STOCK MARKETS, FIRM FINANCE AND ECONOMIC DEVELOPMENT: IPO PROSPECTUS EVIDENCE FROM INDIA

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Abstract

Stock market activity and economic development are correlated internationally, but stock markets can only contribute to growth when firms begin to seek external equity. The present study examines this decision with reference to IPO prospectus evidence of Indian firms during the most recent period of market strength. The analysis reveals comparatively large issues that were probably greater than firms would have chosen if loan markets had been operating efficiently. The more general development gain of stock markets suggested by the analysis is that equity permits investment finance to be raised on terms seen by firm owners as being more favourable.

JEL Classification

G 32, O16

Keywords

Stock markets, share issue, Indian firms

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I. INTRODUCTION

The direction of influence involved in the observed international correlation between indices of stock market activity and per capita incomes was the subject of a number of research studies during the 1990s (Levine and Zervos, 1996, 1998 and Demirgüç-Kunt and Levine, 1996). Arguments that stock markets might contribute to economic growth were based on the view that their emergence could address financial market imperfections, and improve thereby the allocation of investment funds. This emphasis on inefficiencies arising in the absence of equity markets contrasts somewhat uneasily, however, with a substantial theoretical literature that had earlier identified drawbacks to external equity funding when such markets were already established. An influential strand of the traditional corporate finance literature focused on the dilution cost implied for firm owners in a public issue of shares, and concluded that firms would exhibit a 'pecking order' preference for debt over equity issue (Myers and Majluf, 1984, Myers, 1984).

To overcome the bias against external equity when loans are on offer, and to help find a role for equity finance in development, the attractiveness of debt must be thought at some stage to decline. One traditional consideration, the financial losses associated with potential bankruptcy, has been invoked in formal analyses that have attempted recently to justify the emergence of mixed funding choices (Bolton and Freixas, 2000, Bose, 2005). Applied to developing economies, an increased willingness to cede some

ownership in order to safeguard a growing (managerial) income stream might be especially applicable to the closely controlled firms that predominate in these circumstances (La Porta *et.al.* 1998, 1999 and Claessens *et.al.* 2000). Market imperfection considerations would add that the absence of a liquid equity market prevents owners who wish to sell some of their holdings (for risk diversification reasons) from doing so (Pagano, 1993). The owner may therefore feel obliged to diversify by broadening the range of (real) activities undertaken and, as it is unlikely that the firm would be able to manage all of these equally well, a less efficient allocation of investment funds than would be possible with a functioning stock market might be expected (Demirgüç-Kunt and Maksimovic, 1995, p. 6).

The bias against outside equity finance in the traditional literature may also be tempered when market imperfections prevent certain projects from being financed by loans. Moral hazard-related arguments suggest that the managerial incentive effects of very high gearing may make lenders unwilling to finance a firm on any reasonable terms. In this case, firms would not be able to obtain the funds necessary for expansion and overall development may again be impeded (*ibid.* p. 7). While a number of other channels for stock markets to influence development have been proposed, a final consideration for present purposes arises when a well-functioning market permits a country to attract international portfolio investment. By offering further diversification for the 'world portfolio' held by international investors, the cost of equity finance to local firms can be reduced, helping to encourage investment in more productive, if risky, projects (Obstfeld, 1994).

The relevance of this last observation to the present study may be clarified by reference to its context. Indian equity markets have a degree of significance in relation to their local economy that is unique at the stage of development the country has reached. One estimate suggests that equity issues (initial and seasoned) raised in total the equivalent of 20 per cent of domestic saving in 1994-5 (Shah, 1995). Moreover, stimulated by at least eight episodes involving fraudulent share issues and market manipulation between 1992 and 2001, extensive institutional reforms, including the introduction of electronic trading, were to produce a market environment approaching in sophistication that observed in developed economies (Shah and Thomas, 2002). Possibly responding to these developments, a marked increase in the foreign interest in Indian shares has helped to stimulate rapid growth in valuations. Market capitalisation grew to 77 per cent of GDP by 2005, with foreign investors estimated to hold about ten per cent of GDP in the form of equity assets, and to account for around one third of market turnover (Purfield, 2007, p. 5).

Even in favourable international conditions, the proposed developmental benefits of stock markets can only be realised if firms are induced to seek outside equity funding. The present study therefore attempts to clarify the motives involved by examining IPO prospectus evidence for firms that made this decision in the context of India's most recent period of market advance. The first section below explains the data sources and their timing in relation to overall share price behaviour, highlighting a degree of reliance on new equity by these firms that is somewhat surprising in view of the 'pecking order' conclusions of the earlier literature. To aid the later interpretation

of this finding, the theoretical conditions most favourable to a 'reverse pecking order' are reviewed in the second section, and their implications for the chosen balance of funding are investigated by means of simple simulation. Evidence from the sample is then presented and discussed against this background in the third section. The extent to which the findings may contribute to an understanding of the developmental role of stock markets will be assessed in conclusion.

II. FIXED PRICE IPO DATA FROM THE BOMBAY STOCK EXCHANGE

The initial decision of closely controlled firms to issue equity to outside investors is examined here through the use of prospectus data for a group of Indian IPOs that took place between mid-2004 and 2007. Having reached a peak in 1999 market capitalisation tended to weaken until mid-2003, when the current recovery began (Bhattacharya and Patel, 2003). The strong subsequent market upswing depicted in Chart 1 provides the context for the initial public offers studied here:

CHART 1 (SENSEX)

The 48 firms in the study comprise almost the whole population of *fixed-price* initial offers listed on the Bombay Stock Exchange (BSE) web site as having taken place since mid-2004. Exceptions from the coverage are banks and one firm with no prior trading history. While the coverage of fixed price offers (as of mid-September 2007) is otherwise complete it is clear that this issue method, in common with international trends, is in substantial relative decline. Over the same time period the number of 'book building' IPOs listed on the BSE site was roughly 200, reflecting a growing

preference for the pre-sale 'price discovery' afforded by the newer procedure. The restriction here to the fixed price issues was dictated by the provision of links from the BSE site to the company prospectuses that were not available with the book building listing (two further firms had to be excluded from the study because the link was not operative).

Although this selection could have introduced bias, the chosen firms cover a range of sectors that is as varied as that represented by the book building cases. Appendix Table A1 includes an indication of the activities involved together with summary information on shareholding patterns and firm size. Nearly all of the firms had accumulated a number of years of operation before the IPO date, with the figures suggesting that the typical firm was making its initial public offer 12 (median) years after its first incorporation. Just prior to the issue a very high concentration of shareholdings in the hands of the 'promoter group' is evident, as is the dilution implied by the forthcoming issue (the median promoter group holding was due to fall from 91 per cent to 52 per cent). The equivalent promoter share in all private and public limited companies in the manufacturing sector was 48 per cent in 2002 (Topalova, 2004).

The promoter group, typically headed by the individual(s) directly in charge of the firms' operations, also included an extensive listing of family members and relatives together with other persons and enterprises. Less frequently, institutional stakes were included in the promoter group, but in only one case was a sale of shares by a member

of the group to be included in the initial offer[1]. While members were not intending to sell shares at the time of the IPO, it was only in a minority of cases that they were planning to participate in the new issue.

Perhaps the most striking features of the summary table are captured by two ratios indicating the comparative importance of the issues to the firms and their owners. The median value of the equity finance share in the total of new funds to be raised was 82 per cent (14 firms were relying entirely on equity issue proceeds). In addition to the heavy reliance on equity, the funds raised ('project cost') were typically high in relation to the existing capital employed (net worth plus secured and unsecured debt). The median value for this ratio (107 per cent) implies that the projects typically exceeded in value the firms' prior (book) net worth – sometimes by a considerable margin.

The term 'project cost', referred to above to identify the total finance being raised by the firm at the time of the issue, reflects the fact that in almost all cases the IPO was linked directly in the prospectus information to a major intended project for the firm. The relatively detailed estimates provided for these developments were typically dominated by fixed capital and closely associated expenditures, although some subsidiary elements of interest will be noted later in relation to firm borrowing. While clearly important in relation to the firms' initial capital, it is also noteworthy that the expenditures were typically quite substantial in absolute terms. Using an exchange rate (2005) of 45 Rupees/$US, the median expenditure amounted to approximately

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[1] The exception involved the sale of a stake held by a venture capital company.

$7.8 million. Whereas a quarter of the firms were raising up to $4 million (Q1), another quarter required up to $12 million (Q3). The following section therefore analyses the IPO decision of an owner-manager (with a given initial equity stake) seeking to undertake a discrete investment project.

