Does Easing Controls on External Commercial Borrowings boost Exporting Intensity of Indian Firms?

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Abstract

Using a rich dataset of 11,612 Indian firms over the period 1988-2014 and a difference-in-differences approach, we analyse the impact of the export-oriented policy initiative, namely foreign exchange management act (FEMA) on firms' exporting activity. The results show that firms who benefited from this initiative have higher export intensity compared to matched exporting firms with only domestic sources of financing. Further, our results suggest that this effect is particularly stronger for firms that receive extra incentives in the form of government grants and subsidies including export incentives and duty drawbacks. Finally, we find that when financially constrained firms and those firms operating in vulnerable industries gain access to foreign financing, they are able to increase their export participation. Overall, easing controls on trade financing is more responsive for those firms that are smaller in size, have higher output volatility, higher import intensity, and operate in industries with greater dependence on external finance and higher inventory-to-sales ratio.

Keywords: Exporting; Financing; Indian firms; FX market liberalization

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1. Introduction

It is well established that access to financing is critical for firm exporting. As Amiti and Weinstein (2011) discuss, exports depend significantly on external finance, while several other studies document the role of external financing and credit constraints in exporting (see for example Greenaway et al., 2007; Bellone et al., 2010; Berman and Héricourt, 2010; and Minetti and Zhu, 2011). However, due to limited outward orientation on the flow of capital, lack of access to external financing became a major constraint for firms in emerging market during the 1990s hampering the acceleration of their exporting activities. As firms that are involved in foreign sales need to incur sunk fixed costs, only the most efficient and productive firms are able to export by overcoming the entry barriers (Bernard and Jensen, 1999; Melitz, 2003). Many governments in the developing world have been liberalising their capital account rigidities namely restrictions on external borrowings by firms in order to enable them to have better access to financing, which in turn will help them compete in the global market and to expand their market share and thereby increase economic activity. As illustrated through the Chinn-Ito Financial Openness Index (see Appendix; Figure A1), the presence of capital controls in emerging economies namely China and India points to rigidity in financial openness compared to advanced countries and therefore can create external credit constraints for outward oriented firms.

In the context of India, the foreign exchange management act (FEMA), which came into being in 1999 (and became effectively operational starting 2000), was a policy shift that can help us analyse the effectiveness of such liberalisation in enabling firms to access funds from abroad and in achieving greater globalisation of Indian firms during the post-1991 reform period. Liberalising foreign exchange market rules and regulations to enable access to financing will likely facilitate trade flows and overseas flow of funds. This legislation replaced the earlier more rigid regulatory regime called foreign exchange regulation act

(FERA) that remained in place since 1973. The present paper aims to provide new evidence on the response of export intensity to international transaction liberalisation. More specifically, we investigate the following questions. Has firms' export intensity reacted to the FEMA reform? Has this regulatory change had differing effects on different types of firms, such as grant recipients and non-recipients? Are financially constrained firms and those operating in financially vulnerable industries more likely to benefit from a policy change?

To answer the above questions, we rely on the FEMA policy change and use a difference-in-difference model to tease out regional developments and policy influences. We refer to exporting firms with foreign financing as treated firms and we separate them from the population of exporting firms with domestic financing (non-treated firms). The hypotheses considered can display endogeneity where exporting status might influence financing or alternatively, financing could influence export intensity. It is for this reason we consider a non-parametric method – propensity score matching (hereafter PSM) – to accommodate potential endogeneity (see Rosenbaum and Rubin, 1983; Heckman et al., 1997, 1998; Yang and Mallick, 2010; Mallick and Yang, 2011, 2013). PSM technique enables 'like-for-like' comparison and is an appropriate method to examine the relationship between foreign financing and exporting intensity through estimating how distinct the exporting firms are based on their ability to use external debt financing (i.e., those with foreign financing and those only with domestic financing)[1].

The identifying assumption for the research design is that firms that were affected by the policy initiative and the ones that were not would have trended similarly in the absence of the policy change. Figure 1 graphs the trend of export intensity among Indian firms over the

[1] We follow Leuven and Sianesi's (2003) technique to isolate exporting firms with foreign financing (treated firms) from the population of exporting firms with domestic financing (non-treated firms), and then look for control firms that best match treated firms in multiple dimensions such as firm size, profit, profit squared, collateral, collateral squared, age, age squared and industry dummies in the pre-treatment period (FEMA policy).

sample period of 1988-2014. Panel A shows an upward trend in the export share of firms after the FEMA policy became operational in 2000. Further, Panel B displays a graph which shows a rise in export share of treated firms after the policy in 2000, compared to control firms. This graph satisfies the parallel trends assumption of the model suggesting that in the absence of the reform both treated and control groups would have exhibited a similar growth trend in their export shares.

The analysis is conducted at firm-level for India as it allows us to focus on the FEMA policy change. The observation of such a unique policy experiment will help us identify the effects of the policy change on firms' export intensity. Our empirical work is based on an assessment of the policy initiative on firms' exporting activities using an unbalanced panel of 11,612 Indian firms between 1988 and 2014. This paper contributes to the existing literature in two important ways. First, we add to the exporting and financing literature in exploring how a case of financial policy intervention affects firm-level trade performance through easing capital constraints. More closely related to our work is Greenaway et al. (2007), who investigate the role of financial constraints in firms' exporting decisions. However, our focus is on an underexplored but important financial reform pursued by many developing economies: liberalization of capital account transactions. Still many developing countries continue to maintain a closed capital account. Therefore, India's foreign exchange liberalization can be used as a quasi-natural experiment to study the impact of (lowered) capital constraints on exporters, in the context of the interaction between policy intervention, financial constraints, and trade performance literature, exploring the effect of FX liberalization on the intensive margin of trade activity.

Second, this study takes its place in a burgeoning literature on firm heterogeneity and financial aid programmes (see Bernard and Jensen 2004; Görg et al., 2008, Girma et al., 2007 and Banerjee and Duflo, 2014). The main findings of this line of work are that established

exporters benefit the most and for this group of exporters the impact is stronger along the extensive margin. In this paper, we explore the role of grants and subsidies for firms that have access to foreign financing. Our motivation stems from the fact that while FEMA beneficiaries may enjoy an increase in the export intensity, the effect may be heterogeneous across firms, especially those that receive grants and subsidies. We argue that this channel may work as an amplifier whereby grant recipients further improve their export performance compared to their counterparts[2]. We further elaborate on firm-level heterogeneity by focusing on volatility at both firm and industry levels. This is likely to be of great importance since particular segments of firms have higher incentives to take advantage of these initiatives due to the degree of volatility that they are facing. We consider volatility as a measure of credit constraints as firms or industries facing higher volatility are riskier; thus, they have difficulty in obtaining external finance at lower costs (García-Vega et al., 2012).

To preview our findings, we find that the exporting intensity of firms tends to be significantly higher for those who have access to foreign external financing due to liberalisation, relative to firms without any foreign borrowing. Moreover, our results also suggest that this effect is particularly stronger for firms that receive government incentives, face higher output volatility and operate in industries that are more vulnerable. Our findings in this paper suggest a case for easing capital controls as a way forward in improving exporting activity in other countries that maintain a restrictive capital account.

This paper is structured as follows. In section two, we provide a brief review of the relevant literature. In section three, we describe the econometric modelling strategy. We present the data used in our empirical analysis along with summary statistics in section four,

[2] Grants and subsidies are given to all types of firms (both exporting and non-exporting) for different reasons. Exporting firms could receive such support in the form of subsidised export credit such as interest subsidy, import of inputs, and other incentives including duty exemptions and drawbacks when faced with currency appreciation. These export promotion schemes were always there as part of the export-import policy of the government which could be correlated with the FEMA policy and therefore this needs to be controlled for.

and we report the econometric results in section five. In section six, we subject our main models to various robustness tests and finally, in section seven we provide the concluding remarks.

2. Background literature

Policy liberalisation on capital account flows can influence the financial constraint-export relationship in a temporal sense. Caggese and Cuñat (2013) found that financing constraints reduce the aggregate productivity gains induced by trade liberalization by 25 percent by distorting the incentives of the most productive firms to self-select into exporting. Although there are empirical studies reporting a positive link between export participation (extensive margin) and the share of exports in total sales (intensive margin) along with the availability of different types of domestic financing (see Jinjarak and Wignaraja, 2016), there is little evidence in terms of whether regulatory policy shift matters in this relationship. This would require separating the sample into firms with access to (or those who use) foreign financing and those who do not have such access, especially in countries like India and China where closed capital accounts still remain in place.

It is well known that there are both static and dynamic gains from exporting – static gains resulting from access to larger external markets and dynamic gains in terms of learning from exporting and productivity gains. In other words, exporting firms derive learning-by-exporting in a dynamic sense promoting their post-entry performance, via transfer of information from international buyers and competitors (Greenaway and Kneller, 2004; Yasar et al., 2006; Crespi et al., 2008; Yang and Mallick, 2014). Also, cheaper imported inputs due to lower tariffs can raise productivity via learning, variety, and quality effects (see Amiti and Konings, 2007; Goldberg et al., 2009). For exporting to occur, cheaper imported inputs can be a key channel through which trade policy reforms and FDI inflows could influence firm-

level productivity (see for example Topalova and Khandelwal, 2011). Nevertheless, trade financing remains an important constraint for these export oriented firms who need imported raw materials and technology to enhance their productivity. Firms with access to funds from overseas may therefore outperform those firms that are financially constrained. Bandyopadhyay et al. (2015) provide evidence that there are increasing returns to foreign loans, while there are diminishing returns to foreign aid, using country-level data from 131 developing nations. Trade-related financial constraints can therefore reduce a firm's ability to finance the costs of maintaining its presence in a foreign market.

