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Why do firms issue equity? Some evidence from an emerging economy, India

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10 April 2012

Online at https://mpra.ub.uni-muenchen.de/38043/
MPRA Paper No. 38043, posted 11 Apr 2012 15:38 UTC

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In contrast to the existing empirical research on the pecking order hypothesis which has been largely confined to the United States and a few other advanced countries, this paper attempts to test the hypothesis for an emerging economy through a case study of the Indian Corporate sector. A well diverse sample of 556 manufacturing firms over the period 1997-2007 is used in the paper to test the pecking order hypothesis. The study finds strong evidence in favour of the pecking order hypothesis – a result that stands startlingly odd to the most recent evidences against pecking order theory in developed countries (Fama and French, (2005), Frank And Goyal (2003, Lemmon and Zender (2004), Leary and Roberts (2004)).

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1. Introduction

The question of firm's choice of financing securities, particularly the equity issue remains one of the most intensely argued and enigmatic debate in corporate finance. An answer to this apparently straightforward question has its root in the seminal paper by Modigliani and Miller (1958 and 1963) in which the authors had demonstrated that in a typical neo-classical market firms enjoy the benefit of a complete separation of their investment and financing decisions. However, over the last couple of decades, by bringing in the concepts of asymmetry of information and agency costs, the theory of capital structure choice has significantly evolved. One of the widely cited asymmetric information models developed by Myers (1984) and Myers and Majluf (1984) predicts that the information asymmetry between the insiders and outsiders of the firm creates a pecking order over the choice of financing sources.

Based on the argument posited by Myers, the information asymmetry between managers and potential shareholders drives this pecking order in which the firm begins with

internal funds, followed by debt and then move to equity in order to finance their investment in an effort to minimize adverse selection possibilities. One of the main implications of this theory is that firms will have to under price their equity offerings in order to induce investors to subscribe to them. This raises the cost of equity funds to firms and hence they are reluctant to raise funds through these sources. In other words, a firm with superior information about their internal assets with respect to the market displays at first a preference for retained earnings followed by respectively safe debts, risky debts and finally for equity under duress.

A growing body of literature has emerged over couple of decades which has attempted to demonstrate the efficacy of the pecking order model as an accurate description of observed financing behaviour. However, the skepticism about the pecking order model and difference in conclusions dominate this arena of work. For example, in the recent studies, while the paper of Shyam-Sunder and Myers (1999) conclude that the pecking order offers a good description of observed financing behaviour of the US firms, the papers of Fama and French (2002,2005) and Frank and Goyal (2003) conclude the opposite. Further, though both the latter studies refute the conclusion of Shyam-Sunder and Myers, they differ in their own conclusion as well. In contrast to Fama and French (2005), Frank and Goyal (2003) infer that the pecking order is a better descriptor of the financing behaviour of the small firms as opposed to the large firms. Lemmon and Zender (2004) test the pecking order model taking into consideration the financial distress cost and conclude that the model indeed aptly captures the financial pattern of firms. Fama and French (2005), however, disagree with this conclusion. Leary and Roberts (2004) also proceed in the similar vein as Lemmon and Zender (2004) and include financial distress cost in their analysis but do not conclude in favour of the pecking order model. Using a novel information asymmetry index based on the market micro structure literature, Bharath et al (2006) test if information asymmetry is an important determinant of capital structure decision. They argue that firms characterized by low information asymmetry account for the majority of the pecking order failure. Therefore, even after decades of research attempting to test the efficacy of the pecking order theory to describe the capital structure decisions, the empirical evidence in favour of the theory remains still mixed at best.

Further, the existing empirical research has been largely confined to the US and a few other developed countries that may have institutional similarities. The issue of the capital structure choice in the developing countries has, however, received little attention. Only in recent years, a few studies have attempted to shed light on the capital structure choice within the institutional specifics of developing countries using firm specific information (Bhaduri (1999) Booth et al. (2001), Cobham and Subramaniam (1998), Cherian (1996), Singh (1995)). Moreover, a review of the literature reveals that there is no consensus or a definitive support of the pecking order as an accurate description of observed financial behaviour.

In a pioneering study, Singh and Hameed (1992) using a cross country analysis show that external sources in general and equity in particular are much more important in developing countries than in their developed counterparts. These results are startling because of two reasons. First, they stand in contrast to Mayer's (1988,1990) findings that the firms in developed countries depend more on the internal sources of finance and have minimal dependence on equity sources of finance.In fact, Singh and Hameed (1992) suggest the possibility of "reverse pecking order" for the developing countries. It also, indicates the possibility that large firms in *developing* countries might be different from those in the advanced countries in many important respects. Hence, it requires a systematic examination of corporate financing patterns and capital structure choices for firms in developing countries. Second, the result that the firms in developing world rely more on external sources stands quite contrary to the *a priori* expectations. Given the low levels of development of the stock market and the imperfections there in, one would expect firms in developing countries to depend more on internal sources of finance. This encouraged critics of Singh and Hameed (1992) to undertake more country specific studies with larger data set. Their objections to the Singh and Hameed study were two fold: First, the data set used for the Singh and Hameed study constitutes only top 50 (in Singh (1995) it is top 100) companies which might not be a true representation of their corporate sector. The second reason, which is more substantive in nature, came from Samuel (1996). He pointed out that the Singh and Hameed's finding of a reverse pecking order is essentially driven by the very definition of internal sources of finance used. The definition of the internal sources of funds used in Singh and Hameed study excludes

depreciation[1] as an internal source of finance. As a result it undermines the role of internal sources of finance. Recent studies on the India corporate sector by Bhaduri (1999) Cobham and Subramaniam (1998), Cherian (1996), provide results that are at odds with Singh and Hameed's result. All these studies use a much larger set of companies than that used by Singh and Hameed and the focus has been exclusively on India. Therefore, the existing literature on capital structure choice in the context of developing economy has been vexing and, to a large extent, an unresolved issue.

