Financial Constraints and export participation

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(Preliminary and Incomplete)

Abstract

A firm making export market entry decision faces investment in sunk costs. Financially constrained firms, unable to make this investment, cannot enter the export market. This paper investigates this relation between financial constraints and export participation decision for Indian firms during the period of financial liberalization. Strong correlation between these variables has been found using multiple estimators. The paper further decomposes the growth in India's exports during this period. The decomposition helps analyze if the growth in exports was a result of increased export intensity by the same exporters or increase in the number of exporters.

Key Words: Export Participation, financial constraints, financial liberalization

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1. Introduction

Entering the export market entails incurring costs such as market research costs, market development and distribution channel development costs. A forward looking manager would weigh these sunk costs incurred during market entry, against the future stream of income. Therefore, entering the export market becomes a question of which firms have the ability to undertake this investment.

As per the Melitz model (2003), firms self select into the export industry if their productivity is high as it enables them to undertake the investment associated with new market entry. The Melitz model assumes only one factor of production; labor, whose supply is inelastic at the aggregate level. In this paper, I consider the other factor of production; capital, the availability of which might constrain a firm's entry into the export market. In the presence of financial frictions, a firm's investment decision will not be independent of its financing decision. [3] Therefore, even a highly productive firm might be inhibited from entering the export market if it is constrained by its finances.

This paper studies the effect of financial constraints on a firm's export participation decision.

In the literature on export participation much emphasis has been laid on the importance of firm's productivity in its export participation decision (Roberts & Tybout (1997), Bernard, Eaton et al (2003)). All these models are predicated on the assumption that capital is available to the firms at the rate equal to its marginal product. In developing countries, it has been evidenced that the marginal product of capital is higher than the prevalent rate of interest (Caselli & Feyrer (2007)). As most emerging and developing economies are fueling their growth by exports, it is imperative to investigate the importance of credit constraint on export participation.

[3] The Modigliani–Miller theory suggests that in the absence of financial frictions, a firm's internal and external funds are perfect substitutes and the firm's capital structure is irrelevant to its value. Thus, a firm's investment decisions would be independent of its financing decisions.

India underwent a spate of industrial, trade, banking and financial sector policy changes in the 1990s. This changed, among other things, the financial landscape for industries in India. At the same time, India also experienced a healthy growth in exports. This paper investigates the relation between these two phenomena. Was the growth in exports a fall out of trade liberalizations only? Or did financial liberalization help ease the credit constraint and thus affect the export participation of the firms? Did the liberalization manifest itself as increased number of exporters or as increased intensity of exports by the same exporters? These are some of the questions this paper tries to investigate using financial data of Indian firms.

The data used is from the balance sheet and audited financial statement of Indian firms from Center for Monitoring Indian Economy's (CMIE) Prowess database. The data is an unbalanced panel of manufacturing firms for the period 1989 to 2008. Liquidity and leverage ratios of these firms are used as a measure of their credit constraint. A Probit, Logit and GMM estimator are used to see the effect of credit constraint on export participation. The results show strong correlation between credit constraint and export participation decision. This supports the hypothesis that financial constraints discourage firms from entering the export market. This result is particularly significant as total factor productivity does not seem to be of importance to the export market entry decision in the presence of financial constraints. The result emphasizes the role of a developed and smoothly functioning financial market in the economy's export performance.

The paper is organized as follows. The next section talks about the economic liberalization in India. Section 3 discusses the model, section 4 the results, section 5 the specification test and section 6 is the conclusion.

2. Economic liberalization in India

Prior to the massive liberalization undertaken by India in 1991, Indian economy was a highly regulated economy. Most heavy industries were reserved for public sector enterprise. Private enterprise was stymied by the complex licensing policies and the Monopoly and Restrictive

Trade Practice (MRTP) act. Entrepreneurs had to obtain license to enter any industry which was not reserved for either the public sector or for small scale industries. The political climate was such that the licenses were not awarded on economic criteria. The industrial policy maintained a cap on the total investments allowed to be undertaken by the entrepreneur. There were price regulation and other market distortions which did not allow resources to flow to the most productive firms. Industrial inefficiency and accumulated financial losses were pervasive.

Economic liberalization began as a trickle in the mid 1980's. The balance of payment crisis in mid 1990 pushed the country to the brink of default on the IMF loans. This threat of insolvency paved way for the IMF and World Bank recommended industrial, trade and financial liberalization starting July 1990.

Under industrial liberalization, License Raj was done away with. Private sector was allowed in industries previously reserved only for the public sector. Growth stifling policies like the Monopolistic and Restrictive Trade Policy (MRTP), and investment ceilings were removed. The government undertook disinvestment of Public Sector Units (PSU) (Topalova (2004)). Government monopoly in industries like telecom, power infrastructure was replaced by private competition. Some subsidies to industries were reduced. Limit on technology imports was eased away. Automatic approval of foreign investment was allowed in many sectors and the cap on foreign equity participation was gradually increased.

Under trade liberalization, many banned and some restricted items were moved to the Open General List for imports. Import licensing was subsequently abolished. Import tariff rates were reduced and streamlined. Top tariff rates of around 400% prior to liberalization were brought down to an average of around 25%. The government has been trying to change the focus from import substitution to export promotion. There were a number of policy changes to promote exports. Exporters were allowed to import intermediate products and capital goods duty free. Export taxes were abolished but direct subsidies were eliminated too.

2.1 Credit Constraint and Financial Liberalization

In the pre-liberalization era, the financial markets were segmented and underdeveloped. There was a paucity of financial instruments. The debt and money markets were poorly developed. There was large scale preemption of resources from the banking system by the government to finance its fiscal deficit. The administered interest rates were pegged at very low levels. The primary focus of the government was to provide easy and concessional credit to some sectors. These excessive structural and micro regulations lead to a distorted interest rate mechanism. This in turn posed credit constraints on the productive entities. It also affected the profitability of the banks. The lack of market driven norms and lack of transparency lead to huge Non Performing Assets (NPAs) of the banks (Mathur (2007) (2005), Koeva (2003)). Bad accounting policies could hide the underlying problems of the banking system (the accounting policies allowed banks to avoid making provisions for bad debts but also permitted them to recognize as income the overdue interest on these loans). This kind of banking and financial system leads to a McKinnon - Shaw kind of inefficiency in the repressed financial market.[4]

As part of liberalization, institutional reforms in the banking sector and capital market coupled with improved and increased number of instruments led to easing of the credit constraint in Indian industry. There was a change in the ownership pattern of banks. Private banks were allowed to enter the industry. Reserve Bank of India (RBI), India's central bank started divesting in the public sector banks. Government ownership was reduced in the public sector banks. Foreign banks were allowed liberal entry. In 1994, banks were allowed to raise capital from the market by public issues of shares.

In 1992, government borrowings were made at market related interest rates. The return on government securities was aligned with the market, thus increasing both, the number of instruments available and the number of participants. Automatic monetization of fiscal deficit through the issue of ad hoc treasury bills was phased out. Government improved the payment and settlement mechanism in government securities and also introduced screen based trading.