III. A DIFFERENCE OF OPINION AND THE IPO DECISION

The academic literature has identified four broad reasons for a firm to engage in an IPO: to minimise the cost of external funds, to permit founders to liquidate their holdings, to create share 'currency' to facilitate future takeovers (either of other firms or to attract offers for the firm itself), and to make strategic gains - for example, to raise a firm's public profile (Brau and Fawcett, 2006, p. 406). Of these, the first two are relevant to the present study, and the suggestion that firms seek to reduce their costs of finance through IPOs requires clarification in this context. If a cost-minimising debt-equity ratio could be identified, a firm would issue equity when it would otherwise become excessively geared by this criterion. The traditional literature proposed, for instance, that the ideal position would balance the tax deductibility advantage of additional debt against the marginal rise in the (probabilistic) costs of bankruptcy that the extra borrowing would entail. In the case of the IPOs under examination, the importance of this argument must be queried.

While the firms were raising substantial additional equity funds, it is not clear in general that their initial gearing was uncomfortably high. Using the balance sheet-derived ratio of secured plus unsecured debt divided by net worth, averaged for each

firm over the two years prior to the issue, median outstanding loans represented approximately 91 per cent of (book) net worth (or 48 per cent of net assets). The approximately equivalent average figure for the corporate sector as a whole in 2002 was 127 per cent (Topalova, *op.cit.,* Table p. 31). Again, taking the two-year average value for each firm prior to the issue, median income-gearing across the firms was a little over one fifth (the ratio of interest and finance charges to profit (EBITDA[2])). Referring to its inverse, implying an interest coverage ratio of between four and five, comparison with a corporate average of two for 1998 (albeit when interest rates were higher) does not suggest debt burdens for the IPO firms that exceeded international norms (*ibid.*).

With this tentative evidence that bankruptcy risk was not a crucial determinant of the IPO decisions under review, a perspective is required that can accommodate a decision to rely on equity issue in the absence of this threat. Partly prompted by a small number of firms in the sample that were intending to use some of the IPO proceeds to repay "expensive" term loans, the approach adopted allows firms to differ from the market in their assessment of financial prospects.

Evidence that the market's evaluations may not always accord with those of the owner (or with the most likely outcomes) arises in the literature on IPOs in developed economies. Attention there is drawn to the sometimes substantial initial under-pricing of the shares in the sense that their price at the end of the first day of trading is often considerably higher than the price at which they were floated some hours earlier.

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[2] Earnings before interest, tax, depreciation and amortisation.

India's IPO experience has been shown to be broadly consistent with this 'money left on the table' conclusion of international studies (for example, Ghosh, 2005). Although IPO under-pricing is well-established empirically, theoretical arguments relating to its causes are less settled. One detailed review of the relevant literature, while concluding that agency conflicts are likely to be a more important source of under-pricing than has been thought so far, argues that 'behavioural' (herd-type) explanations may also need to be invoked (Ritter and Welch, 2002).[3]

The suggestion that departures from fully efficient market expectations formation might be common in the IPO context raises the further possibility that these expectations may also not be formed on the basis of the same information. Perhaps the most common (rational) explanation for IPO under-pricing has emphasised the necessary asymmetry of information that is likely to exist between the comparatively informed issuer (the owner-manager) and the share-buying public. The supposed information advantage of the owner (as insider) over outside investors in the more general corporate finance literature has normally been thought to involve the expected (mean) return on the project to be financed. Insiders anticipating lower returns would be more likely to issue equity, thereby leading to a tendency for (all) new share issues to be discounted by the market. This argument suggested strongly that information asymmetries would lead firms to rely on debt, rather than equity, finance.

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[3] An agency-type problem may be illustrated by the decision of an investment bank to under-price the issue because its fee is not closely linked to the amount of funds raised for the firm. The agent's (bank's) main concern may simply be to ensure take-up of the issue. A low initial price (with almost certain immediate gains for initial investors) may also reduce the probability of litigation costs that could otherwise arise if investors are disappointed on following the bank's purchase advice.

The possibility that different information in relation to the expected variance (risk) of return could instead motivate reliance on equity issue was recognised initially by Myers and Majluff, but was thought less likely than divergent return expectations to be of empirical importance (*op. cit.* p. 209). Nevertheless, a context in which previously unquoted firms are seeking to finance relatively large projects provides grounds for questioning this conclusion. While entrepreneurs are widely characterised as being psychologically inclined to relative (over-) confidence in their plans, a Bayesian interpretation would be that their privileged possession of recent information favourable to the project is what causes them, rather than someone else, to undertake it (see for instance, Busenitz and Barney, 1997, and de Meza and Southey, 1996, regarding psychological characteristics). In the process of evaluating a project that is ultimately taken up, the arrival of new information presumably has the effect of increasing the owner's relative confidence in a good outcome. At the time the decision is taken, therefore, this argument suggests that the owner's probability distribution would be characterised by a greater degree of certainty (lower expected variance) and/or a higher expected (mean) return than that of the investing public in general.

This configuration of viewpoints is theoretically the most favourable to equity issue, and it is shown in an appendix that greater confidence on the part of the owner, in the sense of lower expected variance, could be sufficient alone to generate an optimal debt-equity issue choice. The underlying reasoning may be clarified with reference to Figure 1 where, to reflect the argument above, the entrepreneur's distribution of

expected returns (dashed) reflects both greater confidence and a somewhat higher mean than that for the market as a whole. The optimum described in the appendix is identified by a level of borrowing (of future repayment value $\underline{L}$) that will remain after the equity issue ($\underline{L}$ is measured from the left extremity to the vertical line). In the configuration chosen, whereas the entrepreneur clearly disagrees with the market's overall project valuation, this does not preclude approximate agreement over the worth of the total *equity* claim (all possibilities to the right of the line $\underline{L}$). Although the market has a lower expected *mean* return, its evaluation of the equity is boosted by the attraction (asymmetric, in view of $\underline{L}$) of the upper tail of the assumed distribution.

FIGURE 1

While the owner may agree to this extent with the market's valuation, the parallel implication from the same viewpoint is that the market over-discounts the debt claim. Its cumulative probability of full or partial default (the area to the left of $\underline{L}$ under the market distribution) exceeds that under the owner's curve. Equivalently, the owner believes it more likely the firm will prove to be solvent, and therefore to have to repay its loan in full, than the market currently believes. Under the conditions assumed in the appendix, and again in the owner's view, this implies that the interest rate charged would be thought unattractive. The motive for issuing outside equity is therefore to reduce reliance on "expensive" debt and, as the appendix shows, the greater the disparity in solvency probabilities, the greater the incentive to do so.

To assist interpretation of the sample evidence, the implications of the analysis for the chosen combination of debt and equity finance should be considered. The simple formal optimum condition describing the position of $\underline{L}$ in Figure 1, ((A2) in the appendix) is derived under the assumption that markets operate efficiently, and is repeated for reference below:

$$\frac{E(V_T)}{M}\bigg|_{(MAX)} = -\frac{d\underline{L}}{dS}\int_{\underline{L}}^{\infty} f(G)dG \qquad (1)$$

The term on the left is the *owner's* expected return *per share* of the enterprise at a future time T, and is the objective maximised at the optimum. The derivative term on the right is the marginal effect of a share issue on the (contractual) repayment value of the debt at T, assuming that it is used to finance a reduction in immediate borrowing. Defined as $\frac{d\underline{L}}{dS} \equiv \frac{d(e^{iT}L)}{dS} < 0$, it provides a source of anticipated 'saving' to be compared with the associated 'dilution' cost of the share issue (implied on the left of the equation). Although the value of this gain will be determined by the market, it must be adjusted by the probability from the owner's perspective that the firm will be solvent (and thus need to repay the debt) at T. This is achieved by multiplying the contractual debt reduction by the final integral term in (1), which defines this probability.

The essential point from the definition of the derivative on the right of the equation is that the owner would be expected to choose a combination of equity and *risk-bearing* debt finance. If, by contrast, the debt was sufficiently risk-free to be reflected as such

in the market interest rate ($i = $ r, the risk free rate), the improbable implication of the analysis is that the owner would be expecting an equity return at the chosen optimum of (less than) the risk-free rate (see (1) above - at this stage $\dfrac{d\underline{L}}{dS} \equiv \dfrac{d(e^{iT}L)}{dS} = -e^{rT}$). The relevance of this observation is that minimum chosen values for gearing are implied, and these can be estimated through simulations using the Black-Scholes equation.

While the procedure involved in the simulations is described in the footnotes to Table 1, it is apparent that the project with a standard deviation (of terminal value) of 20 per cent generates an approximately risk-free return on debt when gearing (measured as the current *market price* of debt divided by the *market price* of shares) is approximately 1.85. When risk increases (a standard deviation of 40 per cent) the debt becomes essentially risk free when gearing is about 80 per cent on the same measure (0.76)[4]. The values chosen by an unconstrained owner would, according to the analysis, be expected to be higher than these magnitudes.