The goal of this paper is to provide a deeper insight into the issue by studying the extent to which the pecking order theory of capital structure provides a satisfactory description of financing behaviour of the Indian firms over the years 1997 to 2007. Apart from expanding the time series the contribution of this paper is two-fold. First, the paper provides evidence about the broad pattern of financial activities in India using a sample of 556 firms that had maintained its existence over the period 1997-2007. This stands in contrast to most of the studies based on Indian data, barring a few (e.g Bhaduri (1999)), which tend to portray mainly a macro picture without adequately controlling the possible sources of differentiation between firms in their optimization choices. Second, the paper develops a direct test of pecking order hypothesis which enables us to identify the extent to which the pecking order behaviour is consistent with the observed financing decision. In other words, the paper precisely focuses on exactly, where and when the pecking order hypothesis succeeds or fails to conform to the observed financing behaviour. In doing so, we are able to identify the *situations* where the theory struggles to conform to the data, thereby revealing elements that are missing from the theory.

Barring a few (e.g Bharath et al. (2006)) most of the studies on the pecking order relies on the financing-deficit regression proposed by Shyam-Sunder and Myers (1999) who, developed a key testable prediction of pecking order by suggesting that financing deficit should exactly be matched by a change in leverage. Exception to this rule is observed only under duress. Hence, the regression of net debt issue on financing deficit along with a null hypothesis of slope coefficient being one has emerged as the main working hypothesis to test the pecking order theory. In contrast, our paper attempts to deploy a

[1] Singh and Hamid (1992) ignore depreciation as internal sources of finance because of non-availability of depreciation data for many sample countries.

direct test of the pecking order hypothesis to address the concerns raised by Chirinko and Singha (2000). We first investigate how well the pecking order describes the financing decisions by testing the likelihood of an exact proportional relationship between net debt issue and financing deficit where the assumptions regarding the asymmetry of information and the riskiness of the firm are most likely to be met. This approach, as pointed out by Leary and Roberts (2004) is consistent with the approach of "simply staking up cards in favour of the pecking order hypothesis and determining an upper bound to its explanatory power". In addition, the approach also helps us identify situations where the pecking order struggles to describe financial behaviour and thereby enable us to suggest a possible integration of alternative theories in explaining the observed behaviour. Thus, this approach consistent with Leary and Roberts (2004) helps to shed light on the quality of the pecking order as a "conditional theory".

The remainder of the paper is structured as follows: Section 2 describes the methodology. Section 3 provides the description of the data used in this study. Section 4 presents and discusses the results and the final section concludes the paper.

2. Methodology

Any complete test of the pecking order should focus on its main prediction concerning the type of securities that firms issue to cover its financial deficit. In a world of asymmetric information all the risky securities are mispriced, since the insiders of the firm do not have any credible method of conveying information regarding the quality of the assets and the prospects they have. As a result, investors ask for "premium" in order to compensate for the probability of investing in bad firms. Firms always try to minimize such adverse selection premium by utilizing retained earning and thereafter issuing the safest security such as debt, as these are least affected by the information problem. Hence, the safest firm would therefore issue a public debt, while firms with moderate risk will issue private debt which suffers relatively less from the information problem due to covenants and monitoring. Finally the most risky firm would resort to equity.

This observation is further developed into a key testable prediction in the form of financing deficit regression initially proposed by Shyam-Sunder and Myers (1999), and further used by many studies by Frank and Goyal (2003) and Lemmon and Zender (2004). Specifically the empirical model used in these studies is given as:

$$\Delta D_{it} = \alpha + \beta DEF_{it} + \varepsilon_{it} \qquad (1)$$

where DEF_{it} follows the standard account flow of fund identity given as:

$$DEF_{it} = DIV_{it} + I_{it} + \Delta W_{it} - C_{it} = \Delta D_{it} + \Delta E_{it} \qquad (2)$$

where DIV is cash dividends, I is net investment, ΔW is change in working capital, C is cash flow after interest and taxes, while ΔD and ΔE are the net debt and net equity issued in a particular year respectively.

In the equation (1) the pecking order hypothesis implies that $\alpha=0$ and $\beta=1$, thus suggesting an exact proportional match of financing deficit by a change in debt. In contrast, we do not test the predictive power of this specification in order to describe the observed financing behaviour in conformity with the pecking order hypothesis. Instead, we develop an empirical model to test when and where the likelihood of this proportional relationship between deficit and debt do not conform to an exact relationship as predicted by the pecking order. In other words, we seek to identify the *non-conformity* with the pecking order hypothesis, in contrast to many recent studies.[2]

In the empirical model we propose to capture the likelihood of an event of non-conformity with the pecking order hypothesis using a logistic regression equation. The dependent variable of the logistic model defines a dichotomous outcome based on the exact relationship between deficit and debt. In other words, the dependent variables take the value one in an event of non-conformity with the pecking order, i.e. $(\Delta D_{it}/DEF_{it})$ is not equal to one indicting an equity issue. Specifically the model is:

$$\log\left(\frac{\pi}{1-\pi}\right) = \alpha + X\beta \qquad (3)$$

[2] For example, Shyam-Sunder and Myers (1999), Frank and Goyal (2003), Fama and French (2005), Lemmon and Zender (2004) and Bharath et al (2006).

where, π denotes the probability of non-conformity with the pecking order theory and β is the vector of coefficients. This framework also helps us to convert the log of odds back to the probability as:

$$\pi = \frac{e^{(\alpha + x\beta)}}{(1 + e^{(\alpha + x\beta)})} \qquad (4)$$

However, in this framework any non-conformity does not necessarily mean a violation of the pecking order hypothesis to describe the observed financing behaviour. The pecking order does not necessarily hypothesize that firms should never issue or repurchase equity. In contrast, it suggests that firms issue equity only under duress. For example, a firm could be in duress if it faces a high deficit and cannot issue fresh debt as it is already highly levered. Therefore, in this model we attempt to identify events when and why the pecking order succeeds or fails to conform to the observed financing behaviour. The pecking order theory is based on the asymmetry of information between insiders and the market. Accordingly, it is natural to examine how the likelihood of non-conformity with the pecking order increases with the degree of asymmetry of information faced by the firm. To this end a set of explanatory variables is introduced in the model which significantly influence the degree of information asymmetry, riskiness and debt capacity faced by the firm.