[4] In an economy with controlled financial market, the interest rates are held artificially low and credit is rationed; which leads to misallocation of funds. A high interest rate and a unified capital market with competition will improve the quality of investments. (Mckinnon (1973)).

The Government has also developed better instruments to precisely modulate short term liquidity and signal short term interest rates. All this has increased transparency in market operations

The government extended financial support to Public Sector Banks to make provisions for NPAs. Introduction and phased implementation of norms on risk weighted capital adequacy requirement and introduction of best practices in accounting, provisioning and exposure improved the NPAs of these banks.

The banks also changed their domain of operation to tem lending; financial institutions started disbursing short term loans. Banks were allowed to provide fee based services like stock broking, merchant banking and other advisory services. RBI moved away from micro regulation to macro management. Interest rates were freed on corporate bonds, bank lending and bank deposits above 1 year. Artificial constraints were removed and greater lendable resources were at the banks' disposal. More competitive and deregulated interest rate regime on the lending side implied borrowers were able to get credit at a lower interest rate. Thus, deposit rates were reduced but the banks still improved their spreads.

In 1993, the exchange rate was changed to a market determined floating Exchange rate. Convertibility of Rupee for current account transactions was adopted. Authorized dealers could now trade in overseas markets, borrow and invest funds in the overseas market. Measures such as the development of Rupee- forex swap market, permitting forward cover for some participants also helped. Developing forward market provided more instruments (cross-currency options, inter rate and currency swaps). FIIs were allowed entry in forward markets and exporters permitted to retain foreign currency accounts.

Capital market too underwent a number of changes. Capital issues control was abolished and free pricing of equity issues was introduced in 1992. Entry norms for capital issues were made easier and disclosure requirements were improved. Scripless trading of shares began in 1997. This made electronic trading in shares feasible. Changes were made in the settlement period to make it more efficient and foolproof. Derivatives were introduced and a true spot market was

created. FIIs were allowed to invest in Indian equity markets. Indian firms were allowed to raise equity in International markets. They were also allowed to borrow in these markers. Indian corporate could tap international capital markets through ADRs, GDR, ECBs and Foreign Currency Convertible Bonds (FCCB).

All these changes in the financial sector coupled with prudential regulation and supervision ensured system stability with respect to both internal and external uncertainties. The net result was that credit (both equity and debt) was available more easily to the productive sectors. There was a time lag between these reforms and the credit availability easing for the firms. (graph: loans to private sector by banks)

The immediate effect of the reforms was that the corporate sector was exposed to international competition and subsidized finance gave way to a regime of high real interest rates. One of the first tasks for the Indian companies was substantial deleveraging. Fortunately, a booming equity market and the appetite of foreign institutional investors for Indian paper helped companies to accomplish this to a great extent in 1993 and 1994. The downturn in the stock market that has followed since then has stopped this process from going any further and has probably left many companies still excessively levered. According to the figures compiled by the Centre for Monitoring the Indian Economy, the average debt-equity ratio of private sector manufacturing companies in India fell from 1.72 in 1990-91 to 1.05 in 1996-97, and more than half of this reduction took place in one single year - 1994-95.

3. The Model

There is a lot of literature on the effects of financial constraints on investment by firms (Whited (1992), Fazzari, Hubbard et al (1988)). There is also a sizeable amount of work on total factor productivity determining export participation (Roberts & Tybout (1997), Bernard, Eaton et al (2003), Baldwin & Gu (2003)).

There are papers which investigate the effect of financial liberalization on capital markets and investment (Galindo et al (2007), Harris et al (1994)). Guarglia, Kneller et al (2005) analyze the effect of credit constraint on export participation decision. They study firms in the UK for a ten year period. They find financial health an outcome rather than a determinant of entry into the export market.

To my knowledge, there is no paper analyzing the effect of financial liberalization on export participation. This paper plans to fill this gap.

The export decision depends on the ease with which the firm is able to raise funds. Funds raised can either be in the form of equity or in terms of debt. In this paper, financial constraint is measured by two variables, leverage and liquidity. Liquidity is defined as the ratio of difference between current assets and current liabilities to total assets. The higher the liquidity ratio the better would be the financial health of the firm. Leverage is defined as the ratio of short term debt to current assets. Lower the leverage the better the financial health of the firm would be.

Thus, a firm with more liquidity and lower leverage is in better financial health to enter the export market. In the model below, if the coefficient on leverage and liquidity is significant, it would corroborate the hypothesis that financial constraints hinder export participation.

The main model is given as

$$Export\_dummy_{i,t} = \beta_0 + \beta_a age_{i,t} + \beta_g verylarge_{i,t} + \beta_l large_{i,t} + \beta_m medium_{i,t} + \beta_s small_{i,t} + \beta_v verysmall_{i,t} + \beta_{lev/liq} leverage/liquidity_{i,t} + \beta_t tfp_{i,t} + time\ dummy + leverage/liquidity * time + \eta$$

Among the other variables used in the model, age and size of the firm might affect the export participation decision. Size of the firm is defined as quintiles of assets size within the industry. Industry and year dummies would cover any change in policy in the industry or in a particular year.

The year dummies will show the effect of policy changes on the export participation. Interactions between industry dummy and financial constraint and the interaction between

year dummy and financial constraint can trace the effects of industry specific trade policy changes and financial liberalization effects.

Exact definitions of the various terms used are given in Annexure A.

3.1 Calculation of TFP

Calculation of TFP by estimating the production function poses a simultaneity problem due to the correlation of input demands with the productivity shocks. OLS will give a biased result in the estimation of productivity.

To overcome this issue Olley & Pakes (1996) came up with a model to use investment as a proxy for the productivity shocks. The investment demand funks needs to be continuous and invertible for the same. If there are kinks in the investment demand function, this model will not work.

Levinsohn and Petrin (2001) use intermediate inputs as a proxy instead of investments. In this paper, I have used their method of TFP calculation.

The first equation for the calculation of productivity can be written as

$$y_t = \beta_0 + \beta_l l_t + \beta_k k_t + \beta_i i_t + \omega_t + \eta_t$$

Where productivity ω is a function of intermediate input, i and capital, k.

To resolve the simultaneity problem because of correlation between input levels and productivity shocks, they use intermediate inputs as proxy in the calculation of productivity, ω. Intermediate inputs change with productivity shocks but there are no adjustment costs attached. Therefore, the demand curve for intermediate goods will be continuous with no kinks and can be easily estimated.

The above equation can be written as

$$y_t = \beta_l l_t + \varphi_t(i_t, k_t) + \eta_t$$

Where

$$\varphi_t(i_{t,}k_t) = \beta_0 + \beta_k k_t + \beta_i i_t + \omega_t(i_t, k_t)$$

The above equation is estimated using a GMM estimator. The first equation is calculated with OLS with a third degree polynomial approximation.

In this paper, y_t is measured as valueadded. The intermediate input used is fuel consumption.

Date on fuel consumption is available for 90 % of the data and therefore serves as a good proxy variable. The estimation using this method gives very precise estimates of the coefficients and also shows constant returns to scale. Estimates in Annexure B.