Focusing on firms rather than on country-level aggregates, Muûls (2008) analysed the interaction between credit constraints and export behaviour at firm-level. The results showed that chances of firms being exporters were more if they enjoyed lower credit constraints and higher productivity levels. Further, Bellone et al. (2010) analysed the relationship between financial constraints and firms' exporting behaviour, and showed that firms that were financially healthy were more likely to become exporters, and hence financial constraints acted as barriers to export participation. Thus, firms that had better access to external finance were more likely to start exporting.

Berman and Héricourt (2010) used a large cross-country and firm-level data of nine developing and emerging economies to study the effect of financial factors on firms' exporting decisions and exporting volumes. The results showed that firms' access to finance played an important role in their decision to enter the export market. However, better financial health does not increase the probability of a firm remaining in the exporting market. They further find that productivity is an important determinant of exporting decision of firms if firms have better access to external finance. Finally, they show that an improvement in a country's financial development has a positive impact on both number of exporters and exporters' selection process.

Manova et al. (2015) used Chinese exports data at firm-product-destination level to investigate how comparative advantage of firms reflected local credit constraints. They showed that foreign-owned firms and joint ventures displayed better export performance compared to private domestic firms, with a greater advantage in sectors with higher financial vulnerability. They further found that private Chinese firms were more successful exporters than state-owned enterprises in financially dependent industries. Using Argentine exporters' sources of financing, Castagnino et al. (2013) show that firms with better access to foreign financing export a wide variety of products and serve more distant and developed markets.

The above studies provide a useful background to setup a linkage between financial constraints faced by firms and how it influences firms' exporting decisions. In this context, policy liberalisation in India allowing greater access to foreign credit can play a role in improving external market access by Indian firms. The pro-liberalisation policies of the Government of India in enacting FEMA in the winter session of parliament in 1999 (replacing FERA) were aimed to help support foreign exchange transactions in both capital account and current account transactions to achieve greater trade and financial openness. The key objective of the act was to facilitate foreign exchange payments and acquisition/holding of FX flows, consistent with full current account convertibility and progressive liberalisation of capital account transactions. Patnaik et al. (2015) provide a detailed account of the existing regulations including recent policy changes on capital controls for foreign currency borrowing by Indian firms. Historically, Indian interest rates have always been higher than interest rates offshore that will encourage Indian firms to borrow at a cheaper rate from overseas. However, the maximum amount of ECB that can be raised without RBI approval has increased gradually since FEMA was introduced (USD 750mn or equivalent currently during a financial year). Such limit can prevent any emergence of systemic risk due to currency mismatch or excessive borrowing. Thus, the policy-shift since early 2000 could

have made a difference to exporting share of Indian firms that requires detailed empirical analysis in order to conclude whether progressive liberalisation of capital account transactions led to any beneficial effect on India's external trade via easing access to external debt market.

As for government grants, these are typically directed towards technological enhancement, can help to improve innovation activity of firms and overall productivity. Görg et al. (2008) study the relationship between government grants and subsidies and exporting activity of firms. They find that if grants are large enough, they can encourage already exporting firms to have competitive advantage in the international market. In this paper, we argue that in addition to increased productivity and effectiveness of firms, government grants and subsidies can also encourage firms with foreign financing to remain in the exporting market as compared to firms without any government grants and subsidies. The government of India introduces different incentives to boost exports from time to time, when the country experiences decline in exports in the wake of sharp currency appreciation, in the form of interest subsidy on loans or export subsidy on shipments. Exporters can be given full or partial refund of any import duty, if they paid on imported materials used in the manufacture of exported product. We therefore consider this dimension to explore any heterogeneity by separating firms that have access to grants and subsidies.

Further, we also focus on volatility at both firm and industry levels. Some recent studies by Comin and Philippon (2005), Davis et al. (2006) and Buch et al. (2009) have focused on the evolution of firm-level volatility over time. As volatility can adversely affect firms' performance, its access to external finance can mitigate any adverse impact on exporting performance. Therefore, greater access to trade financing by firms in countries with capital account restrictions can make a difference to the exporting intensity of firms. Paravisini et al. (2015) suggest that credit shortages can hamper exports as the variable cost of production

increases rather than the sunk entry costs. Theoretically, Eck et al. (2015) show that internationally active firms intensively use cash-in-advance financing because it serves as a quality signal and reduces the high uncertainty related to international transactions. Such trade credits come from a foreign buyer to an exporter as small size advances rather than bigger loans from the international debt market that can help exporting firms to meet their expenses towards imported intermediate inputs and technology (machinery and equipment imports). Therefore, the dataset used in this paper can help us assess whether this type of capital account liberalisation for the outward-oriented firms improves firm participation in the global market.

3. Empirical Methodology

We study the impact of FEMA act on firms' export share using a propensity-score matching difference-in-differences (PSM-DID) estimator in line with the literature in program evaluation and export promotion (see Görg et al, 2008; Martincus and Carballo, 2008 and Cadot et al., 2015). In doing so, we compare the export share of firms before and after the policy liberalisation across firms that had access to foreign financing (treated firms) and firms with domestic financing (non-treated group). As Görg et al. (2008) note, this combined estimator allows to purge all time invariant unobserved effects from the specification. We employ Leuven and Sianesi's (2003) PSM procedure and use three different matching techniques as implemented by Martincus and Carballo (2008) and Mallick and Yang (2013).[3] The idea is to isolate the treated firms, and then from the population of non-treated firms, find observations that best match the treated firms on multiple dimensions. Matching is based on a

[3] These matching techniques are kernel matching (each treated firm is compared to all non-treated firms within an area around the propensity score inversely weighted by the difference between their propensity scores and that of the relevant treated firm), radius matching (each treated firm is compared to all firms within a certain radius around its propensity score) and nearest neighbour matching (each treated firm is compared to the most similar non-treated firm).

rich set of firm-level covariates[4], such as size, profit, profit squared, collateral, collateral squared, age, age squared and industry dummies using the average pre-treatment values (12 years before the policy was introduced) to control for endogeneity as firm variables are likely to be endogenous to the financial choices made by firms.

3.1 Matching Technique

To apply the PSM technique, a logit model – where the dependent variable is a dummy for firms using ECB financing and the regressors are firm characteristics – is estimated. The probability (propensity score) that each company uses foreign financing is derived and used to determine the matched treated (foreign financing) and non-treated (domestic financing) samples. Instead of regressing exporting on FEMA regulation enabling financing access in the whole sample, the average effect of the regulatory change with foreign financing on exporting in the matched samples (also known as the average treatment on treated effect; hereafter ATT) is estimated. The magnitude of difference in exporting pattern between the treatment (companies using foreign financing) and a control group (companies with domestic financing) is then derived. Across all the different matching methods, the average exporting performance differs between companies with foreign financing and those without such financing. Importantly, this difference is statistically significant. In Table 1 all the matching methods show that there is significant difference between companies with access to foreign borrowing and the ones with no foreign financing.

Quality of matching:

It is possible that the above results on matched firms could be biased if the quality of matching is poor. An important assumption of this PSM-DID estimator is that there is sufficient overlap in the distribution of propensity scores between the treatment and control

[4] Matching variables include firm size calculated as natural logarithm of total real assets, profit is measured as the ratio of profit after tax to total assets, collateral is the ratio of net fixed assets to total assets and age refers to the number of years of establishment from the current year.

groups in order to find matches for all or most treated firms. We therefore have conducted the tests on the quality of matching obtained. Propensity score test implemented in our analysis helps us find whether the firm characteristics are similar between matched treated and control groups, allowing an adequate `like-for-like' comparison between two groups. We test the equality of the given firm characteristics between matched treatment and control groups and confirm whether there is significant difference between these two groups in terms of their characteristics using t-tests after matching. The quality of matching appears good as the covariates are not significantly different between matches obtained, suggesting there is an adequate `like-for-like' comparison in the matching exercise, as the p-value of the difference between treatment and control is above 10% (see Table 2).

In addition, we also plot the propensity score histogram of matched treated and control firms (see Figure 2) showing similarity of treated and control firms who have similar "propensities" or likelihoods for receiving treatment, conditional on a set of key covariates. The propensity scores show a similar distribution across treatment and control groups with a reasonably high rate of overlapped propensity scores between treated and control firms, as most control firms (with propensity score below 0.4) are able to find a matched treated firm having similar propensity score. Also Figure 3 compares the treated and control firms, showing little bias for each explanatory variable in the matched samples relative to the raw (unmatched) sample, while Figure 4 shows the histogram of the biases across all variables, again showing little bias (in %) for the matched samples. Therefore, the quality of matching is appropriate to draw the conclusion that foreign financing is a key determinant of higher export share– a result that remains robust in both parametric and non-parametric analysis.

3.2 Baseline Model

In order to establish whether the FEMA policy intervention has had any impact on firms' export intensity, we estimate the following baseline model[5]:

$$Export/Sales_{it} = a_0 + a_1 Treat_i + a_2 FEMA_t + a_3\, Treat_i * FEMA_t + a_4 \mathcal{X}_{it-1} + a_5 Z_{it} + e_{it} \qquad (1)$$

where i = 1, 2, …., N refers to the cross-section of units (firms in this case) for time period t = 1, 2, …., T. The dependent variable is the firm-level export share, measured by the ratio of exports to total sales (%) (see Greenaway et al., 2010). $Treat_i$ is a dummy which takes a value of one for the firms which used external commercial borrowing (ECB) in the period of 1988-2014[6]. $FEMA_t$ is a time dummy which takes a value of one for the policy period during 2000-2014, and zero otherwise. The DD coefficient of $Treat_j * FEMA_t$ provides the policy effect. The point estimate measures the impact of the policy on the export share of firms with access to external borrowing in comparison to the firms with access to only domestic borrowing. The models are estimated with firm fixed effects to control for unobserved heterogeneity. In addition, the models include time fixed effects to control for cyclical factors originating from the business cycle. We also cluster standard errors at the firm level as the observations over time might be correlated within firms. Finally, $\mathcal{X}$ and Z are vectors which include other explanatory variables at both firm and aggregate levels, respectively and e_{it} are the disturbance terms. All time-varying firm-level variables are lagged by one period to reduce possible simultaneity problems.