TABLE 1

For comparison with the median value of 91 per cent for the IPO firms noted earlier, it should be recalled that this was measured in terms of *book values*. As it would normally be expected that the book (contractual) value of debt would exceed the market (default probability-adjusted) value, and/or that the market value of (all) the

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[4] A similar conclusion to this last result arises if the annual standard deviation is assumed to be 0.2, but the project 'pays off' at the end of five years.

equity would be higher than the historic (book) net worth, book gearing would be higher than the ratio derived from market values. While the simulations are clearly sensitive to the degree of risk assumed, the key implication arising from them is that an optimal equity issue decision would normally involve appreciable sums of risk-bearing debt as well. This conclusion may be underlined by recalling that the most favourable set of theoretical circumstances for the use of equity were assumed in deriving it. No allowance has been made, for instance, for the negative market reaction to share issue typically assumed in the literature. Whereas the IPO context may justify this neglect because of the re-assurance supplied to the market by the substantial continuing ownership stake, the bias of any remaining effect would favour higher gearing than implied by the above argument (Leland and Pyle, 1977).

The crude 'derivative' term reported in the final column of Table1 is intended to cast light on the determinants of the value of the equivalent term in equation (1). Its value is always larger for the riskier project, confirming the greater benefit of equity issue for owners when, other things equal, the market perceives a relatively high variance of returns. Alternatively, a relatively confident owner will attach a high probability to ultimate solvency, and to the likelihood that the debt will have to be repaid. The elevated *contractual* interest rates shown for the debt of the riskier project would appear unattractive from this perspective, even if they only represent fair compensation for insolvency risk to the market.

The overall conclusion of the analysis would therefore be that the high equity fraction observed in the financing of Indian IPO firms reflected the apparent unattractiveness

of borrowing terms to firm owners, despite comparatively modest initial gearing. This is the perspective investigated empirically below.

IV. RECENT INDIAN IPOS: FINANCIAL AND OTHER MOTIVES

When the owner is in a position to choose funding methods freely, the analysis has emphasised that equity issue *complements* borrowing in the particular sense that it reduces the risk-bearing interest rate charged. Sample firms with comparatively high initial gearing and perceived market risk may be expected to be particularly responsive to this incentive. Before considering the empirical evidence relevant to this interpretation, two alternative hypotheses that might explain the observed heavy reliance on equity issue should also be acknowledged. Rather than being free to choose between equity and debt, the dominance of the former in practice could simply reflect a lack of loan availability to firms in the Indian case. The second explanation, deriving from the international IPO literature, is simpler still – opportunism on the part of owners.

Setting aside for the present the possibility that loans were not available, the distinction between opportunism and the earlier analysis should be clarified. Whereas it was suggested that owners would issue equity in an attempt to reduce their overall cost of external capital, the argument did not require that they regarded the shares as being overvalued by the market. By contrast, the widely observed tendency for firms to time their IPO offerings – the 'hot issue market' phenomenon – has been attributed in the general literature to the attempt to exploit 'windows of opportunity' when

market sentiment is bullish (for instance, Ritter, 1991). This motivation is seen as a reason for the observed long-run under-performance of returns on IPO shares – the initial market price from which the returns are measured having been 'too high' (*ibid*).

Tentative evidence to this effect in the form of the post-issue mean monthly returns for the sample firms, relative to the popular SENSEX index, is presented in Table A2. In only 17 of 47 cases did the IPO firms out-perform the index on this measure, suggesting that opportunistic behaviour could have played a role in the share issue decision. Before accepting this as a general explanation, however, contrary indications from the sample firms should be considered. As already noted, the firms were typically well-established at the time of the IPO. The median age of 12 years from initial incorporation (average, 15) roughly coincides with peak values for the return on firm assets in a (weak) quadratic relationship with age (13 years using the mean return over the most recent two years). The attraction of issuing equity may therefore have been determined by market conditions in combination with the typical firm having reached a relatively profitable stage of its life cycle.

This observation accords with the quite frequent mention, in prospectus listings of the reasons for the forthcoming issue, of the desire to obtain a market quotation for the firm's shares. Although the often numerous individuals making up the promoter group were typically constrained from selling their shares for a 'lock-in' period of two to three years, the presumption that an objective of the issue was to prepare the way for them to realise their early investments would not be consistent with a deliberate attempt by owners to impose medium-term losses on the investing public. If the

ability of early supporters eventually to sell their holdings was a motive for the issues, another implication arises. To the extent that firms' share valuations are influenced by their market liquidity, comparatively small firms may need to issue a higher fraction of their funding requirement in IPO shares in an attempt to ensure sufficient subsequent trading activity. Chart 2 provides evidence consistent with this (and other) interpretations in the form of the relationship between the Rupee value of the project and the percentage intended to be financed by equity (Rs. 1 Lac = Rs. 100,000).

CHART 2

The quadratic relationship implied by the data suggests that a 'typical' minimum-sized project of around Rs. 2,500 Lacs would be six per cent *over*-funded by equity (the excess used to fund debt reduction). While this value may indicate an approximate minimum size of issue to ensure future liquidity for the shares, a number of firms clearly chose to issue less. The more reliable conclusion from the chart is that equity finance predominated with smaller projects. Logarithmic regression yields an estimated elasticity of equity finance with respect to project cost of 0.57:

Dependent Variable: LOG(EQUITYLAC)
Observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.168516	0.559168	5.666479	0.0000
LOG(PCOSTLAC)	0.570031	0.068490	8.322788	0.0000

R-squared	0.600933	Mean dependent var	7.806227
Adjusted R-squared	0.592257	S.D. dependent var	0.504671
S.E. of regression	0.322257	Akaike info criterion	0.613836
Sum squared resid	4.777069	Schwarz criterion	0.691803
Log likelihood	-12.73208	F-statistic	69.26880
		Prob(F-statistic)	0.000000

To explain this finding in terms of the earlier analysis, the relatively greater attraction of share issue to owners of smaller enterprises (with smaller projects) would arise from a greater disparity between their own and the market's assessment of the risk of likely returns. One dimension of this risk may be captured by the size of the intended project in relation to the existing capital employed in the business. The larger the new project relative to existing activity, the less reliable may past performance be as an indicator of prospective returns – at least from the market's perspective. In this connection, Chart 3 confirms that smaller firms (in terms of capital employed) were embarking on relatively costly projects:

CHART 3

At the lower end of the scale the semi-logarithmic relationship shown implies that a firm with Rs2000 Lacs of capital employed would be undertaking a project of 1.6 times this amount (roughly Rs. 3200 Lacs). At Rs 10,000 Lacs, the ratio would be about 65 per cent. The suggestion that smaller firms may be perceived by lenders as more risky would be consistent with the pattern of profitability (two-year-average EBITDA divided by capital employed) and firm size, measured again by capital employed:

CHART 4

Although the relationship between returns and firm size is only very weakly negative in Chart 4, the highest returns were earned by smaller firms. Perhaps more

significantly, reported returns for firms below the size of (say) Rs4,000 Lacs of capital employed were clearly highly variable. This pattern is confirmed by returns averaged over a longer period and, consistent with the perspective that higher returns may involve higher risk, a positive relationship between returns as measured and the effective interest rate (interest charges divided by secured and unsecured debt) is evident in Chart 5 (one observation was removed due to negative reported returns):

CHART 5

To summarise the evidence that market risk perceptions helped to determine the extent of firms' relative reliance on equity issue, the following regression equation has as its dependent variable the share of equity remaining to the promoter group *following* the IPO issue. The explanatory variables are their share *prior* to the issue, income gearing (normally averaged over five years) and the ratio of project cost to capital employed. Whereas the predicted sign on the first of these would be positive, the presumed concern of owners with retaining control might be expected to imply that a lower initial promoter share would lead to a lower relative degree of dilution following the issue.

Tentative evidence that lenders were sensitive to perceived risk in setting loan terms suggests that firms with high *income* gearing (interest charges to EBITDA) would tend to be those where the initial level of debt was relatively high, and where loan terms were regarded as expensive by owners. The predicted sign for this variable is negative in that owners would tolerate more dilution in order to limit their financial

charges. To the extent that the earlier argument linking project cost as a fraction of capital employed to (market) perceived lending risk is correct, the sign on the third variable would also be negative. Although the bulk of the explanatory power derives from the (non-proportional[5]) relationship with the promoter-group prior share, the signs on the risk-related variables are consistent with the hypothesis and statistically significant:

Dependent Variable: PROMPOST
Observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.19709	5.035042	2.422440	0.0196
PROMPRE	0.570458	0.052126	10.94379	0.0000
YGEAR5	-18.81152	7.177076	-2.621056	0.0120
COSTCAPEMP	-3.095902	1.254923	-2.467006	0.0176

R-squared	0.739614	Mean dependent var	50.23000
Adjusted R-squared	0.721861	S.D. dependent var	14.30475
S.E. of regression	7.544171	Akaike info criterion	6.959083
Sum squared resid	2504.239	Schwarz criterion	7.115016
Log likelihood	-163.0180	F-statistic	41.66001
		Prob(F-statistic)	0.000000

While differential risk perceptions may therefore have been relevant in prompting firms to rely on IPO equity to finance their expansion, the earlier analysis and simulations provide reason to doubt that this consideration would be sufficient alone to generate the high degree of reliance on new equity actually observed. It is well known that credit markets, even if generally well-functioning, may resort to quantity rationing (rather than interest rate adjustment) if risk is perceived to be high. In

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[5] The estimated equation suggests that the promoter group share would cease to decline after an IPO at an initial share of 28-29 per cent. Only in five cases was a smaller ratio observed for the post-IPO fraction, with a minimum value recorded of 24 per cent.

practice, credit market inefficiency could also lead firms to rely more heavily than otherwise on alternative funding sources.

