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Abstract

In this paper we study 325 large scale asset sale transactions by Indian manufacturing firms in the period 1996 to 2008. We find that the likelihood of asset sales increases with the firm's low capacity of debt utilisation and decreases with size, profitability, operating performance and solvency. We also find that the performance of firms after they sell assets do not improve in profitability, solvency or operations. The only difference the episodes of asset sales make is some reduction in leverage. We contrast with the existing episodes of asset sales in developed countries as the performance of firms there, after they sell assets, improves in all parameters.

Keywords: asset sales, focus, low capacity of debt utilisation, size, profitability, operating performance, solvency, leverage.

JEL Classification: D21, G31, G32, G33.

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Section 1: Introduction

Asset sales is the sale of tangible operating fixed assets like land, buildings, fixtures and fittings, machinery, vehicles and so on. It is a potential tool for the firms to undertake some form of financial and/or operational restructuring. It is an alternative to stock sales¹ by firms which is the sale of their investment assets. Structure-wise the status of firms does not change with the sale of stocks. However, with stock sales the firm's liabilities are transferred to the new owner whereas in the case of asset sales the liabilities remain with the firms.² From a tax standpoint, firms would come out better by selling stocks than by selling assets. This is because proceeds from stock sales are taxed at the low long-term capital gains rate whereas proceeds from asset sales are potentially taxed twice- first on the gains realised by firms on the sale of assets and again at the individual level if the proceeds of the sale is transferred to the stockholders. Contrasting further, it is commonly believed that corporate managers prefer to act on large firms rather than small ones for reasons such as status, power and security (Stulz 1990; Hay and Morris 1991). But, sale of fixed assets, against stock sales, potentially reduces the capacity of business. Given these, why firms choose to sell assets remains important to be explained.

Asset sales, potentially, are an important source of finance for firms, especially for those which find difficulty in getting external funds as a consequence of adverse selection and agency problems in the capital market. Theories of adverse selection postulate that investors are unsure about firm's quality because of imperfect information. Shareholders, therefore, seek a 'lemons premium' i.e., they implicitly demand a premium to purchase the shares of relatively low risk firms to offset the losses that will arise from funding high risk firms. This premium raises the cost of new equity finance faced by managers of relatively low risk firms above the opportunity cost of internal funds (Akerlof 1970; Myers and Majluf 1984; Stiglitz and Weiss 1981). Agency theories propagate that managers derive private benefits from investment, and therefore, will invest more when cash flows permits. Shareholders, therefore, have to incur cost for monitoring the managers. These costs are, in turn, passed to the managers raising the opportunity cost of cash flows (Jensen and Meckling

¹ Stock sale is a generic term representing sale of new issues of shares.

² These liabilities might include contract claims, potential product liability claims, or employee lawsuits resulting from the seller's ownership of the company.

1976; Jensen 1986). Therefore, for the firms facing problems of asymmetric information, asset sales is a less costly means of raising capital than public issues of debt and equity (Lang, Poulsen and Stulz 1995).

There can be other motivations for firms to sell assets. Firms may sell assets to make them less attractive to outside bidders in case of takeover threats (Bradley, Desai and Kim 1983). They may also sell assets to achieve potential productivity gains if there is an unfavourable change in the market pricing of assets (Mulherin and Boone 2000). Increasing focus is another common strategy among firms coping with performance declines. This may improve firms' performance for reasons such as elimination of negative synergies with the divested assets or increased efficiency arising from better allocation of management time and other resources in more focused firms (John and Ofek 1995). Some firms also use asset sales as a tool to manipulate earnings. They do so because income from asset sales affects income from continuing operations, and since investors employ income from continuing operations in their decision making, they manipulate earnings to affect investors' perceptions (Bartov 1993).

In this paper, we extend earlier research on asset sales by examining a sample of 325 asset sales during the period 1996 to 2008. Our study revolves around two primary issues: first, what factors are likely to motivate firms to sell assets? This question is important as it can give important insights about the anatomy of firms and the industry, in general, they belong to. For example, the role of factors such as – operating performance, profitability, leverage, solvency and capacity constraints can be analysed for the firms selling assets vis-à-vis firms not selling assets. The second question we attempt to answer is how does the performance of the firms which sell assets change, after they sell assets. This question is important in the following context: the country started gradually shifting from an inward-looking development strategy in the mid-1980s to a more market friendly approach. The year of 1991 witnessed a big change in the form of structural adjustment programme which paved the way for integrating the Indian economy with the global economy in a phased manner. It potentially enhanced the reach of Indian firms in meeting their financial requirements and it also eased the restriction on the firms for reorganisation. Assuming all these policies and programmes translated into ground realities, the firms selling assets, in general, should show better performance after they sell assets if the year is not a bad year and the distress nature of firms is controlled. However, lack of performance improvement by these firms after they sell assets would cast serious doubts on the efficacy of such policies and programmes.

In our empirical exercise we find that the likelihood of asset sales increases with the firm's leverage, distress nature and low capacity of debt utilisation and decreases with increasing size, profitability and improving operating performance. We also find that most of the firms selling assets, in general, do not improve in profitability, operations and solvency apart from some reduction in leverage. A continued dismal performance by firms after they sell assets signals that firms selling assets are already in some kind of vicious circle of bad performance with asset sales being the measure of last resort.

