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DIVESTITURE POST MERGERS AND ACQUISITIONS IN INDIA – REASONS AND MODEL TO PREDICT

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Abstract: *Divestitures post-acquisition are a common occurrence yet the jury is still out on whether they represent correction of prior mistakes or are a restructuring tool to improve performance in the hands of managers evaluating overall portfolio of assets. We take a sample of 1,344 deals buy Indian public listed buyers from 2000 to 2020 of which 13% were followed by a divestiture to create models to predict if an acquisition is likely to be followed by a divestiture or not using logistic regression and discriminant analysis. Our model is more than 75% accurate in its prediction even when tested on unselected data (new data for the model). We find support for portfolio theory and reject the correction of prior mistakes theory to explain post-acquisition divestitures. We support the theory that financial constraints leads to post acquisition divestiture. We also support the theory on indigestion that post acquisition divestitures are due to cookie-jar problem where buyers are finding it difficult to integrate. Increased volatility and poor mean stock price returns both contribute to conditions leading to such divestitures. The model constructed is useful for shareholders and other stakeholders to predict whether a divestiture will follow an acquisition or not. Managers can also use the model to predict eventual outcome of their acquisition decisions.*

Keywords: *Divestiture, merger and acquisition, predicting divestiture, acquisition failure, restructuring.*
(JEL code: G34)

INTRODUCTION

Divestitures around acquisitions are more common than one may imagine. Right from early 1980s, studies have reported that 30 to 45 percent M&As were divestitures of previously-acquired units (Weston, 1989). Porter (1987), Kaplan and Weishbach (1992) and Ravenscraft and Scherer (1987) also find evidence of a high occurrence of divestitures after M&A. The scenario is no different today. Aktas et al. (2022) report that 13% of acquisitions in their large 6,845 sample were associated with at least one divestiture representing on an average about 33% of the original acquisition value. Further, studies have also claimed a 'cause and consequence' relation between these acquisitions and divestitures (Ma & Wang, 2018).

Much of the traditional literature on this topic considers divestitures post M&A evidence of failure of prior M&A. It is so because it is believed that few unsuccessful M&A are retained and few successful M&A are divested (Hamilton & Chow, 1993; Ravenscraft & Scherer, 1987; Taylor, 1988). Porter (1987) and Berger and Ofek (1995) subscribed to the idea that divestitures post M&A were correction of prior mistakes. They accompanied problems like issue of change management, financial and reputational loss (Donaldson, 1990; Kaplan & Weisbach, 1992; Taylor, 1988).

Recent literature, on the other hand, is beginning to explore this topic in a little more nuanced way than to simply classify them as evidence of failure with a broad brush stroke. Divestitures have a positive side to them (Aktas et al., 2022; Amiri et al., 2021), one that improves efficiency (Berry, 2010; Cummins & Xie, 2009), reduces overdiversification (Berger & Ofek, 1995; Curi & Murgia, 2018; Kumar, 2005), eliminates underperforming units (Shimizu, 2007; Wang & Jensen, 2018) and so on.

Much of the research in M&A had earlier either ignored the topic of divestiture or considered it as the other side of M&A. Divestitures are only beginning to get some atten-

tion in the field of M&A research. While some studies have attempted to study the reasons of divestitures post M&A in developed economies like USA, there is not even one study that comprehensively attempted to understand reasons behind such divestitures and create a model to predict them in Indian context, to the best of our knowledge. It is a topic of great significance because such divestitures have significant implications on shareholder's value (Aktas et al., 2022), organizational performance (Helfat & Eisenhardt, 2004; Helfat, et al., 2007; Moliterno & Wiersema, 2007), organizational learning (Shimizu & Hitt, 2005), future strategy (Meschi & Metais, 2015) and so on. Further, a global study also doesn't help one understand India specific nuances. USA's market capitalization as share of global market capitalization is more than 50%. When one adds other developed countries it increases to approximately 80% (Lu, 2024a). Share of Indian markets in global market capitalization is less than 10% of USA (Lu, 2024b). Essentially, even though India is fifth largest economy in the world, a study based on listed M&A buyers which is the case for most existing research–for example, Aktas et al. (2022) and Amiri et al. (2021)–will only have Indian nuances as rounding off errors. It shows a clear, valuable gap in the field of research on divestitures post M&A.

MATERIALS AND METHODS

TWe explored several different factors that potentially contribute to a divestiture around an M&A.

Financial constraints

Divestitures can bring in much needed cash for a struggling organization. Poor performance prior to divestiture (Bergh, 1997; Berry, 2013; Duhaime & Grant, 1984) is topic which has been explored by researchers in the past as one of the explanations of such divestitures in different forms. Thus, we predict that:

Hypothesis # 1a: Financial constraints of buyer increases the likelihood of divestitures post M&A.

We have combined several variables which have been studied in the past to analyze impact of financial constraints on divestitures post M&A in studies such as Aktas et al. (2022), Denis and Sibilkov (2010), and Hadlock and Pierce (2010):

- (Low) Cash:
  - o Cash holding - Cash_Holding_N_Binned
  - o Free Cash Flows – Levered_FCF_Divestiture_N and Levered_FCF_N_Change
- (Low) Profitability:
  - o Return on Assets – ROA
  - o Profit (EBITDA) Margin – Buyer_Profitability_Change
- Debt capital and leverage:
  - o (High) Leverage –Buyer_Leverage_Divestiture_N and Buyer_Leverage_N_Change_Binned
  - o Debt issue (no) – Debt_Issue_B - as increase in debt, at least in the near term, will signify increase in availability of capital, and thus, easing of constraints.
- (Low) Valuation – TobinsQ_Binned
- Size, age and strength:
  - o (Small) Size (by assets) – Small_Organisation_B and Size_Log
  - o (Low) Age – Young_Organisation_B
  - o (Weak) Strength (by revenue) – Strong_Organisation_B
- •Dividend Payer (Yes) – Dividend_Payer_B – as per signaling hypothesis (Baker, 2009), a reduction in dividend payment rate for a regular payer signals trouble which will also likely impact management's compensation, and therefore, acts as an obligation.

