estimate the effect of the demand spillover from the USA and the EU, controlling for other observable and unobservable effects, on Indian firm-level exports. However, before doing so, I start by estimating a counterfactual. In column (1), I estimate the effect of world GDP growth, where world GDP growth excludes India and is created using industry-level export-weighted averages (with the weights for the years 1999–00 and 2000–01) of the destination countries' GDP growth rates. Hence, the relevant industry for each firm would have its own world GDP growth rate. A non-significant effect would show that focusing on the USA and the EU may be an arguable good strategy as it will then signify that

[17]Using interaction of industry fixed effects with time trends will not entirely solve the problem of controlling for other unobserved factors as in case of interaction of industry with year fixed effects. Since our variable of interest, $D_{crisis} \times exposure^{d}_{jt}$, varies by industry-year, using such interactions would subsume all the variations.

TABLE 2 Impact of "2008–09 crisis" on Indian manufacturing exports: benchmark results

	Exports												
	World	USA and EU		USA				EU				USA and EU	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
$GDPGr_{World}$	−0.116												
	(0.183)												
$D_{crisis} \times exposure_{jt}^{USA+EU}$		−1.167***	−1.362***										
		(0.227)	(0.220)										
$D_{crisis} \times exposure_{jt}^{USA}$				−1.606***	−2.047***	−0.977**	−2.668***					−1.721***	−0.927*
				(0.354)	(0.351)	(0.483)	(0.826)					(0.375)	(0.540)
$D_{crisis} \times exposure_{CH}^{USA}$						−0.0005							−0.003
						(0.003)							(0.003)
$D_{crisis} \times exposure_{jt}^{EU}$								−1.483***	−1.585***	−1.001**	−1.470**	−0.971***	−0.808*
								(0.409)	(0.385)	(0.396)	(0.727)	(0.397)	(0.429)
$D_{crisis} \times exposure_{CH}^{EU}$										0.004			0.016*
										(0.005)			(0.009)
$\Delta FB \times \Delta IB \times D_{crisis}$							−0.065				0.090		
							(0.372)				(0.379)		
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.44	0.44	0.44	0.44	0.44	0.44	0.48	0.44	0.44	0.44	0.48	0.44	0.44
N	18,449	18,449	18,449	18,449	18,449	18,449	1,542	18,449	18,449	18,449	1,542	18,449	18,449
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE × Year Trend	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is the natural logarithm of total exports of a firm. $GDPGr_{World}$ is world GDP growth where world GDP growth excludes India and is created by using industry-level export-weighted averages of the destination countries' GDP growth rates. "$exposure_{jt}^{d}$" is the exposure index. It is defined as share of exports of an industrial sector or product category (j) directed towards countries ($d = USA$, EU *or* $USA + EU$) affected by the crisis (the USA and/or the EU) to the total exports of that sector. I use the average exposure index for the years 1999 and 2000 with respect to each of the industrial chapter. D_{crisis} is a dummy variable, which takes a value 1 if the year is greater than or equal to 2008. $exposure_{jt}^{USA+EU}$, $exposure_{jt}^{USA}$, $exposure_{jt}^{EU}$ are "exposure indices" for the USA and EU combined, the USA and the EU, respectively. $exposure_{CH}^{USA}$ and $exposure_{CH}^{EU}$ are exposure indices of the USA and EU for Chinese imports. It is defined as the share of Chinese imports by the USA and EU in total imports. "*FB*" is the amount of borrowings by a firm from foreign banks. I use it as an indicator of foreign sources of supply of finance. "*IB*" is the interbank money call rate, used in its first difference. All the regressions include the individual terms of the double interactions and in case of triple interaction, the double interactions as well. Firm controls include age of a firm, age squared, ownership (domestic or foreign) and size indicator. I use total assets of a firm as the size indicator. Numbers in the parentheses are clustered standard errors at the industry-year level. Intercepts are not reported. *, ** and *** denote 10%, 5% and 1% level of significance.

the drop in export earnings of Indian manufacturing firms is only due to the decline in demand from two of their biggest trading partners, that is, the USA and the EU, and not for other reasons per se. The estimated coefficient shows that my argument is valid.[18]

Columns (2) and (3) regress natural logarithm of total export earnings of an Indian manufacturing firm on the combined (the USA and the EU) $exposure^{d}_{jt}$ interacted with D_{crisis}, controlling for the age of a firm, age squared, ownership of a firm (domestic or foreign) and size of a firm with industry and year fixed effects, and interaction of industry fixed effects with year trends, respectively. The combined "$exposure^{USA+EU}_{jt}$" is calculated by putting together total exports of each industrial category directed towards the USA and the EU and then dividing it by total exports of those categories. This interaction of industry fixed effects with time trends will specifically control for industry-level trade diversion effect, such as reorientation of exports to other emerging economies, for example, Middle East, industrial dependence on credit flows (both external and internal) and changes in exchange rates with respect to these economies. Lastly, the Indian government may have responded to the 2008–09 crisis by implementing certain new export incentives (e.g., export subsidies) to boost up the export flows. And, this could vary across industrial sectors. The interaction of industry fixed effects with year trends will also specifically control for all such government policies that were in effect during the crisis to strengthen the exports.

