

An Examination of Investment Pattern of Indian Power Generation and Supply Firms

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Abstract

This study analyses the association between financial investment and sources of funds. Present study finds that investment in group or associate companies is made from the retained earnings and also from external funds. This type of association explains the diversification principle that followed by PGSFs for receiving constant income and also for the continuous existence of the firms. After examining the association between sources and use of funds of power generation and supply firms in India, we conclude that our findings are similar with the finding of Demirgucit-Kunt and Maksimovic (1996) on the hypothetical association assumed in the context of funds procurement and its use. The reasons for non-significance of hypotheses could be that none of the financing source provides significant amount of funds to PGSFs. We therefore, believe that these firms must be facing the constraints while raising finance from all the major sources of finance in India.

Keywords: Indian power sector, Power generation firms, financing, investment pattern, capital structure, fund flow statement.

JEL Codes: G30, G31, G32, G38

Introduction

Generally, firms raise funds for making investment in several heads of capital structure. By and large, funds rose by way of equity and debenture used for building fixed assets. Some portion of funds may be used as current assets and remaining portion of funds is invested in the instruments of financial institutions and other firms. Capital formation process and growth rate to be achieved in future are the main tasks for managers and owners of the firms. Use of raised funds depends upon nature of firms and product manufactured or service rendered by the firms. Thus, major chunk of borrowed funds and equity capital is invested in plant, machinery, building, furniture and raw materials. Some amount of ready cash is preserved by the firms to meet the day to day obligations. As a part of security for the firms and assurance of continuous source of income, surplus funds are parked into securities of other firms and financial institutions.

Literature, Data and Methodology

As Muthenhari and Green (2002) concluded that balance sheet data

includes several items of intangibles which do not appear in the standard sources and uses statement. Balance sheet data covers all the historical facts hence it is difficult to conclude the changes that might have taken place in the earlier period and that have bearing on the decision process of managers while financing the firms. In comparison of the balance sheet data, sources and uses statement data gives better, direct and factual picture about the trends and pattern of financing firms. Hence, this paper uses firm level data extracted from the statement of sources and use of PGSFs maintained by CMIE, India for the period 1993-2004. To analyze trends and pattern of funds utilization of PGSFs unbalanced panel is made. In this panel, we cover private and public sector power generation and supply firms.

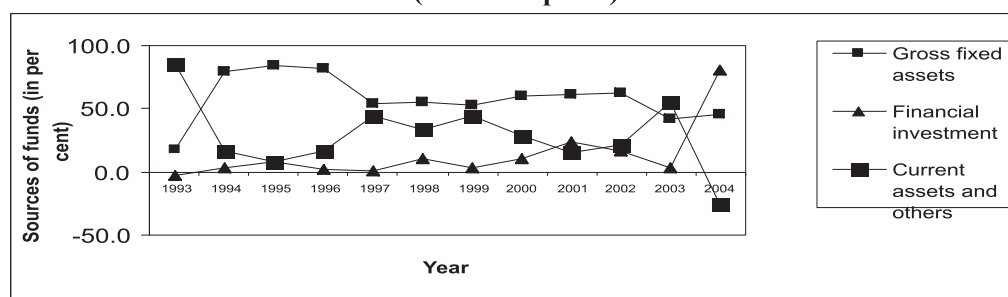
Trends and Pattern in Funds Utilization

It can be concluded from figure 1 and 2 that major portion of funds were used for making investment into gross fixed assets (GFA) except for the year 1993. This is but natural in the case of power generation firms as these firms are capital intensive. The current assets and others (CAO) are observed as the second head of investment for these firms. In the year 1993, funds used for current assets were in high

proportion, however, from the year 1994, trends in funds utilization pattern shifted to gross fixed assets. This is probably the result of power sector reforms of 1992. Analogous to the trends found in GFA, remaining 25 to 30 percent funds were used for building current assets and other purposes. A marginal amount of funds used for investing in financial instruments that to diversify the risks of business and increase the size of collateral. From the year 1998, the investment in financial instruments has increased except the year 1999 and 2003. Again in the year 2004, more funds invested in financial instruments because of the high rate of interest were prevailed in the financial market and other reason may be the unattractive substitute investment opportunities in hand.