Deal complexity

Deal complexity is a double-edged sword. While larger and cross border deals means more opportunities for learning and synergies (e.g., cross border opens up new geographies as markets and larger deals allows more bargaining power with suppliers), it can also lead to cookie-jar problem or indigestion (Gaddis, 1987; Kaplan & Weisbach, 1992; Schipper & Smith, 1983). Thus, we predict that divestitures post M&A could be due to indigestion i.e.,

Hypothesis # 2a: Deal complexity (relative size and/ or cross border deals) increases the likelihood of divestitures post M&A.

The independent variables studied here are Relative_Size and Cross_Border_B.

Instability in performance

Combination of two assets which are less than perfectly correlated should result in reduced volatility which could have been one of the motivations to focal M&A (Lubatkin & Chatterjee, 1994; Lubatkin & O'Neill, 1987; Sanders, 2001). When this expectation is not met or when volatility increases post M&A, it can lead to divestiture (Chatterjee, 1986; Seth, 1990; Singh & Montgomery, 1987). Thus, we predict that:

Hypothesis # 3a: Stock volatility (pre divestiture and increase in volatility when compared to pre-acquisition) increases the likelihood of divestitures post M&A.

The independent variables studied here are Stock_Volatility_Divestiture and Stock_Volatility_Change_Binned.

Mean stock performance

Divestitures are complex decisions with their own share of risks, issues and complexities (Amiri et al., 2020). A manager motivated to minimize volatility, would be equally motivated to maximize mean stock performance. Hence, when mean stock performance is going well, manager would be unlikely to divest (Berry, 2010; Brauer, 2006; Kolev, 2016). Further extending the same argument, mean stock performance would negatively moderate the relationship between volatility and post M&A divestiture likelihood (Amiri et al., 2021). Thus, we predict that:

Hypothesis # 4a: Strong mean stock performance (pre divestiture and increase in performance when compared to pre-acquisition) reduces the likelihood of divestitures post M&A.

Hypothesis # 4b: Strong mean stock performance (pre divestiture and increase in performance when compared to pre-acquisition) negatively moderates the relationship between stock volatility and post M&A divestiture likelihood.

The independent variables studied here are Mean_Stock_Performance_Divestiture, Mean_Stock_Performance_Change, Stock_Volatility_Divestiture, Stock_Volatility_Change_Binned and their respective interactions.

Related vs. unrelated M&A

A related deal provides economies of scale (Berger & Ofek, 1995; Chatterjee & Lubatkin, 1990; Helfat & Eisenhardt, 2004), better strategic fit with buyer (Eisenmann, 2002; Haspeslagh & Jemison, 1991), stronger capabilities, easier integration and thus, lesser challenges. Unrelated deals are known to be associated with higher failure rate (Meschi & Metais, 2015), poor performance (Bergh, 1997; Kaplan & Weisbach, 1992; Porter, 1987) and more risks, challenges and complexities in integration (Bergh, 1995; 1997; Mahoney & Pandian, 1992). Thus, we predict that:

Hypothesis # 5a: Related M&A deals are less likely to be followed by divestitures or unrelated deals are more likely to be followed by divestitures.

The independent variable studied here is Relatedness_C.

Anticipation of regulatory concern

When two big organizations who are market leaders are getting into a deal, regulators can often be raise concerns. One of the ways to allay those concerns is to divest parts of the organization which can be done in anticipation of regulatory concern. Such divestitures are effective tools to check increasing market power following M&A between market leaders (Vasconcelos, 2010; Vergé, 2010). Thus, we predict that:

Hypothesis # 6a: Anticipation of regulatory concern increases the likelihood of divestitures post M&A.

However, divestiture in anticipation of regulatory concern requires robust M&A market which may be available to buyers in developed countries but may be a luxury that Indian managers cannot afford. For example, the deal volume in USA from 2000 to 2010 has been in the range of 8,000 to 14,000 deals (count) and $500b to $2 trillion. In India during the same period it has been between 700 and 1,500 deals valued at $5-60 billion (Institute of Mergers, Acquisitions and Alliances, 2025). In other words, the deal market in India is a fraction of the deal market in USA. Therefore, divesting post an M&A to alleviate potential regulatory concern may neither be feasible nor financially viable. If anything, since other market participants would be well aware of a potential risk of regulatory action, any attempt to sell around a focal M&A in an illiquid market like India is likely to be from a weak bargaining power position leading to fire-sale like situation. Therefore, managers would be motivated to avoid having to divest post such an M&A. It thus presents with the following alternative hypothesis:

Hypothesis # 6b: Anticipation of regulatory concern reduces the likelihood of divestitures post M&A.

The independent variable studied here is High_Reg_Risk_Combined.

Correction of prior mistake

Correction of prior mistake is often the explanation for divestitures following an M&A (Kaplan & Weisbach, 1992; Porter, 1987)), and poor acquisition cumulative abnormal returns (CAR) are often a proxy of such mistakes (Allen et al., 1995). Thus, we predict that:

Hypothesis # 7a: Poor acquisition CAR increases the likelihood of divestitures post M&A or acquisition CAR is negatively associated with likelihood of divestiture post M&A.

The independent variable studied here is Acquisition_CAR.

Experience

Organizations learn from past experiences in the relevant field. For divestitures post M&A, two important variables which would add to organizational learning would be past acquisition experience (Barkema & Schijven, 2008a; Hayward, 2002; Zollo, 2009) and past divestiture experience (Doan et al., 2018) gained over a 5 year period prior to the focal M&A.

If divestitures following an M&A signal correction of prior mistakes where prior mistakes are poor M&A, a more experienced buyer should have fewer mistakes, and therefore, lesser need to divest post M&A. Thus, we predict that:

Hypothesis # 8a: Experience (acquisition and divestiture experience) reduces the likelihood of divestitures post M&A.