In contrast to the existing approach (Leary and Roberts (2004), Frank and Goyal (2003) and Fama and French (2005)) which predominantly uses a sub-sample analysis to test this hypothesis, we use a multivariate approach using a logistic regression framework. The multivariate approach helps us to understand the marginal impact of each of these factors in influencing the non-conformity with the pecking order hypothesis. Since this approach only focuses on identifying events where the pecking order theory does not provide an accurate description of the data, it does not offer any explicit evidence in favour of the financial hierarchy as proposed by the pecking order theory.

Turning to our empirical model, we introduce the level of deficit as an explanatory variable as we tend to believe that beyond certain threshold of deficit to asset ratio, firms may be forced to issue equity. Next, in order to distinguish the effect of a surplus firm

from that of deficit one, we split the sample into groups depending on their deficit values: a cash rich group, is characterized by negative deficit values, a medium group with positive but small deficit to asset ratio and a cash poor characterized by high deficit to asset ratio. The precise separation between a medium and a high group is identified through a sample split algorithm proposed by Hansen (1999). Also we anticipate that the threshold effect of deficit might get even more accentuated in the case of low debt capacity firms. This conjecture is also consistent with the view of Myers and Majluf (1984) that in the face of financial distress, firms confront constraints to issue debt and are forced to issue equity. To capture this effect, we have introduced interaction dummies based on deficit and debt capacity faced by the firm.

Second, we have introduced both direct and indirect measures of debt capacity (such as lagged long term debt to asset ratio as the direct and size and age as the indirect measures). This is consistent with the view of Leary and Robert (2004) that for larger, older and more capital intensive firms the debt capacity is less likely to be a concern. As mentioned earlier, the debt capacity is further interacted with the deficit levels to examine to what extent the firms with a high deficit coupled with a limited debt capacity constitute the group whose equity issuance violate the pecking order model.

Finally, we have noted that the pecking order claims that the type of security choice would be decided by the riskiness and the degree of asymmetric information faced by the firm (Helwege and Liang (1996)). Therefore, a set of proxies to capture riskiness and asymmetry premium are introduced into the model.

In order to control for the riskiness of the firm we introduce following variables: past leverage (one period lagged long term debt to asset ratio), volatility of cash flow (standard deviation of past three years cash flow) and liquidity ratio (ratio of current asset to current liability), while tangible assets (ratio of net fixed assets to total assets) lag divided payment (dummy which takes value one if dividend is paid last year), age (log of age), size (log of total assets), growth (growth of total assets) and assets specificity (ratio of R&D to total assets) are introduced to control for the asymmetry of the information faced by the firm. The lower the liquidity ratio and higher the cash flow volatility and past leverage, the more the firms are vulnerable to financial distress and hence tend to avoid debt. Similarly small, young and high growth firms are subject to more adverse

selection problems and hence tend to conform more to the theory. It is often argued that size and age capture reputation effect and hence larger and older firm might face less asymmetric information. However, it is important to note that these proxies for information asymmetry might have conflicting interpretation. For example, size and age are also likely to be positively correlated with debt capacity and tend to be positively associated with leverage. Similarly, the tangibility might play a conflicting role in capital structure decision. While the conventional view suggests that the tangible assets provide the collateral and hence it is associated with increasing leverage. Harris and Raviv (1991) pointed out that tangibility could also be a credible signal to resolve asymmetric information problem and hence firms with higher tangible assets are likely to issue equity. On a similar count, firms paying dividends and firms with moderate leverage are likely to have less severe adverse selection problems and hence may not adhere to the pecking order theory.

We have also introduced two additional variables, profitability (ratio of net profit to total assets) and financial slack (ratio of cash and investments to total assets. Firms with high profitability and high financial slack are commonly thought to be less leveraged (Fama and French (2002)). However, as pointed out by Frank and Goyal (2003), these proxies are open to multiple interpretations. First, current profitability can also act as a signal of investment opportunities. Alternatively, in the face of adjustment cost, profitable firms will be less levered even if the tradeoff theory is valid. We have also considered the timing of non-conformity as many studies such as Korajczyk, Lucas and McDonald (1990, 1991) Coe, Masulis and Nanda (1993) and Bayless and Chaplinsky (1996) have pointed out the influence of timing varying adverse selection problem on security issue. Therefore, following Leary and Roberts (2004) we split our sample period into high equity (hot) year and neutral year. “Hot” periods are defined as those in the upper quartile of the distribution of number of equity issuance in that year scaled by the number of firms in the sample. For our sample 1997, 2005 and 2006 turned out to be “hot” years. Finally, in order to control for unobservable firm specific effects both industry (42 industry dummies) and year fixed effect are introduced in the model.