Capital stock is constructed using the below

$$k_{i,t} = (1 - \delta)k_{i,t-1} + I_{i,t}$$

Investment in the current period is taken as addition to the capital stock in the current period a la Levinsohn and Petrin. Depreciation, δ is taken at 10 percent for all firms.

4. Data Description

The data used is taken from CMIE's Prowess database. It is taken from the audited financial results of listed and unlisted manufacturing firms. The firms in Prowess accounts for almost 75 per cent of all corporate taxes and over 95 per cent of excise duty collected by the government of India.

The paper uses an unbalanced panel data constructed from the above firms for the period 1989 to 2008. The number of firms in the panel is 7986.

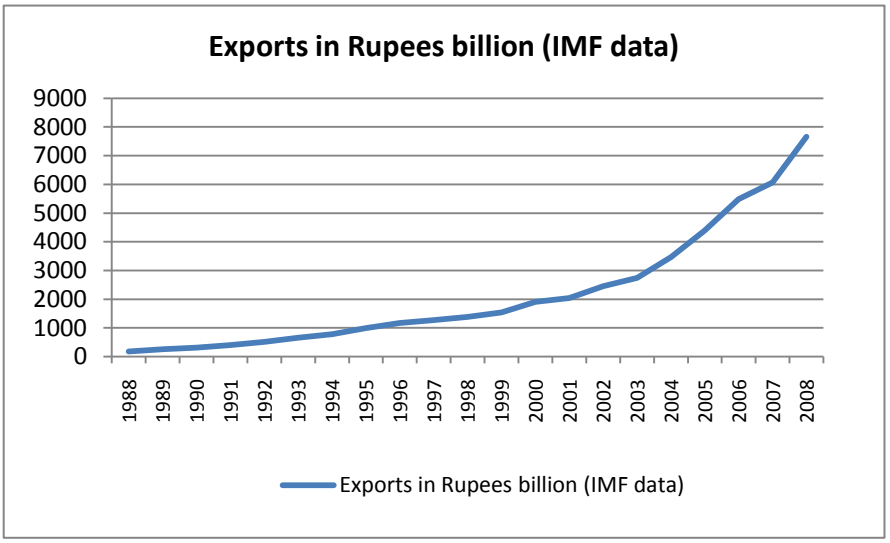
All variables have been deflated by the wholesale price index. The flow variables have been deflated by the annual average WPI deflator for the financial year corresponding to the firm in that year. The stock variables have been deflated by the WPI deflator for the corresponding month in that year.

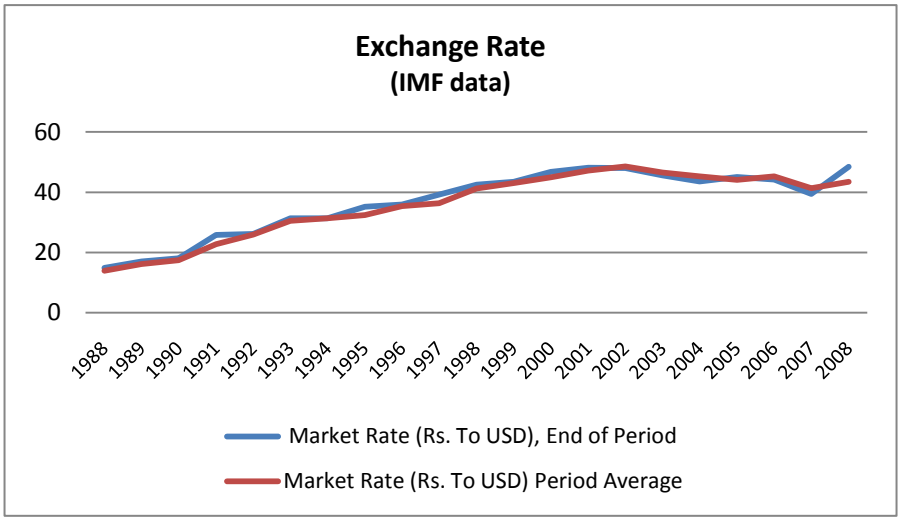
The data on wage per worker has been taken from the Central Statistical Organization's (CSO)'s ASI database. The wages are all industry average wages. This wage per worker is used to calculate the number of workers.

The data has firms from 20 industries. The industries are NIC-2 digit industry. The NIC classification is consistent with the ISIC rev.3. In the unbalanced panel constructed, there are 20 NIC-2 industries. The data is in Rupees.

4.1 Summary Statistics

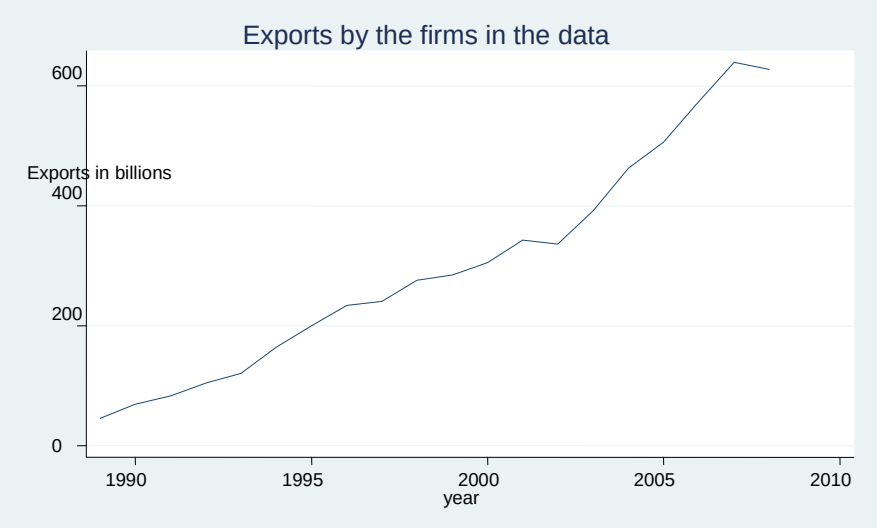
India witnessed a smooth and continuous increase in value of exports during the period 1988 to 2008.



