

Export Intensity and Financial Leverage of Indian firms

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Abstract

The export sector is considered an important sector for developing countries; hence it is important to understand the behavior of exporting firms. This paper looks at the financial structure of such firms and investigates plausible relationships between export status and leverage. If product demand from abroad has a low correlation with domestic demand, we would expect export-intensive firms to have greater cashflow stability than firms that only sell domestically due to this diversification; this implies that they would also be able to support higher financial leverage. On the other hand, exporting firms have been shown to incorporate intangible assets which allow them to increase their profitability; this would suggest a lower debt ratio. We test these hypotheses by looking at a sample of Indian firms. The diversification and cashflow stability hypotheses are accepted.

We also provide evidence on the determinants of capital structure for Indian firms over the last decade. Our results, which are consistent with theoretical expectations, yield the following conclusions: larger firms have more debt; firms with greater cashflow volatility have less debt; firms with greater availability of internal funds use less debt; and, finally, firms with more collateralizable assets – viz. firms that are less growth-oriented, more capital intensive and with less intangibles and R&D all have more debt.

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I. Introduction

After obtaining independence from their erstwhile masters, many colonies found themselves in a difficult situation. Many of them had manufacturing sectors that suffered from underinvestment and underdevelopment. At the same time, they had to cope with burgeoning populations and the high expectations of a newly-liberated people. The question was how they could grow in short order. The solution that many economists recommended was exports.¹ Considering their poverty in terms of capital, autarky would hardly make sense. What better way, then, to obtain resources than to focus on exports to developed and other developing countries? While there is not complete consensus regarding the success of this notion of export-led growth, there is evidence that the share of manufactured goods in exports from developing countries has increased over time.² And exports of services, too, more recently, have increased remarkably, particularly in countries like India that have been able to take advantage of their specialized labor pools. The ratio of exports to GDP has gone up from 7.2% in 1991 to 20.5 in 2005-6.³

Considering the importance of the export sector in emerging economies and in India, in particular, it is important to study the firms that make up this sector to evaluate its role in the growth of developing countries. There is growing research that looks at the

¹ See, for example, Razmi and Bleecker (2008) who lay out this line of thinking that goes back to 1935 (Akamatsu, cited in Razmi and Bleecker): "...less developed countries can move up the development 'ladder' by initially specialising in and exporting low-technology, unskilled, labour-intensive manufactures."

² Razmi and Bleecker (2008) show that the proportion of manufactures in the total merchandise exports of developing countries to industrialized countries has gone up from about 20% in 1980 to about 75% in 2003.

³ See the discussion in Panagariya (2008).

various aspects of these firms.⁴ In this paper, we contribute to this literature by looking at one specific aspect of exporting firms that has generally been ignored, viz. their financial leverage.⁵ Specifically, we examine the question of whether exporting firms have lower higher financial leverage than non-exporting firms and the reasons for the difference, if any. This research is interesting and useful from many points of view – one, it can be used normatively to look at how firms can use financial policies to improve their export performance; and two, it can be used to test theories of exporting firms.⁶ Finally, it can be used to throw light on theories of capital structure.

It is quite well known that firms' capital structures depend upon their industry affiliation, the nature of the assets they hold, etc.⁷ Why would there be any connection between firms' export intensities and their capital structure? One answer points to the low correlation between demand from abroad and domestic demand, particularly for developing countries.⁸ If this is the case, then firms that have diversified their operations

⁴ See for example, Chibber and Majumdar (1998) who look at whether Indian firms that export tend to be more profitable than other firms. Aulakh, Kotabe and Teegen (2000) look at exporting firms in Brazil, Chile and Mexico and find, inter alia, that “cost-based strategies enhance export performance in developed country markets and differentiation strategies enhance performance in other developing countries.” Another example is Demirbas, Patnaik and Shah (2009), who investigate the question of whether firms that are more productive tend to gravitate to export markets or not and answer it in the affirmative.

⁵ Demirbas, Patnaik and Shah (2009) document the financial leverage of different kinds of exporting and non-exporting firms. However, this is not their primary interest.

⁶ See, for example, Cavusgil (1982) Czinkota (1982), Moon and Lee (1990), Rao and Naidu (1992), Wortzel and Wortzel (1981) and Bernard and Jensen (2004).

⁷ See, for example, Titman and Wessels (1988) who use a latent variable model to examine the issue of what factors determine capital structure. More recently, Frank and Goyal (2009) looked directly at variables that have tended to be empirically important in capital structure decisions. Other papers investigate how firms dynamically adjust their capital structure; for example, Byoun (2008), finds that these adjustments depend on internal cashflows. There are also many papers that look at market reactions to changes in capital structure.

⁸ See, for example, Fadhlouli, Bellalah, Dherry and Zouaouil (2008).

to export markets, in addition to domestic sales, would have greater stability of cashflows. This should lead to an ability to take on greater financial leverage. In other words, even after adjusting for industry differences, we would expect to find that exporting firms take on more leverage than other firms. We should also be able to relate this additional leverage to the lower volatility of cashflows, as well as to the choice of export markets – firms exporting to markets that are more detached from their own home economies would take on more leverage.⁹

However, export status might very well be correlated negatively with financial leverage, as well. There is a lot of evidence that exporting firms are better and more efficient than other firms.¹⁰ If so, these firms probably have a lot of human capital incorporated in their value. Human capital, like other intangible assets, does not support high debt. According to this theory, exporting firms would have lower financial leverage.

Another reason for looking at exporting firms' financial policies is their ability to throw light on theories suggesting a connection between financial market development and economic development.¹¹ If this is true, then the success of exporting firms, which are often the force moteur of development, might have something to do with their superior access to finance. On the other hand, if exporting firms' financial policies are determined by their characteristics, rather than determining their ability to export, there would be less support for the financial markets-development nexus espoused by these theories.

⁹ That is, *ceteris paribus*, developing countries would prefer to export to developed countries with economies that are not highly correlated with their own.

¹⁰ See, for example, Ganesh-Kumar, Sen and Vaidya (2003) and Bernard, Jensen, Redding and Schott (2007).