I find that drop in demand in the USA and the EU as a result of the financial crisis of 2008–09 has significant and negative impact on the Indian firm-level exports at the 1% level. In other words, the higher the exposure of a certain product/industrial category is towards the USA and the EU combined, the lower is the export earnings of a firm belonging to that particular product/industrial category. In particular, drop in demand, as a result of the 2008–09 crisis, in these two regions has significantly hampered the export flows of Indian manufacturing firms. The coefficients assert that 1% increase in the "exposure index" ($exposure^{d}_{jt}$) towards the crisis-affected zones (the USA and the EU combined) reduces an average Indian manufacturing firm's export earnings by 1.17%–1.36%. To put it differently, a single unit drop in demand in the USA and the EU combined during the crisis is strongly and significantly transmitted abroad, in this case to Indian exports via international trade.[19]

Columns (4)–(7) and (8)–(11) divide the combined "exposure index" separately for the USA and the EU, respectively. Columns (4)–(5) and (8)–(9) redo the estimations of columns (2) and (3), but using separate "exposure indices" for the USA and the EU. The results continue to be the same: the higher the direction of exports (or proportion of goods in total exports) is towards either the USA or the EU during the financial crisis, the higher is the drop in the firm-level export earnings. However, the negative effect is significantly larger in case of the USA in comparison with that of the EU. To understand it quantitatively, a 1% increase in the "exposure index" ($exposure^{d}_{jt}$) towards the USA during the 2008–09 crisis results in 1.82% decline on average in the firm-level exports earnings; the same is 1.38 in case of the EU.[20] This significant difference between the

[18] I also check my results using the total imports growth of partners. The results are the same; I do not find any effect.

[19] There are certainly other USA and EU-related factors that may affect Indian export exposure too. I assume that changes in my export exposure index reflects on average the changing aggregate demand conditions in the USA and the EU.

[20] It appears that the effect of crisis-exposure to the USA and the EU combined is smaller than when the crisis-exposure measure is measured for just the USA or the EU. This is because the priors of these estimations are completely different. For example, the prior events which may have led an industry to export to both the USA and the EU together are different from those exporting to the USA and the EU separately. Even though the trade exposure index of 1999/2000 of the combined USA and EU is same as the sum of exposure index of 1999/2000, but the effect would be different. For example, it could be the case that a firm exporting to both the USA and the EU during the crisis may shift some of its product basket to the other region where it may have experienced a lesser fall in exports. And, these kinds of events may have soothed down the negative effect than when focusing on one single country/region, where the firms have to bear the full brunt of the crisis.

estimates of the USA and the EU can arguably be attributed to two main reasons: (i) differences in sectoral composition of demand across these two destinations; and (ii) higher income elasticity of demand for India's exports in case of the USA.

However, there are two other crucial factors that could also potentially lead to drop in export earnings of Indian firms and if omitted, my results could run into omitted variable bias. Columns (6)–(7) for the USA and (10)–(11) for the EU controls for two such factors. These are the following: (i) foreign government policies that promote exports may directly affect Indian exports in the US and the EU markets. For example, policy responses in China during the time of the 2008–09 crisis may have negatively impacted Indian exports. In other words, the export "exposure index" ($exposure^{d}_{jt}$) may be correlated with competition from subsidised foreign rivals, and this could vary across sectors and years. In order to potentially control for this, I match the ratio of Chinese imports by the USA and the EU in their total imports to each industrial sectors to investigate whether there is any such effect. The results show that the inclusion of this additional control does not alter my benchmark result. The demand drop, because of the 2008–09 crisis, in these respective economies continues to explain the fall in Indian exports; (ii) in columns (7) and (11) (for the USA and the EU, respectively), I introduce a potential proxy to capture the availability of external finance, in this case foreign sources of finance. The 2008–09 global financial crisis led to significant drop in foreign sources of finance (Chor and Manova, 2012). This could also potentially impact the firm-level export flows which are dependent on foreign sources of finance. Although I use industry fixed effects with year trends in all the estimations to potentially control for this aspect, these interaction terms may leave out a lot of within-industry heterogeneity which could have significant influences. I estimate the effect of foreign sources of finance following the empirical strategy by Chor and Manova (2012). I use "interbank money call rate" from RBI (2010) as a measure of tightness of the credit conditions. The interbank lending rate is the interest rate that commercial banks charge each other for short-term loans which allow banks to meet their liquidity positions (Chor & Manova, 2012). I use the monthly interbank rate, averaged over every year from 1999–00 to 2009–10. To measure the impact of foreign credit crunch in the economy on the financial vulnerability of a firm, I interact the interbank lending rate with a proxy for foreign sources of finance and "crisis dummy" (D_{crisis}).

Although PROWESS does not provide any information on trade finance, it rolls out the amount of credit obtained by a firm and its source, that is, whether the credit is from domestic or foreign origin. In order to control for a potential source of foreign borrowing, I use borrowings from the foreign banks[21] (FBs, hereafter) as a proxy for the foreign sources of supply of finance.[22] I acknowledge that this is by no means to say that this amount has been used for trading activities by a firm, but I use it in order to understand how a certain percentage of the total credit situation of a firm, which is dependent on foreign sources of finance, has impacted export flows. I use this only as a proxy of trade finance from foreign sources. To control for the reverse causality problem, that is, simultaneous drop in trade could also influence the amount of finance obtained by a firm, I use the borrowings from the FBs in its first difference. So, in effect, I use a triple-interaction term,

[21]When a firm takes a loan in currency other than Indian rupees, it is known as foreign currency borrowings. The sum of all secured foreign currency borrowings is reported in this data field. Following are the examples of such borrowing: (i) loans taken from foreign banks; (ii) loans takes from Indian branches of foreign banks; (iii) loans taken from foreign financial institutions (including foreign EXIM banks); and (iv) loans taken from International Development Institutions like World Bank, Asian Development Bank, etc. In other words, any secured loan taken in a foreign currency, whether it is taken from India or from abroad is reported in this data field.