Vectors $\mathcal{X}$ and Z include various factors from the literature that are found to influence firm-level exports. Firms' decision to export is based on a combination of sunk cost and firm-

[5] Following Martincus and Carballo (2008), the main results are based on the kernel matching method with a bandwidth of 0.04. The main concept of this method is that the control observations are assigned more weights if they are closer to the propensity score of a treated observation and lower weights on more distant observations (Caliendo and Kopeinig, 2008).

[6] We also used an alternative treated group of firms that did not have access to ECB in the pre-reform period of 1988-1999 but had access to ECB during the reform period of 2000-2014. The results were qualitatively and quantitatively similar to the results in our main models.

level factors (Melitz, 2003). Exporting is associated with additional upfront expenditures that make production for foreign markets more dependent on external financing. Sunk costs of trade involve collecting information about the profitability of potential export markets, setting up and maintaining foreign distribution networks, making market-specific investments in capacity, product customization and regulatory compliance (Manova, 2013).

To begin with firm specific characteristics, *Firm size*, measured as real total assets, is an important determinant of exports. Firms that are larger in size are able to cope well with financial constraints and have greater access to external finance, which is necessary to finance the sunk and fixed costs of exports (Cheung and Sengupta, 2013). *Wages* are measured by the real wage bill. This variable controls for systematic differences between firms in terms of human capital (Bellone et al., 2010). *Total factor productivity (TFP)* of firms is included as the natural logarithm of TFP and is calculated using the Levinsohn and Petrin's (2003) methodology that is further developed by Petrin *et al*. (2004). TFP captures the efficiency of the firms. Efficient firms are more likely to handle unfavourable movements in exchange rates and output levels. Also, productivity of firms is one of the important determinants of export market decision as more productive firms are less likely to exit the market (Görg and Spaliara, 2013; Mallick and Yang, 2013). *GDP growth* is a proxy for the overall economic development of a country (Manova, 2013). Finally, *REER volatility* refers to the exchange rate uncertainty at the macro-level. Using monthly real exchange rate series[7], a GARCH (1,1) model is implemented and the monthly measures are annualised to match the frequency of the panel data (Caglayan and Demir, 2014)[8]. Movements in exchange rate can affect the profits of firms and hence, firms are more likely to reduce exports in order to

[7] Real exchange rates are more accurate and superior indicators of changes in competitiveness which are calculated after correcting for the movements in nominal exchange rates for inflation differentials. Effective exchange rate changes are not measured against one particular currency, but instead use an average index of a whole basket of currencies, each weighted according to the issuing countries' respective importance as a trade partner.

[8] This measure resembles the volatility clustering which is often found in high frequency financial series (Caglayan and Demir, 2014).

minimise the risk exposure in the absence of hedging incentives (Hooper and Kohlhagen, 1978; Kawai and Zilcha, 1986).

3.3 Access to grants and subsidies

In this sub-section we test whether all firm types are equally affected by the FEMA policy change. We use receipt of grants and subsidies as a sorting device because government grants and subsidies are aimed at improving firms' exporting activities and thus can encourage those with foreign financing to promote their exporting share as compared to firms without any government grants and subsidies.

Given that our objective is to verify whether there is a differential effect of policy intervention on the export intensity of recipients and non-recipients, we augment the above model with interactions between the policy effects and a dummy variable indicating grant receivers. This exercise is based on the consideration that grant beneficiaries tend to face less asymmetric information problems, have better access to external financing and will be better equipped to take advantage of the policy change. If this hypothesis were true, when FEMA takes place, we should expect grant recipients to respond stronger to export intensity compared to their counterparts. Formally, we estimate the following model:

$$Export/Sales_{it} = a_0 + a_1 Treat_i + a_2 FEMA_t + a_3\, Grant\_recipient_{it} + a_4 Treat_i * FEMA_t + a_5 Treat_i * FEMA_t * Grant\_recipient_{it} + a_6 FEMA_t * Grant\_recipient_{it} + a_7 Treat_i * Grant\_recipient_{it} + a_8 X_{it-1} + a_9 Z_{it} + e_{it} \quad (2)$$

where 'Grant recipient' is a dummy variable that takes value one for firms that have access to such grants and subsidies[9]. The main term is the triple interaction coefficient of $Treat_j * FEMA_t * Grant\_recipient_{it}$ which measures the impact of the policy on the export share of firms with access to government incentives and foreign external borrowing with respect to

[9] In our dataset, grants and subsidies are defined as "any assistance received by a company from the government in cash or kind for its compliance with certain conditions in the past, or its agreement to comply with certain conditions in the future. Government grants do not include those firms which cannot be reasonably valued, and which cannot be distinguished from the normal trading transactions of the enterprise."

the firms with access to only domestic borrowing. There is a considerable literature highlighting the effectiveness of export subsidies in developing countries (Low, 1982; Arslan and Van Wijnbergen, 1993; Moreira and Figueiredo dos Santos, 2001). However, the results from these industry-level studies are conflicting and the overall verdict is negative. Studies on firm-level analysis of export subsidies are scarce for developed countries and almost non-existent for developing countries. Bernard and Jensen (2004) study the effect of export subsidies on exports of US firms. They find an insignificant impact of subsidies on exports. Recently, Görg et al. (2008) analysed a sample of 11,730 manufacturing firm-year observations in Ireland over the period 1983–2002 and concluded that large enough grants aimed at improving investment in technology, training, and physical capital are generally effective in increasing total exports of already exporting firms.

Studies such as Görg and Strobl (2007) and Girma et al. (2007) provide evidence that grants can be effective. Government grants, which are directed towards technological enhancement, can help to improve innovation activity of firms and overall productivity. In this paper, we further argue that in addition to increased productivity and effectiveness of firms, government grants and subsidies can also encourage firms with foreign financing to remain in the exporting market as compared to firms without any government grants and subsidies. The government of India introduces different incentives to boost exports from time to time, when the country experiences decline in exports in the wake of sharp currency appreciation, in the form of interest subsidy on loans or export subsidy on shipments. Exporters can be given full or partial refund of any import duty, if they paid on imported materials used in the manufacture of exported product.

3.4 Accounting for financial vulnerability

In this sub-section, we investigate the impact of policy on export intensity of financially constrained firms and firms those are affiliated with vulnerable industries with better access

to foreign financing. Specifically, we examine if firms and industries facing different levels of volatility within the treated group exhibit different sensitivities to their exporting shares after the FEMA act was implemented as compared to control firms. We argue that when financially constrained firms and firms operating in vulnerable industries gain access to external borrowing, they are able to cover the variable trade costs and expand their sales to foreign markets. We consider volatility as a measure of credit constraints as firms or industries facing higher volatility are more risky; thus, they have difficulty in obtaining external finance at lower costs (García-Vega et al., 2012). Credit constraints distort the level of firm exports as firms lower their export quantities in order to reduce the amount of external capital they need for variable costs (Manova, 2013). We anticipate, therefore, the impact of the policy change to be more pronounced for financially constrained firms and those operating in financially vulnerable industries. In order to test this hypothesis, we interact the policy effect with a dummy variable indicating financial constraints as follows:

$$Export/Sales_{it} = a_0 + a_1 Treat_i + a_2 FEMA_t + a_3 Cons_{it} + a_4 Treat_i * FEMA_t * + a_5 Treat_i * FEMA_t * Cons_{it} + a_6 FEMA_t * Cons_{it} + a_7 Treat_i * Cons_{it} + a_8 X_{it-1} + a_9 Z_{it} + e_{it} \quad (3)$$

where the *Cons* dummy takes value one for volatile firms or industries if measures of volatility at firm- or industry-levels are above the 50th percentile of the distribution for all firms in the sample period, and zero otherwise. Firm volatility is measured by output volatility calculated as the squared residual of a regression of sales growth on its own lagged values and a set of time fixed effects (Buch et al., 2009a)[10]. Industry volatility is measured using Braun (2005) and are based on data for all listed US-based companies from Compustat's annual industrial files. External finance dependence is the share of capital expenditures not financed with cash flows from operations and is averaged over 1988–2014

[10] These regressions help to avoid growth rates from autocorrelation dynamics and from macroeconomic development affecting all firms uniformly. Thus, this measure gives a 'conditional' idiosyncratic volatility of output growth.

for the median firm in each industry. Rajan and Zingales (1998), Braun (2005) and Kroszner et al. (2007) argue that this measure captures a large technological component that is innate to the manufacturing process in a sector and are thus good proxies for ranking industries in all countries. Once again, the main variable is the triple interaction coefficient of $Treat_j * FEMA_t * Cons_{it}$ which measures the impact of the policy on the export share of vulnerable firms or firms operating in vulnerable industries with access to foreign external borrowing compared to the firms with access to only domestic borrowing.