¹¹ See, for example, Levine and Zervos (1998) and Rajan and Zingales (1998).

Finally, our paper also adds to the research on the determinants of the capital structure of Indian firms. Bhaduri (2002) has studied this question using data on 363 firms for the period 1990-1995, using a technique similar to that of Titman and Wessels (1988) and obtained mixed results. While he was able to explain 34% of the variation in long-term debt ratios, his use of factor analysis means that it is not always possible to understand why a particular explanatory variable has a specific sign in the regression. Furthermore, the factor that he identifies as a growth factor is positively related to financial leverage, in contrast to theoretical expectations. Finally, he studies a period soon after the liberalization of the Indian economy; firms may not yet have adjusted to the new circumstances. Our data comes from a more recent period beginning almost a decade after economic liberalization, covers about 1800 firms and our results are generally consistent with theoretical expectations. We discuss our results in the next section.

II. Data and Methodology

A: Data

Data was obtained from the Prowess database marketed by CMIE (Centre for the Monitoring of the Indian Economy). While CMIE data is available from the 1990s, there are a lot of policy changes in the earlier years; furthermore, firms are still responding to the new economic environment in these years.¹² Hence we used data from a more recent time period. We chose firms on the A and B lists of the Bombay Stock Exchange with available data from the years 2000 to 2009. Whereas other studies look at the total debt ratio, we chose to focus on the long-term debt ratio. This is because exporting firms

¹² There is some evidence even in the earlier years that exporting firms are already different from other firms (see Ganesh-Kumar, Sen and Vaidya, 2003).

often obtain working capital on preferential terms through government programs; hence a finding that exporting firms use debt may be driven by such preference factors. Table 1 shows the number of firms, by year, for which we have data. Table 2 provides summary statistics on some of the important variables that we use in our study. Table 3 provides information on the behavior of Long-term debt over time for exporters versus non-exporters. Figure 1 shows this behavior graphically.

Table 1: Number of firms in sample, by year

Year	Number of firms
2000	2155
2001	2160
2002	2155
2003	2155
2004	2149
2005	2147
2006	2143
2007	2143
2008	2145
2009	2152

Figure 1: The Behavior of Long-Term Debt Over Time

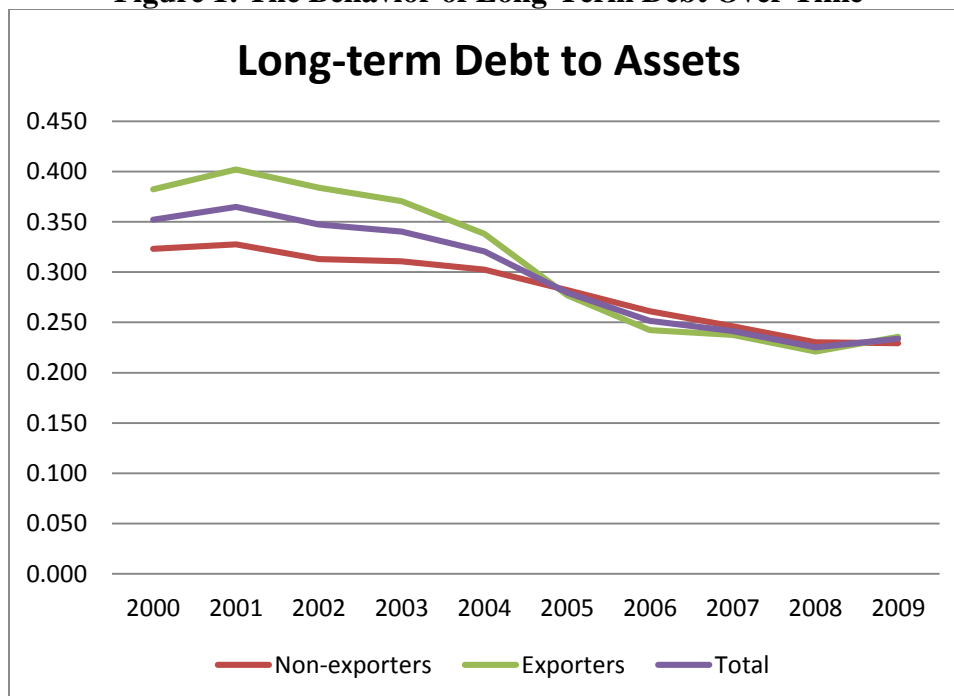


Table 2: Summary Statistics for Selected Firm Specific Variables

LtDebt is the ratio of long-term debt to assets, where long-term debt is defined as firm borrowings minus current portion of secured and unsecured debt; ExpIntensity is the ratio of exports to sales; ExpIntenRel is $1-2|\text{expintensity}-0.5|$; DummyExports = 1 for firms which export and = 0 for firms which do not export; MarketCap is defined as the market price of the stock at the end of March (which is the end of the financial year for most firms in India) times the number of shares outstanding; BookValue is the same as Net Worth; BktoMkt is the ratio of BookValue to MarketCap; R&D is the ratio of R&D expenses on Capital Account to Sales; Log(Assets) is the natural logarithm of Total Assets; CashflowAssets is the ratio of OpCashFlow to Total Assets, where OpCashFlow is Operating Cash Flow before Working Capital Changes; CapInt is the ratio of Net Fixed Assets to Total Assets. Intangibles is the ratio of Net Intangible Assets to Total Assets; Assetbeta is the equity beta times (MarketCap/MktValAssets), where MktValAssets is computed as Total Assets – Net Worth + MarketCap; VarCashFlow is the Variance of OpCashFlow, computed using observations for the previous five years (hence, no observations are available for the years 2000-2004).