[22]If I substitute my proxy for foreign sources of finance, that is, borrowings from the FBs with other possible indicators such as external commercial borrowings, I still do not find any effect (not reported).

$\Delta FB * \Delta IB * D_{crisis}$, to estimate the desired effect.[23] I find no evidence (for both the USA and the EU) of foreign sources of finance affecting exports of Indian manufacturing firms. However, the export "exposure index" for the demand shock continues to significantly explain the drop in the exports of Indian firms. Lastly, I use the separate "exposure indices" of the USA and the EU together in column (12) and in addition controlling for foreign government export promotion policies in column (13). Both the "exposure indices" are significant and negative, with the effect continuing to be higher for the USA.

The result, drop in demand in crisis zones significantly explaining the decline in exports of their trading partners, draws strong support from the existing research on the likely causes of the GTC (Baldwin, 2009; Behrens et al., 2013; Eaton et al., 2016; Levchenko et al., 2010; and especially Bems et al., 2010). Bems et al. (2010) show that demand spillover during the crisis is the strongest for countries, such as India, which have strong trade linkages with the USA and the EU. They also demonstrate that 27% of the fall in the US demand and 18% of the fall in total EU-15[24] demand are borne by the foreign countries with Asia being hit the hardest. Levchenko et al. (2010) also provide with such evidence. That the collapse of US foreign trade has had significant impact on the major trading partners of the USA, of which India is one.

So, why is the fall in exports of India is in concordance with the drop in demand in two of its major export destinations—the USA and the EU? Following could be the possible reasons: (i) virtual cessation of trade finance may have influenced the investment schedule and the financial health of the firms, say in the USA, which are direct buyers of raw materials, intermediate goods, etc. This unavailability of finance in conjunction with the decline in domestic demand during the crisis period may have virtually stopped the production cycle of some of firms in the USA which in turn postponed the purchase of inputs from their suppliers (importers). And, India being one of the major suppliers is being hit negatively. In other words, the decline in demand conjoined with the delay in production results in a negative impact on the trade earnings of the Indian exporters; (ii) the financial crisis of 2008–09 soon turned into an economic crisis. Income dropped, which got coupled with a decline in the income–demand elasticity.[25] On the other hand, India's exports are also found to be more sensitive to income than to price changes (UNCTAD, 2009). Therefore, the drop in income resulted in lower demand for goods which affected the Indian exports, and lastly (iii) the 2008–09 crisis led to a rise in the speculative behaviour which is a potential reason behind the volatility of the commodity prices during that period. The decline in prices because of the decline in demand could also have affected the decline in exports.

My results are also in complete correspondence with existing macro-level studies on Indian economy during the 2008–09 crisis period (Kucera, Roncolato, & Uexkull, 2011; Kumar et al., 2009; Sengupta, 2009). Sengupta (2009) reports that decline in demand in India's major trading partners, especially the USA and the EU, accounts for significant fall in Indian exports. My results are also similar when comparing to other major exporting nations, like Germany, Japan and China. Reports suggest that exports from these countries also plummeted as a result of the drop in demand. Although Indian exporters experience a severe decline in demand from their buyers, its exports to GDP ratio is still lower in comparison with many of its East Asian counterparts; therefore, the adverse effects are not as severe as that of the other emerging export-oriented economies (Joseph et al., 2009).

[23] All the main effects and pairwise double-interaction effects have been controlled in the regression.

[24] Major 15 countries of the European Union.

[25] Also, exports are highly sensitive to GDP movements.

5.2 | Firm characteristics

My benchmark results would be biased or run into omitted variable problem if I do not control for other firm-level attributes that could potentially affect exports. In other words, I explore whether my variable of interest, $D_{crisis} \times exposure^{d}_{jt}$, has heterogeneous effects across firms when interacted with different characteristics. I use the interaction term to vary along these dimensions. Table 3 displays results from such an exercise. Columns (1)–(6) present estimations for the USA, whereas columns (7)–(12) does the same for the EU.

Decline in demand may result in downward pressure on the amount of capital employed by a firm, which may exert a negative effect on the production of output and in turn reduces exports. Column (1) uses logarithm of total amount of capital employed by a firm and its interaction with $D_{crisis} \times exposure^{d}_{jt}$.[26] The results show significant negative effect of capital employed, as a result of the drop in demand during the crisis, by a firm on its export performance. However, the demand shock is negative and significant at 1% level. Column (2) introduces total amount of labour used by a firm in producing goods. Crisis may result in loss of jobs, which in turn could affect the performance of a firm. I use total expenditure on wages and salaries by a firm as the total labour cost by a firm. I do not find that to be true—the coefficient of interest remains robust. In column (3), I examine whether changes in value added affects a firm's export earnings. I define value added as total sales minus total raw material cost of a firm. The inclusion of this additional control also has minimal effect on the coefficient of interest. Column (4) interacts TFP index with $D_{crisis} \times exposure^{d}_{jt}$. I estimate TFP using Levinshon and Petrin (2003).[27] As the coefficient demonstrates, the inclusion of this interaction effect does not significantly alter the baseline specification. In column (5), I substitute the semi-parametric TFP estimate with capital–labour ratio. My primary result, demand shock affecting firms' exports, continues to remain robust. Column (6) puts together capital, labour and gross value added. The drop in demand, as a result of the 2008–09 crisis, continues to significantly affect the export performance of an Indian firm. I run the same set of exercises for the EU; the primary results do not change in this case as well.[28]