The potential contribution of this study can be noted on the following two counts: first, it evaluates asset sales an alternative way, not discussed in the Indian context so far, in which firms can undertake some form of financial and/or operational restructuring. Second, it throws some light on the performance of firms in the deregulation regime post 1991, though via an indirect mechanism.³ The plan of the paper is as following- section two presents literature review; section three gives data description and provides the characteristics of firms selling assets against those not doing so; section four discusses the factors that are likely to influence asset sales decision by firms; section five talks about the performance of firms selling assets pre and post asset sale vis-à-vis firms not selling assets and; lastly, section seven concludes the paper.

Section 2: Literature Review

There are five broad viewpoints on the asset sales: non-synergy and synergy hypothesis, efficient deployment hypothesis, financing hypothesis, increasing focus hypothesis and earnings management hypothesis. Non-synergy theories argue that managers sell assets to make the firm less attractive to outside bidders in case of takeover threats (Bradley, Desai and Kim 1983). Synergy theories suggest that over time if there is an unfavourable change in the market pricing of assets, potential productivity gains can be realized by selling assets (Mulherin and Boone 2000). An example can be a technological change that alters the efficient size of the firm and, by implication, influences the firm's decision to engage in asset sales. Empirically, both, non-synergy theories and

³ The work does not examine the effect of deregulation by comparing firm characteristics pre and post deregulations of 1991; rather it uses some implied consequences to pass some remarks. To say something in strict sense requires further research.

synergy theories predict that asset sales or divestitures create wealth by increasing specialization and reducing agency costs (Mulherin and Boone 2000).⁴

The efficient deployment viewpoint propagates the idea that asset sales promote efficiency by allocating assets to better use (Hite, Owers and Rogers 1987; Maksimovic and Phillips 2001). With increase in size and diversity of the operating activities of an organization, a single head may not be efficient for regulating the entire business. Productive gains may result by selling assets to another firm with closely related activities. Maksimovic and Phillips (2001) investigate that whether market facilitates the reallocation of assets to more efficient uses by studying asset sales by U.S. manufacturing firms using data on 35291 plants from 1974 to 1992. They show that the likelihood asset sales increases when the assets in the parent firm are less productive than their industry benchmarks, and when the selling firm has other more productive divisions than the division to be sold.

The financing hypothesis argues that the motivation for firms to sell assets is that it provides funds when alternative sources of financing are too expensive or unavailable. Firms may find external capital unavailable or too expensive for at least two reasons. First, they may be costly because of the adverse selection problem. Second, the cost of outside funds may be high because of agency costs of managerial discretion. Theories of adverse selection postulate that investors are unsure about firm's quality because of imperfect information. Shareholders, therefore, seek a 'lemons premium' i.e., they implicitly demand a premium to purchase the shares of relatively low risk firms to offset the losses that will arise from funding high risk firms. This premium raises the cost of new equity finance faced by managers of relatively low risk firms above the opportunity cost of internal funds (Akerlof 1970; Myers and Majluf 1984; Stiglitz and Weiss 1981). Agency theories propagate that managers derive private benefits from investment, and therefore, will invest more when cash flows permits. Shareholders, therefore, have to incur cost for monitoring the managers. These costs are, in turn, passed to the managers raising the opportunity cost of cash flows (Jensen

⁴ Mulherin and Boone (2000) study both, divestitures and acquisitions made by 1,305 U.S. manufacturing firms in their study from 1990 to 1999. These firms come from diverse set of 59 industries which includes, for example, aerospace, defense equipments, trucking, electric utility, telecommunications, etc. They note that non-synergy theories predict an asymmetric relation between the wealth effects of acquisitions and divestitures. Divestitures create wealth by increasing specialization and reducing agency costs while acquisitions lower wealth by protecting management from market forces and by lessening corporate focus. In contrast, the synergistic models predict that both acquisitions and divestitures create wealth. They use the event study approach to empirically distinguish between the two set of theories. They find that the positive wealth effects of firms' restructuring are consistent with a synergistic explanation of restructuring. In this paper, however, we focus only on divestitures of fixed assets.

and Meckling 1976; Jensen 1986). Therefore, for the firms facing problems of asymmetric information, asset sales is a less costly means of raising capital than public issues of debt and equity (Lang, Poulsen and Stulz 1995).

Lang, Poulsen and Stulz (1995) investigate what fits the data well- the efficient deployment hypothesis or the financing hypothesis by studying 93 voluntary asset sales reported to Securities and Exchange Commission by 77 U.S. firms taking place from 1984 to 1989. They argue that if the efficient deployment hypothesis motivates asset sale, the proceeds are likely to be paid out to shareholders. This is given the fact that management cannot invest the proceeds from sales profitably within the firm. In contrast, if the financing hypothesis motivates asset sales, the proceeds are likely to be paid to the creditors rather than to shareholders. They show that firms selling assets are poor performers, have high leverage and the sale proceeds are mainly paid out to the creditors. This means that a typical firm selling assets is motivated to do so because of its financial trouble.

The focus hypothesis suggests better performance for the remaining assets of the selling firms after they sell assets. The improvement in performance may be due to various reasons, such as elimination of negative synergies with the divested asset or increased efficiency arising from better allocation of management time and other resources in a more focused firm. John and Ofek (1995) suggest three measures to test whether focus increases with divestitures. The first measure is reduction in the number of lines of business of the selling firm. The second measure is based on whether or not the divested division is unrelated to the seller's main operations. The way to do this is to check if the industry code of the divested division is different from the industry code of the selling division. The third measure is sales-based Herfindahl index, H . This index is calculated as the sum of the square of each segment sales, S_i , as a proportion of total sales:

$$H = \sum_{i=1}^n \left(\frac{S_i}{\sum_i^n S_i} \right)^2 \quad (1)$$

H takes values between zero and one. The closer H is to one, the more concentrated are the firm's sales within a few of its segments, and hence its operations are more focused.