However, if divestitures, like acquisition, are a tool in arsenal of managers to improve performance of overall portfolio as propagated by portfolio theory (Barkema & Schijven, 2008a; Dranikoff, Koller, & Schneider, 2002; Lubatkin & Chatterjee, 1994)), such experience should not reduce the likelihood of divestitures post M&A. In fact, for savvy and experienced buyer, such a divestiture could very well have been part of the plan – acquire, learn, integrate and divest once deal value is fully extracted (Capron et al., 2001). It therefore presents with the following alternative hypothesis:

Hypothesis # 8b: Experience (acquisition and divestiture experience) increases the likelihood of divestitures post M&A. The independent variables studied here are Past_Acquisition_5_Log_Binned and Past_Divestment_5_Log.

Methodology

We used S&P CapitalIQ to extract data of deals by Indian buyers from 2000 to 2020 which was our main dataset for analysis and it covers the period since when the M&A market picked up in India from 2000s. Additionally, we captured data from 1995 to see past deals for calculating prior acquisition and divestiture experience. Similarly, we extracted deals data till end of 2023 to ensure that we follow every deal for three years to ascertain whether it was followed by divestiture or

not. The three year period is in line with prior research–for example, Maksimovic et al. (2011) and in line with findings of Amiri et al. (2020) that average divestiture period was 2.5 years and supported by observations of Ingham et al. (1992), Lubatkin et al. (2001) that integration is completed within three years. It is also more than the one year period taken in studies like Aktas et al. (2022) and it is not too large like five or seven years during which period the buyer would have done many more acquisitions and thus, the findings will be biased with those corporate events. For example, in our sample, the buyers were doing 0.3 acquisition per year on an average. Thus, increasing the period to five or six years would have likely included at least one more acquisition. S&P CapitalIQ was used for extracting financial and share price data of buyers. Deals were filtered and retained based on the following criteria – public listed buyer (as private buyers had a lot of data availability issues), deal should closed or completed, acquisition should have led to change in control, buyer should not have been later bankrupt or been acquired itself, buyer's assets should be positive, the deal should have been closed within three years and if a divestiture happened post deal it should have also led to change in control. Deals with missing data were also removed and we were left with 1,344 deals of which 176 or 13% were followed by a divestiture which is same as the 13% number in the study by Aktas et al. (2022) based on global sample.

Dependent variable was coded as a binary categorical variable which took value 1 if there was no divestiture following an acquisition and 2 if the acquisition was followed by a divestiture. We included relevant control variables which were Capex_N, Equity_Issue_B, RD_N, Listed_Target_B, We also controlled for industry and year fixed effects (Industry_FE and Year_FE). Independent variables have been along with hypothesis above.We used logistic regression as the dependent variable was dichotomous similar to Bergh (1997), Doan et al. (2018), and Nguyen and Rahman (2015). Additionally, we created another predictive model using discriminant analysis similar to Bergh (1997). Further, we compared means and distribution of variables across two groups (acquisitions which were followed by a divestiture and those that weren't) using independent samples t-test for scale variables and chi-square test of independence for categorical variables. We ensured that conditions necessary to run these tests were checked.

RESULTS AND DISCUSSION

Conditions necessary for running Logistic regression were checked and ensured. Linearity of logit was tested using Box-Tidwell test and six continuous variables were found to be breaching the assumption, and therefore, were transformed into categorical variables and their names were suffixed with "_Binned". Multi-collinearity was tested through VIF and correlation matrix and buyer profitability pre divestiture was dropped due to high VIF score. VIF scores can be made available upon request. VIF scores of all the other variables were below the prescribed threshold of 5-10 (Sheather, 2009; Tabachnick & Fidell, 2012). The sample size was sufficiently large and none of the variables ensured perfect separation. Cooks's distance and standardized residuals were used to check for outliers and influential points and were found to be acceptable i.e., all absolute values were below 1 and 3 respectively. For discriminant analysis also, most of the conditions were met and anyway discriminant analysis is quite robust to breaches to these assumptions and is good first choice for a classifier development (Hallinan, 2012). Additionally, we only used 80% of the data to create the model and remaining 20% of observations were used to cross validate the model. The cross validated results of unselected cases were also satisfactory proving the robustness and predictive power of the model.

Table 1 reports comparison of means tests. Significance values have been taken from t-test for scale variables and Chi-square test of independence for categorical variables. Buyers who had acquisitions followed by divestitures had the following characteristics (when compared to buyers who didn't divest post-acquisition) – less cash holding, bigger in size, stronger (by revenue), lower valuation (TobinsQ), more experienced M&A players (more acquisitions and divestitures), lesser increase in leverage, more increase in volatility. More of these buyers were dividend payers. Overall, the profile is clear – larger, more established (size, revenue, dividend payers) and more experienced M&A players were divesting more often. Further, deals which were followed by increase in volatility were also followed by divestitures more often. Further, domestic deals and deals with lower regulatory action risk were being followed by divestitures more than those which were cross border or had higher regulatory action risk.

Table 1. Comparison of means

Acquisition_With_Or_Without_Divestiture	1 (without divestiture)			2 (with divestiture)		
	Mean	N	Std error mean	Mean	N	Std error mean
Capex_N	0.1026	1,278	0.0174	0.0758	188	0.0050
Cash_Holding_N	0.0825**	1,278	0.0031	0.0651**	188	0.0072
Equity_Issue_B	0.6776	1,278	0.0131	0.633	188	0.0352
Debt_Issue_B	1.9405	1,278	0.0066	1.9415	188	0.0172
Dividend_Payer_B	0.7363***	1,278	0.0123	0.8617***	188	0.0252
RD_N	0.0011*	1,278	0.0002	0.0021*	188	0.0008
ROA	0.1447***	1,278	0.0091	0.1182***	188	0.0048
Size_Log	1.9706***	1,278	0.0245	2.7806***	188	0.0639