3. Data and Sample:

The study uses data drawn from an electronic database called "Capitaline Plus" which provides a comprehensive record of accounting and financial information of the Indian firms. Since the focus of this study is on manufacturing establishments, attention here is restricted to a smaller subset of firms listed in this database. From this data set we selected firms based on the criterion that the firms should have maintained its identity and reported its annual accounts without any gap for the financial years 1997 to 2007. Screening for data consistency on the basis of this criterion led us to select sample of 585 firms, belonging to a divergent spectrum of 8 broad industries, viz., food, textiles, chemicals, metals and metal products, non-metallic mineral products, machinery and transport[3]. The final sample consists of a balanced panel of 585 non-financial firms for 11 years giving 6435 firm-year observations with no missing data. Therefore, the sample set, being a composite and heterogeneous mix of firms, offers considerable scope for cross sectional variation in data. In addition to the fact that the firms under consideration come from a broad spectrum of industries, this heterogeneity of the sample makes itself apparent in the spread of distribution of the firms over age and size.

4. Empirical Results:

In order to understand the pattern of security issue in India we have analyzed several indicators and traced the pattern across time as well as various other firm specific attributes. We begin with a simplest definition of equity issue as an event of net equity being positive while debt issue is captured as net debt being positive. Table 1 provides the average incidence of debt and equity issue of our sample from 1997-2007. The overall average of equity issue in India is a moderate 17%.While on an average more than 54% of our sample depends on debt issue. However, we do see a sudden spurt in equity issues in 1997, 2006, and 2007.

[3] At a lower level the data belongs to 42 industries

Table 1: Pattern of security issue over 1997-2007.

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. An equity issue is an event of net equity being positive while debt issue is captured as net debt being positive.

Year	Equity Issue	Debt Issue
1997	24.3%	62.8%
1998	20.5%	61.0%
1999	16.5%	57.2%
2000	16.2%	57.5%
2001	12.9%	53.6%
2002	11.1%	45.3%
2003	9.8%	45.6%
2004	14.2%	44.3%
2005	16.5%	54.4%
2006	21.8%	52.6%
2007	24.3%	56.5%
Over all	**17.1%**	**53.7%**

Since our current definition of equity issue ignores the other contemporaneous security issues and their usages, we further refine our definition into pure equity, pure debt and a joint issue decision. We define a pure equity decision as an event where net equity is positive while the change in debt is zero or negative[4]. Therefore, a pure equity issue would suggest an event of a sole equity issue or an issue to reduce outstanding debt and hence provide a better indicator of a security preference of a firm. Similarly, the pure debt decision would involve a sole debt issue as the equity repurchase is absent in our sample.

Finally a joint issue would involve both debt and equity issue. Table 2 provides the trend of security issues over our sample period of 1997-2007. On average, the incident of pure equity issue in India is as little as 7% while the debt issue remains the major source of funding. It is also important to note that in 10% cases firms decide to issue both types of securities. On the other hand, in 40% cases firms depend on internal sources of funds.

[4] Since no repurchase of equity is observed in the sample the net equity for this study implies a gross equity issue.

The information reported in Table 1 and 2 illustrate an important fact about the financial structures of the Indian firms. According to Fama and French (2005), during 1993-2003, 72% of the American firms issued equity. Table 1and 2 clearly demonstrate that this is not the pattern observed in India as during the similar time frame (1997-2008) only 17% of Indian firms issued equity.

Table 2: Pattern of security issue over 1997-2007.

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007.A pure equity issue indicates an event of a sole equity issue or an issue to reduce outstanding debt. A pure debt decision indicate a sole debt issue as the equity re purchase is absent in our sample. A joint issue would involve both debt and equity issue.

Year	Pure Equity	Pure Debt	Joint Issue	None
1997	0.08	0.46	0.17	0.30
1998	0.07	0.47	0.14	0.32
1999	0.06	0.47	0.10	0.36
2000	0.06	0.47	0.10	0.36
2001	0.05	0.46	0.07	0.41
2002	0.06	0.40	0.05	0.49
2003	0.06	0.41	0.04	0.49
2004	0.08	0.39	0.06	0.47
2005	0.07	0.45	0.09	0.38
2006	0.09	0.40	0.13	0.38
2007	0.08	0.40	0.16	0.35
Over all	**0.07**	**0.44**	**0.10**	**0.39**

Table 3: Pattern of security issue over 1997-2007.

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. Positive deficit indicate firms with DEF greater than zero as defined in equation (2). Surplus indicates a firm with a negative DEF.

	Over all	Positive Deficit	Surplus
Pure Equity	7.02%	3.08%	12.60%
Pure Debt	43.62%	74.42%	
Joint issue	10.08%	17.20%	
None	39.28%	5.31%	87.40%

Table 3 provides the distribution of security issue across positive deficit and surplus firms. In contrast to the pecking order theory, predominantly the surplus firms in the sample indulge into equity issues, while 75% of deficit firms depend on pure debt issues. Only a meager 3% positive deficit firms issues pure equity, whereas around 17% positive deficit firms prefer a joint issue. Notably, majority of the surplus firms (88%) remains dormant and do not issue any securities.

Table 4 provides further break down into security preference of our sample. In contrast to deficit firms, most of the surplus firms either retire outstanding debts (87.33%) or issue equity along with a reduction in their outstanding debt (12.60%). Only less than 1% cases deficit firms issue equity and 2.69% cases they combine this with a reduction in their outstanding debts.

Table 4: Pattern of security issue over 1997-2007.

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. Positive deficit indicate firms with DEF greater than zero as defined in equation (2). Surplus indicates a firm with a negative DEF.