Variable	No. of obs.	Mean	Std.Dev.
LtDebt	17306	0.30	0.26
ExpIntensity	15053	0.15	0.26
DummyExports	17327	0.51	0.50
ExpIntRel	15053	0.17	0.26
MarketCap	17327	1022	7160
BookValue	17327	426	2433
BktoMkt	15497	1.96	12.52
R&D	15053	0.001	0.011
Log(Assets)	17316	4.41	2.30
CashflowAssets	17316	0.08	0.41
CapInt	17316	0.33	0.24
Intangibles	17316	0.01	0.05
AssetBeta	12828	0.34	3.25
VarCashFlow	7707	64400	967634

Table 3: The Behavior of LtDebt (the ratio of long-term debt to assets) over time for exporters and non-exporters

Year		Non-exporters	Exporters	Total
2000	Mean	0.323	0.382	0.352
	Std. Dev.	0.273	0.253	0.265
	No. of obs.	896	855	1751
2001	Mean	0.328	0.402	0.365
	Std. Dev.	0.279	0.254	0.269
	No. of obs.	886	878	1764
2002	Mean	0.313	0.384	0.347
	Std. Dev.	0.283	0.248	0.269
	No. of obs.	956	894	1850
2003	Mean	0.311	0.370	0.340
	Std. Dev.	0.281	0.245	0.266
	No. of obs.	944	928	1872
2004	Mean	0.302	0.338	0.321
	Std. Dev.	0.279	0.240	0.261
	No. of obs.	913	948	1861
2005	Mean	0.282	0.277	0.280
	Std. Dev.	0.271	0.224	0.249
	No. of obs.	930	944	1874
2006	Mean	0.261	0.242	0.252
	Std. Dev.	0.269	0.219	0.245
	No. of obs.	923	973	1896
2007	Mean	0.246	0.237	0.241
	Std. Dev.	0.255	0.207	0.231
	No. of obs.	880	1003	1883
2008	Mean	0.230	0.221	0.225
	Std. Dev.	0.243	0.193	0.217
	No. of obs.	828	988	1816
2009	Mean	0.229	0.236	0.234
	Std. Dev.	0.249	0.208	0.221
	No. of obs.	229	510	739
Total	Mean	0.288	0.310	0.299
	Std. Dev.	0.273	0.240	0.257
	No. of obs.	8385	8921	17306

Table 4: Differences between Exporters and Non-exporters

Variable	Non-exporters			Exporters			t-stat
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	
LtDebt	8385	0.29	0.27	8921	0.310	0.240	-5.6
MarketCap	8406	421.6	3492.9	8921	1588.6	9349.5	-10.8
BookValue	8406	302.1	1888.2	8921	543.5	2848.4	-6.5
BktoMkt	7408	2.196	16.203	8089	1.739	7.748	2.3
R&D	6132	0.000	0.004	8921	0.001	0.014	-6.5
Log(Assets)	8395	3.600	2.422	8921	5.166	1.889	-47.6
CashflowAssets	8395	0.050	0.563	8921	0.112	0.142	-9.9
CapInt	8395	0.285	0.270	8921	0.376	0.204	-24.9
Intangibles	8395	0.009	0.050	8921	0.009	0.042	-0.5
Assetbeta	5270	0.235	5.048	7558	0.406	0.325	-2.9
VarCashFlow	2838	24356.7	244185.4	3737	91642.1	1138087.0	-3.1

Note: Values in bold indicate t-test is significant at 5%

Table 3 shows that for the first part of the decade, exporting firms tended to have much more long-term debt than non-exporting firms. However, over time, the difference has become much smaller and from 2005 onwards, there is hardly any difference between the two groups. On the face of it, therefore, it would seem that exporting firms are more leveraged; however, there are other factors influencing capital structure and there may be systematic differences between exporting and non-exporting firms. Taking these differences into account, we may very well come to a different conclusion. For example, Table 4 shows that exporting firms are larger and are more capital intensive, both of which characteristics are correlated with more leverage.¹³ On the other hand, they score higher on growth indicators, such as R&D and (the inverse of) market-to-book, both of which are correlated with lower financial leverage. Hence the issue clearly needs to be investigated more thoroughly.

¹³ See Frank and Goyal (2009), for example.

B: Regression Evidence – the effects of the other explanatory variables:

We regressed LtDebt, the ratio of long-term debt to total assets on a measure of export intensity, as well as on several explanatory variables. For our measure of export intensity, we decided not to use an export dummy, since we would be ignoring a lot of information. Furthermore, the hypothesis to be tested suggest a relationship between the extent of involvement in exports and the firm's capital structure. We therefore defined our measure of export intensity as the ratio of exports to sales. However, since one of our hypotheses suggests that exporting firms might benefit from having a mix of exports and domestic sales leading to lower cashflow volatility, we defined the following measure of relative export intensity, $\text{ExpIntenRel} = 1 - 2|\text{expintensity} - 0.5|$. If a firm's sales are equally divided between exports and domestic sales, such a firm would score the maximum of 1 on this measure. Firms that rely entirely on the domestic market or entirely on the foreign market for their sales would score the minimum of zero; other firms would score between zero and one.¹⁴

For our independent variables, we used variables that have been commonly used in tests of capital structure theory in investigating US firms. Titman and Wessels (1988) used a latent variable model to examine the issue of what factors determine capital structure. They investigated the following different categories of variables: a) the

¹⁴ We also considered the standard export intensity variable defined as the ratio of exports to total sales. See Table 5 below for details.

While the relative intensity variable is somewhat ad hoc in that we do not know the optimal ratio of exports to domestic sales, here's how it could be conceptualized and justified. Suppose var_x is the variance of cashflows derived from foreign sales and var_d is the variance of domestic sales. Then, the optimal proportion of sales to be derived from exports in order to minimize the variance of total cashflows would be $\text{var}_d / (\text{var}_x + \text{var}_d)$. If $\text{var}_d = \text{var}_x$, then the optimal proportion would be 0.5. In principle, we could estimate var_d and var_x for each firm, but the estimation error would be large. Hence we use the simple assumption that $\text{var}_d = \text{var}_x$ as a reasonable prior and as a convenient approximation to the true variance numbers.

collateral value of assets, b) non-debt tax shields, c) growth, d) uniqueness, e) industry classification, f) size, g) volatility and h) profitability. Of these, they found uniqueness to be most important and find non-debt tax shields, volatility, collateral value, and future growth to be unimportant. Later researchers, however, did find other factors to be relevant. For example, Frank and Goyal (2009), found industry effects, market-to-book ratios, size, tangibility, inflation and profits to be important.