TobinsQ	2.4892**	1,278	0.0994	1.8156**	188	0.1010
Past_Acquisition_5_Log	0.2723***	1,278	0.0084	0.3744***	188	0.0228
Past_Divestment_5_Log	0.0317***	1,278	0.0030	0.1096***	188	0.0141
Relative_Size	0.1742	1,278	0.0206	0.1202	188	0.0475
Cross_Border_B	0.2872*	1,278	0.0127	0.2234*	188	0.0305
Relatedness_C	2.4812	1,278	0.0403	2.3032	188	0.1047
Listed_Target_B	0.1025	1,278	0.0085	0.1277	188	0.0244
Acquisition_CAR	0.0109	1,278	0.0018	0.0055	188	0.0044
Young_Organisation_B	1.0571	1,278	0.0065	1.0319	188	0.0129
Small_Organisation_B	1.1103	1,278	0.0088	1.1277	188	0.0244
Strong_Organisation_B	1.4609***	1,278	0.0139	1.6968***	188	0.0336
Buyer_Profitability_Change	-1.5876	1,278	1.0801	-0.005	187	0.0062
Buyer_Leverage_Divestiture_N	0.2934	1,274	0.0058	0.3044	186	0.0146
Buyer_Leverage_N_Change	0.0337***	1,274	0.0044	0.0032***	186	0.0059
Levered_FCF_Divestiture_N	-0.041	1,274	0.0046	-0.0556	186	0.0106
Levered_FCF_N_Change	0.0231*	1,274	0.0152	-0.0072*	186	0.0091
Stock_Volatility_Divestiture	48.233	1,272	0.5977	45.9303	188	1.6945
Stock_Volatility_Change	-2.3057	1,272	1.0769	2.2913	188	1.7142
Mean_Stock_Performance_Divestiture	0.0809	1,249	0.0196	0.153	186	0.0818
Mean_Stock_Performance_Change	-0.4226***	1,172	0.0770	-0.0299***	177	0.1007
High_Reg_Risk_Combined	5.6291	1,278	0.0278	5.883	188	0.0411

*Note: *, **, *** represents statistical significance at 10%, 5% and 1% levels respectively. Source: created by authors based on analysis of data.*

Source: own elaboration.

Discriminant model using hierarchical insertion was created (see table 2 for details). Final model retained size, equity issue, past divestiture experience, change in leverage, free cash flows pre-divestiture and stock volatility pre divestiture as variables. Equity issue and increase in leverage, which represent increased financing availability for the organization, were found to reduce likelihood of divestiture which supports theory on financial constraints and portfolio theory. Larger (by size) and more experienced players (divestiture experience) are more likely to divest following an acquisition. Increase in volatility and poor free cash flows post-acquisition (pre-divestiture) both increase the likelihood of divestiture.

Table 2. Discriminant analysis model

Details	Model
Standardized Canonical Discriminant Function Coefficients	
Equity_Issue_B	-.228
Size_Log	.896
Past_Divestment_5_Log	.369
Buyer_Leverage_N_Change	-.176
Levered_FCF_Divestiture_N	-.197
Stock_Volatility_Divestiture	.351
% Correct –	
Original Total	76.80%
Cross Validated Selected	76.70%
Cross Validated Unselected	71.20%
Canonical Correlation	.378
Eigenvalue of Model	.167
N - Selected (used for model constructed)	1079
N - Unselected (used for cross validation)	265

Source: own elaboration.

The discriminant model was built using 80% of observations selected randomly and it correctly classified 76.8% of those cases correctly.

This model fairs very well when compared to models created by previous studies on this topic. For example, (Bergh, 1997) created two models based on acquisitions done in 1977 and 1987 which had an accuracy of 63.29% and 75.51%. In our model, of the remaining 20% observations not used for creating the model, the model was able to correctly predict post-acquisition outcome for 71.2% cases.

Column 1 of table 3 reports the values of control model whose adjusted R square (Nagelkerke R Square) is .109. Other columns of table 3 report other models which have been continued to table 4. Final column of table 4 combines all models and has an adjusted R square of .345 which is a marked improvement on control model. It shows that the selected independent variables have good explanatory power and are adding to the model. Results of individual factors are discussed below.

Table 3. Discriminant analysis model

	Control model 1	Cash 2	Profitability 3	Leverage 4	Valuation 5	Size, strong, age 6	Dividend 7	Relative size 8
Constant								
Capex_N	-1.7109 [1.1238]	-2.0337* [1.1976]	-1.6602 [1.1269]	-1.8705 [1.1726]	-1.7247 [1.1266]	-1.502 [1.3001]	-2.2818* [1.1991]	-1.7407 [1.1256]
RD_N	16.0273* [8.5577]	15.5944* [8.797]	15.9492* [8.5332]	18.9624** [8.9019]	15.8166* [8.6108]	12.1127 [8.795]	14.6893* [8.5978]	15.7974* [8.5673]
Listed_Target_B(1)	-0.2789 [0.2499]	-0.2989 [0.2516]	-0.2681 [0.2514]	-0.3192 [0.2538]	-0.2819 [0.2502]	0.023 [0.2674]	-0.2525 [0.2527]	-0.3107 [0.2534]
Equity_Issue_B(1)	0.1256 [0.1803]	0.0915 [0.1827]	0.1086 [0.1817]	0.085 [0.1861]	0.1278 [0.1806]	0.3494* [0.1964]	0.14 [0.1821]	0.1216 [0.1804]
Cash_Holding_ N_Binned(1)		0.3782* [0.2291]						
Levered_FCF_ Divestiture_N		-0.4681 [0.6288]						
Levered_FCF_ N_Change		-0.1443 [0.4709]						
ROA			-0.5468 [0.6229]					
Buyer_Profitability _Change			0.0009 [0.0024]					
Buyer_Leverage _Divestiture_N				0.9986* [0.5136]				
Buyer_Leverage_N _Change_Binned(1)				0.8701*** [0.186]				
Debt_Issue_B(1)				0.0477 [0.3672]				
TobinsQ_Binned(1)					-0.0374 [0.1726]			
Small_Organisation _B(1)						-0.4875 [0.3603]		
Size_Log								
Young_Organisation _B(1)						0.2116 [0.4823]		
Strong_Organisation _B(1)						-0.1752 [0.2344]		
Dividend_Payer_B(1)								