Issue Events	All	Positive Deficit	Surplus
Retire Debt (net debt negative)	36.14%		87.33%
Debt Issue (net debt positive)	43.62%	74.42%	
Equity Repurchase (net equity negative)	0%	0%	0%
Equity Issue (net equity positive)	0.23%	0.38%	
Both net debt and equity negative			
Both net debt and equity positive	10.08%	17.20%	
Net debt positive and equity negative			
Net debt negative and equity positive	6.79%	2.69%	12.60%
none (Deficit= 0)	3.14%	5.31%	0.07%
	100.00%	100.00%	100.00%

Therefore, in sum, we observe a trend which is consistent with the pecking order hypothesis. Most importantly these results are also inconsistent with many theoretical papers put forth by Cooney and Kalay (1993), Fulghieri and Lukin (2001), Halov and Heider (2004) Bolton and Dewatript (2005) and Hennnessy and Livdan (2006).

A similar picture also emerges from the year-on-year aggregate fund flow statement presented in Table 5 and 6. Three main conclusions can be drawn from these tables: First,

equity plays only a marginal role as a source of fund for the Indian firms. Second, though these firms avoid equity issuance, their dependence on external finance is more than on internal finance. However, the dependence has shown a decline over the sample period. Most importantly, the bulk of the external finance constitutes corporate borrowings. Finally, while majority of the surplus firms reduce debt they also issue equity. Therefore, empirically we observed a mixed evidence for the pecking order theory. It is worth noting that these results stand in stark contrast to many studies for the developed countries such as (Fama and French (2005), Frank and Goyal (2003), Leary and Roberts (2004)). Specifically, according to Frank and Goyal (2003), US firms tend to depend more on the equity finance as opposed to debt and during their sample period net equity issues had grown at a faster rate than net debt issue. Therefore, what Table 5 and 6 show is exactly reverse of the conclusions inferred by Frank and Goyal (2003).

Table 5: Trends in flow of funds for positive deficit firms:

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. All the numbers are scaled by total source of funds. We report the average ratio of the annual aggregate value of the numerator for a portfolio divided by the aggregate value of assets, in percent.

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Over all
Dividend	0.112	0.092	0.112	0.133	0.186	0.081	0.184	0.114	0.192	0.129	0.097	0.121
Investments	0.968	0.847	0.850	0.937	0.919	0.931	0.876	0.834	0.769	0.854	0.897	0.878
Change in Working Capital	0.259	0.282	0.180	0.283	0.381	0.129	0.137	0.055	0.605	0.288	0.218	0.246
Cash Flow	0.615	0.491	0.457	0.735	0.769	0.600	0.604	0.675	0.964	0.800	0.716	0.695
Deficit	**0.724**	**0.731**	**0.686**	**0.618**	**0.718**	**0.541**	**0.592**	**0.328**	**0.602**	**0.472**	**0.496**	**0.550**
Net Debt	0.710	0.701	0.649	0.583	0.669	0.534	0.524	0.319	0.581	0.459	0.484	0.529
Net Equity	0.014	0.030	0.036	0.036	0.048	0.007	0.068	0.009	0.021	0.013	0.012	0.020
External Finance	**0.724**	**0.731**	**0.686**	**0.618**	**0.718**	**0.541**	**0.592**	**0.328**	**0.602**	**0.472**	**0.496**	**0.550**
Internal Finance	0.276	0.269	0.314	0.382	0.282	0.459	0.408	0.672	0.398	0.528	0.504	0.450
Total Source of Finance	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table 6: Trends in flow of funds for surplus firms.

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. All the numbers are scaled by total source of funds. We report the average ratio of the annual aggregate value of the numerator for a portfolio divided by the aggregate value of assets, in percent.

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Over all
Dividend	0.334	0.149	0.328	0.506	0.261	0.319	0.314	0.382	0.347	0.228	0.182	0.279
Investments	0.562	0.851	0.542	0.338	0.612	0.649	0.611	0.413	0.563	0.582	0.584	0.581
Change in Working Capital	0.098	-0.249	-0.070	-1.548	-0.220	-0.864	-0.403	-0.131	0.191	0.253	0.100	-0.131
Cash Flow	1.607	1.173	1.514	1.828	1.277	0.746	1.365	1.993	2.021	1.623	1.186	1.463
Deficit	**-0.613**	**-0.422**	**-0.714**	**-2.531**	**-0.623**	**-0.642**	**-0.843**	**-1.329**	**-0.920**	**-0.559**	**-0.319**	**-0.734**
Net Debt	-0.660	-0.434	-0.725	-2.553	-0.638	-0.653	-0.851	-1.363	-0.941	-0.578	-0.329	-0.750
Net Equity	0.047	0.012	0.010	0.022	0.015	0.010	0.008	0.034	0.021	0.019	0.010	0.017
External Finance	**-0.613**	**-0.422**	**-0.714**	**-2.531**	**-0.623**	**-0.642**	**-0.843**	**-1.329**	**-0.920**	**-0.559**	**-0.319**	**-0.734**
Internal Finance	1.613	1.422	1.714	3.531	1.623	1.642	1.843	2.329	1.920	1.559	1.319	1.734
Total Source of Finance	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Therefore, though the majority of the Indian firms predominantly select debt as preferred mode of funding, there exists a small segment of firms which issue equity. And one of the primary objectives of this paper is to explore this segment and understand why and under what circumstance they issue equity. We begin our analysis by analyzing the difference in average characteristics of debt issuing and equity issuing firms. Table 7A provides these average characteristics along with the statistical significance of these differences.

Table 7A: Average attribute of security issuing firms:

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. For column 4, "*" indicates a statistical difference in mean at 1% level of significance, while "**" indicates a 5% level of significance.