4. Data and summary statistics

4.1 The dataset

We construct our dataset from profit and loss and balance sheet data assembled by Centre for Monitoring Indian Economy (CMIE) in their Prowess database. CMIE is a private research organisation in India which collects data and makes it available through Prowess. The Prowess database covers large and medium-sized Indian firms with detailed information on over 25,346 firms. The majority of the companies incorporated in the database are listed on stock exchanges[11]. In addition, data for the macroeconomic variables are drawn from the World Bank database.

Following normal selection criteria, firm-years with missing values for export sales and other control variables in the main models are excluded from the data[12]. In addition, observations in the 1% from upper and lower tails of the distribution of the financial variables are excluded to control for outliers. Finally, the panel has an unbalanced structure with 80,996 observations and a matched sample of 50,779 observations for the period of 1988-

[11] See www.cmie.com for more information on the Prowess database, which has been widely used in several studies such as Majumdar and Sen (2010) and Mallick and Yang (2013).
[12] The sample includes firms with zero exports.

2014 from three broad industries such as non-finance companies, non-banking finance companies and banking companies.

4.2 Summary statistics

Table 3 provides the summary statistics for all the variables, distinguishing between treated and control groups both before and after the introduction of the FEMA policy liberalisation on capital account transactions. We report values for the whole sample (column 1); treated and control groups before the FEMA (columns 2 and 3); treated and control groups after the FEMA (columns 5 and 6). We also report p-values for the test of equality of means between treated and control groups before FEMA (column 4) and after FEMA (column 7). We begin by analysing the level of export share in the two groups before the policy period. We do not find any significant difference in the level of export share between treated and control firms. However, the export share has increased for the treated group in the post-FEMA policy period or after the policy was initiated[13]. With respect to firm-level variables before the policy, treated firms are larger, pay higher average wage, have greater productivity, face higher industrial volatility. Moving to columns 5 and 6, there is a significant difference in the mean values of all variables for treated and control groups at the 5% level. More specifically after the policy, treated firms have a higher export share, are larger in size, pay higher average wage, face lower exchange volatility, receive more grants and subsidies, and face lower firm-level and industry volatility as compared to control firms.

Taken together, two main points can be highlighted from the summary statistics. First, the export share has increased for the treated firms after the introduction of the FEMA policy. Second, firms with access to external borrowing (treated firms) are financially healthy and more productive compared to firms with access to domestic credit only (control firms) after

[13] The increase in the export share, ratio of total exports to total sales, is not due to any decline in total sales. Figure A2 given in Appendix shows an upward trend in the graphs for both sales to income ratio and net sales for the period of 1988-2014.

the introduction of policy. The following sections provide formal regression tests on the relationship between the policy initiative and firms' export share.

5. Empirical results

5.1 Baseline model

Results for the baseline model are reported in Table 4. The main variable of interest is *Treat*Fema*, which captures the impact of the policy on the treated firms as compared to control firms. This variable shows a positive and significant coefficient, implying that after the introduction of the FEMA policy, firms with access to ECB were able to expand their exporting intensity as compared to firms with access to domestic borrowing only (control firms). We calculate the magnitude of this coefficient in percentages by dividing the coefficient value (marginal effect) with the predicted probability of the model. We find that the introduction of the policy increased the firm-level exports within the treated group by 24.56%[14]. This result confirms our hypothesis that after the financial reform firms' export performance improved significantly. Moreover, this finding speaks directly to the literature on financing constraints and trade performance. Berman and Héricourt (2010) and Besedeš et al. (2014) show that credit constraints affect the extensive, not intensive, margin of export activity. Our results are valuable in light of the above studies as our finding suggests that firms which have access to foreign borrowing are likely to face lower financial constraints, are less subject to distortions and hence are able to expand further in terms of global sales. Further, this finding is supported by the evidence shown in Manova et al. (2015) which argue that multinational firms have better export performance than private domestic firms due to access to funding from foreign capital markets.

[14] This is calculated as follows: dividing the coefficient of 3.614 with the predicted probability of this model (14.71) implies an increase of 24.56%.

Coming to our control variables, real wage shows a positive and significant effect on export share which implies that firms that are intensive in human capital are more likely to go abroad (Bellone et al., 2010). Finally, all other control variables show an insignificant effect on export share.

5.2 Access to grants and subsidies

In this section, we focus on the impact of access to foreign financing on the level of exports for the recipients of grants and subsidies. The results are reported in Table 5. The estimation results of the main variable of interest '$Treat_j * FEMA_t * Grant\_recipient_{it}$' show that firms which receive grants and subsidies within the treated group (i.e., they have access to foreign financing) are able to significantly increase their export share compared to similar firms in the control group[15]. In economic terms, after the introduction of the policy, firms that received grants in the treated group were able to increase their export share by 65.25%. This is a novel finding that highlights the link between export promotion policies and financial reforms. When a financial reform, such FEMA, takes place, which was found to increase export intensity, we find that grant receivers further improve their export performance. It is important to note that grants and subsidies per se have not always been effective in improving intensive margin of exports, although export promotion incentives that have been given to treated firms since FEMA was introduced turned out to be more effective in the post-FEMA period. As far as we are aware, this is the first paper to make this point, since we document the amplification channel through which grant receivers enjoy better performance compared to non-receivers in the post-reform period.

5.3 Accounting for financial vulnerability

In this section, we take into account financial vulnerability at the firm and industry level. The results are reported in Table 6. Column 1 reports results for firm-level volatility,

[15] The interaction term of Treat*FEMA is dropped from these regressions due to high correlation with the main variable Treat*FEMA*Grant_recipeint.

followed by column 2 for industry-level volatility. The estimation results in column 1 show that when firms facing higher volatility receive foreign financing, they are able to expand their export share as compared to similar firms within the control group. Further, estimation results in column 2 indicate that firms operating in more-risky (or highly volatile) industries perform better in terms of export share when they gain access to external finance, compared to control firms. These results are in line with earlier studies that show that firms which have access to external financing benefit more in terms of trade performance compared to other firms. Manova et al. (2015) highlight that foreign affiliated firms are able to outperform the domestic firms specifically when those domestic firms face higher trading costs. They also show that firms with foreign affiliations have better export performance in financially vulnerable industries as they have access to foreign capital markets. Thus, availability of outside capital plays an important role when markets face higher trade costs and exporters require more external finance to meet these costs.

In economic terms, we find that higher volatile firms with greater access to foreign financing are able to increase their export share by 25.36% after the introduction of FEMA. Further, when firms operating in more volatile industries gain access to external financing, they are able to expand their exporting intensity by 15.41%.

6. Robustness tests

6.1 Placebo test

We make allowance for the fact that there is divergence in the export-share trend between the treated and control firms since 1997 as shown in Figure 1(b). Therefore, it is possible that our results are influenced by some pre-policy trends. To verify if this underlying trend had any effects on our results, we conducted a difference-in-differences estimation for the pre-

policy period of 1988–1999, as in Imberman and Kugler (2012) and Bose et al. (2017).[16] Particularly, instead of policy taking place in 2000, it is assumed that it took place in 1997.[17] If there are any pre-policy trends affecting our results, then we should get a positive impact of the policy on the export share. On the other hand, if we fail to recognise any significant effects for these placebo time periods, then this lends support to the reliability of the chosen treatment period.[18]

Table 7 presents the results, which show an insignificant effect of the policy on the export share. Further, we do not find any significant effect of the policy on firms receiving grants and subsidies. Finally, no significant effect of the policy is found on the export share of volatile firms and firms operating in volatile industries within the treated group. In sum, this confirms the validity of our difference-in-differences identification strategy used in the main models.

6.2 Controlling for contemporaneous events

It is likely that the treated and control firms are affected by the contemporaneous economic and financial events that occurred during the sample period of 28 years. For example, India initiated its economic liberalisation policy in 1991-93 and reduced the tariff and interest rates, ended public monopolies, and allowed automatic approval of FDI. The second phase of liberalisation was during 1998-99 and there was a global financial crisis in 2007-09. We note that we have already made an attempt to control for this issue in our econometric modelling strategy. Specifically, our results are obtained from regressions with time fixed effects, which remove macro-economic shocks such as the ones mentioned above.

[16] We employ another quantitative test for pre-trends by using lags/leads as used by Autor (2003). The results remain unchanged to our main models.

[17] In other words, these time periods are chosen at random and the true effect for these years is known to be zero. Difference-in-differences tests are also performed for the periods 1996 and 1998. The results show almost similar results both quantitatively and qualitatively as the 1997-1999 reform period.

[18] All the models include time dummies to capture any trends prior to the treatment that would not be picked up by other variables.

However, we take further steps to account for omitted variable bias by controlling for all these major events and further interact all these events with the *Treat* dummy.

The results are shown in Table 8 that are in line with the results reported in Tables 4 to 6. The results confirm a positive effect of the policy on the export share of firms with foreign financing. This result is more sensitive for the firms that have access to grants and subsidies. Further, these results show that constrained firms and firms operating in vulnerable industries within the treated firms are able to increase their export share after the introduction of the policy compared to control firms. Hence, we conclude that our results are not affected when we include other economic events in our main models.

6.3 Alternative treated group

In our main models, treated firms are defined as the firms that have access to ECB anytime during the sample period of 1988-2014. It is likely that our results are biased due to the definition of the treated group. Hence, in this section, we define the treated firms as per the eligibility of firms to use ECB. Treated group includes firms that are eligible and have used ECB, while the control group includes firms that are eligible but do not use ECB during the sample period.

Table 9 gives the results and show a significant effect of the policy on the export share of firms with foreign financing. Further, we find that this result holds for the treated firms that received grants and subsidies compared to the firms with only domestic financing. Finally, we find that volatile firms benefit from the policy in terms of their export share compared to the firms with domestic financing. Thus, we confirm that our results are robust to an alternative treated group.