Despite the extensive reforms in the Indian financial sector dating from the early 1990s, a number of observers have noted the unwillingness of banks to adjust interest rates to reflect loan risk (Bhattacharya and Patel, *op. cit*, Varma, 2004). Loans continue to be made at low rates to traditional, safe, borrowers and there is evidence that banks make little effort to extend their loan books when these needs have been met (Bhattacharya and Patel, *ibid* and Banerjee, Cole and Duflo 2003). Official lending policy guidelines, for instance, assume that firms will finance 75 per cent of their working capital needs (current assets − non-bank current liabilities) with bank loans, and 25 per cent from equity sources (*ibid.* p. 6). This institutional norm appears to be reflected in the data for the IPO firms. The following regression relates the two-year average interest rate charged to the return on assets and to the current ratio over the same period (current assets divided by liabilities):

Dependent Variable: INT2
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.030317	0.028023	1.081869	0.2855
ROA2	0.468492	0.107167	4.371598	0.0001
CURRENT2	-0.006874	0.002943	-2.335898	0.0243

R-squared	0.405670	Mean dependent var	0.109441
Adjusted R-squared	0.377369	S.D. dependent var	0.073183
S.E. of regression	0.057746	Akaike info criterion	-2.801168
Sum squared resid	0.140056	Schwarz criterion	-2.680724
Log likelihood	66.02628	F-statistic	14.33391
		Prob(F-statistic)	0.000018

While the calculated interest rate is again seen to be positively related to the return on assets, it is significantly negatively related to the current ratio – more 'liquid' firms on this measure obtained easier credit terms. Equivalently, firms wishing to obtain loans for longer-term purposes appear to have been at a disadvantage in the loan interest rates they were able to access.

V. CONCLUSIONS: STOCK MARKETS AND FIRM EXPANSION

Recent estimates suggest that IPO issues on Indian stock exchanges raised a combined total of $7.7 billion during 2007 – approximately three times the amount raised in 2005[6] (Financial Times 2007a). The contrast between such vigorous IPO activity and the 'pecking order' presumption that (established) firms would prefer external borrowing to 'seasoned' equity issues suggests that the developmental contribution of equity markets should be interpreted primarily in relation to the life-cycle of business enterprises. The pattern emerging from the small sample studied here is that firms normally begin to seek outside equity when a relatively mature stage of their initial development has been reached. At this time, the Indian evidence reveals that the financing of subsequent expansion is characterised by a 'reverse pecking order' in which most, or often all, of the envisaged expenditure is funded by the IPO issue.

To analyse the basis for this choice, the study presented the formal conditions in which pecking order reversal may be expected to arise. Even when these conditions are met, with owners more confident about outcomes than external investors, it was

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[6] The same report suggested that Chinese firms were thought to have raised a combined total of $100 billion in equity on the exchanges of Shanghai, Shenzhen and Hong Kong during 2007.

shown that the firm would be expected to combine the IPO with an issue of (risk-bearing) debt. Simulation results suggested that initial gearing was not typically high, further emphasising the lack of recourse by Indian IPO firms to new external borrowing. To explain this finding, the study noted both certain features of the sample firms that would be favourable to the issue of equity, as well as institutional considerations suggesting continuing limits on the supply of loans.

The potential importance of the owner-manager's equity stake in helping to counter the negative 'signalling' potential of external share issue has long been recognised in the literature (Leland and Pyle, *op.cit.*). To this consideration, the Indian sample adds that owners had typically relied in the early stages on a wide range of personal relations and contacts as sources of initial equity finance. Although such investors were normally constrained from selling their shares by a 'lock in period' following the IPO, the prospectus emphasis on the desire to obtain a market quotation (as one of the motivations for the issue) suggests the objective of creating for early investors, through a substantial initial public issue, the later opportunity to sell their holdings in a liquid market. To the extent that this pattern is acknowledged by Indian investors, the signalling problem of new 'outside' equity issue would be attenuated – poor subsequent share performance would then be costly for these 'inside' investors.

External investors may also have recognised that the IPO issues were occurring because owners considered loan finance to be either too costly, or unavailable. Evidence cited from elsewhere, for instance, recognised the highly conservative lending practices of Indian banks. Whereas the earlier theoretical analysis suggested

that equity issue might complement the use of risk-bearing debt in minimising the overall cost of external finance, Indian conditions seem to have imposed a substitute relationship between the two sources. Active equity markets have permitted well-established firms to raise external capital when bank finance has been in restricted supply. From the perspective of India's wider industrial development this conclusion is troubling.

In addition to their relatively extensive trading history, the IPO firms studied here were characterised by quite substantial asset size. They had succeeded in establishing their underlying business in the public eye and were now in a position to undertake major expansion of those activities. Bank finance, by contrast, is typically important to firms at an earlier stage of their development, before stock market access becomes feasible. The lack of use of bank funds by the IPO firms certainly suggests that smaller Indian enterprises at an earlier stage of their development may face a serious external financial constraint. To the extent that banks appear content to allocate deposits to the purchase of government bonds, the 'crowding out' implications, while avoidable by firms with access to the stock market, are likely to be felt by smaller, younger, firms that could otherwise improve modern sector employment opportunities in the course of their development.

Finally, in a more general international context, the new record set during 2007 for IPOs in the emerging markets raises again the complement/substitute relationship with loan finance ($255 billion was raised by the end of November, surpassing the previous record of $246 billion in 2006). Low yields (and interest rates) in the

developed centres have encouraged international investors to seek increased exposure to emerging markets. Fourteen out of the largest 20 IPOs by value took place in these markets, where values have been supported by international buyers[7] (Financial Times 2007b).

To the extent that the semi-reformed condition of Indian banking is reflected elsewhere, for example in China, two parallel components of this remarkable level of issue activity are suggested. Whereas international investor interest in emerging market share issues has been, in part, an outcome of abundant credit (and low real interest rates) in the developed markets, the ready supply of IPO scrip may equally have reflected a *deficiency* in the supply of such credit in the main emerging markets.

With a number of international investment vehicles funding their emerging market positions with low interest loan finance, the pattern described here is reminiscent of the early arbitrage argument proposed by Modigliani and Miller (1958). In claiming that a firm's chosen debt-equity ratio could not (under ideal market conditions) affect its overall cost of capital, they noted that investors could 'gear up' their holdings of a debt-free firm's equity by borrowing on their own account to fund their positions. The net result would be equivalent to holding the shares of the same firm that had taken on directly the equivalent gearing. On this interpretation, the lively international interest in emerging market issues may reflect in part the inability of IPO firms (and Indian investors) to achieve a desired level of balance sheet gearing. Ultimately, on this

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[7] Six of the largest were in China, which, in combination with Hong Kong, accounted for 21 per cent of the global IPO total.

interpretation, the strength of demand for emerging market equities depends heavily on the cost and availability of credit in the developed centres. Prospects for 2008 may not, therefore, be conducive to the setting of further records.

APPENDIX: THE OWNER'S ISSUE DECISION

The risk-neutral owner seeks to maximise the expected net value of the enterprise at a particular horizon (year T) attributable to a given (personal) equity holding. The project has fixed cost $\overline{K}$ with the excess over the owner's cash contribution financed by borrowing and the public flotation of shares. Interest rates and equity valuations are set under competitive market conditions and will reflect the financial risk implications of the owner's funding choice.

Provided insolvency is avoided, the initial loan (of present market value L) will be repaid with interest in a single 'bullet' payment at time T, amounting to $\underline{L} \equiv e^{iT} L$. It is assumed that the owner will be advised of the probable interest rate and equity valuation implications of any proposed variation in the public share issue. The objective function is:

$$(Max)\ E(V_T) = \frac{M}{(M+S)}\left[\int_{\underline{L}}^{\infty}(G-\underline{L})f(G)dG\right] \qquad (A1)$$

$E(V_T)$ is the (subjectively) expected value of the owner's share of the project at T, calculated as the product of the fraction of the total equity held (M representing the current market value of shares retained by the owner and S the value of those issued to

the public) and, in square brackets, the subjectively expected value at T of all the firm's shares. Should the firm value (G) fall short of the lower limit defined by the accumulated debt $\underline{L}$ (implying insolvency at T) the owner would receive nothing. Differentiation of $E(V_T)$ in (A1) with respect to S (using Leibniz's rule) yields, after re-arrangement, the first order condition:

$$\frac{E(V_T)}{M}\bigg|_{MAX} = -\frac{d\underline{L}}{dS}\int_{\underline{L}}^{\infty} f(G)dG \quad (A2)$$

The intuition behind this result is noted in the text. According to the second order condition, it is sufficient (not strictly necessary) for (A2) to be an optimum if the ratio of the owner's to the market's solvency probabilities has reached a maximum at the chosen position. That this will normally be the case is evident when (A2) is re-expressed in these terms (using a market valuation relationship equivalent to that in (A1)):

$$E(V_T)\bigg/M_{(MAX)} = \frac{\int_{\underline{L}}^{\infty} f(G)dG}{\int_{\underline{L}}^{\infty} g(G)dG}\, dE(V_{MT})\bigg/dS \quad (A2a)$$

The owners expected per share *average* return on the left (the maximand) is set equal at the optimum to the market's marginal expected per share value (the derivative on the far right) multiplied by the *ratio* of the owner's to the market's probability of solvency for the firm at T (the respective integral terms).