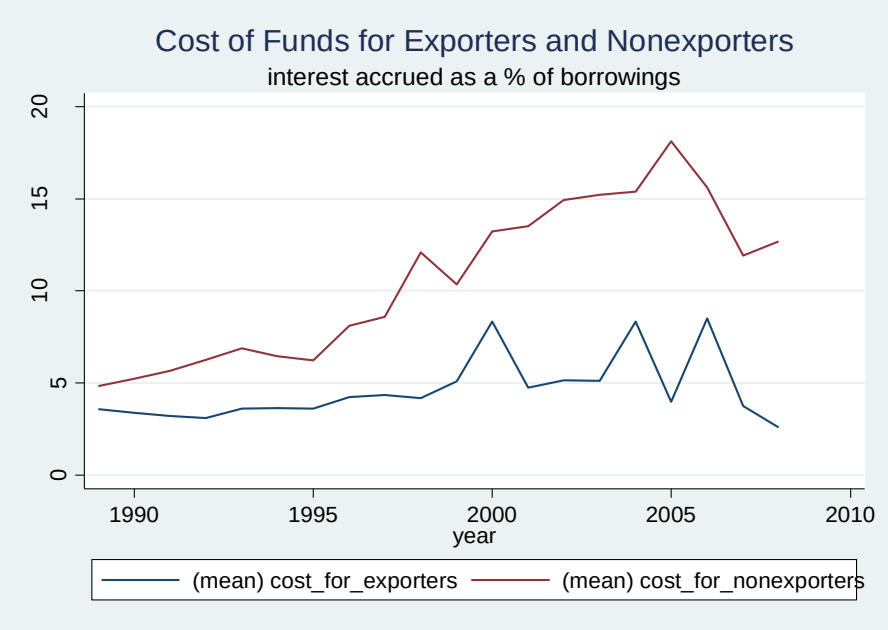


The same period saw the Rupee depreciate against the dollar. This trend continued till 2002 when it was reversed. Figure 1 above shows exports in Rupees billion and Figure 2 shows the movement of Exchange Rate during the same period 1988 to 2008. The macro economic trends can be witnessed in the firm level data as well. Figure 3 shows exports of the firms in the data

for the period 1989 to 2008. The trend is very similar to that of the economy as a whole.



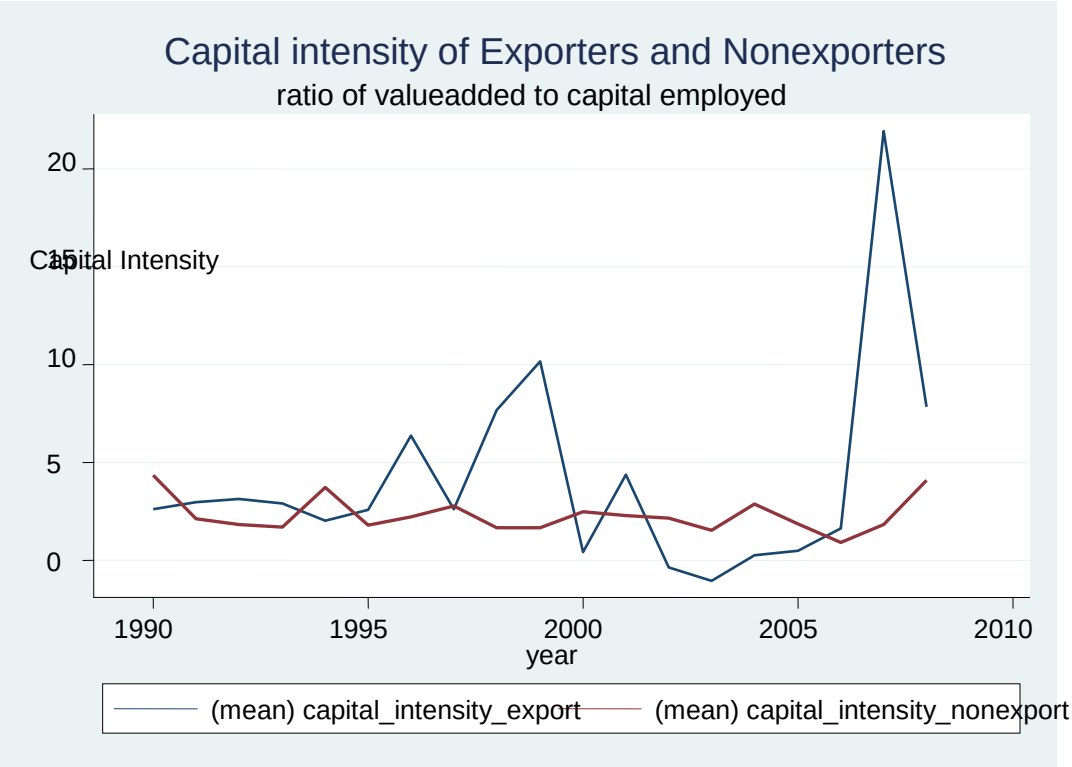
Let us define cost of funds to the firm as the ratio of interest paid to service debt to total debt outstanding.



The figure above shows this cost of funds for exporting and non exporting firms. It can clearly be seen that the cost of funds is much higher for non exporting firms.

There is a drop in the cost of funds after 2005. This trend is reflected in the capital intensity of the firms. Figure below shows the capital intensity of all the firms in the data. Capital intensity is

defined as the ratio of value added to capital employed. We can see that the capital intensity fluctuated around 3 but after 2005 it rose suddenly.



To be completed

5. Estimation

5.1Probit and Logit Estimates:

The model has been estimated using Probit and Logit. Both estimators support the hypothesis that leverage and liquidity are both important determinants of export participation decision. (Table 1)

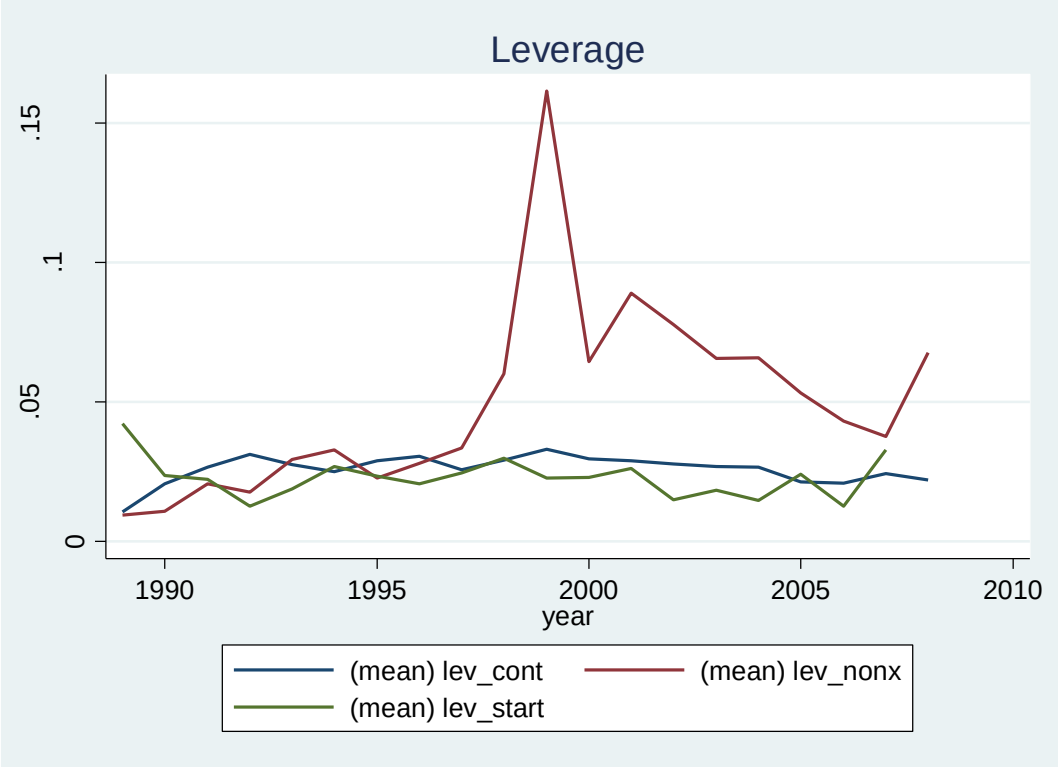
The negative sign on leverage supports the hypothesis that a firm with lower leverage is more likely to export. Similarly, the positive coefficient on liquidity corroborates the hypothesis that a firm with better liquidity position will be able to participate in the export industry.