John and Ofek (1995) use all the three measures to examine whether focus is an important explanation for firms to sell assets. The sample they study includes 321 divestitures by U.S. firms from 1986 to 1988. All the divestitures are reported in the Wall Street Journal. They find that there is a decrease in the number of reported lines of business; in 75% of the cases the divested

division is unrelated to the seller's main operations and; finally, there is an increase in the Herfindahl index. They also find that the firm's remaining assets are more profitable after the divestiture. Denis and Shome (2005) in their study on 130 asset transactions by U.S. firms from 1985 to 1994 notice that 31% of their sample firms downsize with the motivation of refocusing.⁵ They find that the sample firms increase focus by significantly reducing the number of business segments from one year prior to one year post-downsizing. Hillier, McColgan and Werema (2005) in their study of 413 asset sell-offs by 253 non-financial U.K. firms from 1993 to 2000 also find support for the focus hypothesis. They show a significant rise in Herfindahl index and a significant fall in the number of lines of business of sample firms after they sell assets.

Earnings management hypothesis argues that managers use asset sale transactions to make reported income closer to some target number than it would otherwise be. For earnings manipulations three explanations are suggested: the earnings smoothing hypothesis, the bonus-plan hypothesis and the debt-equity hypothesis (Bartov 1993; Poitras, Wilkins and Kwan 2002; Herrmann, Inou and Thomas 2003). The earnings smoothing hypothesis suggests that firms manipulate earnings are to reduce variance of observed earnings over time. The debt-equity hypothesis suggests a positive relation between firms' debt-equity ratio and managers' choice of earnings-enhancing activities. The bonus-plan hypothesis suggests that managers maximize their compensation through earnings manipulation. Bartov (1993) in order to examine whether managers manipulate earnings using asset sales, studies 653 U.S. firm-year observations from 1987 to 1989. He argues that if the earnings-smoothing hypothesis is true then there should be a negative correlation between income from asset sales and earnings changes exclusive of asset sale effects. Moreover, if the debt-equity hypothesis is true then there should be a positive correlation between income from asset sales and debt-equity ratios. His findings are consistent with both the hypotheses on the timing of asset sales. He also shows that the earnings smoothing and the debt-equity effects are incremental, i.e., after controlling for one effect the other still exists.

⁵ They exclude utility and financial services firms from their sample.

Section 3: The Sample and the Characteristics of Indian Firms Selling Assets

Section 3.1: The Sample

We use PROWEES, corporate data directory of Center for Monitoring of Indian Economy (CMIE), for carrying out our empirical exercise. It contains detailed information on over 20,000 Indian firms. It includes a normalised database of the financials covering around 1500 data items and ratios per company. Our study of asset sale in India is based on the manufacturing sector. Our period of study is from 1996 to 2008.⁶

In our sample we consider those firms for which data is available for at least half of the sample period, i.e., 7 years. To ensure that the firms are predominantly engaged in manufacturing activity we require firms to have at least 85% of their operating income coming from manufacturing sale for at least half of the sample period.⁷ These filters give us 30913 firm-year observations from 2800 firms. Among these, we identify the firms engaged in asset sales in two steps. First, we look for those firms that have reduced the scope of assets by at least 15% in a single accounting year. Our choice of a minimum 15% decrease in asset size stems from our desire to isolate the group of firms that make a discrete decision to accomplish a sizeable reduction in size from those firms which do not do so. Second, we require the firms to have at least 15% reduction in tangible operating fixed assets in the same year in which we observe a reduction in scope of assets.⁸ However, we exclude those firms for which either assets or plant and machinery or land and buildings fall by more than 90% because these cases are likely to be bankruptcy or exit cases.⁹ Meeting all the requirements, we have 325 asset sale transactions by 282 firms. To give a

⁶ In fact, we tried to capture asset sales from 1992 onwards, a year after the reforms of 1991. But, since 1992 to 1995 the number of observation in our sample were very small (a total of 6 in number). So, we dropped the years before 1996. Year 2008 is last year of data available at the time of this study.

⁷ Though the firms are taken from manufacturing sector but we found that some of the firms have diversified away from manufacturing at some point of time. For defining asset sales, we tried various other cut-offs from 60% to 90%. The orientation of the analysis does not change significantly with any of these cut-offs. The choice of 85% was made keeping in mind the existing literature. See table 2 for a comparison.

⁸ A reduction of at least 15% in a firm's total asset position can also come, for example, by a reduction in its financial assets or intangible assets. This is why we require there to be at least a 15% fall in its tangible operating fixed assets.

⁹ We are not analyzing bankrupt firms. There is also a legal dimension to it which is beyond the scope of this work.

comparative picture of the sample size table 1 outlines the sample size in some of the studies on asset sales.

Table 1: Sample Size in Some of the Studies on Asset Sales

Studies	Sample Firm-years / Firms	Country	Study Period
Hite, Owers and Rogers (1987)	212 / -	USA	1963-78
Brown, James and Mooradian (1994)	62 / 49	USA	1979-88
Lang, Poulsen and Stulz (1995)	93 / 77	USA	1984-89
Denis and Shome (2005)	130 / -	USA	1985-94
Hillier, McColgan and Samwel (2005)	413 / 253	UK	1993-2000
This study	325 / 282	India	1996-2008

Hite, Owers and Rogers (1987) consider transactions worth at least \$ 10m. They avoid firms, which do not have daily stock returns data.

Brown, James and Mooradian (1994) consider only distressed firms.