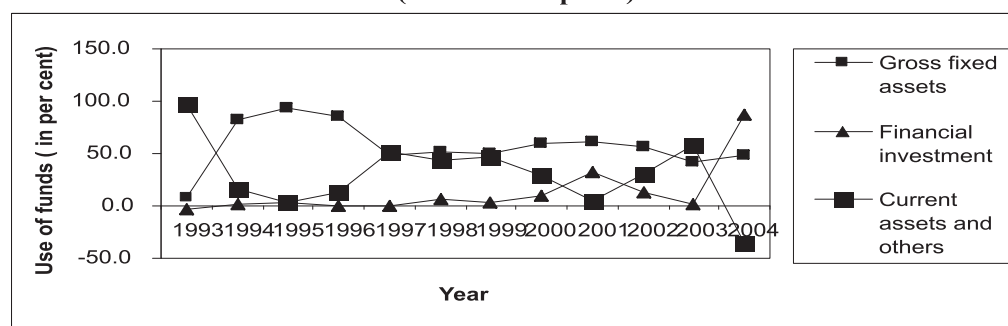
In figures 1 and 2 investment pattern of power generation and supply firm are shown for both the panels. It is observed from the both the figures that the investment pattern are similar in terms of trends and pattern. Major portion of funds were utilized for investing in gross fixed assets. Second preference is given for building current assets and remaining portion of funds is invested in financial instruments.

Figure 6.5 Investment Patterns of Power Generation and Supply Firms (Balanced panel)



Source: Firm level data extracted from Prowess database of Centre for Monitoring Indian Economy, (CMIE) Mumbai, The aggregates and percentage thereof reported here are researchers' calculation.

Figure 1 Investment Patterns of Power Generation and Supply Firms (Unbalanced panel)



Source: Firm level data extracted from Prowess database of Center for Monitoring Indian Economy, (CMIE) Mumbai, The aggregates and percentage thereof reported here are researchers' calculation.

Application of Funds

In the market based economy, funds can be raised either internally or externally to perform a task of investment. A choice of a particular source of finance depends upon several considerations such as cost of funds, access to funds, financial system, types of investment- products, commercial laws, state of economy, and monetary and credit policy. Funds raise from the different means are generally used for making investments into fixed assets and some portion of funds kept aside to meet the day to day obligations. How funds are being used by the power generation and supply firms is shown in the Table in 1 and 2. It is clear from both the tables that power industry is a capital intensive industry; hence, large share of fund went into gross fixed assets over the other uses of funds.

Study conducted by Saggar (2005) also finds that Indian Cement and Shipping industries invested around 74.1 and 65.1 percent funds in gross fixed assets of the total funds during the period 1971-72 to 1999-2000. The same study also reveals that at aggregate level, 52.6 percent of the funds were utilized for investment in fixed assets by the Indian firms. However, her study didn't cover the investment pattern of power generation and supply firms. Before the study conducted by Saggar (2005), Samuel (1996) has made the comparison of U.S. firms with Indian firms to examine the finance and investment pattern on the line of study made earlier by RBI and ICICI on medium and large sized firms for the period 1972-1993. He reveals that on an average, 53.5 percent funds were utilized for investing in gross fixed assets and remaining 46.5 percent went in current assets and others purposes.

Table 1 Trends in Financing and Investment Patterns of Power Generation and Supply Firms (Balanced Panel)