5.3 | Sectoral effect

This section divides the entire manufacturing sector into different categories of goods following the end-use or user-based classification. I use the categorisation by Nouroz (2001). To classify the manufacturing sector into different user-based categories, I, first, match the NIC 2004 codes with the input–output (I-O) classifications. Second, I arrange the matched NIC categories into user-based products at the NIC four-digit level. It categorises the manufacturing sectors into five major subsectors: (i) capital, (ii) intermediate, (iii) consumer durable, (iv) consumer non-durable and (v) basic goods; I denote these different categories using five binary dummies. I do so to examine the compositional effects of the crisis, that is, how the effect varies across different kinds of products. This decomposition of the entire manufacturing sector would tell us the type of good which has

[26]The main effect and the double-interaction terms are all controlled for in the regression. I do the same for all the following regressions.

[27]For details, see Levinshon and Petrin (2003).

[28]However, there is another issue that one may have concerns about. That is, not how changes in firm characteristics are correlated with the trade behaviour of manufacturing firms, but how these characteristics are correlated in itself. In order to test for this, I interact the "crisis-exposure index" with these different firm characteristics in levels, but the results do not change. My initial result—drop in demand negatively impacts the exports of a firm—continues to play a significant role.

TABLE 3 Impact of "2008–09 crisis" on Indian manufacturing exports: controlling for other possible channels

	Exports											
	USA						EU					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$D_{crisis} \times exposure^{d}_{jt}$	−1.710*** (0.349)	−1.743*** (0.351)	−1.912*** (0.349)	−1.884*** (0.352)	−1.825*** (0.349)	−1.716*** (0.358)	−1.513*** (0.415)	−1.337*** (0.436)	−1.564*** (0.378)	−1.637*** (0.397)	−1.641*** (0.390)	−1.526*** (0.485)
$\Delta Cap \times D_{crisis} \times exposure^{d}_{jt}$	−2.274** (1.107)					−2.428** (1.166)	−1.210 (1.342)					−1.718 (1.481)
$\Delta Lab \times D_{crisis} \times exposure^{d}_{jt}$		−1.344 (1.082)				−1.374 (1.475)		−0.652 (1.408)				0.037 (1.781)
$\Delta GVA \times D_{crisis} \times exposure^{d}_{jt}$			0.405 (0.830)			0.758 (1.054)			0.794 (0.962)			0.654 (1.143)
$\Delta TFP \times D_{crisis} \times exposure^{d}_{jt}$				1.128 (0.927)						0.681 (1.059)		
$\Delta(K/L) \times D_{crisis} \times exposure^{d}_{jt}$					0.394 (0.936)						0.179 (1.252)	
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
N	16,001	16,345	16,483	15,743	15,786	15,743	16,001	16,345	16,483	15,743	15,786	15,743
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE × Time Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is the natural logarithm of total exports of firm. $exposure^{d}_{jt}$" is the exposure index. It is defined as share of exports of an industrial sector or product category (j) directed towards countries ($d = USA, EU\ or\ USA + EU$) affected by the crisis (the USA and/or the EU) to the total exports of that sector. I use the average exposure index for the years 1999 and 2000 with respect to each of the industrial chapter. D_{crisis} is a dummy variable, which takes a value 1 if the year is greater than or equal to 2008. "*Cap*" is the amount of capital used by a firm. "*Lab*" is the labour cost of a firm. It is defined as the total amount of salaries and wages paid by a firm. "*GVA*" (Total Sales - Raw Material Expenditure) is the gross value added by each industry. "*TFP*" is the total factor productivity of a firm measured through Levinshon and Petrin (2003) methodology. "*K/L*" is the capital–labour ratio of a firm. All the dependent variables (except $exposure^{d}_{jt}$) are used in their natural logarithm and at first difference. All the regressions include the double-interaction terms of the triple interactions as well as the individual terms. Firm controls include age of a firm, age squared, ownership (domestic and foreign) and size indicator. I use total assets of a firm as the size indicator. Numbers in the parentheses are clustered standard errors at the industry-year level. Intercepts are not reported. *, ** and *** denote 10%, 5% and 1% level of significance.

suffered the most in case of India as a result of the drop in demand from its buyers. To measure the effects of demand shock across destinations, I interact "$D_{crisis} \times exposure^{d}_{jt}$" with the respective user-based category dummies. The coefficient of this triple-interaction term would give the idea about the magnitude of the effect of the crisis on each of the different type of goods with respect to each of the destination. Table 4 presents the results.

