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THÈSE

Pour obtenir le grade de Docteur en Sciences de Gestion

Présentée et soutenue publiquement par

Asad Iqbal MASHWANI

Le 13 Novembre 2015

VALUATION, INFORMATION AND INDUSTRY PERSPECTIVES OF EQUITY CARVE-OUTS

JURY

Directeur de thèse :

Monsieur Sébastien DEREEPER, Professeur à l'Université Lille 2

Membres du jury:

Monsieur Pascal ALPHONSE, Professeur à l'Université Lille 2

Madame Géraldine BROYE, Professeur à l'Université de Strasbourg

Madame Cécile CARPENTIER, Professeur à l'Université Laval, Québec, Canada

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L'Université n'entend donner aucune approbation ni improbation aux opinions émises dans la thèse : ces opinions doivent être considérées comme propres à leur auteur.

I dedicate this work to my grandfather Hunar SHAH (Late) and grandmother Minhaj BEGUM (Late). Without their prayers and encouragement, it would never be possible to come so far.

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Introductory Chapter

General Introduction

The Wall Street Journal (WSJ) reported on 22 October 1998, that Conoco Inc., a Houston based oil and gas Company raised $4.4 billion in the largest IPO (initial public offering) in the U.S. history. In fact, Conoco Inc. was a wholly owned subsidiary of DuPont Co. that acquired Conoco Inc. in 1981 for $8.8 billion. The IPO mentioned in WSJ was made by DuPont Co., which was the corporate parent of Conoco Inc. at that time. In this IPO, DuPont Co. sold 30 % of Conoco Inc. stock. They sold 191.5 million shares at $23 per share for which the initial price range was set as $20-$24. The underwriters group was lead by Morgan Stanley Dean Witter for this issue. The special relation between DuPont Co. and Conoco Inc. makes this case distinct from conventional IPOs[1]. In this case the parent company (DuPont Co.) is not selling its own shares, but instead, sells shares of its wholly owned subsidiary (Conoco Inc.) to the general public. This IPO of the subsidiary of a firm is termed as carve-out in the finance literature. After this carve-out, DuPont Co. and Conoco Inc. are listed separately on the stock exchange, though DuPont Co. still own 70% of Conoco Inc.'s shares. IPO of Conoco Inc. was a part of bigger corporate strategy of DuPont Co. to increase its focus on biotechnology and agricultural products. When Conoco Inc.'s shares started trading on stock market, its stock price closed on first day of trading with a rise of 6.5%, or we can say that the Conoco Inc.'s shares were underpriced by 6.5%.

As we can see in the Conoco Inc.'s case, several things became clear to the market both about Conoco Inc. and DuPont Co. For example, the market now knows the corporate strategy of DuPont Co., i.e. they want to focus on some core business. Like wise, DuPont Co. has more information about the true value of the assets of Conoco Inc. and if they wanted to sell the rest of Conoco Inc. assets later, they could better price it due to more information about its true value. This last point would be more clear if the underpricing[2] of Conoco Inc. would be 30% or 40% or even more.

[1] Conventional IPOs are IPOs of firms that go public for the first time by themselves

[2] Underpricing is defined as the number of shares issued in an IPO multiplied by the difference between the closing price on the first trading day and the offer price of the IPO.

Before Conoco Inc. mentioned in the start, in April 1996 Lucent Technologies Inc., a subsidiary of AT&T Corp. raised $2.6 billion in its IPO, which is also a carve-out IPO. Similarly, there are other carve-outs where significantly big amounts are involved. These are cases in US domestic market; internationally even bigger amounts are involved. Though these transactions are not always as big as the Conoco Inc. and Lucent Technologies Inc. carve-outs, but still the combined volume is large enough in these carve-outs that they cannot be ignored.