Lang, Poulsen and Stulz (1995) consider transactions worth at least \$ 1m.

Denis and Shome (2005) take only those firms, which have asset size more than \$ 100m. They require firms to shed asset and employment both by at least 25%.

Hillier, McColgan and Samwel (2005) consider transactions worth at least £ 5m. This is only study in this list based on UK firms; remaining are based on US firms. This study is on India.

Section 3.2: Characteristics of Indian Firms Selling Assets

Table 2 presents the year-wise frequency of asset sale transactions made by firms. The average number of transaction per year is 25. Year 1996 records the minimum number of 3 transactions. Years 2005 and 2006, each, record the maximum number of 36 transactions. Table 3 presents the number of asset sale transactions spread over firm's asset size distribution. We notice a decreasing trend as firm's asset size increases. There is one asset sale transaction out of every 29.65 firms on average in first five percentile; the ratio worsens to one out of 96.3 on average in 45 to 50 percentile and it worsens even more to one out of 220.7 on average in the last five percentile. The reason for this pattern can be that firms having small asset size may be resource starved to meet their financing needs for operational requirements or/and debt payments etc. Moreover, they

also have less collateralizable assets to use them for borrowing from external sources. Such firms, therefore, use proceeds from asset sale to meet their requirements.¹⁰

Table 2: Year-wise Frequency of Asset Sales

Year	Frequency	Year	Frequency
1996	3	2003	35
1997	13	2004	31
1998	14	2005	36
1999	20	2006	36
2000	31	2007	29
2001	31	2008	19
2002	27	Total	325

Source: CMIE (PROWESS)

Table 4 outlines the frequency of asset sale transactions by ownership structure of firms. Private firms account for nearly 93% of transactions, foreign firms account for 5.5% of it and the remaining is by public firms. Looking at it differently, one asset sale transaction takes place out of every 92.2 private firm-years, 119.1 foreign firm-years and 162.6 public firm-years. So, the private firms sell assets more frequently than the other ownership structures. This is because for other ownership structures the process of selling fixed assets is more complex. Specifically, for public firms there is a bureaucratic setup which takes such decisions. For foreign firms the decision on asset sales involves the parent firm's approval. For private firms, however, such decisions are taken by the firms' management on their own. Also, for public and foreign firms there are interlocked sources of fund (e.g. other public firms or parent institutions) which they can use in the time of need. But, private firms are mainly dependent on external sources for funds; and in case of external sources are unavailable or are very costly they have to use their internal sources either by liquidating assets or by exhausting reserves.

¹⁰ This is intuitive but we have the study by Athey and Laumas (1994) which shows a contrary finding. Working on Indian manufacturing firms from 1978 to 1986 they show that internal funds are relatively more important for large firms than smaller firms. In line with excess sensitivity literature (or finance constraint literature) this implies that for larger firms have severe problems of information asymmetry. If such an argument is false and the large firms are operating in a perfect market in the sense that they do not face information asymmetry problem, alternative sources of funds should not matter for carrying out their operations (Fazzari, Hubbard and Petersen 1988). However, since internal funds are significantly more important for large firms in their sample, the argument holds.

Table 3: Firms' (Asset) Size Distribution and Asset Sale Frequency (in Rs crore)

Percentile	Asset Size	Frequency of Asset Sales	Total Number of Firm-years	Ratio (Col. 3 / Col. 5)
0 - 1	Less than 1.45	15	305	1 : 20.33
1 - 5	1.44 - 4.26	37	1237	1 : 33.43
5 - 10	4.26 - 6.63	24	1548	1 : 64.5
10 - 15	6.63 - 8.76	23	1539	1 : 66.91
15 - 20	8.76 - 11.19	16	1555	1 : 97.19
20 - 25	11.19 - 14.02	22	1543	1 : 70.14
25 - 30	14.02 - 17.28	11	1543	1 : 140.27
30 - 35	17.28 - 21.019	13	1549	1 : 119.15
35 - 40	21.019 - 25.536	14	1546	1 : 110.43
40 - 45	25.536 - 31.38	10	1549	1 : 154.9
45 - 50	31.38 - 38.86	16	1541	1 : 96.31
50 - 55	38.86 - 48.624	21	1547	1 : 73.67
55 - 60	48.624 - 61.73	19	1547	1 : 81.42
60 - 65	61.73 - 76.931	14	1545	1 : 110.36
65 - 70	76.931 - 97.02	14	1546	1 : 110.43
70 - 75	97.02 - 127.97	11	1544	1 : 140.36
75 - 80	127.97 - 175.494	11	1547	1 : 140.64
80 - 85	175.494 - 248.396	8	1545	1 : 193.125
85 - 90	248.396 - 399.864	8	1546	1 : 193.25
90 - 95	399.864 - 812.053	11	1546	1 : 140.55
95 - 99	812.053 - 4112.88	6	1236	1 : 206
99 - 100	4112.88 - 150149.40	1	309	1 : 309
Total	0 - 150149.4	325	30913	1 : 95.12

Source: CMIE (PROWEES)

Table 5 presents the frequency of asset sale transactions by Group and Stand-alone firms. Nearly 45.2% asset sale transactions are carried out by group firms whereas remaining 54.8% transactions are carried out by stand-alone firms. After accounting for the proportion of each kind of firms in total firms, asset sale transactions take place for one out of every 83.1 group firms-years and one out of every 105.1 stand-alone firm-years. So, once we account for the respective representation in the potential number of firms that could have undertaken asset sales, asset sale

transactions by group firms are more common than stand-alone firms. In the existing literature there are two opposite strands on performance of group firms. The first strand argues that the group firms have their internal capital market to fund their requirements that the external capital market may not be willing to provide because of information asymmetry problems. The second strand argues that business groups mainly exist to the benefit of the typically small number of investors that control a group leading to the expropriation of minority shareholders. So, the complicated ownership structures of business groups may lead to more severe agency conflicts. This negatively affects a firm's performance and its value, making it more likely to sell assets. This is known as tunneling hypothesis in the literature. Khanna and Palepu (2000) and Molen and Lensink (2005) in their study on Indian group firms' performance, also support the tunneling hypothesis.