Following these and other studies, we chose several explanatory variables. First, we included $\text{Log}(\text{Assets})$ as a measure of firm size: there is a fair amount of literature suggesting that larger firms tend to have greater financial leverage. The whole notion of size as a determinant of firm choices is one fraught with uncertainty; there is no unambiguously accepted theory of firm size. Hence the best explanation of why size seems to consistently show up as a statistically significant variable in firm choice regressions may be that size is a proxy for some other firm characteristic. In this case, firm size may very well be proxying for stability of cashflows. Larger firms tend to be established firms and such firms tend to have stable cashflows. Further, if one thinks of a firm as a portfolio of projects, not all perfectly correlated, then a larger firm would have a greater potential for diversification across projects, leading to lower cashflow volatility.¹⁵ Lower cashflow volatility means that the firm can have higher leverage because for a given level of leverage, the probability of bankruptcy, i.e. the probability of not having enough funds to make promised payments on the debt is lower. The observed positive coefficient of size is consistent with this explanation.

We used VarCashFlow and AssetBeta as two measures of cashflow volatility. We included the firm's asset beta as an explanatory variable, on the assumption that beta and return volatility would be positively correlated. And since return volatility and

¹⁵ Assuming that there are minimum sizes for projects.

cashflow volatility are probably correlated (since a primary mover of prices is news regarding the firms future cashflow prospects), higher beta would imply lower financial leverage. AssetBeta is a measure of the beta of the assets of the firm. Since this is difficult to compute directly, we computed it indirectly as follows. We took the measure of equity beta provided by Prowess and adjusted for the weight of equity in the capital structure of the firm by multiplying the equity beta by the ratio of the market value of equity to total assets, implicitly assuming a debt beta of zero. As a proxy for the market value of assets, we used Total Assets – Net Worth + Market Capitalization. We do not compute the firm's equity beta, ourselves. Rather, we use the value provided by CMIE.¹⁶ In order to measure cashflow variability more precisely, we computed another variable, VarCashFlow, which is computed as the variance of Operating Cashflow before Working Capital Changes for each company over the past five years. This variable would be expected to correlate negatively with financial leverage, since the higher the volatility of cashflows, the higher the probability of bankruptcy for any fixed level of financial leverage, as explained earlier.

We used CashflowAssets (the ratio of cashflow to assets) as a measure of internal fund availability¹⁷ In theory, the greater the ability of a firm to generate cashflow, the lower the need to go to the capital markets for financing. And since higher cashflows (and higher profitability) automatically increase a firm's equity, the result would be a

¹⁶ This value is computed by regressing weekly firm returns on the CMIE Overall Share Price Index, using data for the last five years.

¹⁷ See Myers (1984) for a static version and Viswanath (1993) for a dynamic version of the Pecking Order Hypothesis that suggests the importance of this category of variable. Byoun (2008) presents a recent test of this hypothesis.

lower level of financial leverage. Hence we would expect a negative relationship between financial leverage and measures of cashflow.¹⁸

And finally we have four measures of asset quality – the ratio of Intangibles to Total Assets and (the inverse of) BktoMkt as measures of firm growth; R&D as a measure of firm uniqueness; CapInt (the ratio of Net Fixed Assets to Total Assets) as a measure of collateral. Capital Structure theory suggests that tangible assets provide greater debt capacity, since the market for tangible assets is more liquid relative to intangible assets and because tangible assets tend to have multiple uses and therefore do not lose value when a firm's fortunes decrease. On this basis, we expect a negative coefficient for the Intangibles-to-Assets ratio and a positive slope coefficient for Capital Intensity. On the other hand, higher Market-to-Book values reflect the existence of growth options in the firm's asset structure; these decrease in value when the firm's prospects drop and are rarely marketable. Since many firms in our sample have a negative value for Book Value of equity (Net Worth), we use the Book-to-Market Value ratio instead. This variable, which we call BktoMkt would be expected to enter the regression with a positive slope. A similar analysis would apply for the amount of R&D expenditure, which is usually a force moteur for organic growth in the firm. This variable should be negatively correlated with firm leverage according to capital structure theory.¹⁹

We ran the regression as an unbalanced panel regression with a total sample size of 11452 observations (Table 5). The R-squared of the regression was 27%. It is interesting to note that when the standard export intensity variable, ExpIntensity, and our

¹⁸ Another variable that is often used in this context is the profit margin, the ratio of Net Income to Sales. However, this variable exhibited strange behavior exhibiting values below zero and above one with a mean of 7.43. Hence we did not include it.

¹⁹ See, for example, Titman and Wessels (1988), who find that firms with high R&D tend to have lower debt.

relative export intensity variable, ExpIntenRel, are both included in the regression (Model 1), the coefficient of the former is statistically insignificant; we therefore restrict our analysis henceforth to using ExpIntenRel as our measure of export intensity. The signs of the control variables are all, as predicted. ExpIntenRel is very significant in both model 1 and 2. We also included dummy variables for the years 2001-2009 (2000 is omitted), of which the dummies for 2004-2009 were significant.²⁰ This perhaps indicates omitted variables.

Table 5: Financial Leverage as a function of firm characteristics and export intensity variables

Variable	Model 1		Model 2	
	Coef.	P> t	Coef.	P> t
ExpIntensity	-0.0073	0.398		
ExpIntRel	0.0380	0	0.03377	0
Log(Assets)	0.0034	0	0.00340	0
CapInt	0.3640	0	0.36452	0
R&D	-0.6951	0	-0.69785	0
Intangibles	-0.5926	0	-0.59264	0
BktoMkt	0.0008	0.002	0.00080	0.002
AssetBeta	-0.0983	0	-0.09847	0
CashflowAssets	-0.0247	0	-0.02471	0
Year dummies included	YES		YES	
Constant	0.2194	0	0.2188	0
Number obs	11452		11452	
Sample	2000-2009		2000-2009	
R-squared	0.270		0.270	
Adj R-squared	0.269		0.269	

Note: Numbers in bold are significant at 5%

Tobit regression results are similar and omitted here to save space

Models were also estimated with robust standard errors; the significance did not change

It is worthy of notice that our independent variable is censored at zero, since a firm cannot have a negative value for financial leverage. This raises questions as to the

²⁰ These are not shown in the regression.

appropriateness of the linear regression that we use. In order to check that this has not skewed our coefficient estimates, we show below the results of the Tobit regression. As can be seen, the results are not affected. However, since it is difficult to interpret Tobit coefficients, henceforth we report only the results from the standard least-squares regression, unless there are counter-indications from the Tobit regression.