It may be noted that the assumed greater confidence of the owner implies that the market's marginal valuation will be depressed *below* the owner's average at the chosen point. Intuitively, the less relatively confident the market is in the firm's eventual solvency, the less attractive to the owner will be the discount on the firm's debt - shares are issued to reduce this penalty. The resulting funding position reflects the potential 'reverse pecking order' result noted by Myers, in which the balance of advantage moves towards equity issue when project differences concern perceived risk, rather than expected return (1984, fn 13, p. 584).

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FIGURE 1: THE ENTREPRENEUR'S EQUITY ISSUE DECISION

Probability of
return

A

$\underline{L}$
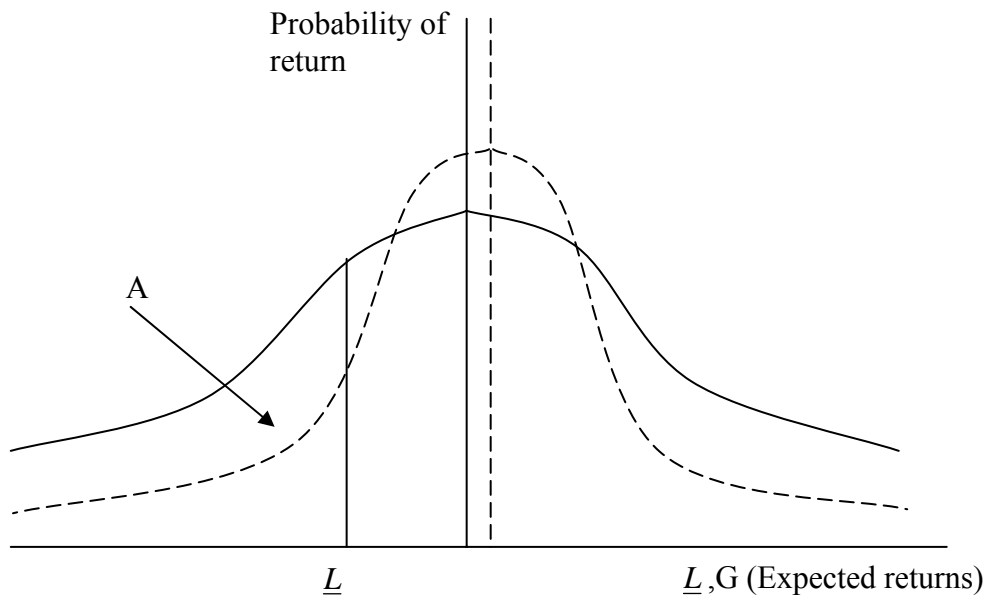
$\underline{L}$,G (Expected returns)

TABLE 1: FUTURE DEBT REDUCTION AND EQUITY VALUATION - INFERENCES FROM THE BLACK-SCHOLES EQUATION

Standard deviation of expected project value (fraction of $\overline{G}$ = 100): 0.2

$\underline{L}$	S (mkt. price)	Debt PV	Risk rate	Contract rate	Gearing	'$d\underline{L}/dS$'
100	4.2	82.8	0.11	0.19	19.90	
90	8.0	79.0	0.10	0.13	9.89	2.62
80	13.8	73.1	0.08	0.09	5.28	1.71
70	21.6	65.3	0.07	0.07	3.03	1.29
60	30.5	56.4	0.06	0.06	1.85	1.12
50	39.9	47.1	0.06	0.06	1.18	1.07
40	49.3	37.7	0.06	0.06	0.76	1.06
30	58.7	28.3	0.06	0.06	0.48	1.06

Standard deviation of expected project value (fraction of $\overline{G}$ = 100): 0.4

$\underline{L}$	S (mkt. price)	Debt PV	Risk rate	Contract rate	Gearing	'$d\underline{L}/dS$'
100	11.0	75.9	0.11	0.28	6.89	
90	14.7	72.2	0.10	0.22	4.90	2.70
80	19.5	67.5	0.09	0.17	3.47	2.11
70	25.4	61.6	0.08	0.13	2.43	1.70
60	32.4	54.5	0.07	0.10	1.68	1.42
50	40.5	46.4	0.07	0.07	1.14	1.23
40	49.4	37.5	0.06	0.06	0.76	1.13
30	58.7	28.2	0.06	0.06	0.48	1.08

Shared assumptions in the simulations

Estimated (market) mean value of the entire project at T: $\overline{G}$ = 100.
The continuously compounded cost of debt-free equity to the project (ρ) = 0.14. The present market value of the project (PVP) is therefore 86.9 for T = 1.
Risk-free interest rate (continuously compounded): r = 0.06.
Expected project values are log-normally distributed.

Explanation of the procedure

The first column is the *contractual* value of the zero-coupon loan to be repaid at time T. Starting at the anticipated return value of 100, this amount is reduced in steps of ten for the simulation of current share prices (Column 2) and of the present market value of the debt (Column 3). Column 6 ('Gearing') is from these market value definitions (= Column 3 divided by Column 2). Column 4, calculates the cost

of risk-bearing debt from the conventional formula: $k_d = r + (\rho - r)N(-d_1)\dfrac{PVP}{L}$, where L is the

present market value of the outstanding debt. $N(\cdot)$ = the cumulative normal probability of the unit

normal variable, d_1 as defined in the Black-Scholes equation. The 'contractual' interest rate (i) (Column 5) is calculated as the (logarithmic) growth rate implied by the present market value of the debt and its face value at T. The 'derivative' term in Column 7 is the ratio of first differences of the first two columns (see text).

CHART 1: SENSEX INDEX (JANUARY 1991-SEPTEMBER 2007)
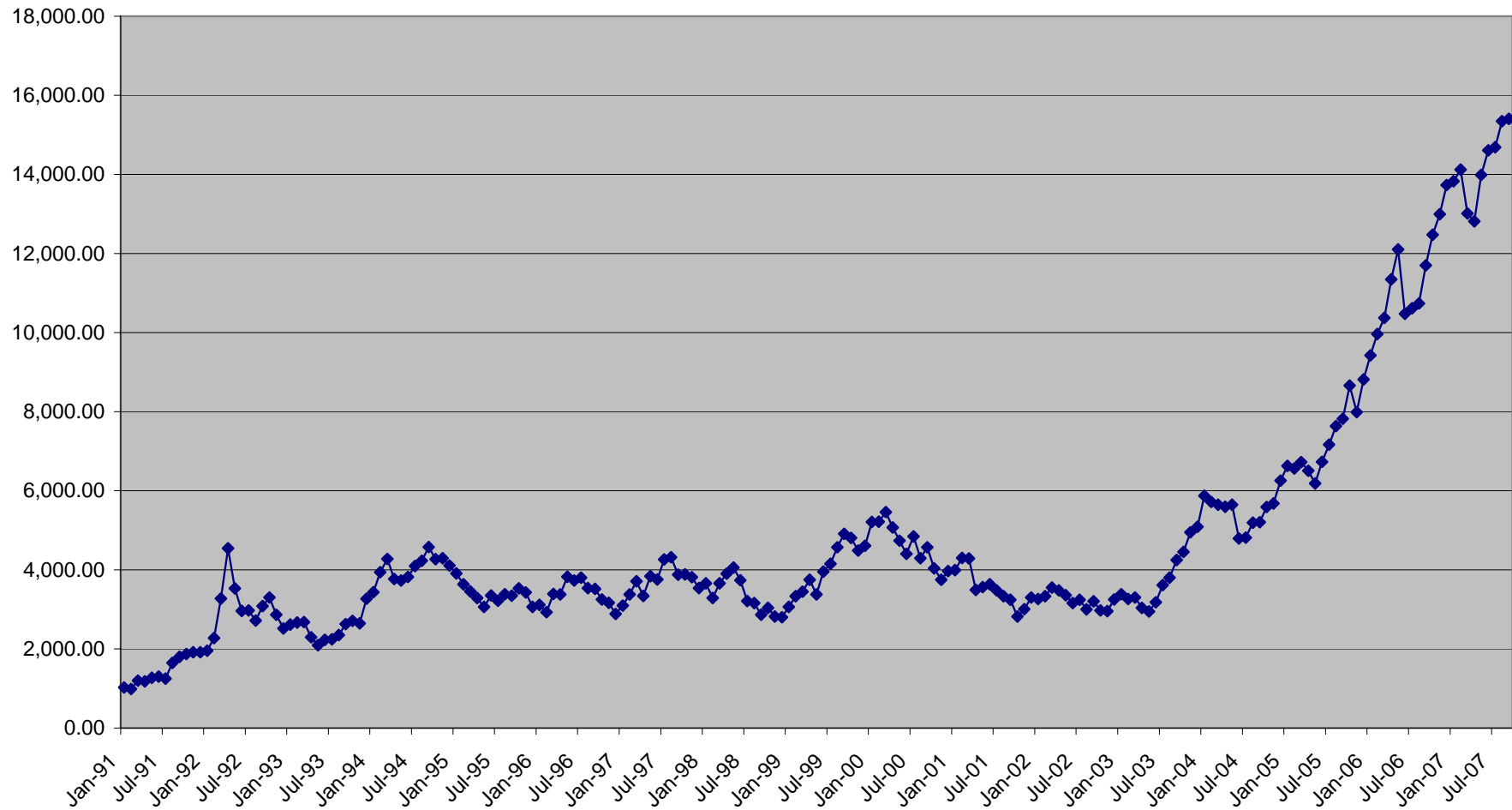
CHART 2: PROJECT COST (Rupees, Lacs) AND PERCENT EQUITY FINANCE