Table 4: Asset sale Frequency and Ownership Structure

	Public	Private	Joint	Foreign	Total
Asset sale Frequency (Firm-years)	5	302	0	18	325
Asset sale Frequency (Firms)	4	261	0	17	282
Total Number of Firm-years	813	27831	126	2143	30913
Total Number of Firms	69	2522	11	198	2800
Ratio (Row 2 / Row 4)	1:162.6	1:92.16	0	1:119.1	1:95.1
Ratio (Row 3 / Row 5)	1:17.25	1:9.66	0	1:11.65	1:9.93

Source: CMIE (PROWEES)

Table 5: Group Nature of Firms and Asset sale Frequency

	Group Firms	Stand-alone Firms	Total
Asset sale Frequency (Firm-years)	147	178	325
Asset sale Frequency (Firms)	124	158	282
Total Number of Firm-years	12213	18700	30913
Total Number of Firms	1057	1743	2800
Ratio (Row 2 / Row 4)	1 : 83.08	1 : 105.06	1 : 95.12
Ratio (Row 3 / Row 5)	1 : 8.52	1 : 11.03	1 : 9.93

Source: CMIE (PROWEES)

Table 6: Health of Firms and Asset sale Frequency

	Distressed	Non-distressed	Total
Asset sale Frequency (Firm-years)	65	260	325
Total Number of Firm-years	2596	28317	30913
Ratio (Row 2 / Row 3)	01:39.9	02:48.9	02:35.1

Source: CMIE (PROWEES)

Table 6 outlines the frequency of asset sale transactions by healthy and distressed firms.¹¹ Nearly 20% asset sale transactions are carried out by distressed firms. The remaining 80% transactions are carried out by healthy firms. After accounting for the proportion of each kind of firms in total firms, asset sale transactions take place for one out of every 39.95 distressed firms-years and one out of every 108.90 healthy firm-years. So, once we account for the respective representation in the potential number of firms that could have undertaken asset sale, asset sale transactions by distressed firms are more common than healthy firms.

Section 4: Determinants of Asset Sales by Indian Firms

Section 4.1: The Model

A major empirical challenge in finding the determinants of asset sales is that there is not much information available on the nature of transactions. We have a proxy method of defining asset sales as fall in book value of assets by at least 15% with a similar fall in tangible operating fixed assets in the same year. Hence, we only have information on which firms are engaged in asset sales vis-à-vis firms which are not engaged in asset sales. This, by definition, calls for a qualitative variable estimation approach. We, therefore, use a logistic regression to determine the factors which are likely to motivate managers to undertake asset sales.¹² The model is:

¹¹ We define a firm to be distressed in a year if its net worth in that year and the previous year is negative. Otherwise, it is a healthy firm.

¹² In qualitative estimation techniques we have two options- a probit regression model or a logistic regression model. We choose to use a logistic regression approach because the distribution of variables does not follow a normal distribution as required by the probit model. We used graphical plots and tests such as Skewness-Kurtosis test and Shapiro-Wilk test to note that the distributions of the two groups are non-normal.

$$P(\text{assetsale}) = f(Xb) = \exp(Xb) / \exp(1 + Xb) \quad (2)$$

here, $P(\text{assetsale})$ is the probability of asset sale, X is a vector of explanatory variables and b is a parameter vector. We use the method of maximum likelihood to estimate the following specification of the model given in equation (2):

$$\ln\left(\frac{P(\text{assetsale})}{1 - P(\text{assetsale})}\right) = \beta_0 + \sum_{i=1}^n \beta_i(X_{-0}) + \epsilon \quad (3)$$

The left hand side is the log of odds in the favor of asset sale against non-asset sale. β_i 's are coefficients in the regression. X is the vector of explanatory variables. The time subscript (-0) means the explanatory variables are taken just before firms' sell asset. ϵ represents the error term.

In the set of explanatory variables we consider book value of assets to represent the size of firms; sales-asset ratio to represent operating performance of firms; return on assets to represent profitability of firms; debt-capital ratio to measure leverage of firms; current ratio to represent solvency of firms; industry sales shock to measures of industry performance to which a firm belongs to. We also consider three dummies- a distress dummy, a group firm dummy and a low debt capacity dummy.¹³

Section 4.2: Regression Results

We employ two specifications of the model in equation (2) with a binary dependent variable that takes the value one for firms selling assets in any year and zero for non-selling firm-years. In specification 1, we use all explanatory variables as discussed in the previous paragraph. Specification 2 is same as specification 1 except current ratio, return on assets, debt capital ratio and sales-asset ratio are all adjusted for industry median values.