Column (1) regresses natural logarithm of total exports of an Indian manufacturing firm on all the five different categories of goods and their interaction with "$D_{crisis} \times exposure^{d}_{jt}$" of the USA and the EU combined. The results portray that all but basic goods are significantly affected by the negative demand shock. The effect is highest for consumer durable products followed by non-durable, intermediate and capital goods. In column (2), I replace the combined index with that of the USA; the results remain the same. Finally, in column (3), in case of the EU, an alternative specification did little to alter the pattern of results—durable goods are the most affected followed by non-durables. To find out which type of product(s) is particularly hit by the crisis, I explore further by looking within these broad industrial categories. I find the sectors, which are export-oriented

TABLE 4 Impact of "2008–09 crisis" on Indian manufacturing exports: sectoral effect

	Exports		
	USA and EU (1)	**USA (2)**	**EU (3)**
$D_{capital} \times D_{crisis} \times exposure^{d}_{jt}$	−0.765*** (0.242)	−1.052*** (0.364)	−1.610*** (0.463)
$D_{intermediate} \times D_{crisis} \times exposure^{d}_{jt}$	−0.781*** (0.288)	−1.223** (0.513)	−1.427*** (0.476)
$D_{non-durable} \times D_{crisis} \times exposure^{d}_{jt}$	−1.174*** (0.263)	−1.953*** (0.447)	−2.175*** (0.501)
$D_{durable} \times D_{crisis} \times exposure^{d}_{jt}$	−1.200*** (0.263)	−2.518*** (0.473)	−2.209*** (0.507)
$D_{basic} \times D_{crisis} \times exposure^{d}_{jt}$	0.017 (0.396)	0.718 (0.816)	−0.076 (0.102)
Firm controls	Yes	Yes	Yes
R^2	0.45	0.45	0.45
N	18,449	18,449	18,449
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE × Time trend	Yes	Yes	Yes

Notes: The dependent variable is the natural logarithm of total exports of firm. "$exposure^{d}_{jt}$" is the exposure index. It is defined as share of exports of an industrial sector or product category (j) directed towards countries ($d = USA, EU\ or\ USA + EU$) affected by the crisis (the USA and/or the EU) to the total exports of that sector. I use the average exposure index for the years 1999 and 2000 with respect to each of the industrial chapter. D_{crisis} is a dummy variable, which takes a value 1 if the year is greater than or equal to 2008. The entire set of manufacturing goods are classified into different user-based categories following the "Protection in Indian Manufacturing" by Nouroz (2001). The different user-based categories are used as dummy variables and then interacted with ($D_{crisis} \times exposure^{d}_{jt}$). "$D_{capital}$," "$D_{intermediate}$," "$D_{durable}$," "$D_{non\text{-}durable}$" and$D_{basic}$" are dummies for capital goods sector, intermediate goods sector, durable goods sector, non-durable sector and basic goods sector, respectively. All the regressions include the double-interaction terms of the triple interactions as well as the individual terms. Firm controls include age of a firm, age squared, ownership (domestic and foreign) and size indicator. I use total assets of a firm as the size indicator. Numbers in the parentheses are clustered standard errors at the industry-year level. Intercepts are not reported. *, ** and *** denote 10%, 5% and 1% level of significance.

and has significant comparative advantage, are the ones that have been hit the hardest. In the durable goods sector, it is the gems and the jewellery which had the highest fall, and in the non-durables sector, exports of textiles, apparel, leather, food products, beverages, certain chemicals recorded a significant drop as a result of the 2008–09 crisis.

Most of the studies evaluating the sectoral effect of the 2008–09 GTC find that the durable manufacturing goods had the highest drop followed by the non-durables with almost no effect on basic goods (Baldwin, 2009; Behrens et al., 2013; Crowley & Luo, 2011; Eaton et al., 2016). My results are in complete accord with the existing literature on 2008–09 crisis.

5.4 | Heterogeneous impact

5.4.1 | Empirical strategy

This section aims to test whether the effect of the crisis is heterogeneous when using the size distribution of the firms. To do so, I divide the sample of firms into four different quartiles according to their size. I use total assets of a firm as the size indicator. These four different size categories of firms are indicated by different dummy variables. For example, if the total assets of a firm fall below the 25th percentile of the total assets of the industry (to which the firm belongs), then that particular firm belongs to the first quartile and the variable indicating first quartile takes a value 1 for that firm and zero otherwise. Likewise, if a firm's total assets fall between 25th percentile to 50th percentile, 50th percentile to 75th percentile and above of 75th percentile, the firm belongs to the categories of second, third and fourth quartiles, respectively. I interact each of the four different quartile dummies with the "crisis-exposure index"— $D_{crisis} \times exposure^{d}_{jt}$—to measure the effect of the 2008–09 crisis on each of those quartile of firms. I estimate the effect of the 2008–09 crisis on the different quartiles of the firms using the following equation:

$$\ln(y_{ijt}) = \beta^{r} \sum_{r=1}^{4} \left(Q_i^r \times D_{crisis} \times exposure^{d}_{jt} \right) + \varphi^{r} \sum_{r=1}^{4} Q_i^r + \gamma_1 \left(D_{crisis} \times exposure^{d}_{jt} \right) + X^{d}_{ijt} + firmcontrols + \theta_j + \gamma_t + \varepsilon_{ijt},$$

where r indexes each of the four different quartiles of the size distribution and Q_i^r are the dummy variables, which takes the value 1 when firm i belongs to quartile r and zero otherwise. My coefficients of interest are four different β^r. X^{d}_{ijt} includes all the interactions as well as the individual terms. I continue to use age, age squared, size of a firm and ownership indicator (domestic or foreign) as the *firmcontrols*. To control for the endogeneity—that firms can switch their quartiles during the period of operation—I use the average size of the firms across the period of analysis. I also check my results using the rank of the firms' in the base year of the data set, that is, 1999–2000. The results stay the same. Lastly, to check for the robustness of the results, I alternatively use total sales or output of a firm as the size indicator.