Attributes	Debt Issue (b)	Equity Issue (c)	Difference (Col (b) – Col(c)
Deficit to Assets Ratio	0.12	0.05	0.07*
Surplus to Assets Ratio	0.00	-0.03	0.03*
Positive Deficit to Assets Ratio	0.12	0.09	0.03*
Total Assets	610.93	1391.64	-780.71*
Age	32.66	33.94	-1.28**
Lag Long term debt to Assets Ratio	0.21	0.18	0.03*
Lag Dividend Payment Dummy	0.68	0.74	-0.06*
Cash Flow Volatility	0.07	0.07	0.00
Liquidity	2.90	2.87	0.03
RND to Assets Ratio	0.0012238	0.0019523	-0.0007285*
Growth Rate of Assets	18.19	23.37	-5.18*
Tangible Assets	0.91	0.51	0.40
Net Profit to Assets Ratio	0.01	0.07	-0.05*
Financial Slack	0.13	0.16	-0.03*
Hot Year Dummy	0.29	0.37	-0.08*
Pure Equity Incidence	0.00	0.41	-0.41*
Pure Debt Incidence	0.81	0.00	0.81*
Combined Equity and Debt Issue	0.19	0.59	-0.40*

Table 7A reveals that debt issuing firms are high deficits, low growth, less profitable firms and with less assets specificity. In contrast, equity issuing firms are low deficit, large, matured, and more profitable and cash rich. We also observe that the debt issuing firms tend to have more tangible assets and liquidity. However, in contrast to the general expectation debt issuing firms are more leveraged. Table 7A also brings out two interesting facts about equity issuing firms: First, firms with dividend history prefer equity issue and it also observed that firms tend to time their equity issue in "hot years". Second, firms with surpluses issue equity. Therefore, though the first observation is consistent with the pecking order, second one is not. Finally, 59% of equity

issuing firms tend to issue equity along with a debt issue, while only 19% of debt issuer combine it with an equity issue. Also 81% of debt issue is a "pure debt issue" while only 41% of equity issue is a "pure equity" issue.

Table 7B: Average attribute of security issuing firms:
A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. For column 6, 7 and 8 "*" indicates a statistical difference in mean at 1% level of significance, while "**" indicates a 5% level of significance.

	Pure Equity (a)	Pure Debt (b)	Combined Debt and Equity (c)	None (d)	(b)-(a)	(c)-(a)	(d)-(a)
Deficit to Assets Ratio	-0.065	0.115	0.136	-0.171	0.180*	0.201*	-0.106*
Surplus to Assets Ratio	-0.080	0.000	0.000	-0.171	0.080*	0.080*	-0.091*
Positive Deficit to Assets Ratio	0.015	0.115	0.136	0.000	0.101*	0.121*	-0.015*
Total Assets	861.8	339.5	1760.55	377.88	-522.3*	898.65*	-484.0*
Age	35.859	32.671	32.600	34.186	-3.188*	-3.259*	-1.673
Lag Long term debt to Assets Ratio	0.184	0.214	0.180	0.155	0.031*	-0.004	-0.029*
Lag Dividend Payment Dummy	0.636	0.652	0.813	0.616	0.016	0.177*	-0.020
Cash Flow Volatility	0.092	0.072	0.055	0.118	-0.020	-0.037*	0.026
Liquidity	2.682	2.879	2.994	2.998	0.197	0.313**	0.31**
RND to Assets Ratio	0.002	0.001	0.002	0.001	-0.001*	-0.001	-0.001*
Growth Rate of Assets	11.032	14.943	31.968	3.209	3.910*	20.935*	-7.823*
Tangible Assets	0.524	1.006	0.501	0.584	0.482	-0.023	0.060
Net Profit to Assets Ratio	0.090	0.004	0.049	0.069	-0.086*	-0.041*	-0.021
Financial Slack	0.186	0.125	0.145	0.187	-0.061*	-0.041*	0.000
Hot Year Dummy	0.325	0.265	0.406	0.236	-0.060*	0.081*	-0.089*

A very similar picture emerges when we further analyze the difference in average characteristics among pure debt, pure equity and a joint debt and equity issuing firms in Table 7B.

Finally before proceeding to our empirical model, we analyze the difference in the average characteristics of firms which follow the classical pecking order prediction of exact proportional relationship between net debt issue and financing deficit from their counterparts which do not follow the pecking order. Table 8 provides the results of this characteristic analysis between these two groups. The table clearly demonstrates that the firms which violate the pecking order tend to be large, more profitable with dividend history, and large deficit. In contrast, firms with low growth, high tangible assets and low assets specificity tend to follow the pecking order hypothesis. However, the risk attributes do not play any

significant role in differentiating these two groups. Finally, it is interesting to note that violation happens more in the "hot year" and also as a part of a joint issue decision of debt and equity.

Table 8: Average attribute of security issuing firms:

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. ΔD/DEF=1 indicate an exact relationship between debt and deficit as hypothesized by the pecking order model. For column 4, "*" indicates a statistical difference in mean at 1% level of significance, while "**" indicates a 5% level of significance.

	ΔD/DEF=1 (a)	ΔD/DEF≠1 (b)	Difference (a)-(b)
Deficit to Assets Ratio	-0.02	0.05	0.07*
Surplus to Assets Ratio	-0.08	-0.03	0.05*
Positive Deficit to Assets Ratio	0.06	0.09	0.02*
Total Assets	307.71	1600.18	1292.47*
Age	33.32	34.25	0.94
Lag Long term debt to Assets Ratio	0.19	0.18	-0.01
Lag Dividend Payment Dummy	0.63	0.74	0.11*
Cash Flow Volatility	0.09	0.07	-0.02*
Liquidity	2.94	2.85	-0.08
Net Profit to Assets Ratio	0.03	0.07	0.03*
RND to Assets Ratio	0.0012	0.0019	0.0007*
Growth Rate of Assets	9.39	23.16	13.77(
Tangible Assets	0.81	0.51	-0.30
Financial Slack	0.15	0.17	0.01**
Hot Year Dummy	0.25	0.37	0.12*
Pure Equity Incidence	0.00	0.40	0.40*
Pure Debt Incidence	0.53	0.01	-0.52*
Combined Equity and Debt Issue	0.00	0.58	0.58*