Skewness-Kurtosis test presents a test for normality based on skewness and kurtosis of the distribution and then combines the two tests into an overall test statistic. Shapiro-Wilk test maintains the null hypothesis that the sample being studied comes from a normal distribution. Moreover, The size of coefficients in either model is a multiple of the size of coefficients in the other model (Maddala 1983)

¹³ For construction of variables see the Appendix. Putting industry sales shock as a separate variable in the model has a purpose. We have defined asset sales as the sale of tangible operating fixed assets. Since, these assets are operating, only those firms which are engaged in the closely related activity as the seller are, would purchase such assets. Such transactions, therefore, are very likely to be condensed within the respective industries than the outside industries. Hence, industry level shocks are likely to capture the demand (for sold fixed assets) side conditions for the good under transaction.

Table 7 presents the regression results. In specification 1, log asset is significant with negative coefficient. This implies that firms with smaller size are more likely to sell assets than firms with larger size. This is because small firms are more likely to be resource starved to meet their financing needs for operational requirements and debt payments etc. Such firms also have less collateralizable assets to use them for borrowing from external sources. They, therefore, use proceeds from asset sale to meet their requirements. Current ratio is significant with negative coefficient. This implies that firms with lower solvency are more likely to sell assets. This is because creditors' pressure may influence them to undertake asset sales. Return on assets is significant with negative coefficient. This implies that firms with lower profitability are more likely to sell assets than firms with higher profitability so as to supplement their financing needs.

Table 7: Logistic Regression Results (for 15% Definition of Asset Sales)

Variables	Specification 1 Coefficients	Specification 2 Coefficients
Constant	-3.456***	-4.194***
Log Assets	-0.134***	-0.147***
Current Ratio	-0.117***	
Current Ratio Adjusted		-0.124***
Return on Assets	-1.069**	
Return on Assets Adjusted		-0.989**
Debt Capital Ratio	-0.263	
Debt Capital Ratio Adjusted		-0.156
Sales Asset Ratio	-0.424***	
Sales Asset Ratio Adjusted		-0.442***
Industry Sales Growth	-1.163**	-1.227**
Low Debt Capacity Dummy	0.441***	0.414***
Group Firm Dummy	0.327***	0.334***
Distress Dummy	0.159	0.156
Log Likelihood	-1676.492	-1677.603
Wald chi ² (9)	126.81	122.12
Prob > chi ²	0.000	0.000
Number of Observations	27370	27370

The results of the logistic regressions use a binary dependent variable that takes the value one for firms selling assets in any year and zero for non-selling firm-years. Asset sales equations are estimated using year dummies in order to control for year effects. The variables used in the regression are defined in the appendix. ***, **, and * represent 1%, 5%, and 10% level of significance, respectively.

Sales-asset ratio is significant with negative coefficient. This implies that firms with lower operating performance are more likely to sell assets than firms with better operating performance. This can be because firms with low operating income use proceeds from asset sales to supplement their income. Industry sales growth is significant with negative coefficient. This implies that firms are more likely to sell assets if their performance is worse than the industry median. This is in the sense that they have operating problems in the product market. Low debt capacity dummy is significant with positive coefficient. This implies that firms which are less solvent and more leveraged than their industry average, are more likely to sell assets. The possible reason for this can be creditors' pressure and/or need for finance. Group firm dummy is significant with positive coefficient. This implies that group firms, compared to stand-alone firms, more likely to sell assets. This is contrary to the notion that a group's internal capital market enables the affiliated firms to fund their requirements that the external capital market may not be willing to provide because of information asymmetry problems. This, however, supports the view that the complicated ownership structures of business groups lead to more severe agency conflicts, which negatively affects a firm's performance and its value, making it more likely to sell assets.¹⁴ In specification 2, the results are similar, but the interpretations need to account for the industry median values. For example, industry adjusted current ratio is significant with negative coefficient. This implies that firms with lower solvency than the industry average are more likely to sell assets than the firms that are more solvent than the industry average. The reason can be that creditors' pressure influences them to undertake asset sales.

Section 4.3: Robustness Check

For robustness check, we use an alternative definition of asset sales where we require firms to reduce at least 25% of their assets in a single year. All the other conditions remain same as discussed in the section 4. Meeting all the conditions as mentioned in the section 3 we get 194 asset sale transactions by 177 firms at 25% definition. Table 8 presents the estimation results for the determinants of asset sales at this alternative definition. We find similar results for this definitions of asset sales across the two specifications except for the variable, industry sales growth, which is significant at 15% definition but not at 25% definition of asset sales. The explanation of the variables, therefore, is same as in the previous sub-section.

¹⁴ Khanna and Palepu (2000) and Molen and Lensink (2005) in their study on Indian group firms' performance, also arrive at a similar conclusion though they do not talk about asset sales per se.

Table 8: Logistic Regression Results (for 25% Definition of Asset Sales)

Variables	Specification 1 Coefficients	Specification 2 Coefficients
Constant	-4.038***	-4.706***
Log Assets	-0.151**	-0.170***
Current Ratio	-0.088*	
Current Ratio Adjusted		-0.089
Return on Assets	-0.960**	
Return on Assets Adjusted		-0.880**
Debt Capital Ratio	-0.077	
Debt Capital Ratio Adjusted		0.147
Sales Asset Ratio	-0.583***	
Sales Asset Ratio Adjusted		-0.635***
Industry Sales Growth	-0.649	-0.730
Low Debt Capacity Dummy	0.584***	0.532***
Group Firm Dummy	0.460***	0.468***
Distress Dummy	0.052	0.036
Log Likelihood	-1091.073	-1090.737
Wald chi ² (9)	81.73	79.86
Prob > chi ²	0.000	0.000
Number of Observations	27370	27370

The results of the logistic regressions use a binary dependent variable that takes the value one for firms selling assets in any year and zero for non-selling firm-years. Asset sales equations are estimated using year dummies in order to control for year effects. The variables used in the regression are defined in the appendix. ***, **, and * represent 1%, 5%, and 10% level of significance, respectively.