Table 5a: Financial Leverage as a function of firm characteristics and relative export intensity: Tobit regression results

Variable	Coef.	Std. Err.	t	P> t
ExpIntRel	0.0393	0.0077	5.1	0
Log(Assets)	0.0065	0.0011	6.2	0
CapInt	0.3972	0.0094	42.48	0
R&D	-0.6957	0.1663	-4.18	0
Intangibles	-0.6021	0.0432	-13.95	0
BktoMkt	0.0008	0.0003	2.8	0.005
AssetBeta	-0.1051	0.0035	-29.75	0
CashflowAssets	-0.0247	0.0043	-5.72	0
Year dummies included	YES			
Constant	0.1881	0.0088	21.28	0

Number obs	11452	
Obs. summary	969	left-censored observations at $ltdebt \leq 0$
	10483	uncensored observations
	0	right-censored observations
Log likelihood	302.47	

We now present results for Model 2 above, except that we include as an explanatory variable, the variance of cashflows. Since this variable is computed using data for the previous five years, we can only include observations for the years 2005-2009. Table 6 presents results from these regressions. For convenience, we also present data for the regression without the VarCashFlow variable, both for the entire time period (2000-2009) and for the restricted time period (2005-2009) for ease of comparison.

First of all, we see that the variance of cashflows is highly significant, and adds substantially to our ability to explain a firm's tendency to use long-term debt in its capital

structure – the R-squared of the regression jumps from 19.3% in Model 2 to 37.1% in Model 3. The effects of the other variables are all similar over all three regressions, with the exception of the BkToMkt variable, which goes from a predicted positive value to a negative value. Comparing Models 1, 2 and 3, we see that this is not due to the inclusion of the cashflow variance model, but rather an effect of the later years in the sample. This may be due to the fact that for most of this period, firm profits were high causing the book value of equity to rise while simultaneously reducing the role of long-term debt in the firm’s capital structure. However, this is only a conjecture and requires further investigation. We do not pursue this issue: on the one hand, a structural model of firm financing is not our main interest; on the other, all the other variables are quite well-behaved.

Table 6: Financial Leverage as a function of firm characteristics, including cashflow variance and relative export intensity

Variable	Model 1		Model 2		Model 3	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
ExpIntRel	0.03377	0	0.0344	0	0.0299	0
Log(Assets)	0.00340	0	-0.0011	0.372	0.0098	0
CapInt	0.36452	0	0.3108	0	0.2575	0
R&D	-0.69785	0	-0.8253	0	-0.6096	0.01
Intangibles	-0.59264	0	-0.4837	0	-0.3564	0
BktoMkt	0.00080	0.002	-0.0039	0	-0.0019	0.001
AssetBeta	-0.09847	0	-0.0623	0	-0.2916	0
CashflowAssets	-0.02471	0	-0.0165	0	-0.1891	0
VarCashFlows					-9.11E-09	0
Year dummies incl	YES		YES		YES	
Constant	0.2188	0	0.1759	0	0.2344773	0
Number obs	11452		5882		5076	
Sample	2000-2009		2005-2009		2005-2009	
R-squared	0.270		0.193		0.371	
Adj R-squared	0.269		0.192		0.369	

Note: Numbers in bold are significant at 5%

Tobit regression results are similar and omitted here to save space; models were also estimated with robust standard errors; the significance did not change

C. Export Intensity and Financial Leverage:

A constant through all the regressions that we report above is the highly significant and positive coefficient of the relative export intensity variable, ExpIntenRel. This strongly supports the Diversification Hypothesis presented above in the first sections of the paper. The highly significant nature of the volatility variables, both the indirect asset beta measure as well as the direct cash flow variance measure, supports this conjecture. On the other hand, if our cash flow variance measure fully captured the diversification possibilities, we would not expect the export intensity variable to be significant anymore. Perhaps, then, our measure has not fully captured the diversification possibilities of the export status.²¹ Alternatively, there are other, hitherto unexplored, factors that explain this higher financial leverage for exporting firms.

In order to test this theory further, we computed the covariance between exports and sales for each firm. If diversification between domestic sales and exports were an important contributor to the lower cashflow volatility, which in turn would allow the firm to have higher leverage, then this correlation measure should be significant in explaining the higher financial leverage of exporting firms. However, in our regressions, while the sign of the correlation measure was negative as expected indicating that higher correlation co-existed with lower leverage, the statistical significance was low. This might be because of the low precision of this measure. Tentatively, then, we conclude that when a firm's sales are more or less equally distributed between domestic sales and foreign exports, the resulting diversification and consequent lower volatility of cashflows allows it to have higher financial leverage. In order to examine the stability of this relationship over time, we estimate the model above, year-by-year.

²¹ From the results presented above in Table 5, we see that the pure export intensity variable, ExpIntensity, is not a better measure than ExpIntRel. The same result obtains for other specifications, the results of which we do not provide for lack of space.