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sources of funds												
INTS	37.3	38.4	45.3	68.6	64.7	55.6	57.6	57.4	78.8	64.2	40.7	51.9
REPR	23.9	20.6	22.5	35.9	31.3	28.7	31.1	30.4	45.2	40.6	25.6	35.4
DEPR	13.4	17.8	22.8	32.7	33.4	26.9	26.5	27.0	33.6	23.6	15.1	16.5
EXTS	62.7	61.6	54.7	31.4	35.3	44.4	42.4	42.6	21.2	35.8	59.3	48.1
CAPM	19.5	41.2	36.8	1.6	-31.9	37.8	-2.3	1.5	7.3	20.2	26.6	23.8
FRCA	19.4	20.7	32.4	-3.7	0.7	20.3	14.2	13.1	11.9	14.8	11.8	13.9
FIDE	0.0	1.7	2.4	0.4	-0.9	2.1	-0.5	0.8	-1.2	1.8	1.0	0.1
DEBO	0.0	18.8	2.0	4.9	-31.7	15.4	-15.9	-12.3	-3.3	3.6	13.8	9.9
TOBO	43.3	20.4	18.0	29.8	67.2	6.6	44.7	41.1	13.9	15.6	32.7	24.3
BBOR	-1.2	-12.0	-0.7	-3.2	-1.1	7.1	2.9	35.7	-17.5	65.1	8.4	0.8
FINB	7.1	13.1	0.6	-2.4	-6.9	17.5	5.7	15.3	-4.4	-19.7	3.1	0.5
CLAP	16.6	2.3	-1.9	15.7	19.7	27.1	26.2	22.8	-1.2	-0.4	30.1	15.5
OTBO	20.3	16.5	20.8	19.5	54.9	-45.2	9.7	-32.5	36.6	-29.5	-8.6	7.6
BOCB	0.4	0.4	-0.8	0.1	0.5	0.1	0.1	-0.1	0.4	0.2	-0.3	0.0
	100	100	100	100	100	100	100	100	100	100	100	100
Use of funds												
GFAS	7.5	82.4	93.4	86.2	48.1	51.1	50.3	60.2	61.7	56.7	41.2	47.9
FINV	-3.9	1.2	2.9	0.5	0.8	5.9	2.7	10.0	32.7	12.7	1.4	87.2
CAAT	96.5	16.4	3.7	13.2	51.1	43.0	47.1	29.8	5.6	30.6	57.4	-35.2
	100	100	100	100	100	100	100	100	100	100	100	100
FIRMS	12	12	12	12	12	12	12	12	12	12	12	12

Source: Firm level data extracted from Prowess database of Centre for Monitoring Indian Economy, (CMIE) Mumbai, The aggregates and percentage thereof reported here are researchers' calculation.

Abbreviations used: INTS- internal sources, REPR- retained profits, DEPR- depreciation, EXTS - external sources, CAPM - capital market, FCAP - fresh capital, FIDE- fixed deposit, DEBO- debenture and bonds, TBOR- total borrowings, BBOR - bank borrowings, FINB - financial institutions borrowings, CLAP-current liabilities and provisions, OTBO-other borrowing, BOCB-borrowing from corporate bodies. GFAS - Gross fixed assets, FINV - financial investments, CAAT - current assets and others.

Notes: Internal sources= (retained profits + depreciation); External sources= (capital market + total borrowing); Capital market= (fresh capital including share premium + fixed deposits + debenture and bonds); Borrowing= (bank borrowing + borrowing from finan. inst. + current liabilities and provisions + Other Borrowings + Borrowings from corporate bodies.

Table 2 Trends in Financing and Investment Patterns of PGSFs (Unbalanced Panel)

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sources of funds												
INTS	35.6	35.2	35.7	56.2	50.8	47.8	51.3	53.9	65.8	66.6	45.1	53.2
REPR	23.0	19.7	18.5	30.3	24.1	23.6	26.6	27.4	36.3	36.9	22.9	33.8
DEPR	12.6	15.5	17.2	25.9	26.6	24.2	24.6	26.4	29.5	29.7	22.2	19.4
EXTS	64.5	64.8	64.3	43.8	49.3	52.2	48.7	46.1	34.2	33.4	54.9	46.8
CAPM	20.8	39.6	35.9	7.5	-11.3	31.7	1.4	7.1	16.3	21.2	20.8	24.4
FRCA	20.5	20.7	33.9	4.3	8.1	15.8	13.1	13.4	11.8	14.6	10.5	16.9
FIDE	0.1	1.6	1.7	0.2	-0.5	2.1	-0.4	0.6	-0.8	2.6	0.8	0.1
DEBO	0.3	17.3	0.3	3.0	-18.8	13.7	-11.3	-7.0	5.3	4.0	9.5	7.4
TOBO	43.6	25.2	28.4	36.3	60.5	20.6	47.3	39.1	17.9	12.2	34.1	22.4
BBOR	-1.6	-10.2	4.9	1.1	1.1	3.9	4.9	34.0	-12.2	58.7	6.5	0.3
FINB	5.7	12.0	4.9	1.1	0.2	14.9	5.5	18.5	-3.1	-19.5	6.8	-0.3
CLAP	16.7	4.0	-2.6	20.5	17.7	20.4	29.7	21.2	3.6	-0.6	27.3	12.8
OTBO	22.5	19.0	22.4	13.9	41.8	-19.1	6.3	-36.9	30.8	-26.9	-7.1	9.2
BOCB	0.3	0.4	-1.3	-0.3	-0.3	0.5	0.8	2.3	-1.2	0.4	0.6	0.4
	100	100	100	100	100	100	100	100	100	100	100	100
Use of funds												
GFAS	17.4	79.5	84.4	81.4	54.3	55.7	52.3	60.6	61.0	62.0	41.8	45.5
FINV	-3.3	3.6	7.9	1.7	1.4	10.8	3.6	10.3	23.7	16.6	3.0	80.9
CAAT	85.9	16.8	7.7	16.9	44.4	33.6	44.2	29.1	15.4	21.4	55.2	-26.4
	100	100	100	100	100	100	100	100	100	100	100	100
FIRMS	16	17	23	24	26	31	37	42	46	47	52	38