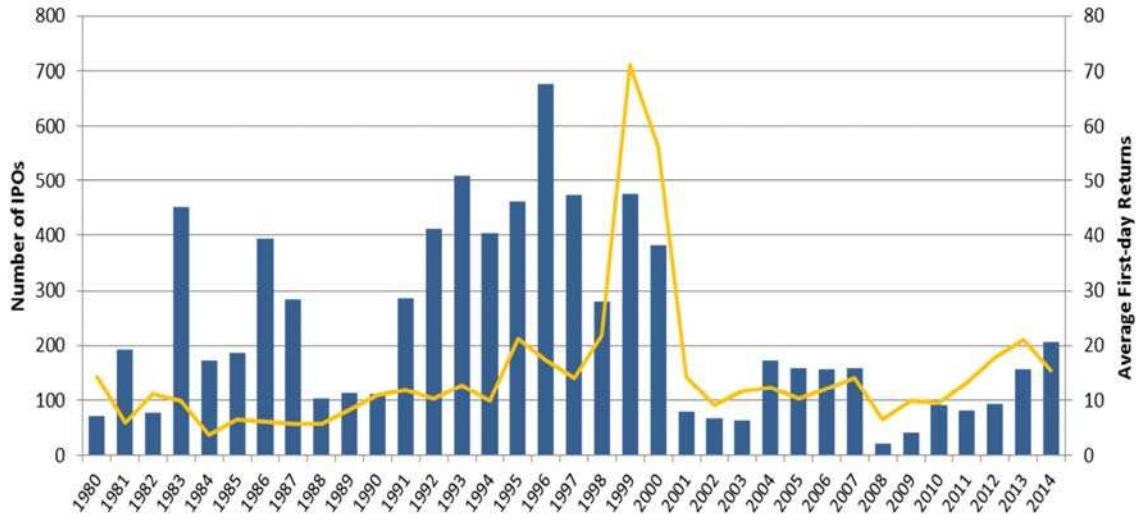
Securities offerings are a very important and visible activity in the life cycle of any firm. Eckbo (2008) says that, when a firm takes a decision to issue securities, it draws on all the core areas of financial economics, like asset pricing theory, corporate governance, capital structure theory, managerial investment incentives, contracting, and financial institutions. Further, there are several rules and regulations to follow while issuing securities, have to consider different methods of floatation, floatation costs, and the overall strategy of the firm and several other aspects[3]. Equity offerings exist in different colours and flavours, include IPOs (initial public offerings) and SEOs (seasoned equity offerings), management stock options and convertible debts, different classes of stocks with different voting rights and cash flows, public offerings to private placements. In our present work we are dealing with IPOs, and more specifically, IPOs of subsidiaries of listed firms (equity carve-outs).

In a conventional IPO, a firm goes public for the first time in to the market, with limited access to market information and limited expertise about the market knowledge. The motives behind offering new securities in an IPO are very diverse. Most of the reasons given in literature are capital restructuring, raising capital for capital expenditures, financing investment projects, unlocking the intrinsic value of the securities through information from the market, financing mergers and acquisitions etc. The managers of the firms in an IPO have to deal with all new underwriters, and have to go through a process, which it has never gone through before.

When we talk about IPOs, the phenomenon of wealth effect (valuation) hits our minds, because when we sell shares, we either have positive effect on the existing shareholders'

[3] For details about issuance process and the regulations, costs etc., consult the Handbook of corporate finance by Espen Eckbo (volume 1)

wealth, or negative effect. For example, an IPO, that is underpriced, results in wealth creation for the new shareholders, who purchase shares in the IPO. Consider an investor purchases a share at, say $10, and the price of the same share, at the close of first trading day is, say $20. This investor has a $10 increase in his wealth in one day. But on the other hand, the existing shareholders lost money, because they could sell their shares for a price higher than the one on which they sold it in the IPO. The market is willing to pay $20 for the shares, which the existing shareholders sold for $10. It means the existing shareholders could have earned $10 per share more than they did or, intuitively, they lost $10 per share in the IPO. Similar wealth effects also occur in carve-outs. Graph 1 below gives information about the number of IPOs in US market and their respective average first day return on yearly basis.



Graph 1: Number of Offerings (bars) and Average First-day Returns in Percentage (line over the bars) on US IPOs, 1980-2014 (Source: Jay Ritter, University of Florida)

According to Jay Ritter (University of Florida), $143.51 billion is left on the table (lost in underpricing) from 1980 to 2013. But why would the existing shareholders be ready to lose this much of their money? There are several models and theories in literature, which explain the phenomenon of underpricing. One aspect is the information asymmetry. For example, Rock (1986), presented the winner's curse explanation of underpricing. Benveniste and Spindt (1989) present the information revelation theory. Loughran and Ritter (2004) discuss

the agency problem between investment banks and issuing firms. Ibboston (1975), Welch (1989), Allen and Faulhaber (1989), Grinblatt and Hwang (1989) present theories of signaling, about the quality of issuing firms.