The Logit random effects estimates are bigger than the Probit estimates. But both estimates are similar for the other variables considered in the model - size and age. As expected a bigger and older firm is more likely to export.

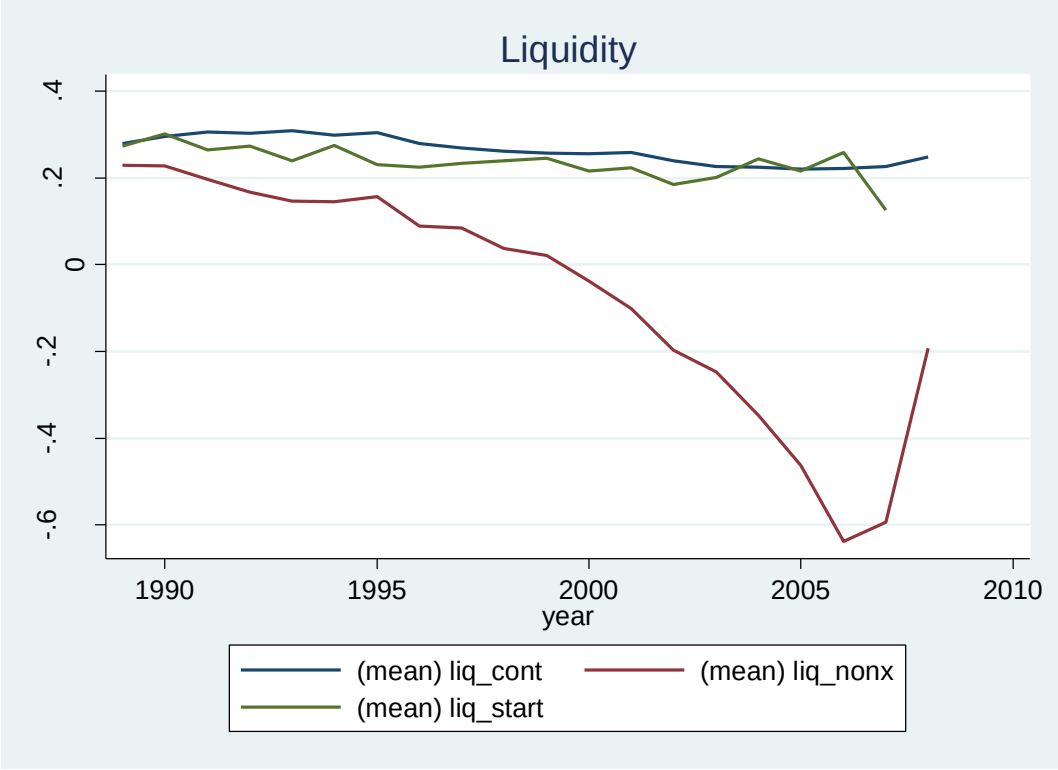
We can further define firms as non exporting firms for the year t if it does not export in that year t, or the year before,t-1, or the year after, t+1. We can similarly define continuous exporters as those which export in all the three period, t-1, t and t+1. A firm entering the export market in year t will have no wxports in the year before but will have exports in the time t+1. We also define firms which exit the export market and sporadic exporters on the same basis. A summary analysis of leverage, liquidity, total factor productivity, size and other variables of these exporters and non exporters is given in Table 2. This table gives the mean value for these variables. It can be seen from the table that the financial health of firm which export whether new entrants or continuous exporters is better than that of non exporters. This analysis has been graphed in the following two figures.

The first plot shows the leverage ratio for non exporters, new entrants and continous exporters. It can easily be seen that non exporters have much higher leverage.

Figure



Figure



The above figure shows the liquidity for non exporters, new entrants and continuous exporters. Again the liquidity of non exporters is much lower than the others.

5.2 Estimation by the Arellano- Bond estimator:

The data we use has a large number of firms. Though the entire time span is 20 years, the panel being an unbalanced one, the data is available for an average of 7 years. A dynamic panel estimator which does not require the time dimension to be large in order to obtain consistent parameter estimates will be helpful. This will allow us to use lagged dependent variable as a regressor. As the decision to export or not in the previous period might have an effect on this periods decision to enter the export market, this will be a useful exercise. Using the lagged dependent variable gives rise to autocorrelation. This can be addressed by using the Arellano-Bond Estimator (1991) which uses GMM to address the issue of autocorrelation. This estimator

also has the added advantage of being able to address the issue of both serial correlation and any endogenous regressors in the model.

To be completed

5.3 Export Decomposition

The growth in exports in India increased at a continuous rate in spite of the credit constraint in the economy. Can this growth in exports be decomposed into components which can help us analyze the source of growth? Is the source of export growth increase in the number of exporters? Or has the export intensity of the current exporters increased? Maybe it is a combination of both. To investigate this I use the decomposition used by Alessandria, Pratap, Yue (2009) and Alessandria and Choi (2008).

$$\frac{\sum_{i=1}^{n} Export_{\ i,t}}{\sum_{i=1}^{N} Sales_{\ i.t}} = \left(\frac{\sum_{i=1}^{n} x_{i,t}}{\sum_{i=1}^{n}(x_{i,t}+d_{i,t})}\right)\left(\frac{n_t}{N_t}\right)\left(\frac{1/_n \sum_{i=1}^{n}(x_{i,t}+d_{i,t})}{1/_N \sum_{i=1}^{N}(x_{i,t}+d_{i,t})}\right)$$