Source: Firm level data extracted from Prowess database of Centre for Monitoring Indian Economy, (CMIE) Mumbai, The aggregates and percentage thereof reported here are researchers' calculation.

Abbreviations Used: INTS - internal sources, REPR- retained profits, DEPR- depreciation, EXTS - external sources, CAPM - capital market, FCAP - fresh capital, FIDE- fixed deposit, DEBO- debenture and bonds, TBOR- total borrowings, BBOR - bank borrowings, FINB - financial institutions borrowings, CLAP-current liabilities and provisions, OTBO-other borrowing, BOCB-borrowing from corporate bodies. GFAS - Gross fixed assets, FINV- financial investments, CAAT-current assets and others.

Notes: Internal sources= (retained profits + depreciation); External sources= (capital market + total borrowing); Capital market= (fresh capital including share premium + fixed deposits + debenture and bonds); Borrowing= (bank borrowing + borrowing from finan. inst. + current liabilities and provisions + Other Borrowings + Borrowings from corporate bodies.

A study of financing patterns of 510 firms in U.S.A was conducted during the same period that concludes 48.4 percent funds were utilized for gross fixed assets, 39.8 percent in other current assets, and 11.4 percent were used for investing in financial instruments. Another study conducted by Kumar et al., (2002) about the sources and uses of funds on Indian firms for the period 1993-1998, reveals that domestic firms invested 60.48 percent funds in gross fixed assets and 4.85 percent in financial investment and remaining 34.67 percent were invested in current assets including inventories.

As it can be seen from the Table 1, firms included in the balanced panel have invested funds in gross fixed assets, investment in financial instruments, and current assets and others in the proportion of 57.23 percent, 12.85 percent, 29.93 percent respectively of the total funds raised from the several sources of finance. Table 2 shows the funds utilization pattern of the firms included in the unbalanced panel. This panel covers more firms. Out of total funds raised, 57.99 percent went in gross fixed assets, 13.33 percent funds used for investing in financial instruments and remaining 28.68 percent funds used for to meet current obligations and some other purposes. It is clear from both the panels that the investment patterns of the firms are more or less similar. The trends appeared from the funds using patterns are comparable with the results of the earlier studies conducted on financing and investment pattern of Indian firms.

However, there is a minor shift in investment pattern from the year 1999. This is because opportunities of investment aroused in the stocks (shares) of other companies. Indian premier stock market, Bombay, Sensex (BSE stock market index) was 4269.69 in the year 2001, which again went up to 4492.19 in the 2004. The upward development in the Sensex must have attracted various firms for deploying their surplus funds into the securities. Investment pattern of power generation firms for the entire period of study shows that investment in gross fixed assets decreased from 79.5 to 45.5 percent for the period 1994-2004. This may due to ambiguity in the policies applicable to the power generation firms in India.

Meanwhile, many state governments abandoned the private power projects due to the pressure from public on

the issues of cost of land, lack of assurance of job to local people, alternate source of income to them, and general reason is threat to environmental balance. Therefore, capital formation process that has taken place in the form of investment in fixed assets shows declining trends over period of the study. On the other hand, during the same period, proportion of investment made in financial instruments by these firms jumped up from 3.6 percent to 80.85 percent of the total funds.