Although this univariate analysis provide valuable insight into the pecking order behaviour of the Indian firms, yet one needs to undertake a multivariate analysis to check robustness of these findings. Therefore, for a more formal analysis of pecking order hypothesis at the aggregate level, a series of logistic models are estimated. The logistic regression captures our dichotomous outcome variable which takes value one for non-conformity with the pecking order model (i.e., ΔD/DEF≠1). Further, in order to arrive at a robust conclusion, the model is tested for different specifications and the results are reported in Table 9. As we model the non-conformity with pecking order any significant positive coefficient would imply a higher likelihood of an event of non-conformity. All the models reported in Table 9 include both industry and fixed year dummy to capture the unobservable firm behaviour. However, we do

not include them in the table due to space restriction. Models 1-6 capture various specifications that we have tested to check the robustness of our results. These models primarily differ with respect to the financial deficit variable while the rest of the control variables remain the same. Model 1, serving as our benchmark, clearly brings out that large, matured, high deficit and high growth firms tend to violate the pecking order hypothesis. The profitable firms are more likely to violate the pecking order hypothesis. However, debt capacity captured through tangible assets and past leverage play an insignificant role in explaining the pecking order hypothesis. Firms tend to time their equity issue during "hot year" indicating that the violations are more common during the hot years than otherwise. Most importantly, these conclusions remain invariant across all specifications. Therefore, the result presented so far lends support to the *patched version* of the pecking order suggested by Lemmon and Zender (2004) suggesting that firms facing moderate leverage and large deficits caused by high growth are among the firms which will opt out of the pecking order and issue equity to meet this gap.

Next, model 2-6 capture the threshold effect of deficit on the event of non-conformity with the pecking order hypothesis. Two specific approaches have been adopted to split the deficit into high, middle and low groups: We have used the 90^{th} percentile value as the arbitrary cutoff in one, while in the other we have followed a more robust method of sample splitting using algorithm developed by Hansen (1999)[5]. The surplus group is defined as deficit being negative. In addition, to understand how this threshold effect might get accentuated with limited debt capacity we have interacted the middle group with past leverage in model 6. Model 4, 5 and 6 in Table 9 fail to support the possibility of a threshold effect as for both the high deficit as well as the middle deficit cases the likelihood of non-conformity with the pecking order model increases with the deficit level. Since, the magnitude of these two coefficients are not comparable we have estimated the marginal effect of each of the attributes used in the model[6]. The marginal effects are reported in table 10. In all the cases the marginal effect of middle segment is higher than that of high segment

[5] The threshold model is specified as $\Delta D_{it} = \alpha + \beta_1 DEF_{it} * I(DEF_{it} \leq \delta) + \beta_1 DEF_{it} * I(DEF_{it} > \delta) + \beta_3 Z_{it}$ where Z is the set of control variable and I isan indicator function. The mode is estimated using the algorithm developed by Hansen (1999).

[6] In the case of logistic regression, F(X) = P(Y=1|X), the Marginal Effect for Xk = P(Y=1 |X) * P(Y = 0|X) * bk.

indicating that the non-conformity with the pecking order can not be attributed to the scale of deficit. Moreover, the threshold effect does also not get accentuated by limited debt capacity as the coefficient on the interaction dummy is insignificant in all the cases.

Finally the rest of the variables such as volatility of cash flow, dividend history, liquidity ratio, and assets specificity have turned out to be insignificant in all the specifications. Further, since these variables have failed to add any additional explanatory power to our empirical model they have been drop from the final specifications reported in Table 9.

Turning to the goodness of fit of these models, most of the specifications reported in Table 9 tend to have a very high degree of concordance along with a high percentage of correct classification. All the models also satisfy the fitness criterion suggested by Hosmer and Lemeshow test.

Table 9: Pecking order test for a sample of 585 Indian firms:

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. A logistic regression is estimate with dependent variable which takes value 1 if $\Delta D/DEF \neq 1$ and zero other wise. $\Delta D/DEF \neq 1$ indicates a violation of an exact relationship between debt and deficit as hypothesized by the pecking order model. For all columns, "*" indicates a statistical difference in mean at 1% level of significance, while "**" indicates a 5% level of significance. Standard errors are reported in parenthesis. The δ indicates the threshold value suggested by the sample split algorithm of Hansen (1999).