Table 8: Financial Leverage as a function of firm characteristics and relative export intensity, year-by-year regressions

Panel A: 2000-2004

	2000	2001	2002	2003	2004
ExpIntRel	0.0660	0.0481	0.0388	0.0368	0.0296
Log(Assets)	0.0165	0.0180	0.0095	0.0107	0.0013
CapInt	0.4256	0.3963	0.4339	0.3997	0.3277
R&D	-2.9408	-1.0121	-5.0785	-2.4953	-0.1920
Intangibles	-0.5350	-0.6933	-0.6536	-0.5984	-0.5138
BktoMkt	0.0166	0.0056	0.0033	0.0000	-0.0010
AssetBeta	-0.1567	-0.2362	-0.1233	-0.1990	-0.2306
CashflowAssets	-0.3640	-0.3644	-0.0857	-0.2265	-0.0249
Constant	0.1421	0.2111	0.1686	0.2110	0.2607
Number obs	1068	1107	1109	1132	1154
R-squared	0.406	0.389	0.275	0.284	0.266
Adj R-squared	0.402	0.384	0.270	0.279	0.261

Panel B: 2005-2009

	2005	2006	2007	2008	2009
ExpIntRel	0.0133	0.0195	0.0246	0.0655	0.0330
Log(Assets)	0.0037	0.0023	0.0158	-0.0006	0.0170
CapInt	0.3271	0.2618	0.2137	0.3162	0.3001
R&D	-1.6963	-0.9222	-1.3046	-1.0746	-0.3462
Intangibles	-0.4537	-0.4189	-0.2819	-0.4990	-0.4248
BktoMkt	-0.0024	-0.0075	-0.0050	0.0000	0.0285
AssetBeta	-0.1691	-0.1775	-0.3413	-0.0153	-0.2446
CashflowAssets	-0.1235	-0.0047	-0.2607	-0.4711	-0.4952
Constant	0.2045	0.2065	0.2717	0.1686	0.1566
Number obs	1202	1254	1359	1426	641
R-squared	0.285	0.297	0.432	0.214	0.455
Adj R-squared	0.280	0.293	0.428	0.210	0.448

Note:

Numbers in bold are significant at 5% or 10%

Tobit regression results are similar and omitted here to save space

Models were also estimated with robust standard errors and the significance did not change

Note that the assetbeta variable is significant in all of the regressions. The export intensity variable continues to have the same positive sign in each regression, except that from 2002-2006 and in 2009, it is no longer significant. All the other variables also have the predicted sign consistently, except for the BktoMkt variable, as noted previously. This underscores the robustness of our previous findings.

D. Inter-Industry Differences in Financial Leverage:

Up to this point, we have treated all firms as a group. While this aggregate treatment provides some support for the general thesis that export intensity is positively related to financial leverage, we must recognize that there are likely to be differences across industries that are not sufficiently captured by the firm-specific variables that we have already taken into account. Furthermore, as Frank and Goyal (2009) point out, industry affiliation turns out to be a significant explanatory variable, in addition to the other variables that are traditionally used in capital structure models.

In order to check this, we started out by recognizing that mean debt-equity ratios vary by industry and hence we should allow for industry fixed effects in our regression of financial leverage on firm-specific characteristics. Industry membership for the companies was obtained from the PROWESS database, using the NIC classification variable. We used the industry classification shown below.

Industry	NIC numbers	% Observations	Variable indicator
Agriculture and Mining	10000-14999	2.54%	
Manufacturing	15000-36999	54.98%	manuf
Electricity	40000-44999	1.16%	electr
Construction	45000-45301	3.53%	constr
Trade and Hotel	50000-55000	7.50%	trade
Transport and Telecom	60000-64202	2.10%	transpt
Business Services	65000-75000	24.99%	busserv
Community Services	80000-92200	2.31%	comserv
Miscellaneous	93000-97000	0.88%	

Table 9: Industry Effects for Financial Leverage as a function of firm characteristics and exports including direct measure of Cashflow Volatility

Variable	Model 1		Model 2		Model 3	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
ExpIntRel	-0.0084	0.365	-0.0085	0.466	0.0001	0.993
Log(Assets)	0.0034	0.001	0.0005	0.708	0.0104	0
CapInt	0.3476	0	0.3088	0	0.2734	0
R&D	-0.8288	0	-0.9709	0	-0.6937	0.003
Intangibles	-0.4735	0	-0.4098	0	-0.3222	0
BktoMkt	0.0008	0.002	-0.0038	0	-0.0019	0.001
AssetBeta	-0.0912	0	-0.0586	0	-0.2859	0
CashflowAssets	-0.0255	0	-0.0167	0	-0.1900	0
ind_manuf	-0.0179	0.071	0.0005	0.969	-0.0367	0.003
ind_electr	-0.1076	0	-0.0904	0	-0.0928	0
ind_constr	-0.0211	0.157	-0.0027	0.882	0.0088	0.614
ind_trade	-0.0543	0	-0.0312	0.057	-0.0743	0
ind_transpt	-0.1134	0	-0.0712	0.001	-0.0830	0
ind_busserv	-0.0609	0	0.0010	0.947	-0.0137	0.338
ind_comserv	-0.1568	0	-0.0999	0	-0.0931	0
exp_manuf	0.0714	0	0.0749	0	0.0649	0
exp_electr	0.1960	0.009	0.0739	0.445	0.1499	0.079
exp_constr	-0.0290	0.763	-0.0625	0.565	-0.2195	0.077
exp_trade	0.0218	0.467	0.0436	0.278	0.0508	0.194
exp_transpt	-0.0724	0.191	-0.1041	0.207	-0.1484	0.157
exp_busserv	-0.0891	0	-0.0965	0	-0.0697	0
exp_comserv	0.0634	0.4	0.0157	0.87	0.0163	0.867
varcashflow					9.5E-09	0
year dummy variables	YES		YES		YES	
Constant	0.251694	0	0.1747	0	0.2758	0

Number obs	11452	5882	5076
Sample	2000-2009	2005-2009	2005-2009
R-squared	0.298	0.218	0.386
Adj R-squared	0.296	0.214	0.382

There are three different models considered here – all the models include the industry variables. There are two kinds of industry variables considered, industry dummies, labeled ind_manuf, ind_electr, etc. and interactions of the industry dummy with the relative export intensity variable labeled exp_manuf, exp_electr etc. Since the

agriculture industry includes very few observations, it has been commingled with the miscellaneous category. This commingled category is left out from the regression to prevent multi-collinearity. Hence all industry effects are relative to the agriculture industry. Model 1 includes data from 2000-2009, i.e. the entire sample period; however, this is only possible if we do not include the variance of cashflows variable. Model 3 includes the powerful variance of cashflows variable, but as a result, we only have data from 2005-2009. Model 2 uses the same observations as Model 3, but without the variance of cashflows variable to facilitate comparison with Model 1.