Funds used to meet the current obligations reveal that 85.88 percent were used in the year 1993; however from the year 1994, funds using pattern went in favour of GFA. This shows that power sector reforms opened up the opportunity to increase generation capacity. For the remaining years, funds utilized for current assets demonstrate uneven pattern; the reasons for uneven pattern can be concluded as reluctance of banks and financial institutions in lending to PGSFs.

Hypotheses Testing about Funds Utilization

Funds raised by the firms are generally utilized for investing in plant and machinery and also for discharging the current obligation. The use of collected funds is determined by factors such as requirement of funds, cost of raising funds, and necessity of the funds. In the present section, we attempt to ascertain whether these firms were facing financial constraints or not. To answer this question, the association between the long term investment (which goes in GFA) and internal source (INTS) i.e. retained profits is verified, the expected association between these two sources would be either positive or negative, if positive relationship is found, then it is safe to conclude that firms have faced the financial constraints as they rely predominantly on internal sources of funds. In this context, Fazzari et al., (1988) finds a positive relationship between long term investment and internal financing. On the same line, Demirgüç-Kunt and Maksimovic (1996a) and Saggat (2005) examine the relationship between sources of funds and its uses. In line with above studies, present study proposes to test the following hypotheses:

H1 = There is positive correlation between the investment that goes in plant and equipment (GFA) and retained earnings.

H2 = There is negative correlation between the investment that goes in plant and equipment (GFA) and external financing.

H3 = There is negative correlation between the investment that goes in short term assets (CAAT) and retained earnings.

H4 = There is positive correlation between the investment that goes in short term assets (CAAT) and external financing.

H5 = There is positive correlation between equity (CAPM) finance and the investment that goes in Plant and machinery.

The present study examines the correlation between sources of finance and it uses made by power generation and supply firms in India for the period 1993-2004. In addition to the first four hypotheses assumed by Demirutic-Kunt and Maksimovic (1996a); Saggar (2005) in their studies, we add hypothesis number 5 to find out the association between fresh capitals (equity) issued and investment made in plant and machinery (GFA). This study examines correlation coefficient between sources and uses of funds for both the panels. The correlation coefficient values are given in the Table 3.

The standard format of funds flow statement divides sources of funds into two broad heads i.e. internal and external. Further, internal sources can be decomposed into retained profits and depreciation. External sources of financing are generally divided into seven sub heads:

capital market borrowings, borrowings from debentures and bonds, borrowings from fixed deposits, borrowings from banks, borrowings from financial institutions, borrowings from corporate bodies, and borrowings from others. In this study, under the head of capital market sources, we have shown fresh capital, borrowing from debentures and bonds, and borrowings from fixed deposits. However, the last two instruments of financing mentioned above are active part of the capital market, which provides liquidity to the firms. Funds raised by various sources used for investing in plants and machinery, to make investment in group or associate firms or others, making provision of current assets, and to meet deferred tax liabilities. We use sign Δ (delta) to show the dynamic nature of funds flow statement. We use the following accounting identity given in the funds flow statement:

$$\Delta GFA + \Delta FINV + \Delta CAAT = \Delta INTS + \Delta EXTS \quad \text{..... (1)}$$

By decomposing internal and external sources of funds we get the following two identities-

$$\Delta INTS = \Delta REPR + \Delta DEPR \quad \text{..... (2)}$$

$$\Delta EXTS = \Delta CAPM (\Delta FRCP + \Delta FIDE + \Delta DEBO) + \Delta BBOR + \Delta FINB + \Delta CLAP + \Delta OTBO + \Delta BOCB \quad \text{..... (3)}$$

Table 3 Results of Correlation between Sources and Uses of Funds for PGSEs

Balanced panel					
	INTS	EXTS	CAPM	BBOR	FINB
GFAS	0.2392	-0.2334	0.1694	-0.0995	-0.0658
FINV	0.1839	-0.1859	0.0952	-0.0569	-0.1624
CAAT	-0.3064	0.3039	-0.1900	0.1123	0.1698
Unbalanced panel					
GFAS	0.0874	-0.0893	0.1979	0.034	-0.0149
FINV	0.3201	-0.3209	0.1839	-0.0144	-0.2428
CAAT	-0.3178	0.3197	-0.284	-0.0115	0.2069

Source: Researchers calculation. Abbreviations Used: INTS - internal sources, EXTS - external sources, CAMP - capital market, BBOR - bank borrowings, FINB - financial institutions borrowings, GFAS - Gross fixed assets, FINV - financial investments, CAAT - current assets and others.