Section 5: Pre and Post-Asset Sale Characteristics of Indian Firm

Works on developed countries suggest that firms selling assets, on average, are characterised by poor performance before they sell assets and their performance improves, on average, after they sell assets (John and Ofek 1995; Denis and Shome 2005; Hillier, McColgan and Werema 2005). In this section, on similar lines, we attempt to investigate two specific questions. First, are the firms selling assets different from the firms not selling assets, on average, over two years period before they sell assets? This exercise can help us to find evidence on whether firms selling assets, on average, are characterised by poor performance before they sell assets. Second, are firms selling assets different from firms not selling assets, on average, over two years period

after they sell assets? This exercise can help us to find evidence on whether firms selling assets improve their performance, on average, after they sell assets.

For answering these questions we look at the firms selling assets and the firms not selling assets in two ways. First, we compare all the firms selling assets against all the firms not selling assets on various firm characteristics on an aggregate basis. Second, we compare the firms selling assets against the firms not selling assets in each decile of the asset size. We do this to control for size while making a contrast between the two groups.¹⁵ We use Wilcoxon signed-rank-test for comparing average firm characteristics of firms selling assets to firms not selling assets. This test is a nonparametric alternative to the two-sample t-test. We use Wilcoxon signed-rank-test because the condition that the two distributions being compared should be normal is not met.¹⁶

Section 5.1: Contrasting Sellers with Non-sellers over Two Years Period before Asset Sales

To investigate whether firms selling assets are different from firms not selling assets, on average, over two years period before they sell assets, we compare sample group with the control group by means and medians of various firm characteristics. The first four columns of the table 9 present the comparative picture across the two groups.¹⁷ We notice almost similar pattern in both the years for all the firm characteristics. Mean and median asset size by sample firms is statistically smaller than the control firms. A similar pattern is shown by solvency, profitability and operating performance characteristic of firms. Mean and median leverage, however, is statistically higher for sample firms than the control firms. Looking at the deciles, we find that sample firms in almost all the deciles show a similar characteristic vis-à-vis control firms as we noted on aggregate basis. The pattern, however, is not statistically significant in some of the cases. Thus, we find some indication here that for most of the firms selling assets, the factors leading them to sell assets, may be sustained by their bad performance over a period before they sell assets.

¹⁵ We suspect that size may bias the comparison between the two groups at an aggregate level because the pattern of asset size in the two groups is very different on aggregate.

¹⁶ See note 12 for the tests on normality.

¹⁷ We present the results for only complete sample and first, fifth and tenth deciles. Tables on other deciles can be presented on request.

Table 10: Pre and Post-Asset Sale Characteristics of Indian Firms

Variables / Year	Mean		Median			Mean		Median	
	-2	-1	-2	-1	+1	+2	+1	+2	
Complete Sample and Control									
Assets	-	-	-	-	-*	-	-***	-***	
Current Ratio	-***	- ***	- ***	- ***	-*	+	- ***	- ***	
Debt capital ratio	+*	+	+ **	+	- ***	- ***	- **	- **	
Return on assets	-***	- ***	- ***	- ***	- ***	- ***	- ***	- ***	
Sales asset ratio	-***	- ***	- ***	- ***	- ***	- ***	- ***	- ***	
First Decile									
Assets	-	-	-	-	- ***	+*	- ***	-	
Current Ratio	-**	-**	-	- *	-	-	-	+	
Debt capital ratio	+ ***	+	+ **	+	-*	-*	-	-	
Return on assets	-	- **	- ***	- ***	-	- **	- **	- *	
Sales asset ratio	-	- ***	-	- **	- **	-	-	-	
Fifth Decile									
Assets	-	-	-	-	+ *	+	+ **	+	
Current Ratio	-	-	- ***	- *	-**	-	-	+	
Debt capital ratio	+	+	+ *	-	-	-	-	- *	
Return on assets	- ***	- ***	- ***	- ***	-	-	- **	-	
Sales asset ratio	- ***	- ***	- **	- ***	- **	-	- **	- *	
Tenth Decile									
Assets	+	-	-	-	- ***	- ***	-*	-*	
Current Ratio	-	- ***	-	- *	-**	-***	-	- *	
Debt capital ratio	+**	+	+	+	+	+	- ***	- ***	
Return on assets	- ***	- ***	- ***	- ***	- *	-	-	-	
Sales asset ratio	- ***	- **	-	-	-	-	-	-	

The table presents a comparison of the sample group with the control group by means and medians of various firm characteristics, over two years before they sell assets and over two years after they sell assets. Control group firms are firms that could potentially sell assets, but they did not sell assets in the sample period. We use Wilcoxon signed-rank-test for this purpose. First, we do this for entire dataset; and then, for firms in each decile based on firms' book value of assets. Year j denotes the year from an asset sale transaction year. + (-) denotes that the average for sample firms is greater (smaller) than control firms. Variables are defined in the appendix. ***, **, and * denote level of significance at 1%, 5% and 10%, respectively.