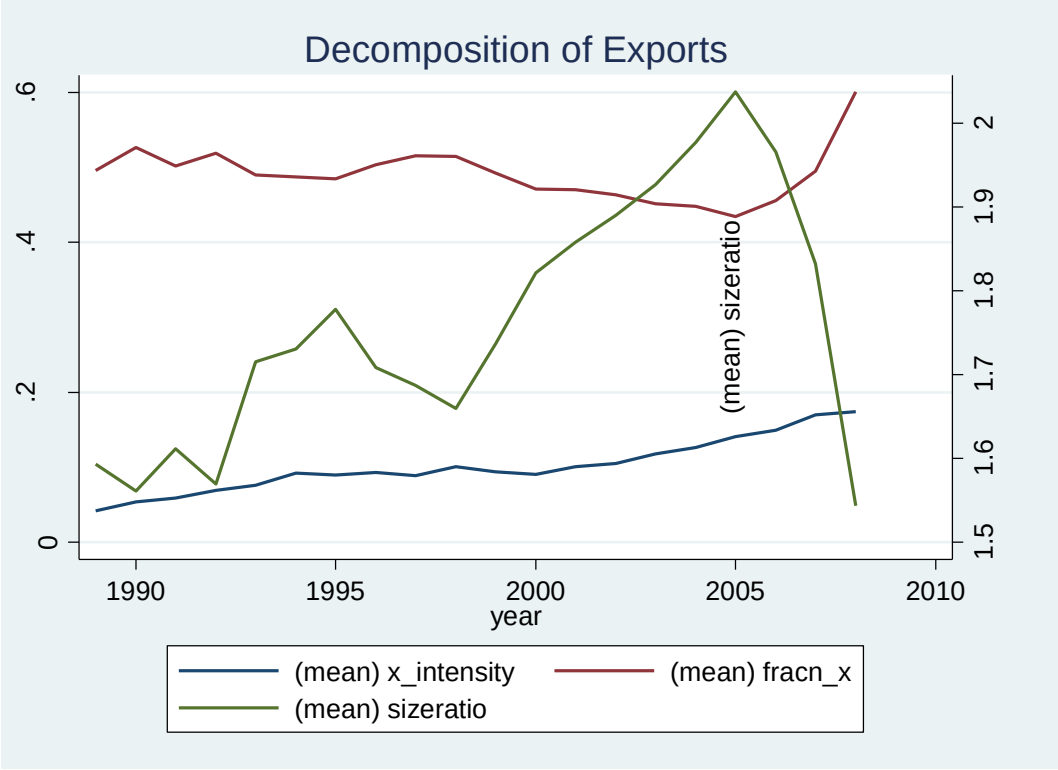
Where n is the number of exporters and N the total number of firms. The domestic sale is denoted by d and exports by x.

The above equation can be written as

$$\frac{Exports}{sales} = (export\ intensity)(fraction\ of\ exporters)\left(\frac{size\ of\ exporters}{size\ of\ all\ firms}\right)$$

An investigation of the three components will have great policy implications as it will show if the trade policy has helped existing exporters intensify their exports or if the financial liberalization helped increase the number of exporters.

The decomposition of the data gives us a steady increase in export intensity over the years and a substantial increase in the size ratio of exporters to all firms. The fraction of exporters to all firms remained mostly steady.



The fraction of exporters and the size ratio change drastically after 2004. The fraction of exporters increases dramatically and the size ratio falls sharply.

5 Conclusion

The estimation results show significant correlation between leverage and liquidity of the firm with the export participation decision. Surprisingly, TFP is not very important in the presence of credit constraints. Given the fact that financial constraints existed in the form of rising interest rate in the newly liberalized economy, this result validates the hypothesis.

To be completed

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Table 1

Variable	lev_probit	lev_logit	liq_probit	liq_logit
export_d				
verysmall	-2.71	-4.76	-2.74	-4.82
	0.13	*0.21*	*0.13*	*0.22*
small	-1.97	-3.43	-2.00	-3.48
	0.13	*0.22*	*0.13*	*0.22*
medium	-1.31	-2.23	-1.34	-2.29
	0.14	*0.22*	*0.14*	*0.23*
large	-0.71	-1.19	-0.67	-1.12
	0.14	*0.23*	*0.14*	*0.23*
TFP	0.00	0.00	0.00	0.00
	0.00	*0.00*	*0.00*	*0.00*
leverage	-0.16	-0.29		
	0.07	*0.11*		
age	0.00	0.01	0.01	0.01
	0.00	*0.00*	*0.00*	*0.00*
liquidity			0.47	.88
			0.03	*0.07*
_cons	1.77	3.09	1.69	2.93
	0.13	*0.22*	*0.13*	*0.22*
lnsig2u				
_cons	1.61	2.75	1.62	2.76
	0.05	*0.04*	*0.04*	*0.05*

Note: Standard error is given under the coefficients. export_d is the dummy variable for export participation. If the firm exported in year t, export_d will be equal to 1. If not then export_d will be equal to 0. Very small, small, medium and large are quintiles of asset size. Very large has been dropped because of collinearity. TFP is the TFP calculated using the Levinsohn-Petrin method. It equals 0.00015 (0.00011) for the probit estimation with leverage as regressor. Leverage is calculated as the ratio of short term debt to current assets. Liquidity is calculated as the ratio of the difference in current assets and current liabilities to total assets. lev_probit and lev_logit are the probit and logit estimation using leverage in the model. liq_probit and liq_logit are the probit and logit estimation using liquidity as the regressor. The logit is a random effects logit estimation.

Table 2

Year	Variable	Non_exporter	Starter	Continuous Exporter	Drop outs
1990	Liquidity	0.23	0.27	0.29	0.26
	Leverage	0.011	0.04	0.02	0.004
	TFP	54.39	65.61	47.33	43.12
	Size	2.38	3.09	3.42	2.69
	K_stock	5.37E+08	7.80E+08	1.54E+09	2.88E+08
	Age	40.15	42.9	51.03	51.4
	No.of firms	745	91	674	42
1991	Liquidity	0.2	0.3	0.31	0.12
	Leverage	0.02	0.02	0.03	0.01
	TFP	43.37	54.08	43.92	38.99
	Size	2.27	2.61	3.26	2.55
	K_stock	5.86E+08	3.11E+08	1.42E+09	6.44E+08
	Age	38.19	43.98	47.57	47.89
	No. of firms	1018	87	868	47
1992	Liquidity	0.17	0.26	0.3	0.22
	Leverage	0.02	0.02	0.03	0.01
	TFP	36.34	33.11	34.97	26.37
	Size	2.18	2.5	3.2	2.3
	K_stock	4.63E+08	1.08E+09	1.25E+09	2.27E+08
	Age	35.57	40.12	45.78	47.38
	No. of firms	1118	143	966	60
1993	Liquidity	0.15	0.27	0.31	0.22
	Leverage	0.03	0.01	0.03	0.05
	TFP	34.7	37.7	37.37	33.53
	Size	2.05	2.47	3.09	2.71
	K_stock	3.54E+08	5.70E+08	1.17E+09	5.90E+08
	Age	32.49	34.32	42.96	42.1
	No. of firms	1428	131	1146	59

This table gives the year wise mean values of the various variables. TFP is calculated using Levinsohn Petrin value added method with fuel as proxy as used in the estimation 5.1. Non-exporters for the year *t* are the ones which do not export in years *t-1 ,t and t+1*. Continuous exporters for the year *t* are the ones which export in year *t-1, t* and *t+1*. Starters are the ones which export in year *t* and *t+1* but not in *t-1*. Drop out are the ones which export in period *t-1* and *t* but not in *t+1*.