	Control model 1	Cash 2	Profitability 3	Leverage 4	Valuation 5	Size, strong, age 6	Dividend 7	Relative size 8
Relative_Size								-0.1426 [0.1781]
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nagelkerke R Square	.109	.116	.112	.138	.109	.241	.135	.110
Hosmer and Lemeshow Test	.402	.523	.306	.173	.264	.059	.081	.266
% Correct	86.6	87.0	86.7	87.4	86.6	88.1	86.9	86.6
Omnibus Tests of Model Coefficients	.001	.001	.001	.000	.002	.000	.000	.001
N (observations)	1,466	1,460	1,465	1,460	1,466	1,466	1,466	1,466

*Note: Values outside brackets are B coefficient. *, **, *** represents statistical significance at 10%, 5% and 1% levels respectively. Terms in square brackets are standard errors. Source: created by authors based on analysis of data.*

Table 4. Logistic regression: remaining models and combined model

	Cross border 9	Volatility 10	Performance 11	Related 12	Regulatory risk 13	Acqui CAR 14	Past 15	Combined model 16
Constant			-63.13* [37.3712]		-92.3923*** [35.1792]		-47.6911	37.8235 [47.9622]
Capex_N	-1.6947	-1.8999 [1.1564]	-1.99925 [1.2339]	-1.7407 [1.1291]	-1.75785 [1.1334]	-1.7105 [1.127]	-1.7924 [1.1868]	-1.4442 [1.6312]
RD_N		14.4435* [8.5636]	11.68944 [8.6033]	17.0492** [8.6252]	14.87795* [8.7603]	16.2499* [8.5565]		10.0505 [9.7315]
Listed_Target_B(1)	-0.2654	-0.2551 [0.2517]	-0.29335 [0.2543]	-0.3484 [0.2536]	-0.49987* [0.2588]	-0.2777 [0.2498]	-0.2623 [0.2558]	-0.1395 [0.3025]
Equity_Issue_B(1)	0.1239	0.1412 [0.1813]	0.07122 [0.1882]	0.11157 [0.1809]	0.15665 [0.1819]	0.124 [0.1804]	0.2235 [0.186]	0.33399 [0.2218]
Cash_Holding_ N_Binned(1)								0.7929*** [0.2824]
Levered_FCF_ Divestiture_N								-1.6098 [1.0318]
Levered_FCF_ N_Change								-0.4945 [0.8167]
ROA								-2.1335** [0.8933]
Buyer_Profitability _Change								0.22111 [0.2307]

	Cross border 9	Volatility 10	Performance 11	Related 12	Regulatory risk 13	Acqui CAR 14	Past 15	Combined model 16
Buyer_Leverage_Divestiture_N								-0.4029 [0.7108]
Buyer_Leverage_N_Change_Binned(1)								0.6449*** [0.2164]
Debt_Issue_B(1)								0.1425 [0.4295]
TobinsQ_Binned(1)								-0.3894* [0.2302]
Small_Organisation_B(1)								-0.6567 [0.4081]
Size_Log								1.3732*** [0.1992]
Young_Organisation_B(1)								-0.0718 [0.5123]
Strong_Organisation_B(1)								-0.0767 [0.2696]
Dividend_Payer_B(1)								-0.7116** [0.3294]
Relative_Size								0.3326** [0.1695]
Cross_Border_B(1)	0.1427 [0.208]							0.3868 [0.2537]
Stock_Volatility_Divestiture			-0.0098* [0.0052]					0.0137** [0.0064]
Stock_Volatility_Change_Binned(1)			-0.5264*** [0.1877]					-0.3022 [0.2169]
Mean_Stock_Performance_Divestiture			-0.7797* [0.4348]					-0.8801* [0.4943]
Mean_Stock_Performance_Change			0.1527 [0.1469]					0.1429 [0.1741]
Mean_Stock_Performance_Divestiture by Stock_Volatility_Divestiture			0.0104* [0.0062]					0.0142** [0.0073]
Mean_Stock_Performance_Change by Stock_Volatility_Change_Binned(1)			0.0225 [0.1716]					-0.1051 [0.1937]

	Cross border	Volatility	Performance	Related	Regulatory risk	Acqui CAR	Past	Combined model
	9	10	11	12	13	14	15	16
Relatedness_C				0 [0]				0 [0]
Relatedness_C(1)				0.3644** [0.1811]				0.2517 [0.2174]
Relatedness_C(2)				0.2295 [0.3816]				0.2027 [0.4346]
Relatedness_C(3)				-0.0849 [0.5146]				-0.4674 [0.5817]
High_Reg_Risk					0*** [0]			0 [0]
_Combined High_Reg_Risk					-1.6268** [0.7385]			-1.0832 [0.8728]
_Combined(1) High_Reg_Risk					-1.5513 [1.0371]			-18.7583
_Combined(2) High_Reg_Risk					-0.8974* [0.4869]			0.00065 [0.577]
_Combined(3) High_Reg_Risk					-1.9675* [1.0252]			-2.588 [1.7267]
_Combined(4)								
Acquisition_CAR						-1.0187 [1.3669]		0.5642 [1.8172]
Past_Divestment_5_Log								1.2249** [0.6233]
Past_Acquisition_5								0.1491 [0.239]
_Log_Binned(1)								
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nagelkerke R Square	.110	.122	.131	.114	.133	.110	.162	.345
Hosmer and Lemeshow Test	.366	.251	.448	.374	.227	.623	.087	.155
% Correct	86.6	87.1	86.7	86.8	86.6	86.6	87.3	88.9
Omnibus Tests of Model Coefficients	.002	.000	.000	.001	.000	.002	.000	.000
N (observations)	1,466	1,460	1,349	1,466	1,466	1,466	1,466	1,344

*Note: Values outside brackets are B coefficient. *, **, *** represents statistical significance at 10%, 5% and 1% levels respectively. Terms in square brackets are standard errors. Source: created by authors based on analysis of data.*

Other key notes:

1) For categorical variables, sign of coefficients in the output table are against the reference category which is the highest category by default in SPSS. For ease of interpretation, in the text, the signs have been changed to reflect the true nature of variable i.e., if higher category implies more of the variable and original sign was negative for lower category (implying if variable is less the likelihood of divestiture is more) the sign

has been changed to positive (as we are studying the higher category).