6.4 Endogeneity concerns

To control for endogeneity due to simultaneity bias, we take the average of the pre-treatment characteristics and allow them to flexibly vary through time. These firm-level averages are then interacted with time trends to allow for proper pre-treatment controls that are not absorbed by firm fixed effects. Table 10 provides these results that confirm the results of our main models. The results show that firms that receive foreign financing are able to increase their export share compared to firms with domestic financing. Further, this result holds for the firms which receive grants and subsidies. Finally, volatile firms and firms in volatile industries benefit from these policies in terms of their increased export share. In sum, we conclude that our findings are robust to endogenous regressors.

6.5 Alternative matching estimation

In this section we use a different matching technique namely radius matching. One could argue that the matching is poor as the closest neighbour may be too far. To deal with these concerns, one can impose a propensity score caliper requirement. The caliper draws the maximum distance between the matched firms in treated and control groups that is closest in terms of the propensity score. Following Mallick and Yang (2013), caliper is done with radius matching to avoid bad matching. Radius matching uses not only the nearest neighbour within each caliper but all the comparison members within the caliper, and it allows for usage of extra (fewer) units when good matches are not available (Caliendo and Kopeinig, 2008). Matching is done on the pre-treatment values of firm size, profit, profit squared, collateral, collateral squared, age, age squared and industry dummies, with caliper of 0.04 (Martincus and Carballo, 2008).

The results are given in Table 11 and are in line with the main results. We find that the FEMA policy had a positive impact on the export share of firms with access to foreign borrowing as compared to the firms with domestic financing. Next, we find that firms that are

recipients of grants and subsidies within the treated group are able to increase their export share after the policy initiative. Finally, we find that when financially vulnerable firms and firms within vulnerable industries achieve access to external financing, they benefit by increasing their participation in the exporting market. Thus, we confirm that our results are robust to an alternative matching technique, which also indicates the validity of the treated and control groups in our main models.

6.6 Alternative measures of financial vulnerability

In this section, we use alternative measures of financial constraints at firm-level and industry level. Firm-level constraints are measured by firm size and import intensity. Firm size is defined as the real total assets. Smaller firms have less access to external finance, as they are more dependent on short-term bank financing, compared to larger firms. Import intensity is defined as the percentage of imported raw materials consumed. This measure captures the extent of credit constraints of firms with respect to variable costs of imported intermediate goods. Following Manova et al. (2015), we use inventory-to-sales ratio as a different measure of industry-level volatility and is calculated using the data for all listed US-based companies from Compustat, averaged over 1988–2014 for the median firm in each industry. This is a proxy for the duration of production cycle and the liquidity required for maintaining inventories and meeting demand.

Column 1 in Table 12 reports results for smaller firms; column 2 provides results for firm-volatility measured by import intensity, followed by column 3 for inventory-to-sales ratio. The results show that smaller firms, firms with higher costs and firms operating in constrained industries are more likely to increase their export share when they receive foreign financing compared to the firms that receive only domestic finance. Hence, we conclude that our results are robust to alternative measures of financial vulnerability.

7. Conclusion

Using a non-parametric matching analysis, this paper has shown that firms with foreign financing tend to have higher exporting intensity relative to firms with only domestic sources of financing. Despite greater globalisation of Indian firms in the last two decades, their access to international debt market remains restricted and there has been limited focus on the impact of this dimension in the literature. It is likely that firms with foreign financing tend to have better production and innovation networks with overseas market participants, which could explain why these firms do better in their exporting intensity.

This paper therefore extended the literature on the relationship between exporting and the external financing access in the context of a large emerging market economy using a dataset comprising of 11,612 firms from India over a sample period of 28 years. The results show that firms that had access to foreign credit after the introduction of FEMA were able to increase their export share. We also find that this relationship is more sensitive for firms that receive government grants and subsidies.

Further, we explore that financially vulnerable firms and industries are able to benefit more from foreign financing compared to their less vulnerable counterparts during the FEMA regime. The policy paradigm shift in the early 1990s from a controlled regime of import substitution, and the subsequent gradual liberalisation of capital account transactions in the early 2000s towards private debt flows have indeed been effective in enabling access to the much-needed overseas financing in order to make Indian exporters gain competitive advantage in increasing their export intensity. Thus, this paper suggests that countries that maintain a restrictive capital account can improve their exporting activity by easing capital controls. Our causal inference in this paper indicates that better access to foreign financing (both long- and short-term) particularly for small- and medium-sized enterprises (in managing exchange rate risks) will help boost exporting activity in low-income countries.

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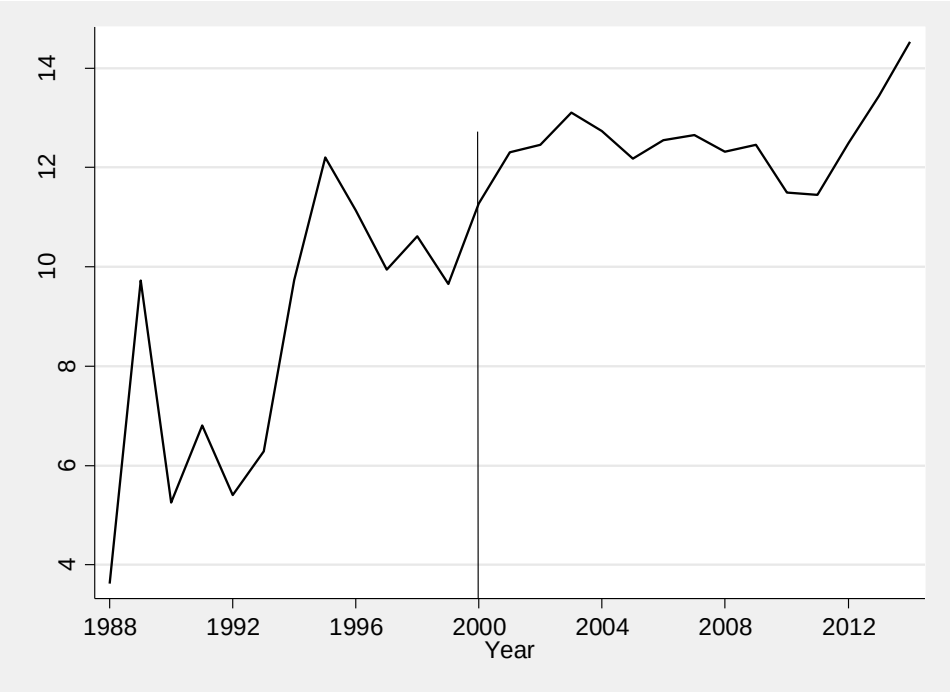
Figures

Figure 1:

(a) Share of exports (%) for the period of 1988-2014



(b) Export share (%) of treated and control firms

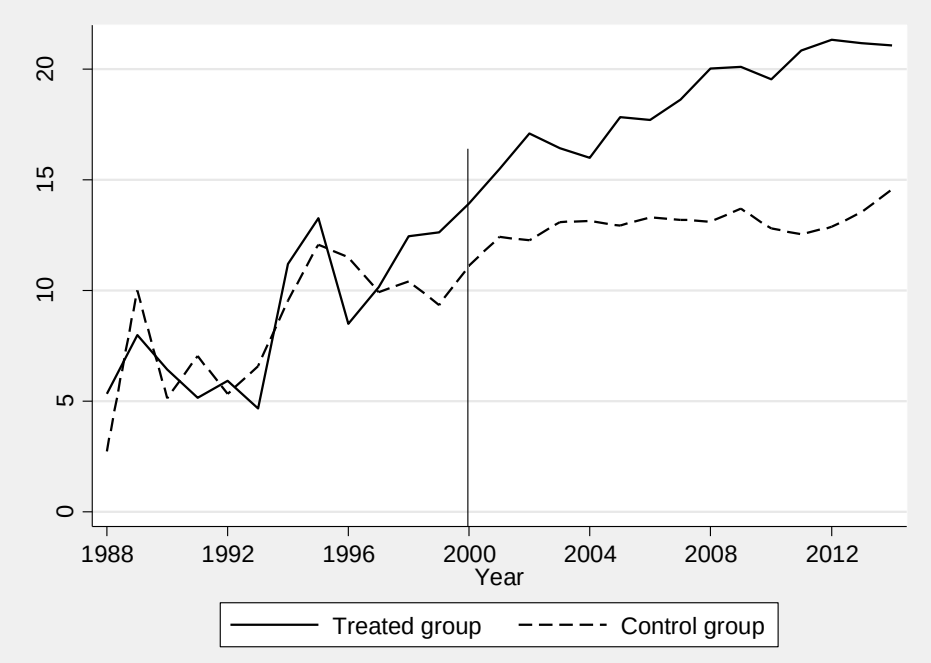
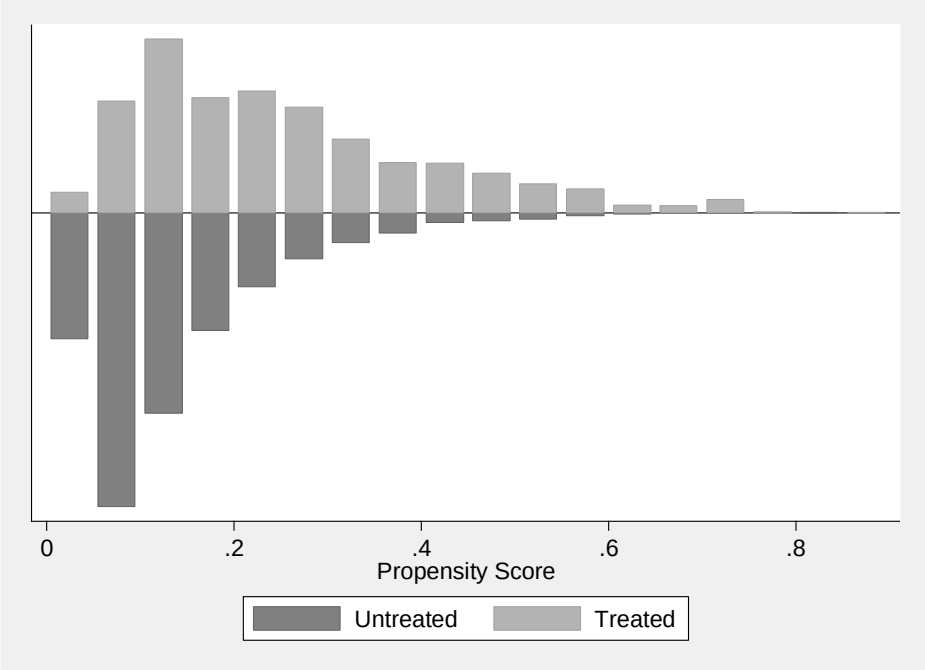


Figure 2: The propensity score histogram of matched firms



Notes: Matching method used is kernel. `Non-treated' and `Treated' are firms in the control group and treatment group, respectively. Exporters with foreign financing are in the treatment group, while exporting firms with domestic financing are in the control group.