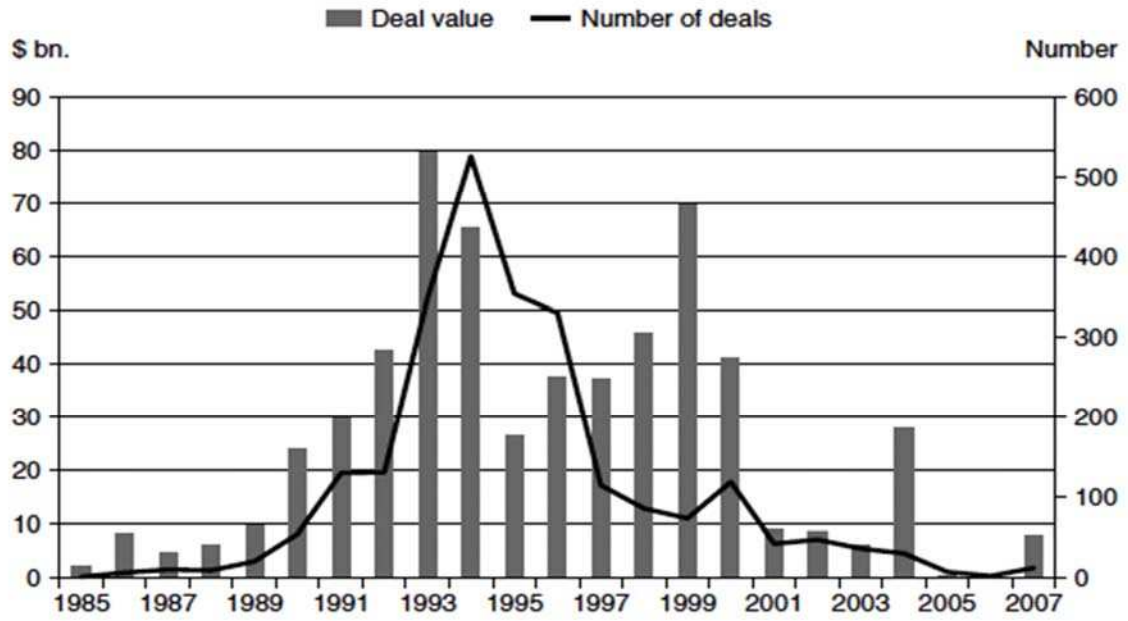
Second aspect of explaining underpricing can be, as Brennan and Franks (1997) present, the managers' intention to retain control of the firms. Third aspect is the institutional one, like the lawsuit avoidance hypothesis by Ibboston (1975) and Tinic (1988). Similarly, tax advantage is also mentioned as one of the reasons for increased underpricing in literature, e.g. Rydqvist (1997) and Taranto (2003). The fourth aspect is the behavioral explanation. Welch (1992) presents the cascade effect that may be reason for high underpricing. Similarly, Loughran and Ritter (2002) tried to explain IPO underpricing under the spotlight of prospect theory. We know that firms sell a small percentage of its shares in an IPO. The prospect theory predicts that the issuer will sum the wealth loss (as a result of underpricing) on shares sold, with the wealth gain (caused by the price jump) on the shares retained, resulting in a net increase in the wealth of pre-issue shareholders.

Equity carve-out[4] is a terminology used for IPOs of the subsidiaries of a firm. After the IPO, the subsidiary has its own board of directors and management team, separate from the parent firm. The disclosures of the subsidiary stand separate from the parent firm, and the subsidiary has to public all the financial information according to the rules of US Securities and Exchange Commission (in other countries according to their respective regulators), like a conventional IPO. The shares sold in a carve-out can be sold either by the existing shareholders (secondary shares) or new shares are created and sold by the subsidiary (primary shares). Most of the time, primary shares are sold in an equity carve-out or a small number of secondary shares accompany the major portion of primary shares because of the tax consequences, because a secondary issue is taxable to the existing shareholders as a capital gain, whereas the primary shares has no such issues. The proceeds raised from these operations are used for different purposes, e.g. for paying off debts, potential investments in