2) While Levered_FCF_Divestiture_N (free cash flow pre-divestiture) and Relative_Size were not statistically significant in the individual model, when analyzed with other factors in the combined model, it gained statistical significance. The text reports coefficients and statistical significance from the combined model.

3) Stock_Volatility_Divestiture was significant in both individual model and combined model, however, the sign changed. We report coefficient based on combined model.

CONCLUSION

Financial constraints

Several factors have been found to statistically significant and supporting hypothesis # 1a that presence of financial constraints is associated with increased likelihood of divestitures of prior acquisitions. These factors are low cash (cash holding and free cash flows before divestiture), high leverage prior to divestiture and regular dividend payer. Of these, free cash flow prior to divestiture is also included in the discriminant model with negative coefficient. Overall, it provides strong support to the assertion that financial constraints lead to problems which ultimately requires buyers to divest post an acquisition. Further, issues pertaining to strength of balance sheet have been found to be statistically significant and not profitability. Change in leverage has a statistically significant negative coefficient implying that if the leverage increases post-acquisition then it reduces the likelihood of divestiture of prior acquisition. An increase in leverage, at least in the short term means that organization has been able to secure debt financing and its immediate financial constraints i.e., need for cash have been alleviated. It is also in-line with previous research that when larger financial resources are available the buyer has more runway and take more risks (Finkelstein & Haleblian, 2002; Haleblian & Finkelstein, 1999; Shimizu, 2007). Therefore, this also supports the theory on financial constraints. Overall, our findings are in-line with prior research in the area, for example, Bergh (1997), Berry (2013), Borisova & Brown (2013).

Deal complexity

As the coefficient for Relative_Size is positive (.143) statistically significant at 10% level, we find support the argument that larger relative size deals are complex, and therefore, often lead to cookie jar problem i.e., the buyer finds it difficult to manage integration complexities. The resultant divestiture that often follows is an outcome of indigestion similar to the assertion of Gaddis (1987) and Kaplan and Weisbach (1992). When a buyer has acquired something that it is finding difficult to integrate and manage (indigestion), divestiture may seem like the only feasible option to reduce size, scope and complexity of the organization (Schipper & Smith, 1983). While the coefficient for cross border deals was also positive it wasn't statistically significant implying that we cannot support the argument that cross border deals are more likely to be divested.

Instability in performance

Similar to the findings Amiri et al. (2021), we find support for the theory that any instability in performance, as shown by high volatility prior to divestiture or an increase in volatility when compared to pre-acquisition period, leads to increase likelihood of divestiture of prior acquisition. The coefficients for Stock_Volatility_Divestiture and Stock_Volatility_Change_Binned were .013 (p: <.001) and .560 (p: <.001) respectively. Volatility is an important factor because it is a measure of risk. Increased risk hampers an organization's ability to raise debt financing (Correia et al., 2018; Kim et al., 2001; Merton, 1974) and also increases cost of capital Barth et al. (2013)). Further, since managers are responsible and rewarded for increasing shareholder's wealth, high volatility or reduced predictability of returns harms management's earning potential. Combination of assets should have reduced volatility, assuming the assets were not perfectly correlated. When this fair expectation is not met, managers respond by divesting. This finding supports portfolio theory that managers evaluate their entire portfolio of assets and volatility of combined assets is an important factor.

Mean stock performance

As managers are motivated to ensure predictability of returns, they are equally if not more motivated to ensure that the absolute returns are good, or the corollary is that poor performance triggers divestiture of prior acquisitions. In support of hypothesis # 4a based on previous assertions on this topic we find that strong mean stock performance reduces the need for divestiture post-acquisition (Berry, 2010; Brauer, 2006; Kolev, 2016). The coefficient for Mean_Stock_Performance_Divestiture is -.780 (p: <.100). These findings are also in line with the recent USA based study of Amiri et al. (2021) and support the portfolio theory. However, when it comes to moderating impact of mean stock performance on relationship between volatility and divestiture likelihood, the results are not as hypothesized and we do not find support for hypothesis # 4b as the coefficient for interaction between Mean_Stock_Performance_Divestiture and Stock_Volatility_Divestiture is positive (.010; p: <.100).

Related vs. unrelated M&A

We find support for hypothesis # 5a that unrelated deals are more likely to be followed by a divestiture than a related deal which is similar to prior research, for example the study by Meschi and Metais (2015). This relationship has statistical significance when comparing completely unrelated deals where not even two SIC digits match with completely related deals where all four SIC digits match (coefficient is .364 p:<.050). However, it is not statistically significant when two or three SIC digits match. Overall, the support for hypothesis that related (unrelated) deals are less (more) likely to be followed by divestiture is in-line with theories that unrelated deals are more risky, complex, have poorer performance and higher failure rate when compared to related deals which provide more economies of scale and better strategic fit.

Anticipation of regulatory concern

Anticipation of regulatory concern is a factor where Indian M&A industry behaves completely differently with their developed economies' counterparts. We find support for hypothesis # 6b for three relative size categories - 10-20%, 33-100%, 100%+ (coefficients are -1.627 p:<.050; -.897 p:<.100; -1.967 p:<.100 respectively). When regulatory action is a concern, Indian deals are less likely to be followed by a divestiture. It makes sense because Indian M&A markets are less vibrant, and it would therefore not be easy for a buyer to find suitable buyers for its assets to be divested and/ or the price will not be as per expectations.

Correction of prior mistake

When prior mistake is proxied by poor CAR around acquisition returns, we do not find support for hypothesis # 7a that divestitures post-acquisition represent correction of prior mistakes as the coefficient is not statistically significant. These findings are almost identical to the findings of Amiri et al. (2021) on the USA sample. Similar to them, we have a negative coefficient for Acquisition CAR which is statistically insignificant.