5.4.2 | Results

Table 5 presents the heterogeneous effect of the demand shock, as a result of 2008–09 crisis, on the exports of the Indian manufacturing firms. In other words, how different is the effect of the demand shock across the size distribution of the firms or when the firms are placed into bins of different sizes. Column (1) regresses natural logarithm of a firm's total exports on the four different quartiles and its interaction with the combined, the USA and the EU put together, "exposure

TABLE 5 Impact of "2008–09 crisis" on exports of Indian manufacturing firms: size heterogeneity

	Exports					
	Size indicator = "Assets"			**Size indicator = "Total Sales"**		
	USA and EU (1)	**USA (2)**	**EU (3)**	**USA and EU (4)**	**USA (5)**	**EU (6)**
1st Qr $\times D_{crisis} \times exposure^{d}_{jt}$	−2.098***	−3.576***	−2.456***	−1.774***	−2.921**	−1.300***
	(0.436)	(0.833)	(0.744)	(0.353)	(0.690)	(0.582)
2nd Qr $\times D_{crisis} \times exposure^{d}_{jt}$	−1.113***	−1.346**	−0.877*	−1.498***	−2.102**	−1.109**
	(0.297)	(0.560)	(0.515)	(0.296)	(0.532)	(0.487)
3rd Qr $\times D_{crisis} \times exposure^{d}_{jt}$	−1.551***	−2.569***	−1.432***	−1.828***	−3.053***	−1.538***
	(0.267)	(0.426)	(0.492)	(0.270)	(0.409)	(0.491)
4th Qr $\times D_{crisis} \times exposure^{d}_{jt}$	−1.707***	−2.939***	−1.628***	−1.582***	−2.601**	−1.187***
	(0.235)	(0.429)	(0.410)	(0.251)	(0.430)	(0.429)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.44	0.44	0.44	0.45	0.45	0.45
N	18,449	18,449	18,449	18,449	18,449	18,449
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE × Time Trend	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is the natural logarithm of total exports of firm. "$exposure^{d}_{jt}$" is the exposure index. It is defined as share of exports of an industrial sector or product category (j) directed towards countries ($d = USA$, $EU\ or\ USA + EU$) affected by the crisis (the USA and/or the EU) to the total exports of that sector. I use the average exposure index for the years 1999 and 2000 with respect to each of the industrial chapter. D_{crisis} is a dummy variable, which takes a value 1 if the year is greater than or equal to 2008. "Quartiles (Qr)" are defined according to the average total assets of a firm over the years of analysis. If a firm's total asset falls below the 25th percentile of the total assets of that particular industry, then the firm belongs to the 1st quartile (1st Qr). Similarly, if a firm's asset is within 25th–50th, 50th–75th and over 75th percentile, then it would fall into 2nd, 3rd and 4th quartiles, respectively. All the regressions include the respective double-interaction terms of the triple interactions as well as the individual terms. Firm controls include age of a firm, age squared, ownership (domestic and foreign) and size indicator. I use total assets of a firm as the size indicator. Numbers in the parentheses are clustered standard errors at the industry-year level. Intercepts are not reported. *, ** and *** denote 10%, 5% and 1% level of significance.

index." I find that drop in demand significantly hampers the export performance of firms across all sizes. The effect is highest for small or the most vulnerable exporters, followed by firms which have the highest exposure to the global market, that is, the firms belonging to the 4th quartile (or the big firms). However, in case of the small Indian exporters, there could be another potential factor which may have driven the result. The smallest exporters may tend to appear in sectors in which India does not have any overall advantage and this could hurt them significantly as when demand drops. To check whether this could be true, I check the entry rates of the exporters according to the each of the five different sectors (divided according to the user-based category). I do not find any such evidence which could possibly support this hypothesis. Bricongne et al. (2012) and Behrens et al. (2013) also investigating the French and the Belgian data set, respectively and do not find any evidence in support of size heterogeneity concerning the impact of the trade crisis on firm-level exports.

In columns (2) and (3), I replace the combined "exposure index" with respective "exposure indices" for the USA and the EU, respectively. The results remain the same: (i) effect is negative across size quartiles and (ii) effect is highest for the most vulnerable firms (firms of 1st quartile),

followed by the high-exposed ones (of 4th quartile). Columns (4)–(6) substitute total assets of a firm by total sales or output as the size indicator. Firms of all sizes display significant drop in export values because of the demand shock from India's major trading partners, the USA and the EU, due to the 2008–09 crisis.

6 | IV ANALYSIS

While in principle it is useful to use pre-crisis data (using average of the "exposure index" for the years 1999–2000 and 2000–01) as an instrument for the contemporaneous "exposure index," this could be more a measure of long-term trade patterns rather than a meaningful reflection of export demand shocks during the crisis period itself. Therefore, the concern regarding the results to be biased may continue to persist. To potentially clear out such bias, I use "total imports by the USA and/or the EU less imports from India" as an instrument for "exposure index." This is arguably a more clear and exogenous measure of the demand shock (because of the 2008–09 crisis) and also provides a good exposition of the demand condition of a region. For example, change in imports, say in case of the EU, from other countries less India will first influence imports, across different industries, from India which in turn will affect firm-level exports. I interact "total imports by the USA and/or the EU less imports from India" with the D_{crisis} to construct the main variable of interest.