Figure 3: Dot chart showing standardised % bias for each covariate before and after matching

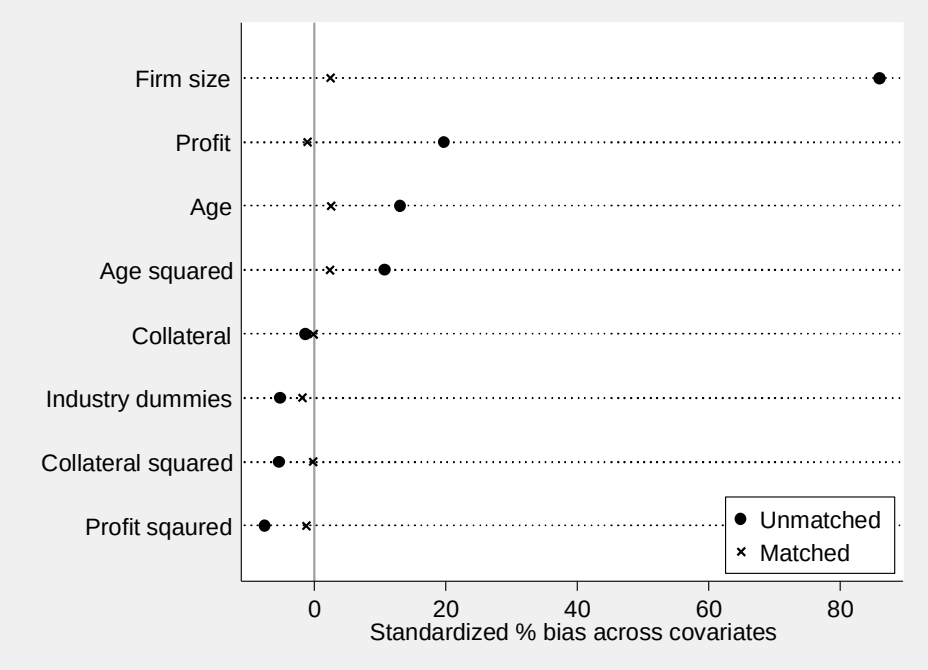
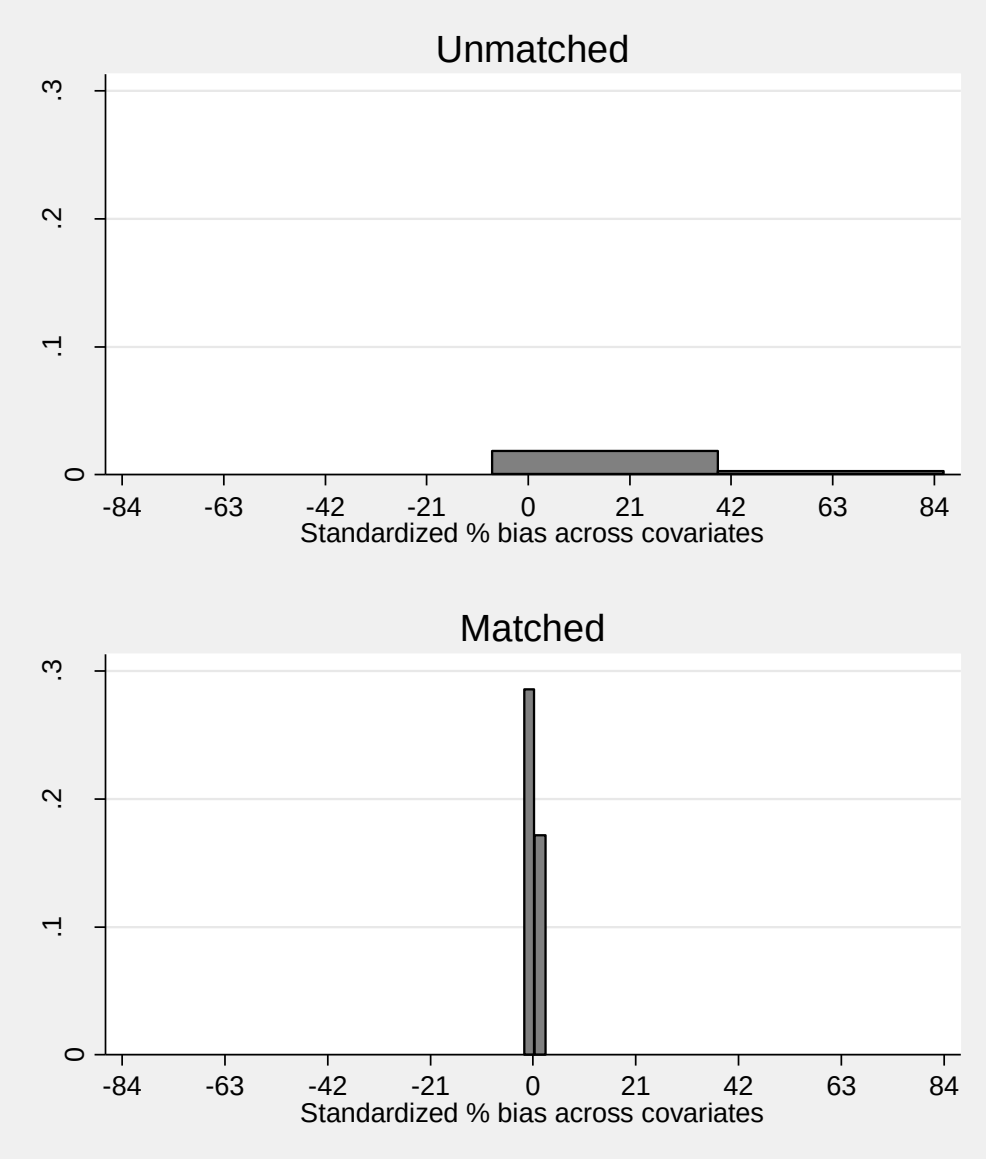


Figure 4: Histogram showing distribution of standardised % bias before and after matching



Tables

Table 1: Exporters' Foreign financing versus Domestic Financing

	Unmatched Difference	**ATT Difference**	**T-statistic (ATT)**	**N(treated)**	**N(control)**
Kernel matching	5.254	3.706	10.57	8,102	42,677
Radius matching	5.254	3.774	10.79	8,102	42,677
One nearest neighbor matching	5.254	3.774	10.79	8,102	42,677
Two nearest neighbor matching	5.254	3.774	10.79	8,102	42,677
Three nearest neighbor matching	5.254	3.774	10.79	8,102	42,677
Four nearest neighbor matching	5.254	3.774	10.79	8,102	42,677
Five nearest neighbor matching	5.254	3.774	10.79	8,102	42,677

Notes: The results are based on three different matching methods, including kernel matching, radius matching and nearest neighbors matching. `ATT' refers to the average treatment effect for the treated in terms of outcome variables, namely exports to sales ratio. `t-stat (ATT)' is the t-ratios of the average treatment effect. `Treated' and `Control' are the number of firms in the treated (exporters with foreign financing) group and matched control (exporters with domestic sources of financing) group, respectively.

Table 2: Balancing properties of matched firms

	Mean		**T-test**	
Variable	**Treated**	**Control**	**t**	**p>t**
Profit	0.033	0.033	-0.75	0.452
Profit squared	0.006	0.006	-1.01	0.314
Collateral	15.731	15.742	-0.09	0.927
Collateral squared	303.01	303.66	-0.15	0.883
Age	38.405	37.963	1.60	0.110
Age squared	1787	1745.7	1.49	0.137
Size	2.636	2.599	1.51	0.132
Industry dummies	24.798	25.038	-1.20	0.232

Notes: Matching method: kernel `t-test' is the t-test to the equality of given firm characteristics between treated (exporters with foreign borrowing) and control (exporters with domestic borrowing only) firms.