Section 5.2: Contrasting Sellers with Non-sellers over Two Years Period after Asset Sale

To investigate whether firms selling assets are different from firms not selling assets, on average, over two years period after they sell assets, we do a similar exercise as done above. The last four columns of the table 9 present the comparative picture across the two groups. We notice almost similar kind of pattern in both the years for all the firm characteristics, except leverage characteristic. Sample firms are less leveraged after they sell assets. This means that firms sell assets, in general, to reduce their debt burden. Mean and median asset size by sample firms are statistically smaller than the total control firms. A similar pattern is shown by solvency, profitability and operating performance characteristic of firms. Similar results are noted by looking at the deciles as well. However, the pattern, again, is not statistically significant in some of the cases. Thus, for firms selling assets, on average, the only advantage asset sales seem to make, is some reduction in leverage. We, therefore, can infer from the results that for most of the firms, asset sales, apart from some reduction in debt, does not change their performance.

Section 6: Conclusion

To investigate asset sales in the Indian perspective, we study 325 asset sale transactions made by 282 manufacturing firms from 1996 to 2008. Some of the important observations which came up in the course of the analysis are as follows: first, an asset sale on a significant scale is highly uncommon phenomenon. Second, there is a decreasing trend in the number of transactions as the firm's asset size increases. This suggests that firms having small asset size might be resource starved to meet their financing needs for operational requirements and debt payments etc. Moreover, small firms also have less collateralizable assets to use them for borrowing from external sources. Third, private firms are more frequent in selling assets compared to the other ownership structures, i.e., public and foreign firms. Fourth, asset sales by the distressed firms are more frequent than the non-distressed firms. Fifth, asset sales by group firms are more frequent than stand-alone firms. This is in contrary to the notion that a group's internal capital market enables the affiliated firms to fund their requirements that the external capital market may not be willing to finance because of problems of information asymmetries. This, however, supports the view that the complicated ownership structures of business groups lead to more severe agency conflicts, which negatively affects a firm's performance and its value, making it more likely to sell assets.

In this paper, the focus is mainly on two important questions. First, what are the potential factors causing asset sale decision by firms? Second, how does firms' performance change after they sell assets? In answering the first question we find that the likelihood of asset sale increases with the firm's leverage, distress nature and low capacity of debt utilisation and decreases with size, profitability and operating performance. In analysing the second question we find that most of the firms selling assets, in general, do not improve in profitability, operations and solvency apart from some reduction in leverage. Since these firms, in general, continue to deteriorate in their performance post-asset sales, it may be concluded that firms selling assets are already in some kind of vicious circle of bad performance with asset sale being the measure of last resort.

Episodes of asset sales in the developed countries, similar to our finding on the factors which are likely to influence managers to undertake an asset sale, find that the likelihood of downsizing increases with poor operating performance, high leverage, and financial distress. However, contrary to our results post asset sale performance by firms selling assets, these episodes suggest that the operations of the firms selling assets improve after they sell assets. The only similarity in this regard is that they also note a significant reduction in the leverage of firms after they sell assets. There can be two possible reasons for such contradictory findings: first, sample of firms taken from different countries differ in composition with respect to characteristics such as the size of the firms, capital-intensity, borrowing capacity, openness and the durability of their output, etc. For example, asset sales by firms in India, after controlling for general firm characteristics such as size, profitability, leverage, solvency and operating performance, is a consequence of structural problems as indicated by capacity constraint and organisational set up, and which by definition are persistent in nature. The second reason for the contradictory findings can be on account of the informational problems inherent in the financial system. In India (and in other developing countries) owing to the less developed nature of financial markets, the problems of adverse selection and moral hazard are more severe. Thus, for such firms problems in getting external finance is more severe.

Some of the suggestions which can be made out the work are:

- 1) Problems of moral hazard seem to be important issue since group firms are more likely to sell assets. Strengthening of machinery to provide credit bureau information to track potentially delinquent debtors could be an important step to reduce such problem.

2) Problem with firms selling assets seem more to be intrinsic in nature because firms with debt capacity constraint are more likely to sell assets. One way to handle this can be to lend support to firms to compete rather than to grow in size. The East Asian Newly Industrialised Countries (NICs) followed a similar model.

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Appendix: Variables Definition

Sales-asset ratio- It is defined as the ratio of total sales to total assets of a firm in the same period.

Return on assets- It is defined as ratio of profits before taxes, interest payments, dividends and amortisation (PBTIDA) to total asset position of a firm in the same period.

Debt capital ratio- It is defined as the ratio of a firm's outstanding debt to its total capital at the same point in time. The capital stock is sum of total borrowings and equity.

Current ratio- It is defined as the ratio of a firm's current assets to its current liabilities at the same point in time. Current asset includes cash and bank balance, inventories, receivables except loans receivables and marketable securities. It excludes all application money. Current liabilities include all liabilities that are due within 12 months period. It includes sundry creditors, acceptance, unclaimed dividends, interest accrued and due, deposits from dealers, leased deposits, advances against orders, advances against work in progress, immature financial charges and other current liabilities.

Industry sales shock- It is defined as the difference between the sales growth in that industry and the average sales growth across all industries in the same year.

Distress dummy- A firm is classified as financially distressed in a given year if the firm's net worth is negative for that year and the previous year.

Group firm dummy- A firm is classified as a group firm if it belongs to a group.

Low debt capacity dummy- A firm is classified as low debt capacity firm if the firm has an industry-adjusted debt-capital ratio positive and industry-adjusted current ratio negative.

Industry-adjusted debt-capital ratio- It is the debt-capital ratio of a firm minus the median debt-capital ratio of all the firms in that industry.

Industry-adjusted current ratio- It is the current ratio of a firm minus the median current ratio of all the firms in that industry.

Industry-adjusted return on assets- It is the return on assets of a firm minus the median return on assets of all the firms in that industry.

Industry-adjusted sales-asset ratio- It is the sales-asset ratio of a firm minus the median sales-asset ratio of all the firms in that industry.