We note in all three models that there are industry effects in the levels. All the industry effects are negative relative to the omitted agriculture/mining/miscellaneous category. This is plausible given that mining firms tend to have high financial leverage. What is also of interest to us, however, are the interaction variables. In all three models, we see that the coefficient for the manufacturing sector interaction variable (exp_manuf) is positive, while that of the business services sector ($exp_busserv$) is negative. This is probably because the business services sector (which includes the IT sector) is much more integrated into the global markets. As a result, the diversification possibilities for exporting firms in this sector are much less than in other sectors; rather being exposed to the higher global volatility, they have lower financial leverage; this shows up in the regression as an interaction with the export variable. Exporting capability in this sector does not enhance debt capacity because of the probable high correlation between cashflows in exporting domestic firms and foreign firms. On the other hand, firms in the manufacturing industry are probably less integrated with the world economy and thus exporting firms have the opportunity to diversify their cashflow streams by participating in the world global economy. Once we take industry effects into account, export intensity no longer matters. This represents further support for the diversification hypothesis.

E. Endogeneity of Export Status and Financial Leverage:

In addition to our previous caveats, it must also be noted that we have not explicitly considered the fact that firms endogenously choose to export. And, indeed, capital structure might be a determinant of a firm's export status; if so, our regression model might well be mis-specified. One such hypothesis might go as follows. Firms in the export business are exposed to a lot of uncertainty – the business environment is constantly changing because these firms have to compete with other firms that operate internationally.²² It is well known that a consequence of high financial leverage is loss of flexibility, since these firms must make promised payments to debtholders each period, and further, may have to satisfy various covenants in the bond indenture restricting the firm from taking various actions. Consequently, it is possible that firms with less debt tend to export because of their greater flexibility. However, this story would suggest that exporting firms would have less debt. As a result, they tend to gravitate to businesses where there is not a lot of debt, which brings in its wake, covenantal and other restrictions. An alternative story would suggest that only aggressive firms can survive in the competitive export business. Firms with higher financial leverage signal their willingness to be aggressive because they have much more at stake if they fail – viz. failure.²³ According to this story, firms characterized by high financial leverage after adjusting for firm characteristics would tend to be involved in exports.

²² In contrast, domestic firms are protected to some extent because foreign firms will be less quick to enter the domestic market because of the need to make an investment in fixed costs (cost of dealing with a new bureaucracy, steep learning curve etc.).

²³ This is consistent with the model of Brander and Lewis (1986), who present a model where firms with higher debt tend to be more aggressive. In our context, firms with more debt would be more willing to enter export markets, which are more competitive, compared to domestic markets.

Table 10: Panel Granger-Casuality Test of Endogeneity of Relative Export Intensity

Dependent Variable: $\Delta \text{ExpIntRel}$		
Variable	Coef.	P> t
$\Delta^2 \text{LtDebt}$	-0.0011	0.86
$\Delta^2 \text{ExpIntRel}$	0.4832	0.00
$\Delta \text{Log(Assets)}$	0.0144	0.00
$\Delta \text{CashflowAssets}$	0.0013	0.69
ΔCapInt	0.0034	0.79
$\Delta \text{Intangibles}$	0.0451	0.25
$\Delta \text{BktoMkt}$	0.0000	0.91
$\Delta \text{AssetBeta}$	-0.0038	0.59
$\Delta \text{R\&D}$	0.0296	0.65
Year dummies included	YES	
Constant	-0.0003	0.94

Number obs	8107
Sample	2000-2009
R-squared	0.6114
Adj R-squared	0.6107

Note: $\Delta X = X_t - X_{t-1}$, where Δ denotes the first difference.

$\Delta^2 X = X_{t-1} - X_{t-2}$, where Δ^2 denotes the second difference.

Numbers in bold are significant at 5%

The number of lags was selected using the Swartz Information Criterion (SIC).

The panel data fixed effects were jointly insignificant and omitted to save degrees of freedom; only time fixed effects were kept in the regression.

These two hypotheses point out the importance of explicitly recognizing the endogeneity of firm's exports, as well as a possible role for capital structure in the firm's decision to export. We performed a Granger-Causality test to see if the long-term financial leverage ratio Granger-causes the relative export intensity. Table 10 presents these results. Since preliminary panel unit root tests showed the non-stationarity of our variables, we performed our analysis using differenced variables. The results, in Table 10, of the OLS regression of the change in export intensity on past lags of the change in long term debt and other factors show that past changes in long term debt do not Granger-

cause exports; we see that the lags of the long term debt are not significant. However, since the panel has only 10 years of data, it would not be appropriate to make much of these results. Another possibility is to estimate a two-stage estimation model that recognizes the firm's decision to enter the export market using appropriate instruments and then in the second stage regress debt ratio on the relative export intensity variable. We have not pursued this avenue of research in this paper because it is likely to take us too far afield. The question of endogeneity and/or reverse causation does remain, however, a significant caveat in interpreting our results.

III. Conclusion

The importance of the export sector for developing countries has been emphasized in the literature. In order for export-led growth strategies to succeed, policy makers need to know more about how exporting firms function. In this paper, we look at the long-term financing policies of exporting firms in India and seek to understand their financing strategies vis-à-vis non-exporting firms. Of course, exporting firms are similar to other firms in many ways, and hence their financing policies should be similar to those of other firms; hence we use variables that are recognized as determinants of financial leverage in corporate finance as controls. And, indeed, we find that firms' financial leverage is related to the standard variables suggested by corporate finance theory. Larger firms have more debt; firms with greater cashflow volatility have less debt; firms with greater availability of internal funds use less debt; and, finally, firms with more collateralizable assets – viz. firms that are less growth-oriented, more capital intensive and with less intangibles and R&D all have more debt.