Table 3: Summary statistics for other explanatory variables

		FEMA=0			FEMA=1		
Explanatory Variables	**Whole sample**	**Treated**	**Control**	**p-value**	**Treated**	**Control**	**p-value**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Export/ Sales (%)	12.27 (24.89)	11.10 (22.68)	9.99 (23.18)	0.295	18.30 (28.81)	11.57 (24.45)	0.000
Firm Size	26.52 (69.97)	66.93 (149.40)	13.58 (48.87)	0.000	81.78 (135.61)	19.26 (50.17)	0.000
Real wage	1.05 (2.21)	2.09 (3.29)	0.54 (1.46)	0.000	2.78 (3.55)	0.83 (1.86)	0.000
Total Factor Productivity	1.57 (1.08)	1.98 (1.03)	1.85 (1.05)	0.005	1.56 (1.16)	1.54 (1.07)	0.199
GDP growth	7.24 (2.20)	6.94 (1.64)	7.00 (1.63)	0.406	7.11 (2.20)	7.27 (2.24)	0.000
REER volatility	21.20 (21.47)	17.22 (10.35)	17.55 (10.03)	0.498	20.25 (21.30)	21.58 (22.02)	0.000
Grant recipient	0.23 (0.42)	0.28 (0.45)	0.29 (0.46)	0.499	0.25 (0.43)	0.22 (0.42)	0.000
Firm volatility	0.22 (1.24)	0.07 (0.12)	0.29 (1.01)	0.086	0.14 (0.94)	0.23 (1.28)	0.000
Industry volatility	12.90 (11.21)	13.52 (11.94)	11.99 (10.11)	0.002	12.72 (10.24)	12.98 (11.40)	0.045
Number of Observations	80,996	530	4,284		9,385	66,797	

Notes: The table presents sample means with standard deviations in parentheses. The p-values of test of equalities of means are reported. Treated firms are the ones that have access to external commercial borrowing (ECB) anytime during the period of 1988-2014. Control firms are the matched firms using the Kernel matching technique. FEMA is a time dummy that takes value one for the reform period from 2000-2014 and zero otherwise. Firm size: Natural logarithm of real total assets. Wages: Natural logarithm of total wage bill. Profit: Profit after tax/ Total assets. Total factor productivity (TFP): Natural logarithm of TFP measured by the detailed specification introduced by Levinsohn and Petrin (2003). GDP growth: Annual percentage growth rate of GDP at market prices based on constant local currency. REER volatility: Exchange rate uncertainty calculated by monthly real exchange rate series using a GARCH (1,1) model. Grant recipient is a dummy that takes value one for firms that have access to grants and subsidies, and zero otherwise. Firm volatility is measured as the squared residual of a regression of sales growth on its own lagged values and a set of time fixed effects. Industry volatility is the share of capital expenditures not financed with cash flows from operations and is averaged over 1988–2014 for the median US firm in each industry.

Table 4: Baseline model

Dependent variable = Export/ Sales (%)	
	(1)
Treat*FEMA	3.614**
	(2.09)
FEMA	-0.610
	(-0.35)
Lagged Firm Size	0.003
	(0.76)
Lagged Wage	0.275*
	(1.82)
Lagged Total Factor Productivity	0.354
	(0.47)
GDP growth	0.060
	(0.09)
REER volatility	-0.053
	(-0.49)
Predicted probability	14.71
N	42,123
R^2	0.009
Number of firms	5,145

*Notes: All specifications are estimated using the difference-in-differences estimator with firm fixed effects. Treated firms are the ones that have access to external commercial borrowing during the reform period of 2000-2014. Control firms are the matched firms using the Leuven and Sianesi's (2003) propensity score kernel matching technique. The matching covariates are firm size, profit, profit squared, collateral, collateral squared, age, age squared and industry dummies (pre-treatment values). The dependent variable is the ratio of export to sales ratio (%). Treat*FEMA measures the policy liberalisation effect. All regressions include firm fixed effects. Time dummies are included in the models with standard errors clustered at the firm-level. Robust t-statistics are reported in the parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).*

Table 5: Access to grants and subsidies

Dependent variable = Export/ Sales (%)	
	(1)
Treat*FEMA*Grant recipient	10.544**
	(2.38)
Treat*Grant recipient	-11.178**
	(-2.55)
FEMA*Grant recipient	1.113
	(0.89)
FEMA	-1.053
	(-0.59)
Grant recipient	-1.838
	(-1.47)
Lagged Firm Size	0.002
	(0.62)
Lagged Wage	0.297**
	(1.99)
Lagged Total Factor Productivity	0.331
	(0.44)
GDP growth	0.036
	(0.05)
REER volatility	-0.051
	(-0.46)
Predicted probability	16.16
N	42,123
R^2	0.012
Number of firms	5,145

*Notes: All specifications are estimated using the difference-in-differences estimator with firm fixed effects. The dependent variable is the ratio of export to sales ratio (%). Treat*FEMA measures the policy liberalisation effect. Grant_recipeints is a dummy that takes value one for the firms that are recipients of governments' grants and subsidies, and zero otherwise. All regressions include firm fixed effects. Time dummies are included in the models with standard errors clustered at the firm-level. Robust t-statistics are reported in the parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*) Also, see notes to Table 4.*

Table 6: Accounting for vulnerability

Dependent variable = Export/ Sales (%)		
	Firm volatility	**Industry volatility**
	(1)	(2)
Treat*FEMA*Cons	4.093**	2.378*
	(2.11)	(1.66)
Treat*Cons	-4.364**	-
	(-2.35)	
FEMA*Cons	-0.734	-1.447
	(-0.75)	(-0.68)
Cons	0.733	3.571
	(0.77)	(0.32)
FEMA	0.041	1.270
	(0.03)	(0.79)
Lagged Firm Size	0.003	0.003
	(0.75)	(0.80)
Lagged Wage	0.273*	0.283*
	(1.81)	(1.87)
Lagged Total Factor Productivity	0.360	0.368
	(0.48)	(0.50)
GDP growth	0.067	0.059
	(0.10)	(0.09)
REER volatility	-0.054	-0.053
	(-0.50)	(-0.49)
Predicted probability	16.14	15.43
N	42,123	42,123
R^2	0.009	0.008
Number of firms	5,145	5,145

*Notes: All specifications are estimated using the difference-in-differences estimator with firm fixed effects. The dependent variable is the ratio of export to sales ratio (%). Treat*FEMA measures the policy liberalisation effect. Cons is a dummy that takes value one for volatile firms or industries if measures of volatility at firm- or industry-levels are above the 50th percentile of the distribution for all firms in the sample period, and zero otherwise. All regressions include firm fixed effects. Time dummies are included in the models with standard errors clustered at the firm-level. Robust t-statistics are reported in the parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*). Also, see notes to Table 4.*

Table 7: Robustness: Placebo tests

Dependent variable = Export/ Sales (%)		
Panel 1:		
Treat*FEMA	1.389	
	(0.73)	
N	2,103	
R^2	0.021	
Panel 2:		
Treat*FEMA*Grant recipient	-0.097	
	(-0.07)	
N	2,103	
R^2	0.022	
Panel 3:		
	Firm volatility	**Industry volatility**
	(1)	(2)
Treat*FEMA*Cons	1.582	3.544
	(0.60)	(1.41)
N	2,103	2,103
R^2	0.022	0.050

*Notes: All specifications are estimated using differences-in-difference with firm fixed effects. The dependent variable is the ratio of export to sales ratio (%). Treat*FEMA measures the policy liberalisation effect. All regressions include firm fixed effects. Time dummies are included in the models with standard errors clustered at the firm-level. Robust t-statistics are reported in the parentheses. The remaining specifications, which are not reported for brevity, are identical to those in Tables 4-6. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).*

Table 8: Robustness: Controlling for contemporaneous events

Dependent variable = Export/ Sales (%)		
Panel 1:		
Treat*FEMA	5.321**	
	(1.97)	
N	42,123	
R^2	0.009	
Panel 2:		
Treat*FEMA*Grant recipient	11.750**	
	(2.29)	
N	42,123	
R^2	0.012	
Panel 3:		
	Firm volatility	**Industry volatility**
	(1)	(2)
Treat*FEMA*Cons	5.616**	2.149
	(2.06)	(1.28)
N	42,123	42,123
R^2	0.009	0.008

*Notes: All specifications are estimated using differences-in-difference with firm fixed effects. The dependent variable is the ratio of export to sales ratio (%).Treat*FEMA measures the policy liberalisation effect. All regressions include firm fixed effects. Time dummies are included in the models with standard errors clustered at the firm-level. Robust t-statistics are reported in the parentheses. The remaining specifications, which are not reported for brevity, are identical to those in Tables 4-6. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).*

Table 9: Robustness: Alternative treated group

Dependent variable = Export/ Sales (%)		
Panel 1:		
Treat*FEMA	2.578**	
	(2.09)	
N	41,103	
R^2	0.011	
Panel 2:		
Treat*FEMA*Grant recipient	6.566***	
	(2.79)	
N	41,103	
R^2	0.014	
Panel 3:		
	Firm volatility	**Industry volatility**
	(1)	(2)
Treat*FEMA*Cons	2.831**	2.213
	(2.09)	(1.57)
N	41,103	41,103
R^2	0.012	0.011

*Notes: All specifications are estimated using differences-in-difference with firm fixed effects. The dependent variable is the ratio of export to sales ratio (%).Treat*FEMA measures the policy liberalisation effect. All regressions include firm fixed effects. Time dummies are included in the models with standard errors clustered at the firm-level. Robust t-statistics are reported in the parentheses. The remaining specifications, which are not reported for brevity, are identical to those in Tables 4-6. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).*

Table 10: Robustness: Endogeneity concerns

Dependent variable = Export/ Sales (%)		
Panel 1:		
Treat*FEMA	2.962**	
	(2.34)	
N	22,033	
R^2	0.017	
Panel 2:		
Treat*FEMA*Grant recipient	8.387***	
	(2.91)	
N	22,033	
R^2	0.021	
Panel 3:		
	Firm volatility	**Industry volatility**
	(1)	(2)
Treat*FEMA*Cons	3.704**	3.196**
	(2.60)	(2.24)
N	22,033	22,033
R^2	0.012	0.011