Experience

We find support for hypothesis # 8b that experience increases the likelihood of divestiture. These findings further reject the argument that divestitures post-acquisition are correction of prior mistakes. If it was the case, more experienced buyers would ideally be making fewer mistakes, and therefore, reducing the likelihood of divestitures post-acquisition. It instead supports portfolio theory that divestitures, like acquisitions, are tools in the arsenal of managers who evaluate entire portfolio and use additions and subtractions in their portfolio to drive shareholder value. Divestitures could very well have been part of the plan all along – to acquire, integrate, assimilate know-how, extract synergies and divest slack resources.

We conclude that it is possible to predict whether an acquisition in India will be followed by a divestiture or not with reasonable accuracy. Several factors are used for this prediction many of them are similar to the findings of global studies and selected variables vary in their behavior. We find that financial constraints in terms of cash, leverage and obligation to pay dividends are important factors that put pressure on managers to divest post an acquisition. Indigestion caused by high relative size leads to increased integration complexity which forces managers to divest to reduce organization's size, scope and complexity. Shareholder's returns and thereby stock price is also an important predictor whereby increased volatility (predictability of shareholders' returns) and/ or decreased mean stock performance (absolute shareholders' returns) both increase the likelihood of such divestitures. This provides strong support to portfolio theory. Experience of buyers translates into more divestitures post M&A which also provides support to portfolio theory and rejects the argument that such divestitures are correction of prior mistakes. While unrelated deals are more likely to be divested, anticipation of regulatory concern has the opposite impact.

This study makes significant contributions to the field of research around divestitures post-acquisition in India. We identify factors where Indian M&A markets are similar to their developed economies' counterparts and where they are not. Importantly, we developed a robust model to predict whether an acquisition will be followed by a divestiture or will be retained. This model is more than 75% accurate in its predictions which is more than what was achieved by earlier studies for example the study by Bergh (1997). We have also identified factors that increase and decrease the likelihood of such divestitures.

Findings of this study provide a clear framework for market participants including shareholder's and analysts to predict outcome of acquisitions. It is also useful for managers to understand factors that cause one to ultimately divest a prior acquisition. Further, it establishes that such divestitures are not evidence of correction of prior mistakes but instead can be a tool in the hands of experienced buyers to restructure and manage overall portfolio. We have studied several factors and this research, to the best of our knowledge, is the most comprehensive study on predicting divestitures of prior acquisitions done by Indian buyers. Future research work can leverage this work to gain understanding and undertake other research questions as detailed in the limitations of this study.

Like any research, there are certain limitations to this study that represent opportunities for future research. First, we have studied factors pertaining to the buyer and have not investigated factors pertaining to the target. Second, our sample was restricted to publicly listed buyers leaving transactions by privately held buyers out of scope. Third, we have not distinguished between partial and full divestitures as well as between divestiture of same unit and other units by the buyer. Fourth, we have not investigated parallel yet important research questions, which can be covered by future research, such as impact of such divestitures on shareholders' returns and impact of such divestitures on profitability of the organization. Fifth, we have not evaluated the interaction effect between variables for example, impact of high volatility on post-acquisition divestiture likelihood of cross border deals. Sixth, we have defined factors in a certain manner e.g., we calculated acquisition CAR using standard market model. Future research can evaluate impact of different definitions and calculation methodologies.

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APPENDICES

Variable definitions

Organization variables:

•Capex (Capex_N): Capital expenditures normalized on a base of total assets.

•Cash holding (Cash_Holding_N): Cash and cash equivalents normalized on a base of total assets.

•Equity Issue (Equity_Issue_B): taken as a binary variable with value of 1 if organization issued equity during the focal deal, 0 otherwise.

•Debt Issue (Debt_Issue_B): taken as a binary variable with value of 2 if organization issued debt during the focal deal, 1 otherwise

•Buyer's Leverage: Total debt normalized on a base of total.

oLeverage pre divestiture (Buyer_Leverage_Divestiture_N): Calculated one year before divestiture announcement.

oChange in leverage (Buyer_Leverage_N_Change): Calculated as difference between value one year before acquisition announcement and one year before divestiture announcement.

•Normalized Levered Free Cash Flow (FCF): Levered free cash flow which is EBITDA adjusted for net working capital changes, Capex and mandatory debt payments was taken and normalized on the base of total assets.

oLevered FCF pre divestiture (Levered_FCF_Divestiture_N): Calculated one year before divestiture announcement.

oLevered FCF change (Levered_FCF_N_Change): Calculated as difference between value one year before acquisition announcement and one year before divestiture announcement.

•Stock Volatility: Stock volatility is standard deviation of returns or variability of returns which is a measure of risk.

oStock volatility pre divestiture (Stock_Volatility_Divestiture): Calculated for a period of one year before divestiture.

oStock volatility change (Stock_Volatility_Change): Calculated as difference between value for the period one year before acquisition announcement and for the period one year before divestiture announcement.

•Stock performance: Stock performance was the abnormal return calculated as the difference between observed return and expected return. It was calculated using standard market model: $ARj,t = Rj,t - (\alpha + \beta \times Rmt)$. Where ARj,t is abnormal returns, Rj,t, is organization's observed returns, and Rmt is observed returns for the market, and α and β are constant and systematic risk respectively of organization j. α and β shall be calculated over approximately 230 trading days (i.e., approximately 320 days) ending 45 days before announcement date of the event. Country specific appropriate index was used as market portfolio (i.e., Brazil: Bovespa Index (Ibovespa); Russia: MOEX Russia Index, India: Nifty 50 Index, China: Shanghai Composite Index and South Africa: FTSE/JSE Top 40 Index).

oStock performance pre divestiture (Mean_Stock_Performance_Divestiture): Calculated for a period of one year before divestiture.

oStock performance change (Mean_Stock_Performance_Change): Calculated as difference between value for the period one year before acquisition announcement and for the period one year before divestiture announcement.

•Dividend Payer (Dividend_Payer_B): taken as a binary variable with value of 1 if organization, before the focal deal, paid cash dividends, 0 otherwise.