[4] An equity carve-out is a form of corporate restructuring where a parent firm sells a portion of its subsidiary to the general public and retains control of the subsidiary in most of the cases. In a spinoff, parent firm distributes its ownership in the subsidiary to its existing shareholders on a pro-rata basis. In case of an asset sale, ownership in a subsidiary is sold by the parent firm, on a private negotiation basis, to a third-party. In spinoff and asset sale, the parent firm retains no ownership in the subsidiary after the divestiture.

or acquisitions of other businesses, research and development expenses, capital expenditures, to fund development and marketing, finance maturing securities, working capital and other general corporate purposes etc.

In recent years, the carve-out activity happened worldwide, is very small in number compared to the volume of activity happened in the 1990s. Graph 2 below shows the annual distribution of equity carve-outs worldwide from the year 1985 to 2007. We can see that in 1993, the total value of carve-outs reached to $80 billion and in 1994 the total number of equity carve-outs reached over 500.



Graph 2: Annual worldwide volume of subsidiary IPOs from 1985 to 2007 (Source: Handbook of corporate finance by Espen Eckbo)

These operations not only change the capital structure of the firms but also have benefits and consequences for these firms. For example, when there is an announcement of a carve-out, the parent firm shares, which are already trading in the market, have on average positive abnormal returns and this return is highly significant (Dereeper & Mashwani, (2013), Eckbo (2008), Wagner (2004), Hulburt (2003), Mulherin and Boone (2000), Vijh (1999, 2002)). At

the same time, normally in these operations, the issued stock is underpriced for different purposes, and the amount of underpricing is a direct loss to existing shareholders (if prospect theory is not applied).

Though we have immense literature on IPOs, some aspects of IPOs are still not explored, especially of the IPOs of subsidiaries (carve-outs). Nanda (1991) argues that though an equity carve-out is similar to IPO in issuance mechanism, the information environment of equity carve-out is closer to seasoned equity offerings.

After understanding the importance of equity carve-outs, its effects on wealth of shareholders and the extent of information it gives, we decided, to further explore the valuation effect and information content of these equity offerings. All our three chapters are addressing the information and valuation related questions and we are trying to give logically convincing and statistically significant answers to those questions. In the first two chapters, we use samples from the US market, specifically firms listed on New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ. However, in the third chapter, we collect our sample from 17 different stock exchanges around the world. The reason for this difference in the sample market is the availability of data. It is a known fact that the data about carve-outs is not available easily, and that is the main reason that all studies on carve-outs have comparatively very small sample size.

Our case is not different from others. In the third chapter, we need information about the analysts following, and this particular requirement reduces our sample from US market to very low number. Besides this sample size limitation, we want to see the bigger picture in the last chapter, and hence we go global to capture the information content of carve-outs. However, additional tests, separately on the small number of US firms are performed and the results from the global market are not significantly different from the US sample.

In our first chapter, we find out, at which stage of a carve-out process, the information revelation to the market about the wealth effect, takes place. The idea behind this work was the intuition, that, if the parent who is holding the majority interest in a subsidiary is already trading in the market, the stock performance of the parent can be used to pre-empt the wealth effect of the carve-out, as Benveniste et al. (2008) report that underpricing of subsidiary is

significantly related to the parent returns in the book building period. In conventional IPOs, the firm goes public for the first time and every thing is new for it, e.g. the market mechanism, the rules guiding those mechanisms, market forces, underwriters etc. Also, the market do not know anything about the firm because before listing on stock exchanges, firms are not obliged to disseminate its information. Investors know things, which they investigated by themselves using their own valuable resources. On the contrary, in an equity carve-out, by an already listed firm, managers are not that naïve nor are the investors. As the parent firm has already gone through all the process before, and its shares are already trading on some stock exchange, the information environment is different from a conventional IPO, both for managers and investors. The underwriters, whose services were acquired in IPO by the parent, are most of the time, hired again for the carve-out event. The relationship between the parent and the underwriters is already developed; the parent firm has experience of the market, and the investors are also not as uniformed as they were in case of the parent IPO.