*Notes: All specifications are estimated using differences-in-difference with firm fixed effects. The dependent variable is the ratio of export to sales ratio (%).Treat*FEMA measures the policy liberalisation effect. All regressions include firm fixed effects. Time dummies are included in the models with standard errors clustered at the firm-level. Robust t-statistics are reported in the parentheses. The remaining specifications, which are not reported for brevity, are identical to those in Tables 4-6. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).*

Table 11: Robustness: Alternative matching techniques

Dependent variable = Export/ Sales (%)		
Panel 1:		
Treat*FEMA	3.646**	
	(2.11)	
N	42,123	
R^2	0.009	
Panel 2:		
Treat*FEMA*Grant recipient	10.593**	
	(2.39)	
N	42,123	
R^2	0.012	
Panel 3:		
	Firm volatility	**Industry volatility**
	(1)	(2)
Treat*FEMA*Cons	4.126**	2.414*
	(2.13)	(1.69)
N	42,123	42,213
R^2	0.009	0.008

*Notes: All specifications are estimated using the difference-in-differences matching estimator. The dependent variable is the ratio of export to sales ratio (%). Treat*FEMA measures the policy liberalisation effect. All regressions include firm fixed effects. Time dummies are included in the models with standard errors clustered at the firm-level. Robust t-statistics are reported in the parentheses. The remaining specifications, which are not reported for brevity, are identical to those in Tables 4-6. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).*

Table 12: Robustness: Different measures of financial vulnerability

Dependent variable = Export/ Sales (%)			
Panel 3:	**Smaller firms**	**High import intensity**	**High inventory-to-sales ratio**
	(1)	(2)	(3)
Treat*FEMA*Cons	7.220**	4.008**	3.159*
	(2.31)	(2.42)	(1.72)
Observations	42,123	42,123	42,123
Number of id	5,145	5,145	5,145
R-squared	0.011	0.010	0.009
II			

*Notes: All specifications are estimated using differences-in-difference with firm fixed effects. The dependent variable is the ratio of export to sales ratio (%). Treat*FEMA measures the policy liberalisation effect. All regressions include firm fixed effects. Cons is a dummy which takes value one for volatile firms when vulnerability measures are above the 50th percentile of the distribution for all firms in the sample period, and zero otherwise. Time dummies are included in the models with standard errors clustered at the firm-level. Robust t-statistics are reported in the parentheses. The remaining specifications, which are not reported for brevity, are identical to those in Table 6. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).*

Appendix

Figure A1: Chinn-Ito Financial Openness Index shows rigidity for India and China

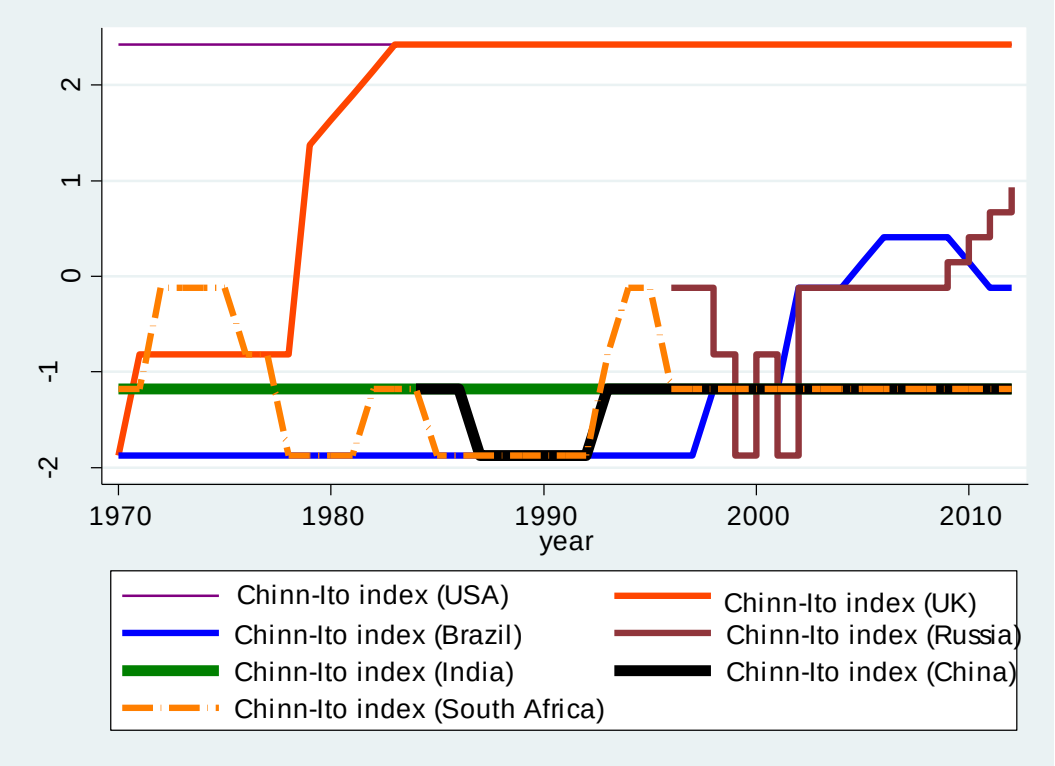


Figure A2: Graphs of sales to income ratio and net sales for the period of 1988 to 2014.

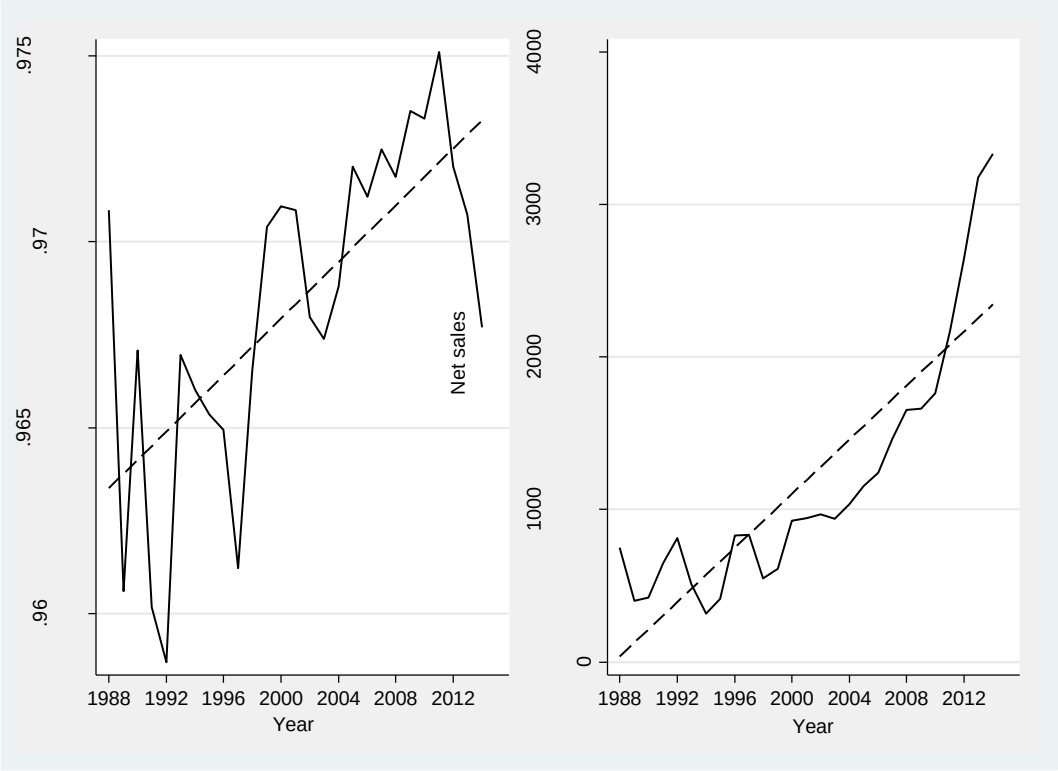


Table A1: Correlation matrix of explanatory variables

	Treat	Fema	Treat*Fema	Size	Wage	TFP	GDP gr.	REER	Grant recip.	Firm vol.	Industry vol.
Treat	1.000										
Fema	-0.017	1.000									
Treat*Fema	0.995	0.033	1.000								
Size	0.308	-0.009	0.307	1.000							
Wage	0.296	-0.002	0.294	0.668	1.000						
TFP	0.001	-0.049	-0.002	0.080	-0.004	1.000					
GDP gr.	-0.001	0.033	0.001	-0.019	-0.022	0.016	1.000				
REER	-0.015	0.023	-0.013	0.020	0.013	-0.024	0.209	1.000			
Grant recip.	-0.028	-0.001	-0.028	-0.023	-0.058	-0.113	-0.002	-0.008	1.000		
Firm vol.	-0.004	0.008	-0.004	0.049	0.012	-0.054	-0.001	0.010	-0.018	1.000	
Industry vol.	0.010	-0.015	0.010	-0.019	-0.018	-0.032	0.022	-0.026	-0.011	0.005	1.000

Notes: Abbreviations: Size: Firm size, Wage: Wages, TFP: Natural logarithm of Total Factor Productivity, GDP gr.: GDP growth, REER: REER volatility, Grant recip.: Grant recipient dummy, Firm vol.: Firm volatility measured as the squared residual of a regression of sales growth on its own lagged values and a set of time fixed effects, Industry vol.: Industry volatility measured as the share of capital expenditures not financed with cash flows from operation.