Table 2 (Contd.)

year	Variable	Non_exporter	Starter	Continuous Exporter	Drop outs
1994	liquidity	0.14	0.24	0.30	0.29
	leverage	0.03	0.02	0.02	0.05
	TFP	35.28	23.87	34.21	21.13
	size	1.98	2.40	2.98	2.34
	k_stock	3.15E+08	3.63E+08	1.17E+09	2.79E+08
	age	29.95	31.30	39.63	37.17
	No. of firms	1844	231	1400	87
1995	liquidity	0.16	0.27	0.30	0.19
	leverage	0.02	0.03	0.03	0.02
	TFP	41.59	47.20	32.56	47.12
	size	1.86	2.12	2.87	2.45
	k_stock	2.12E+08	2.39E+08	1.03E+09	3.94E+08
	age	28.09	25.07	37.42	35.52
	No. of firms	2192	255	1629	110
1996	liquidity	0.09	0.23	0.28	0.20
	leverage	0.03	0.02	0.03	0.05
	TFP	40.22	34.94	29.01	40.75
	size	1.87	2.07	2.85	2.32
	k_stock	1.86E+08	2.78E+08	1.09E+09	3.33E+08
	age	28.16	25.89	36.31	32.05
	No. of firms	2143	228	1700	152
1997	liquidity	0.08	0.22	0.27	0.19
	leverage	0.03	0.02	0.03	0.05
	TFP	31.60	24.26	39.70	24.30
	size	1.92	2.03	2.82	2.27
	k_stock	2.19E+08	3.24E+08	1554	4.24E+08
	age	28.63	27.26	35.39	31.43
	No. of firms	1980	191	1702	152
1998	liquidity	0.04	0.23	0.26	-0.03
	leverage	0.06	0.02	0.03	0.02
	TFP	27.29	16.89	22.44	19.67
	size	1.92	2.17	2.83	2.17
	k_stock	2.69E+08	2.90E+08	1.39E+09	2.63E+08
	age	28.66	27.74	34.97	29.06
	No. of firms	1998	134	1758	173

This table gives the year wise mean values of the various variables. TFP is calculated using Levinsohn Petrin value added method with fuel as proxy as used in the estimation 5.1. Non-exporters for the year *t* are the ones which do not export in years *t-1 ,t and t+1*. Continuous exporters for the year *t* are the ones which export in year *t-1, t* and *t+1*. Starters are the ones which export in year *t* and *t+1* but not in *t-1*. Drop out are the ones which export in period *t-1* and *t* but not in *t+1*.

Table 2 (Contd.)

year	Variable	Non_exporter	Starter	Continuous Exporter	Drop outs
1999	liquidity	0.02	0.24	0.26	0.17
	leverage	0.16	0.03	0.03	0.01
	TFP	25.16	25.11	35.65	28.35
	size	1.94	2.45	2.86	2.32
	k_stock	2.61E+08	5.77E+08	1.56E+09	3.47E+08
	age	28.48	28.90	34.09	29.50
	No. of firms	2316	129	1861	191
2000	liquidity	-0.04	0.25	0.26	-0.03
	leverage	0.06	0.02	0.03	0.05
	TFP				
	size	1.96	2.21	2.87	2.44
	k_stock	2.49E+08	5.55E+08	1.59E+09	5.28E+08
	age	28.00	26.19	33.51	30.84
	No. of firms	2525	128	1902	159
2001	liquidity	-0.10	0.22	0.26	0.08
	leverage	0.09	0.02	0.03	0.07
	TFP	39.25	42.83	80.69	167.23
	size	1.98	2.25	2.90	2.52
	k_stock	2.45E+08	9.03E+08	1.73E+09	3.95E+08
	age	28.00	26.15	32.96	31.49
	No. of firms	2514	181	1835	149
2002	liquidity	-0.20	0.22	0.24	0.13
	leverage	0.08	0.03	0.03	0.07
	TFP	56.64	15.74	19.50	15.04
	size	1.96	2.27	2.85	2.48
	k_stock	2.36E+08	4.76E+08	1.84E+09	9.74E+08
	age	27.84	26.51	32.41	31.09
	No. of firms	2564	163	1884	116
2003	liquidity	-0.25	0.18	0.23	0.09
	leverage	0.07	0.01	0.03	0.01
	TFP	42.19	35.03	39.86	24.92
	size	1.94	2.22	2.87	2.45
	k_stock	2.59E+08	3.05E+08	1.86E+09	2.81E+08
	age	26.58	27.53	31.04	32.75
	No. of firms	2932	161	2073	128

This table gives the year wise mean values of the various variables. TFP is calculated using Levinsohn Petrin value added method with fuel as proxy as used in the estimation 5.1. Non-exporters for the year *t* are the ones which do not export in years *t-1 ,t and t+1*. Continuous exporters for the year *t* are the ones which export in year *t-1, t* and *t+1*. Starters are the ones which export in year *t* and *t+1* but not in *t-1*. Drop out are the ones which export in period *t-1* and *t* but not in *t+1*.

Table 2 (Contd.)

year	Variable	Non_exporter	Starter	Continuous Exporter	Drop outs
2004	liquidity	-0.35	0.20	0.22	0.09
	leverage	0.07	0.02	0.03	0.05
	TFP	42.83	23.86	18.91	14.62
	size	1.89	2.34	2.87	2.46
	k_stock	2.27E+08	5.72E+08	1.90E+09	6.56E+08
	age	26.20	26.49	30.70	30.69
	No. of firms	2996	175	2072	125
2005	liquidity	-0.46	0.24	0.22	0.09
	leverage	0.05	0.01	0.02	0.03
	TFP	41.18	135.18	52.12	16.21
	size	1.89	2.32	2.87	2.44
	k_stock	2.32E+08	3.68E+08	2.02E+09	3.45E+08
	age	26.26	23.76	30.94	29.87
	No. of firms	2982	165	1979	103
2006	liquidity	-0.64	0.22	0.22	0.01
	leverage	0.04	0.02	0.02	0.04
	TFP	46.61	20.59	53.46	10.37
	size	1.91	2.23	2.85	2.58
	k_stock	2.24E+08	6.26E+08	2.23E+09	7.32E+08
	age	26.20	26.83	30.39	31.99
	No. of firms	2668	155	1963	69
2007	liquidity	-0.59	0.26	0.23	0.03
	leverage	0.04	0.01	0.02	0.03
	TFP				
	size	1.92	2.34	2.84	2.61
	k_stock	2.62E+08	4.47E+08	2.52E+09	8.97E+08
	age	26.34	26.59	30.68	27.95
	No. of firms	2037	123	1816	38

This table gives the year wise mean values of the various variables. TFP is calculated using Levinsohn Petrin value added method with fuel as proxy as used in the estimation 5.1. Non-exporters for the year *t* are the ones which do not export in years *t-1 ,t and t+1*. Continuous exporters for the year *t* are the ones which export in year *t-1, t* and *t+1*. Starters are the ones which export in year *t* and *t+1* but not in *t-1*. Drop out are the ones which export in period *t-1* and *t* but not in *t+1*.