•R&D (RD_N): is the expenses on research and development normalized on a base of total assets.

•EBITDA ROA (ROA): EBITDA or earnings before special items, interest, tax, depreciation and amortization normalized on a base of total assets.

•Size (Size_Log): taken as the log of total assets in USD million in the year prior to acquisition announcement.

•Tobin's Q (TobinsQ): Calculated as sum of total debt and equity market value normalized on a base of total assets.

•Acquisition experience (Past_Acquisition_5_Log): measured as the log transformation of count of deals completed by the buyer (excluding subsidiaries and affiliates) five years prior to the focal deal. Since the count observations contained several 0 values, a small positive constant was added before log transformation as the log of 0 is undefined.

•Divestment experience (Past_Divestment_5_Log): measured as the log transformation of count of divestments completed by the buyer's entity (excluding subsidiaries and affiliates) in five years prior to focal deal. Since the count observations contained several 0 values, a small positive constant was added before log transformation as the log of 0 is undefined.

•Small organization (Small_Organisation_B): taken as a binary variable with value of 2 if the organization is in the bottom tercile using total assets as the normalization variable, 1 otherwise. The cut-off was calculated for each industry and country combination.

•Young organization (Young_Organisation_B): similar to small firm variable, it is taken as a binary variable with value of 2 if the organization is in the bottom tercile using firm age as the normalization variable, 0 otherwise. The cut-off was calculated for each industry and country combination.

•Strong organization (Strong_Organisation_B): taken as a binary variable with value of 2 if the organization is above the four-firm concentration ratio (CR4), 1 otherwise. CR4 is calculated as the average share of revenue/ shipments by top four organization. The cut-off was calculated for each industry and country combination.

•Change in profitability (Buyer_Profitability_Change): profitability was measured as the industry adjusted net margin (return on sales). The industry average was calculated for each industry and country combination. The variable was calculated as a difference between profitability one year before acquisition announcement and profitability one year before divestiture announcement.

Deal characteristics:

•Binary variable for divestiture (Acquisition_With_Or_Without_Divestiture) which takes the value 2 if the focal deal was accompanied with an acquisition in the focal period, 1 otherwise.

•Acquisition Cumulative abnormal return (Acquisition_CAR) over a three-day window (-1, +1) around the acquisition announcement date i.e., one day before and one day after the announcement date. Abnormal return is observed return less expected return using standard market model as defined above in calculation of stock performance variable.

•Relative size (Relative_Size): refers to the greater of ratio of book value of total assets of target to that of the buyer prior to the acquisition and ratio of total transaction value to market capitalization of the buyer.

•Cross Border (Cross_Border_B): taken as a binary variable with value of 1 if the target organization is from a different country than the buyer, 0 otherwise.

•Cross Industry (Relatedness_C): similarly, cross border shall be taken as a category variable with value of 1, 2, 3,4,if the buyer and target had no, two, three and all four digits of SIC same.

•Public Target (Listed_Target_B): taken as a binary variable with value of 1 if the target organization is a publicly listed company, 0 otherwise.

•High regulatory risk (High_Reg_Risk_Combined): Proxy for high risk taken to be when a market leader is either the buyer or the target and the deal's relative size is significant. The variable takes the value of 2, 3, 4, 5 when the relative size is 10-20%, 20-33%, 33-100%, 100%+ respectively or 6 when there is no regulatory risk.

Other control/ fixed effect variables:

•Industry (Industry_FE): defined as first two digit of primary SIC code of the buyer to control for time-invariant industry characteristics.

•Time fixed effects (Year_FE): unique identifier given to year to control for year of acquisition.

Other definitions

•Acquisition or mergers and acquisitions (M&A): Acquisition is defined as a corporate transaction where a buyer has bought assets or shares of another organization fully or partially. Merger is where two entities combine to form a new entity. In this work, acquisition and M&A are both considered and used interchangeably. Several filters were applied on M&A deals – deals with missing data were removed and in line with most of the researches on this topic, for example, Aktas et al. (2022) and Amiri et al. (2021). Only deals by public listed buyers were included as data for private buyers was not available. The deal should have closed within three years and the status should be closed or completed i.e., not just announced or cancelled. The deal should have resulted in change in control. The buyer should be solvent with positive assets. The buyer should have been from one of the BRICS countries and deals should have been announced between 1st January 2000 and 31st December 2023 (both inclusive) to be included in the work.

•Focal deal is defined as the acquisition/ M&A deal around which divestitures are being studied. Divestitures are associated to a focal deal if such a divestiture took place during the focal period.

•Divestiture: divestiture is defined as sale of a business unit by a parent organization. Direct investment (even 100%) in parent organization is not considered i.e., the seller has to be an organization and not an individual. Similarly, a private equity owner selling an organization is not included, the seller should be a corporate organization and not a financial investor. For being considered in the study, only divestitures which were done by a buyer of the focal M&A were considered, the deal should not have been completed and should have led to change in ownership. The divestiture could have been of the same unit that was acquired or any part of the combined business of the buyer (Aktas, Baros, & Croci, 2022). If such a divestiture was done during the focal window, it was tagged to the focal M&A deal and the deal was said to be with divestiture (Acquisition_With_Or_Without_Divestiture took the value 2). If it was done up to five years before the focal window, it was counted in Past_Divestment_5_Log.

•Focal window: Focal window taken as the period starting one year before acquisition announcement to three years post-acquisition closure.

•All pre divestiture variables: For acquisitions with accompanying divestitures, these were calculated one year before divestiture announcement. For remaining observations, it was calculated one year before end of focal window which was three years from acquisition announcement.

•All post divestiture variables: For acquisitions with accompanying divestitures, these were calculated one year after divestiture announcement. For remaining observations, it was calculated one year after end of focal window which was three years from acquisition announcement.

•All change variables: All change variables were calculated as a difference between variable's value one year before acquisition announcement and variable's value one year before divestiture announcement. Where an acquisition was not accompanied by divestiture instead of one year before divestiture announcement one year before focal window end (which was three years from acquisition announcement) was taken.