$y = 1.2673x^2 - 269.88x + 16857$
$R^2 = 0.5737$
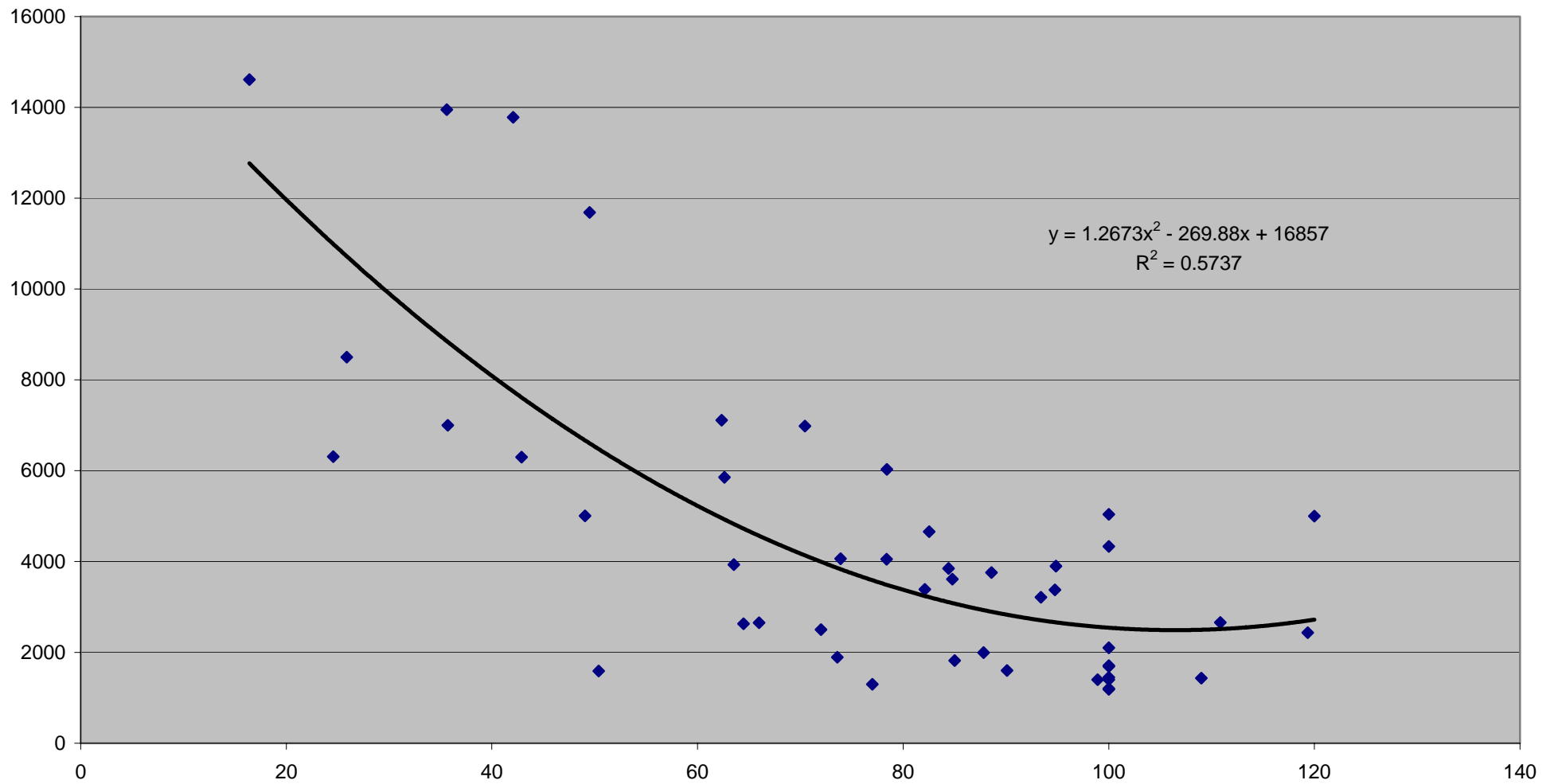
CHART 3: PROJECT COST FRACTION OF CAPITAL EMPLOYED AND CAPITAL EMPLOYED
(Rs. Lacs)