Table 3

Column1	Labor	Capital	Material	Fuel	Returns to Scale
TFP_va_material	0.445	0.456	na	0.035	0.94
	(0.012)	(0.040)		(0.011)	
TFP_va_fuel	0.449	0.379	0.293	na	1.12
	(0.012)	(0.033)	(0.012)		
TFP_sales_material	0.242	0.108	0.812	0.107	1.27
	(0.006)	(0.042)	(0.049)	(0.006)	
TFP_sales_fuel	0.243	0.119	0.606	0.308	1.28
	(0.006)	(0.030)	(0.007)	(0.035)	

Note: TFP was calculated using the Levinsohn Petrin method. The dependent variable was either output or value added. The first two measures here use value added and the last two use output.In the first measure, fuel is used as proxy whereas in the second material is used as proxy.

Annexure A

Definitions of terms used

Liquidity: Liquidity is defined as ratio of the difference in current assets and current liabilities to total assets.

Leverage: Leverage is defined as the ratio of short term debt to current assets

Very Small, Small, Medium, Large and Very Large: These size dummies are quintiles of assets by industry and by year.

I**ndustry**: Defined as the two digit National Industrial Classification (NIC-2) 1998. The NIC 1998 is consistent with the ISIC revision 3 classification.

Total Factor Productivity (TFP): Calculated by the Levinsohn- Petrin method, uses material as the proxy variable. Both labor and fuel are considered as freely varying inputs. Sales, deflated by the WPI, is used as the output.

Labor: Labor is calculated by dividing the wage bill by average wage per worker obtained from CSO's Annual Survey of Industries.

Capital Stock: Capital stock has been constructed by adding current period investment to last period's capital stock net of depreciation. Capital has been depreciated at the rate of 10%.

Annexure B

1. Estimation results using TFP measured using value added with material as proxy

Variable	lev_probit	lev_logit	liq_probit	liq_logit
export_d				
verysmall	-2.74	-4.83	-2.78	-4.90
	0.13	*0.22*	*0.13*	*0.22*
small	-1.99	-3.48	-2.03	-3.54
	0.13	*0.22*	*0.13*	*0.22*
medium	-1.32	-2.23	-1.36	-2.33
	0.14	*0.23*	*0.14*	*0.23*
large	-0.74	-1.25	-0.70	-1.17
	0.14	*0.23*	*0.14*	*0.24*
TFP	0.00	0.00	0.00	0.00
	0.00	*0.00*	*0.00*	*0.00*
leverage	-0.18	-0.30		
	0.07	*0.12*		
age	0.00	0.01	0.00	0.01
	0.00	*0.00*	*0.00*	*0.00*
liquidity			0.50	.94
			0.03	*0.07*
_cons	1.78	3.10	1.69	2.94
	0.13	*0.22*	*0.13*	*0.22*
lnsig2u				
_cons	1.61	2.75	1.63	2.76
	0.04	*0.04*	*0.04*	*0.05*

Note: Standard error is given under the coefficients. export_d is the dummy variable for export participation. If the firm exported in year t, export_d will be equal to 1. If not then export_d will be equal to 0. Very small, small, medium and large are quintiles of asset size. Very large has been dropped because of collinearity. TFP is the TFP calculated using the Levinsohn-Petrin method. It equals 0.00015 (0.00011) for the probit estimation with leverage as regressor. Leverage is calculated as the ratio of short term debt to current assets. Liquidity is calculated as the ratio of the difference in current assets and current liabilities to total assets. lev_probit and lev_logit are the probit and logit estimation using leverage in the model. liq_probit and liq_logit are the probit and logit estimation using liquidity as the regressor. The logit is a random effects logit estimation.

2. Estimation using TFP calculated using output with fuel as proxy

Variable	lev_probit	lev_logit	liq_probit	liq_logit
export_d				
verysmall	-2.79	-4.92	-2.14	-3.83
	0.12	*0.20*	*0.11*	*0.18*
small	-2.18	-3.81	-1.52	-2.72
	0.12	*0.21*	*0.11*	*0.18*
medium	-1.44	-2.48	-0.78	-1.38
	0.13	*0.21*	*0.11*	*0.19*
large	-0.74	-1.25	0.72	1.21*
	0.13	*0.22*	*0.13*	*0.22*
TFP	0.00	0.00	0.00	0.00
	0.00	*0.00*	*0.00*	*0.00*
leverage	-0.14	-0.26		
	0.05	*0.10*		
age	0.00	0.01	0.00	0.01
	0.00	*0.00*	*0.00*	*0.00*
liquidity			0.56	1.05
			0.03	*0.06*
_cons	1.65	2.87	0.86	1.52
	0.12	*0.20*	*0.11*	*0.17*
lnsig2u				
_cons	1.62	2.77	1.65	2.79
	0.04	*0.04*	*0.04*	*0.04*

Note: Standard error is given under the coefficients. export_d is the dummy variable for export participation. If the firm exported in year t, export_d will be equal to 1. If not then export_d will be equal to 0. Very small, small, medium and large are quintiles of asset size. Very large has been dropped because of collinearity. TFP is the TFP calculated using the Levinsohn-Petrin method. It equals 0.00015 (0.00011) for the probit estimation with leverage as regressor. Leverage is calculated as the ratio of short term debt to current assets. Liquidity is calculated as the ratio of the difference in current assets and current liabilities to total assets. lev_probit and lev_logit are the probit and logit estimation using leverage in the model. liq_probit and liq_logit are the probit and logit estimation using liquidity as the regressor. The logit is a random effects logit estimation.

3. Estimation using TFP caluculated using output with material as proxy

Variable	lev_probit	lev_logit	liq_probit	liq_logit
export_d				
verysmall	-2.05	-3.67	-2.86	-5.04
	0.11	*0.17*	*0.12*	*0.20*
small	-1.43	-2.56	-2.24	-3.93
	0.11	*0.18*	*0.12*	*0.21*
medium	-.70	-1.23	-1.50	-2.59
	0.11	*0.19*	*0.13*	*0.21*
large	0.74*	1.25*	-0.72	-1.21
	0.13	*0.22*	*0.13*	*0.22*
TFP	0.00	0.00	0.00	0.00
	0.00	*0.00*	*0.00*	*0.00*
leverage	-0.14	-0.26		
	0.05	*0.10*		
age	0.01	0.01	0.01	0.01
	0.00	*0.00*	*0.00*	*0.00*
liquidity			0.56	1.05
			0.03	*0.06*
_cons	0.90	1.62	1.57	2.73
	0.10	*0.17*	*0.12*	*0.20*
lnsig2u				
_cons	1.62	2.77	1.57	2.79
	0.04	*0.04*	*0.12*	*0.04*

Note: Standard error is given under the coefficients. export_d is the dummy variable for export participation. If the firm exported in year t, export_d will be equal to 1. If not then export_d will be equal to 0. Very small, small, medium and large are quintiles of asset size. Very large has been dropped because of collinearity. TFP is the TFP calculated using the Levinsohn-Petrin method. It equals 0.00015 (0.00011) for the probit estimation with leverage as regressor. Leverage is calculated as the ratio of short term debt to current assets. Liquidity is calculated as the ratio of the difference in current assets and current liabilities to total assets. lev_probit and lev_logit are the probit and logit estimation using leverage in the model. liq_probit and liq_logit are the probit and logit estimation using liquidity as the regressor. The logit is a random effects logit estimation.