Table 6 produces the required results along with first-stage estimates. Columns (1)–(3) present the results in case of the USA, whereas results for the EU are in columns (4)–(6). The results from IV estimation reinforce my OLS findings. In other words, IV estimates are in complete accordance with the OLS results—drop in demand, as a result of the 2008–09 crisis, significantly affecting the drop in exports of the Indian manufacturing firms. Also, the magnitude of the IV estimates is close to that of the OLS coefficients. The first-stage results also significantly satisfy the exclusion restriction—increase in imports from other regions significantly reduces imports from India. The F-statistic which determines the exogeneity of the instrument is consistently greater than 10.

7 | SENSITIVITY ANALYSIS

Table 7 uses different kind of samples to investigate whether the baseline specification is robust. As for this table, I only present the results using the "exposure index" of the USA. The results are same for the EU as well (not reported). Column (1) tests for the trade diversion effect—whether the fall in exports for the manufacturing firms is a result of the demand shock from the USA and the EU or there has been some sort of a trade diversion. An expectation in the fall in demand from the USA and the EU because of the crisis could lead to diversion of trade to other destinations, such as Middle East, Japan. This may exert a negative impact on the exports of the firms rather than a demand shock. Then my coefficients are nothing but a result of some spurious correlation and not the evidence of the effect of 2008–09 crisis. To test this, I compute "exposure index" for all the major trading partners of India—the USA, the EU, Japan, Middle East and China, using the same strategy as before, which is average of the "exposure index" for the years 1999–00 and 2000–01. If a supposed trade diversion has taken place, then the drop in exports towards the USA and the EU should get cancel out with the increase in exports towards Japan, Middle East and China, and I should not find any significant

TABLE 6 Impact of "2008–09 crisis" on exports of Indian manufacturing firms: IV analysis

	Exports					
	USA			**EU**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
$D_{crisis} \times exposure^{d}_{jt}$	−1.473*** (0.253)	−1.403*** (0.232)	−1.390*** (0.293)	−1.139*** (0.250)	−1.106*** (0.228)	−1.387*** (0.306)
$\Delta TFP \times D_{crisis} \times exposure^{d}_{jt}$		−1.921*** (0.593)			−1.894*** (0.590)	
$\Delta Cap \times D_{crisis} \times exposure^{d}_{jt}$			0.345 (0.514)			0.050 (0.456)
$\Delta Lab \times D_{crisis} \times exposure^{d}_{jt}$			2.051 (1.497)			1.962 (1.413)
$\Delta GVA \times D_{crisis} \times exposure^{d}_{jt}$			−2.011*** (0.628)			−2.065*** (0.629)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.44	0.44	0.44	0.44	0.44	0.44
N	18,449	15,743	15,743	18,449	15,743	15,743
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time trend	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE × Time trend	Yes	Yes	Yes	Yes	Yes	Yes
	First-stage (Crisis-exposure Index)					
	US			EU		
$Imports^{d}_{India} \times D_{crisis}$	−0.129** (0.062)	−0.182** (0.083)	−0.090** (0.037a)	−0.159** (0.066)	−0.159** (0.062)	−0.169*** (0.063)
R^2	0.83	0.84	0.84	0.84	0.85	0.85
F test (exogeneity of instrument)	14.35	14.77	12.31	16.66	16.86	17.12

Notes: The dependent variable is the natural logarithm of total exports of a firm. "$exposure^{d}_{jt}$" is the exposure index. It is defined as share of exports of an industrial sector or product category (j) directed towards countries ($d = USA\ or\ EU$) affected by the crisis (the USA and/or the EU) to the total exports of that sector. I use the average exposure index for the years 1999 and 2000 with respect to each of the industrial chapter. D_{crisis} is a dummy variable, which takes a value 1 if the year is greater than or equal to 2008. In columns (1)–(3), I use natural logarithm of "total imports by the USA minus India" as the exposure index, whereas columns (4)–(6) use natural logarithm of "total imports by the EU minus India" as the exposure index. "*TFP*" is the total factor productivity of a firm measured through Levinshon and Petrin (2003) methodology. "*Cap*" is the capital employed by a firm. "*Lab*" is the labour cost of a firm. It is defined as the total amount of salaries and wages paid by a firm. "*GVA*" (Total Sales - Raw Material Expenditure) is the gross value added by each industry. All the explanatory variables (except $exposure^{d}_{jt}$) are expressed in their first difference. The lower half of the table reports the results for the first stage, where I use "$D_{crisis} \times exposure^{d}_{jt}$" as the dependent variable and "$Imports^{d}_{India}$" interacted with "D_{crisis}" as the explanatory variable. "$Imports^{d}_{India}$" is defined as the total imports by country/region $d(= USA\ and\ EU)$ less *India*. All the regressions include the respective double-interaction terms of the triple interactions as well as the individual terms. Firm controls include age of a firm, age squared, ownership (domestic and foreign) and size indicator. Numbers in the parentheses are clustered standard errors at the industry level. Intercepts are not reported. *, ** and *** denote 10%, 5% and 1% level of significance.

effects of the drop in demand. I find this to be untrue. My baseline results continue to hold. This result also negates the idea that the drop in India's exports towards the USA and the EU is a result of the loss in market share in those countries (coupled with an increase in market share in case of the Middle East and China).