$y = -0.5925 \text{Ln}(x) + 6.1138$

$R^2 = 0.2138$
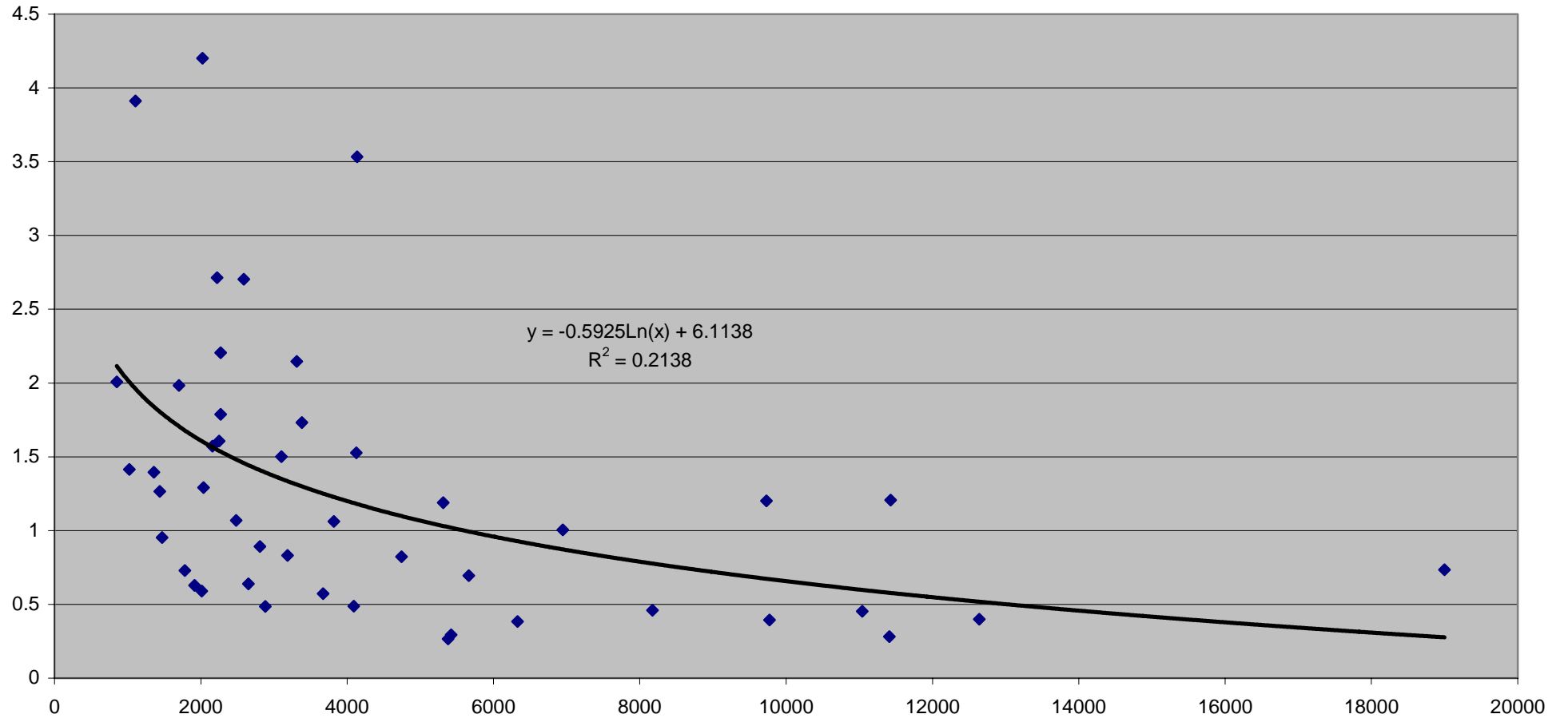
CHART 4: CAPITAL EMPLOYED AND RETURN ON ASSETS

$y = -7E{-}06x + 0.2469$

$R^2 = 0.1026$
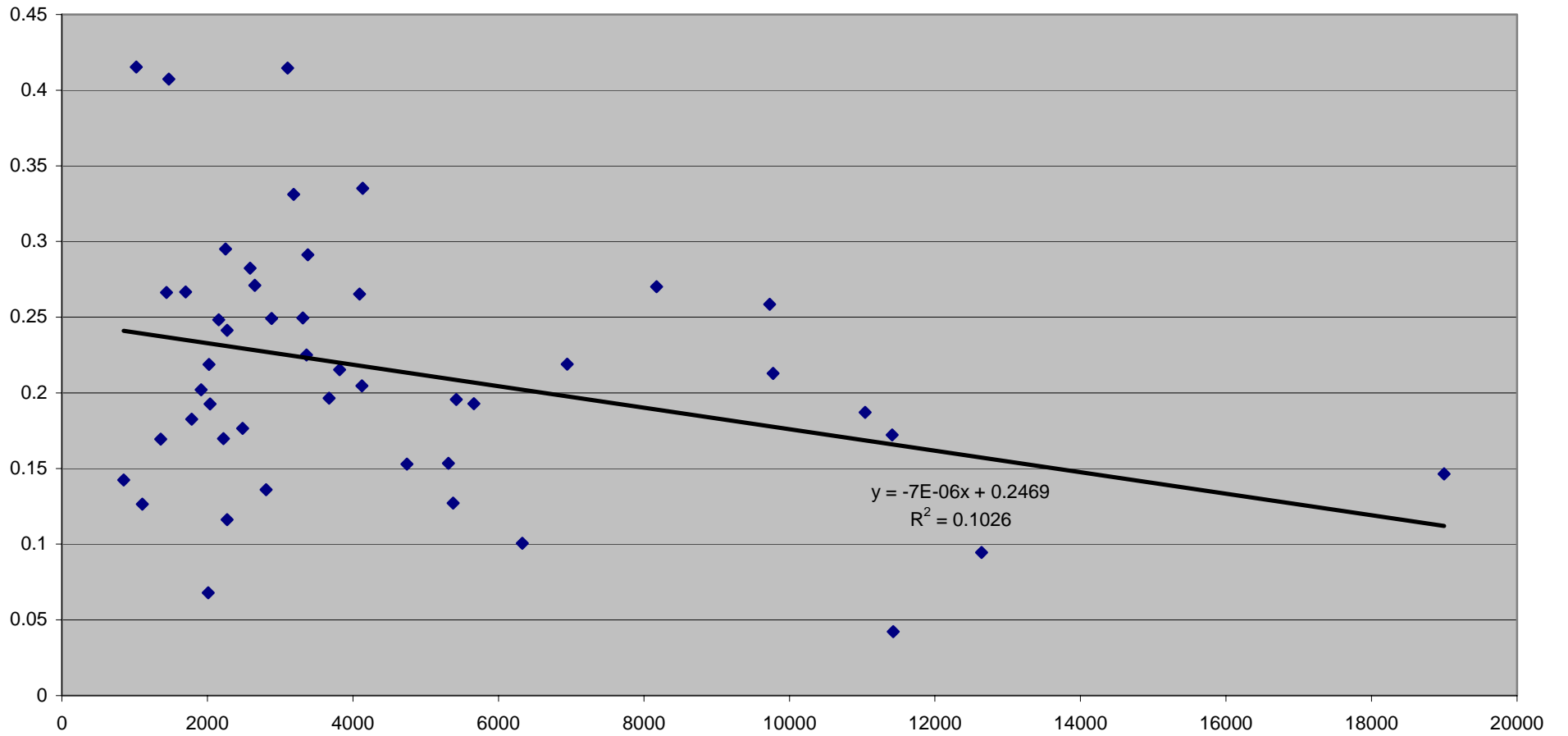
CHART 5: RETURN ON ASSETS AND LOAN INTEREST CHARGES (TWO-YEAR AVERAGES)
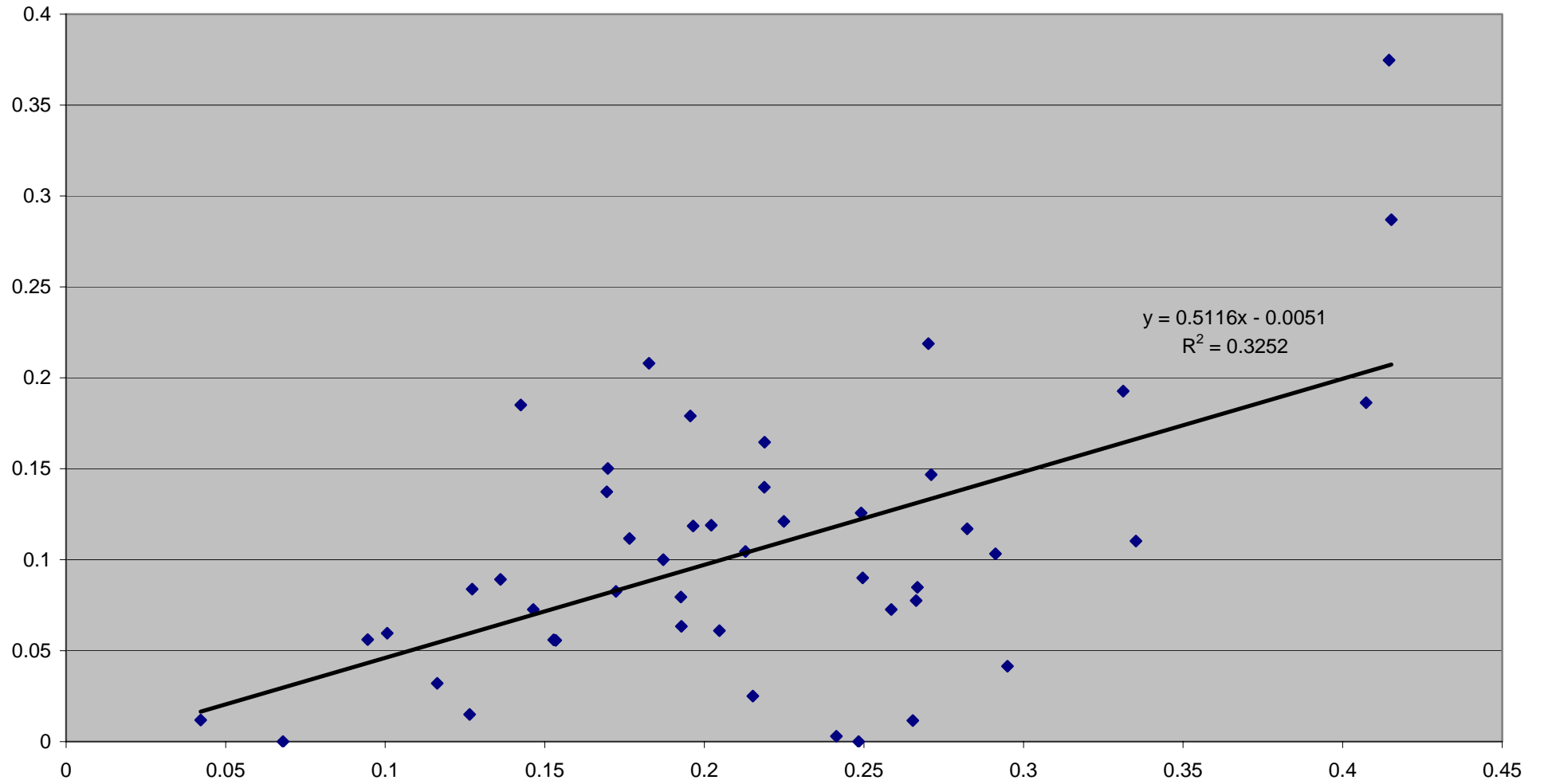