Results of Association between Financial Investment and Sources of Funds

Table 3 shows the linear association between sources and uses of funds for both the panels, for which, we used accounting identities numbered as 6.1, 6.2 and 6.3 above. The association between sources and uses of funds are explored on the selected basis. The focus of the present analysis is to identify the correlation between sources and uses of funds. This helps us to establish the hypotheses whether these firms (PGSF) were facing constraints from the prime sources of finance or not. In order to establish the hypotheses, we run pair wise correlation. It is observed from the Table 3 (under the category of balanced panel) that there is positive correlation between gross fixed assets and internal sources with a correlation coefficient 0.2392. The positive association is observed between both because of the high monitoring and contract cost of external funds. Therefore, these firms prefer internal funds over the external funds for investing into fixed assets. On the hand, the value of correlation coefficient between external source and GFA is found -0.2334. Generally, this type of relation is expected between both.

The association between fresh capital (equity) and gross fixed assets shows positive correlation coefficient 0.1694, which shows that funds raised from equity used for building fixed capital assets. We conclude from this association that funds procured in the form of equity capital invested in the plant and machinery by these firms. The subsets of external sources i.e. borrowings from banks and financial institutions also depicts negative or virtually no correlation -0.0995 and -0.0658 respectively with GFA. This kind of relationship generally arise on account of the following reasons: high cost of the funds procured from bank and financial institutions, fear of permanent financial burden, and the more important cause is imperfect financial market. Other meaning of this correlation can be interpreted as the reluctance shown by banks and financial institutions in financing to the power sector firms.

The positive correlation between internal sources and financial investment observed at 0.1839. This relationship reveals that these firms had financial investments from the internal sources. The positive association between current assets and external funds found as 0.3039. It shows that current assets and funds rose from external sources found as independent. On the contrary, there is negative correlation between current assets and internal sources of finance, which found -0.3064. This shows that the current assets were used to meet the day to day liabilities of the firms.

The subsets of external finance such as bank borrowing and

borrowing from financial institution shows positive correlation with current assets, which finds as 0.1123 and 0.1698 respectively. The aforesaid positive association between current assets and external funds arises due to the nature of assets, its value, and liquidity they impart. Investment made in current assets entails the features such as more liquid, easy access, interest rate elastic, low acquisition cost, and easy to re-possess. All these peculiarities of current assets found in the lending operations of the banks and financial institutions (supply side) and funds required for the firms (demand side); hence the positive association is observed between both.

Same kind of relationship is found among the major sources and uses of funds in respect of unbalanced panel except a minor difference. Difference between both the panels is that financial investment is made from the equity finance in the unbalanced panel where as in the balanced panel; these firms (PGSFs) make financial investments from internal sources. Other point of difference is that there is positive relationship between bank finance and current assets in the balanced panel where as in the unbalanced panel, negative relation is appeared between both, which is compensated by procuring more finance from the financial institutions. This shows that after meeting the requirements of fixed capital, these firms have diverted excess funds for making investment into financial securities. In the above discussion, the hypothesized relationship is found between all major entities except the relationship between equity capital and financial investment.

Although the correlation coefficients observed in both the panel are not significant in respect of the major sources of finance and its uses for the period under consideration, but their signs are valid and conclusive to accept the hypotheses proposed in this section. The reasons for non-significance of hypotheses could be that none of the financing source provides significant amount of funds to PGSFs. We therefore, believe that these firms must be facing the constraints while raising finance from all the major sources of finance in India.

Conclusions

This study analyses the association between financial investment and sources of funds. Present study finds that investment in group or associate companies is made from the retained earnings and also from external funds. This type of association explains the diversification principle that followed by PGSFs for receiving constant income and also for the continuous existence of the firms. After examining the association between sources and use of funds of power generation and supply firms in India, we conclude that our findings are similar with the finding of

Demirguc-Kunt and Maksimovic (1996) on the hypothetical association assumed in the context of funds procurement and its use. The reasons for non-significance of hypotheses could be that none of the financing source provides significant amount of funds to PGSFs. We therefore, believe that these firms must be facing the constraints while raising finance from all the major sources of finance in India.

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