TABLE 7 Impact of "2008–09 crisis" on exports of Indian manufacturing firms: sensitivity analysis

	Exports				
	Trade Diversion (1)	**High-exposure industries (2)**	**Low-exposure industries (3)**	**Drop outliers (4)**	**Drop nuclear fuel (5)**
$D_{crisis} \times exposure_{jt}^{USA}$	−1.437*** (0.413)	−1.813*** (0.471)	−0.814 (1.109)	−2.658*** (0.703)	−1.428** (0.568)
$D_{crisis} \times exposure_{jt}^{EU}$	−0.778* (0.439)				
$D_{crisis} \times exposure_{jt}^{JAPAN}$	1.924 (2.321)				
$D_{crisis} \times exposure_{jt}^{MIDDLE\ EAST}$	0.409 (0.505)				
$D_{crisis} \times exposure_{jt}^{CHINA}$	4.328 (2.992)				
Firm controls	Yes	Yes	Yes	Yes	Yes
R^2	0.44	0.47	0.42	0.18	0.43
N	18,449	9,896	7,758	9,808	18,290
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE × Time trend	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is the natural logarithm of total exports of firm. "$exposure_{jt}^{USA}$," "$exposure_{jt}^{EU}$," "$exposure_{jt}^{JAPAN}$," "$exposure_{jt}^{MIDDLE\ EAST}$" and "$exposure_{jt}^{CHINA}$" are defined as the "exposure indices" of the USA, the EU, Japan, the Middle East and China, respectively. It is defined as share of exports of an industrial sector or product category (j) directed towards countries ($d = USA, EU, Japan, Middle\ East, China$) affected by the crisis (the USA and/or the EU) to the total exports of that sector. I use the average exposure index for the years 1999 and 2000 with respect to each of the industrial chapter. D_{crisis} is a dummy variable, which takes a value 1 if the year is greater than or equal to 2008. All the regressions include the individual terms of the double interactions. Firm controls include age of a firm, age squared, ownership (domestic and foreign) and size indicator. I use total assets of a firm as the size indicator. Numbers in the parentheses are clustered standard errors at the industry-year level. Intercepts are not reported. *, ** and *** denote 10%, 5% and 1% level of significance.

In columns (2) and (3), I classify industries according to high and low exposure index, respectively. I classify industries as having high (low) "exposure index," if the average "exposure index" of any industry for the years 1999–2000 and 2000–01 is greater (lower) than the median "exposure index" of the entire sample (of all the manufacturing sectors). The results show that the negative effect of the drop in demand on the exports of the highly exposed industries is significantly higher than the entire sample. On the other hand, I do not find any significant effect of the decline in demand on the export earnings for those industries which have lower exposure index than the median exposure index of the sample.[29] This shows that firms who are highly exposed or integrated to the global markets are more affected by external shock(s) in comparison with others. In

[29]I also run separate estimations by dropping the large (firms belonging to 4th quartile) and small firms (belonging to 1st quartile) from the sample, respectively. The large firms are the ones which belong to the fourth quartile of the sample, whereas the small firms are the firms from the first quartile. I find no effect of either of the change in the sample on the baseline effect; it remains robust. However, the effect for the small firms (when dropping the large firms) is significantly higher than the case of big firms (when dropping the small firms). This reiterates the fact that the effect is significantly large for the most vulnerable firms in the export market(s). This also supports my earlier result in Section 5.4 on heterogeneous impact of the 2008–09 crisis.

other words, the vulnerability or the multiplier effect of the 2008–09 crisis on the highly exposed firms is significantly higher than its counterparts. Bricongne et al. (2012) using French firm-level data set also arrives at the same conclusion—high-exposure firms are more affected due to the crisis. To quantify, it can be said that around 55% of firms are adversely affected by exposure to the US and the EU markets.

I also test whether the results are robust to the exclusion of the outliers in column (4). Outliers are defined as observations for which the absolute values of studentised residuals are above two. The results indicate that even after outliers have been dropped the demand factor remains negative and significant. Lastly, I drop the energy sector—coke, refined petroleum and nuclear fuel from sample in column (5) because of the large volatility in global energy prices. This could possibly explain the collapse in export for India. I find no such evidence. As the estimate shows, dropping the energy sector does not alter my baseline finding. It continues to be negative and significant at 1% level.

8 | CONCLUDING REMARKS

This paper evaluates the impact of the drop in demand from the major importing countries of India (the USA and the EU) as a result of the 2008–09 crisis on the export performance of the Indian manufacturing firms. I show that the Indian trade collapse during the 2008–09 crisis is a result of a significant negative demand shock from its major buyers or importers, the USA and the EU, more so in the case of the USA than in the EU. The effect is robust to a series of checks where I control for both domestic and foreign government export promotion policies, role of foreign sources of finance and variety of firm-level characteristics. Durable goods are the most affected by the crisis followed by the non-durable goods. I also find that drop in demand has similar effects throughout the size distribution of the firms, that is, the small firms and the large firms are affected similarly with the effect being highest for the most vulnerable exporters or small exporting firms. The effect of the drop in demand concentrates only in case of the high-exposure industries. Finally, I do not find any evidence of trade diversion affecting the performance of the firms.

The 2008–09 global financial and economic crisis adversely affected all the major world economies. To offset the negative impact of the crisis, prudent fiscal policies by the Government of India and appropriate responses by monetary authorities helped in managing a part of the crisis. Although the policy measures are quickly in place, given the limited fiscal space and a weak channel of monetary transmission, the real sector of India, nevertheless, is impacted. However, the trade flows started to rise from 2010 onwards. Given the structure of demand, India's growth critically depends on revival of exports and investment, especially private investment. The policymakers played an important role in stimulating these by ensuring appropriate policy instruments impacting the cost of credit, exchange rate and other fiscal incentives to induce private investment in the post-crisis period.

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