However, exporting firms also differ from other firms. On the one hand, exporting firms tend to be more profitable than other firms, probably because of their greater human capital; finance theory teaches that, *ceteris paribus*, firms with more human capital have less financial leverage. On the other hand, exporting firms in developing firms have a greater ability to reduce cashflow volatility compared to non-exporting firms because their markets are generally located in developing countries, whose economies are not entirely in sync with developing country economies. To the extent that our measures of cashflow volatility do not capture this characteristic of exporting firms, we should find that exporting firms have less long-term financial

leverage than non-exporting firms. And, indeed we find that a measure of relative export intensity is significant in explaining financial leverage. However, once we add variables proxying for exporting firms' ability to diversify such as variance of cashflows and industry dummies interacting with export intensity, we find that the export intensity variable is no longer significant. This provides support for the notion that firms that export have higher financial leverage because their ability to use their exports as partial hedges against variations in domestic demand provides them with higher debt capacity.

While this evidence is certainly strong evidence of the diversification hypothesis, it would be worthwhile to do more work to confirm this theory. For one thing, in this paper, we have taken export status as given. However, a firm's exports are endogenous; in other words, it is conceivable that a firm's decision to export is related to the firm's financial leverage. Work on the interaction of financial and product markets shows that higher leverage tends to induce more aggressive behavior in product markets; if export markets are more competitive than domestic markets requiring more aggressive behavior on the part of their participants, firms with higher leverage may be more suited to such markets. Our preliminary investigations suggest that such reverse-causation does not exist; still future work might pursue this avenue this further using data from a longer time period.

In addition, in this paper, we have restricted ourselves to looking at long-term debt because export firms are given special breaks by the Indian government on their short-term borrowings. Since short-term debt is a partial substitute for long-term debt, explicit modeling of these tax-breaks may be warranted because it would then allow us to look at the entire leverage structure of exporting firms. Finally, it would be of interest to see if our conclusions can be replicated with respect to exporting firms in other developing countries.

Bibliography

- Aulakh, Preet S; Masaaki Kotabe; and Hildy Teegen. (2000). "Export strategies and performance of firms from emerging economies: Evidence from Brazil, Chile, and Mexico," *Academy of Management Journal*, vol. 43, no. 3, pp. 342-361.
- Bernard, A. B. and J. B. Jensen. (2004): "Why Some Firms Export," *Review of Economics and Statistics* vol. 86, no. 2, pp. 561-569.
- Bernard, Andrew B., J. Bradford Jensen, Stephen J. Redding and Peter K. Schott. (2007): "Firms in International Trade," *Journal of International Perspectives*, vol. 21, no. 3, pp. 105-130.
- Bhaduri, Saumitra. (2002). "Determinants of capital structure choice: a study of the Indian corporate sector," *Applied Financial Economics*, v. 12, pp. 655-665.
- Brander, James and T.R. Lewis. (1986). 'Oligopoly and financial structure: the limited liability effect,' *American Economic Review* 76(5): 956-970.
- Byoun, Soku. (2008). "How and When Do Firms Adjust Their Capital Structures toward Targets?," *The Journal of Finance*, vol. 43, no. 6, pp. 3069-3096.
- Cavusgil, S. T. (1982): Some Observations on the Relevance of Critical Variables for Internationalization Stages. In M.R. Czinkota and G. Tesar, eds., *Export Management: An International Context*, pp. 276-85. New York: Praeger.
- Chibber, Pradeep and Sumit Majumdar. (1998). "Does it Pay to Venture Abroad? Exporting Behavior and the Performance of Firms in Indian Industry," *Managerial and Decision Economics*, vol. 19, no. 2, pp. 121-126.
- Czinkota, M. R. (1982): *Export Development Strategies: U.S. Promotion Policy*. New York, Praeger.
- Demirbas, Dilek, Ila Patnaik and Ajay Shah. (2009). "Graduating to globalisation: A study of Southern Multinationals," Working Paper, National Institute of Public Finance and Policy.
- Fadhlaoui, Kais; Makram Bellalah; Armand Dherry and Mohamed Zouaouil. (2008). "An Empirical Examination of International Diversification Benefits in Central European Emerging Equity Markets," *International Journal of Business*, vol. 13, no. 4, pp. 331-348.
- Frank, Murray Z. and Vidhan K. Goyal. (2009). "Capital Structure Decisions: Which Factors Are Reliably Important?," *Financial Management*, v. 38, no. 1, pp. 1-37.
- Ganesh-Kumar, A.; Kunal Sen and Rajendra R. Vaidya. (2003). *International Competitiveness, Investment and Finance : A Case Study of India*, Routledge, New York.
- Jensen, J.B., Redding, S. and Schott, P., (2007) "Firms in International Trade", *Journal of Economic Perspectives*, vol. 21, no. 3, pp. 109-130.

- Levine, Ross; and Sara Zervos. 1998. "Stock Markets, Banks, and Economic Growth," *The American Economic Review*, Vol. 88, No. 3. (Jun., 1998), pp. 537-558.
- Moon, J. and Lee, H. (1990) "On the Internal Correlates of Export Stage Development: An Empirical Investigation in the Korean Electronics Industry," *International Marketing Review*, vol. 7, no. 5, 16-26.
- Myers, S. (1984). "The Capital Structure Puzzle," *The Journal of Finance*, v. 39, pp. 575-92.
- Panagariya, Arvind. (2008). "Transforming India," in Jagdish Bhagwati and Charles Calomiris (eds.) *Sustaining India's Growth Miracle*, Columbia University Press, New York, NY.
- Rajan, Raghuram G.; and Luigi Zingales. 1998. "Financial Dependence and Growth," *The American Economic Review*, v. 88, no. 3, pp. 559-586.
- Rao, T. R. and Naidu, G. M. (1992). "Are the Stages of Internationalization Empirically Supportable?" *Journal of Global Marketing*, vol. 6, nos. 1-2, pp. 147-170.
- Titman, Sheridan and Roberto Wessels. (1988). "The Determinants of Capital Structure Choice," *The Journal of Finance*, v. 43, no. 1, pp. 1-19.
- Viswanath, P.V. (1993). "Strategic considerations, the pecking order hypothesis, and market reactions to equity financing," *Journal of Financial and Quantitative Analysis*, v. 28, 213-234.
- Wortzel, L. H. and Wortzel, H. V. (1981). "Export Marketing Strategies for NIC and LDC-based Firms," *Columbia Journal of World Business*, Spring, pp. 51-60.