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Intercept	-3.7613	-3.829	-3.7825	-3.8976	-3.826	-3.8780
	(6.9586)	(6.9612)	(6.9814)	(6.8523)	(6.9399)	(6.9408)
Deficit to Assets Ratio	0.5648 *					
	(0.2251)					
Surplus to Assets Ratio		0.00214	-0.0014	-0.0129	-0.00733	-0.00747
		(0.1043)	(0.0967)	(0.0721)	(0.0845)	(0.0847)
Positive Deficit to Assets Ratio		1.3659 *	1.2304*			
		(0.2945)	(0.3161)			
Positive Deficit to Assets Ratio* Lag Long term debt to Assets Ratio			0.00229			
			(0.00175)			
High Deficit to Assets Ratio (DEF/TA > 90th percentile)				1.1825*		
				(0.3085)		
Middle Deficit to Assets Ratio (0<DEF/TA <= 90th percentile)				3..7177		
				(0.6896)		
High Deficit to Assets Ratio (DEF/TA > δ (0.09))					1.4038*	1.4027*
					(0.2947)	(0.2949)
Middle Deficit to Assets Ratio (0<DEF/TA <= δ (0.09)					4.1377*	4.3872*
					(1.4976)	(1.5604)
Middle Deficit to Assets Ratio * Lag Long term debt to Assets Ratio						-0.00303
						(0.0054)
Log of Total Assets	0.4825 *	0.4888 *	0.4786*	0.4808*	0.4872 *	0.4902*
	(0.0274)	(0.0274)	(0.0283)	(0.0275)	(0.0274)	(0.0279)
Log of Age	-0.184*	-0.1858*	-0.1827*	-0.1827*	-0.1870 *	-0.1874*
	(0.0684)	(0.0685)	(0.0685)	(0.0685)	(0.0685)	(0.0685)
Lag Long term debt to Assets Ratio	0.137	0.032	-0.0184	0.0525	0.0336	0.0371
	(0.0968)	(0.1062)	(0.1169)	(0.1033)	(0.1062)	(0.1061)
Growth rate of Total Assets	0.00262*	0.00189*	0.00193*	0.00191*	0.00191*	0.00190*
	(0.00104)	(0.000971)	(0.000978)	(0.00097)	(0.000973)	(0.000971)
Financial Slack	-0.4755*	-0.4572*	-0.4567 *	-0.3780**	-0.4384*	-0.4414*
	(0.214)	(0.2132)	(0.2132)	(0.2142)	(0.2134)	(0.2136)
Tangible Assets	-0.0586	-0.076	-0.0718	-0.0675	-0.0754	-0.0742
	(0.0857)	(0.0881)	(0.0873)	(0.0869)	(0.0879)	(0.0874)
Hot Year (Year in 1997, 06 and 07)	0.368*	0.3529 *	0.3532*	0.3529*	0.3667 *	0.3667*
	(0.1424)	(0.1425)	(0.1427)	(0.1426)	(0.1428)	(0.1428)
Concordance	**73.3**	**73.4**	**73.4**	**73.6**	**73.5**	**73.5**
% of Correct classification	**83.2**	**83.2**	**83.2**	**83.2**	**83.2**	**83.1**
Hosmer and Lemeshow Lack Fit Test (P values)	**0.64**	**0.53**	**0.72**	**0.41**	**0.80**	**0.86**

Table 10: Marginal Effect of the attributes:

A balanced panel of 585 manufacturing firms from "Capitaline Plus" data base is used. The sample period is 1997 to 2007. A logistic regression is estimate with dependent variable which takes value 1 if $\Delta D/DEF \neq 1$ and zero other wise. $\Delta D/DEF \neq 1$ indicates a violation of an exact relationship between debt and deficit as hypothesized by the pecking order model. For all columns, "*" indicates a statistical difference in mean at 1% level of significance, while "**" indicates a 5% level of significance. Standard errors are reported in parenthesis. δ indicates the threshold value suggested by the sample split algorithm of Hansen (1999). Marginal Effect captures the partial derivative of the predicted probability with respect to a given independent variable.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Deficit to Assets Ratio	0.0758*					
Surplus to Assets Ratio				-0.0016	-0.0006	-0.0006
		0.001	0.0006			
Positive Deficit to Assets Ratio		0.174*	0.1599*			
Positive Deficit to Assets Ratio*						
Lag Long term debt to Assets Ratio			0.0003			
High Deficit to Assets Ratio (DEF/TA > 90th percentile)				0.144*		
Middle Deficit to Assets Ratio (0<DEF/TA <= 90th percentile)				0.4521*		
High Deficit to Assets Ratio (DEF/TA > δ (0.09))					0.1795*	0.1792*
Middle Deficit to Assets Ratio (0<DEF/TA <= δ (0.09)					0.5698*	0.6024*
Middle Deficit to Assets Ratio * Lag Long term debt to Assets Ratio						-0.0004
Log of Total Assets	0.0558*	0.0569*	0.0558*	0.0585*	0.0567*	0.0571*
Log of Age	-0.0322*	-0.033*	-0.0327*	-0.0222*	-0.033*	-0.0331*
Lag Long term debt to Assets Ratio	0.0081	-0.0061	-0.0123	0.0064	-0.006	-0.0054
Growth rate of Total Assets	-0.0177*	0.0004*	0.0004*	0.0002*	0.0004	0.0004
Financial Slack	0.0005*	-0.0415*	-0.041*	-0.0459*	-0.0377*	-0.0383*
Tangible Assets	-0.0426	-0.0199	-0.0194	-0.0082	-0.0195	-0.0192
Hot Year (Year in 1997, 06 and 07)	0.0632*	0.0628*	0.0628*	0.0019*	0.0633*	0.0633*

5. Conclusions:

Evidence presented in this paper provides support in favour of the pecking order hypothesis. The exploratory analysis and a set of econometric models indicate that Indian firms prefer debt to equity even in a deregulated regime, which is consistent with the pecking order hypothesis. Equity financing for the Indian firm plays a minimal role, while bulk of the financing deficit is covered through debt. These results are novel, because of two reasons: First the fact that the Indian corporate sector follows a hierarchical preference pattern as predicted by the pecking order hypothesis where equity plays a very limited role as source of finance, is in contrast to many studies such as Fama and French (2005), Frank and Goyal (2003), Leary and Roberts (2004) for a set of firms from the developed countries. Second, while our results relate directly to India, they are of more general interest. Most of the information-based models of financial structure have been developed with the aim of explaining the data relating to the advanced countries like the U.S with a significantly different institutional and financial environment than their developing counterparts. However, despite these differences in institutional framework, our findings point out that information-based model like pecking order hypothesis can successfully predict the capital structure choice for our sample, particularly for the equity issuing firms. These results are not surprising from the perspective of the pecking order theory as weak regulatory framework in many developing countries does not facilitate effective information disclosures and hence the relationships derived from information based models (e.g. pecking order model) are more likely to have a better empirical validity here. Therefore, contrary to general intuition, many of the mainstream capital structure theories do conform to the realities of developing countries, despite their differences in institutional characteristics.

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