$y = 0.5116x - 0.0051$
$R^2 = 0.3252$

TABLE A1: DESCRIPTIVE DATA FOR BSE IPO FIRMS

FIRM	ACTIVITY	Age yrs	Quoted before IPO? Yes = 1	Prom pre%	Prom post%	Equity % cost	IPO % diluted equity	Project cost lakhs	Cost to capital employed
ALPS INDUSTRIES	Textiles (clothing and fabrics)	33	1	38	37	36	38	13951	0.7
ASTRAL POLY TECHNIK LTD	Piping, plumbing manufacture	11	0	87	64	62	26	7112	2.1
BEEYU OVERSEAS	Tea production	12	1	49	24	77	50	1300	0.7
BIRLA POWER SOLUTIONS	Electric genset manufacture	22	1	54	25	100	53	5040	0.4
CELESTIAL LABS	IT/Bioinformatics	10	0	64	35	74	45	4059	1.8
COMPULINK SYSTEMS LTD	Software development	9	0	54	36	80	40	2649	1.1
CREW PRODUCTS	Leather fashion goods	16	0	100	68	100	36	1400	0.5
CYBER MEDIA	Magazine publishing	23	0	79	57	100	28	1694	0.6
DAGGER FORST TOOLS	Gear cutting tools (auto ind.)	42	1	71	50	119	61	2430	0.4
DEEP INDUSTRIES	Natural gas comprsn-processing	15	0	92	40	78	57	6028	2.7
DWARIKESH SUGAR COMPANY	Sugar refining	11	0	96	58	84	40	3850	0.4
DYNEMIC PRODUCTS	Dyes	15	0	100	61	85	39	1819	1.3
ERA CONSTRUCTION	Civil engineering	15	1	40	28	70	51	6984	1.0
FCS SOFTWARE	Software development	12	0	100	75	88	25	1993	0.5
FOUR SOFT	Software development	4	0	68	51	82	25	3390	1.6
GLORY POLYFIMS	Flexible packaging	9	0	100	53	95	47	3900	0.8
IMPEX FERROTECH	Manganese for steel ind.	9	0	99	67	50	32	1588	0.3
INDOTECH TRANSFORMERS	Electrical transformer mfctr.	14	0	81	35	83	28	4657	1.5
JRG SECURITIES	Brokers and financial services	12	0	100	72	100	28	1450	1.4
KAMDHENU ISPAT	Steel bar manufacture	12	0	94	50	95	67	3377	2.0
KEW Industries	Automotive components	10	0	55	25	100	54	2100	0.6
KM SUGAR MILLS	Sugar refining	34	0	100	65	89	35	3756	0.5
LAWRESHWAR POLYMERS	Shoes (synthetic materials)	12	0	88	45	74	64	1894	1.4
MALU PAPER MILLS	Paper mill	12	0	100	61	36	49	7000	2.7
MANGALAM DRUGS	Pharmaceuticals production	33	0	100	51	109	49	1430	0.3
MSK PROJECTS	Construction, civil eng pjct mgt.	10	0	100	50	16	50	14613	3.5

		Age							
MSP STEEL AND POWER	Iron and steel manufacture	37	0	100	72	42	28	13783	1.2
NANDAN EXIM	Textile manufacture	11	0	100	57	25	43	6310	1.2
PARADYNE INFOTECH	Software development	8	0	99	69	99	30	1401	1.0
PBA INFRASTRUCTURE	Construction, BOT projects.	31	0	100	63	93	37	3212	0.3
POWERSOFT	Business process outsourcing	14	1	73	43	100	45	1188	0.6
RADHA MADHAV	Packaging production	1	0	81	34	49	41	5006	2.2
RAMKRISHNA FORGINGS	Forgings and parts mfctr.	23	0	100	52	64	66	2629	1.3
REFEX REFRIGERANTS	Refrigerant gases	5	0	87	65	85	25	3615	1.6
RICHA KNITS	Clothing manufacture	13	0	100	56	43	53	6297	1.5
ROHIT FERRO-TECH	Forgings	6	0	89	61	50	49	11686	1.2
SAH PETROLEUMS	Lubrication products	21	0	100	55	78	45	4053	1.1
SAKUMA EXPORTS	Export-import (esp. ag. goods)	7	0	100	59	100	41	4333	3.9
SHIVALIK GLOBAL	Garment mfctr. Fabrics	9	0	100	59	120	41	5000	0.5
SOUTHERN ONLINE BIO TECH	ISP dvsfctn to bio-diesel mfctr.	7	1	32	25	100	75	1710	2.0
SPANCO TELESYSTEMS	Telecoms systems integration	20	1	44	36	64	59	3935	0.7
SREE SAKTHI PAPER	Paper mill	15	0	100	49	111	51	2655	1.1
SUNIL HITECH ENGINEERS	Fabrication, testing powerplants	7	0	94	61	63	35	5853	1.7
UNIPLY INDUSTRIES	Mfctr. Veneers and plywoods	9	0	75	45	100	40	1200	0.6
USHER AGRO	Food products and processing	10	0	59	37	72	67	2502	0.9
VIVIMED LABS	Antimicrobials to pharm. ind.	17	0	80	53	66	34	2650	0.8
YASH PAPERS	Paper mill	24	1	40	24	26	81	8500	4.2
YOGINDERA WORSTED	Acrylic and blended yarns	9	0	90	54	90	40	1599	0.5
	Median values	**12**		**90.9**	**52.4**	**82.3**	**42.3**	**3502.5**	**1.1**

Key: Age = years between original incorporation and issue date, Prom pre = Promoter group's share of total equity before the issue, Prom-post = share after issue and Equity issue amount expressed as % of project cost. Final column = project cost as % of capital employed. Capital employed = Net worth + secured debt + unsecured debt.

TABLE A2: AVERAGE EQUITY RETURNS SINCE ISSUE

FIRM	Firm	Sensex	Excess	Months
ALPS INDUSTRIES	-0.041	0.025	-0.066	24
ASTRAL POLY TECHNIK LTD	0.063	0.030	0.033	6
BEEYU OVERSEAS	-0.025	0.027	-0.052	26
BIRLA POWER SOLUTIONS	-0.032	0.018	-0.050	18
CELESTIAL LABS	-0.111	0.002	-0.113	2
COMPULINK SYSTEMS LTD	-0.053	0.024	-0.077	21
CREW PRODUCTS	0.031	0.029	0.002	36
CYBER MEDIA	-0.010	0.029	-0.038	27
DAGGER FORST TOOLS	-0.053	0.018	-0.071	1
DEEP INDUSTRIES	0.094	0.019	0.075	12
DWARIKESH SUGAR COMPANY	-0.022	0.026	-0.048	33
DYNEMIC PRODUCTS	-0.022	0.022	-0.044	19
ERA CONSTRUCTION	0.072	0.029	0.044	27
FCS SOFTWARE	-0.041	0.025	-0.065	24
FOUR SOFT	0.019	0.024	-0.005	42
GLORY POLYFIMS	0.073	0.021	0.052	3
IMPEX FERROTECH	-0.029	0.027	-0.056	31
INDOTECH TRANSFORMERS	0.051	0.018	0.033	18
JRG SECURITIES	0.019	0.025	-0.007	16
KAMDHENU ISPAT	-0.022	0.025	-0.047	16
KEW Industries	0.017	0.019	-0.002	12
KM SUGAR MILLS	-0.045	0.026	-0.071	22
LAWRESHWAR POLYMERS	-0.020	0.030	-0.050	6
MALU PAPER MILLS	0.055	0.015	0.040	17
MANGALAM DRUGS	-0.020	0.030	-0.050	28
MSK PROJECTS	0.033	0.027	0.006	34
MSP STEEL AND POWER	0.037	0.027	0.010	26
NANDAN EXIM	-0.094	0.029	-0.123	27

PARADYNE INFOTECH	0.058	0.026	0.032	22
PBA INFRASTRUCTURE	0.000	0.026	-0.026	22
POWERSOFT	0.034	0.015	0.018	17
RADHA MADHAV	0.032	0.023	0.009	20
RAMKRISHNA FORGINGS	0.048	0.030	0.018	40
REFEX REFRIGERANTS	-0.050	0.018	-0.068	1
RICHA KNITS	-0.029	0.017	-0.046	11
ROHIT FERRO-TECH	0.000	0.015	-0.015	17
SAH PETROLEUMS	-0.019	0.029	-0.048	36
SAKUMA EXPORTS	-0.046	0.018	-0.064	18
SHIVALIK GLOBAL	-0.055	0.015	-0.070	17
SOUTHERN ONLINE BIO TECH	0.031	0.030	0.001	23
SPANCO TELESYSTEMS	0.041	0.027	0.014	34
SREE SAKTHI PAPER	-0.018	0.022	-0.039	19
SUNIL HITECH ENGINEERS LTD.	0.035	0.018	0.017	18
UNIPLY INDUSTRIES	0.007	0.027	-0.020	26
USHER AGRO	0.147	0.017	0.130	11
VIVIMED LABS	-0.011	0.028	-0.038	25
YASH PAPERS	-0.019	0.027	-0.046	26
YOGINDERA WORSTED				

Key: The columns report the average monthly (logarithmic) return on the firm's shares from the individual month of issue to mid-September 2007. The average monthly SENSEX returns are reported on the same basis and for the same months in the second column. The third column, 'Excess' deducts from the firm's mean return over its share trading period the SENSEX return (negative signs imply that the shares of 30 out of 47 IPO firms under-performed the market index). The number of months included in the calculations for each firm is reported in the final column.