We, like in literature, identify four different times in the process of a carve-out, i.e. filing date, book-building period, offer date and listing date. Benveniste and Spindt (1989) argue that issuing firm's price and number of shares to be issued is contingent upon the information acquired by its underwriter(s) during the book-building process. During this time the market reveals the true value of the issue and in return, the issuer compensates this true revelation of information, by underpricing its shares. Benveniste and Spindt (1989) talk about the information revelation from the market to the firm, during book-building period, on the basis of which the firm decides the price and number of shares to be issued. We present in our study, that during book-building period of a carve-out, the market (investors) can also observe information that can help pre-empt the wealth effect of the issue. We succeed in doing so by establishing a link between the returns to the parent firm at all the four stages of the carve-out process and the wealth effect at offer, listing and whole carve-out IPO. This information is not available in a conventional IPO.

To date, equity carve-outs have been address on firm level in the literature, with exceptions of few studies. In our second chapter, we take the discussion to the industrial level and unveil very interesting and important knowledge about carve-outs. Literature gives different possible causes or motives for the decisions of equity carve-outs. For example, Schipper and Smith

(1986) explain three main reasons for carve-out: unlocking the value, financing and restructuring. Desai et al. (2011) also identify three main categories of reasons for conducting equity carve-outs by the parent firms. These categories include financing/investing, restructuring and unlocking the value of the subsidiary. They argue that these categories are not mutually exclusive as parents may provide multiple reasons for conducting an equity carve-out. They also point out that there are cases when reasons for carving out do not fall in any of these categories (e.g. carve-out conducted to meet government regulations on an antitrust lawsuit etc.). Financing/investing category include the carve-out for general corporate purposes, debt repayment, working capital, or helping parent to get rid of the financial distress etc. Restructuring reasons, according to Desai et al. include carve-outs conducted to focus on the core business of the parent or as a part of a larger restructuring plan of the parent company. The unlocking category contains carve-outs that are conducted to allow the market to value the subsidiary. The market participants evaluate the information provided by the parent and gain some private information about the value of the subsidiary. It assists the parent firm to ascertain the fair value of the subsidiary and help them to take an informed decision of reacquisition or sell off.

We add another possible reason about the decision of the parent firm to conduct an equity carve-out. We argue that equity carve-outs, on average, are carried out in industries, where opportunities are low. These industries have low operating performance, gauged on profitability, cash flow and profit margin compared to industries where there are no carve-outs. Nanda (1991) claims that firms whose assets are undervalued and whose subsidiary assets are overvalued choose for a carve-out rather than a seasoned equity offering. This is in essence of our findings.

But when we talk about carve-outs, we understand, in the light of literature, that decision of a carve-out is of temporary nature or is a transitory arrangement, most of the time. Klein et al. (1991) state that 39 of the 40 carve-outs that occurred before 1983 in their sample were followed by a second event, suggesting that carve-outs are temporary arrangements rather than a permanent restructuring tool. These carved-out firms are either reacquired or acquired by a third party. We understand that carve-out is a divestment activity, where as an acquisition is an investment activity. If a divestment in an industry is followed by an

investment in that industry, both these activities should have impact on the value creation of both the investing and divesting parent firms, and that this impact should be align in an inverse relationship. A vast number of studies in literature on carve-outs confirm that the parent cumulative abnormal announcement stock return is positive and significant. These studies include, Dereeper and Mashwani (2013), Wagner (2004), Hulburt (2003), Mulherin and Boone (2000), Vijh (1999, 2002). Eckbo (2008) also reported a sample-size-weighted average of 1.9% for a total of 1050 cases of carve-outs in 8 different studies. In our present work, we report a negative abnormal return to the acquirer, bidding in industries where carve-outs happen in the last three years, which supports our argument above. We argue, that if our hypothesis that carve-outs are undertaken in industries where opportunities are low, then the bidders bidding in these industries should have low value created. Our findings support both the notions.

Further advancing in the pursuit of carve-outs, we have enormous literature about the information content of equity carve-outs. Logically, when there is an equity carve-out, more information is available to the market, both about the parent, as it becomes more clear because subsidiary assets are now separated, and about the subsidiary, because it is now listed on the stock exchange and have to abide by all the information disclosure rules and regulations. But does more information means clearer picture about the firms? Literature is not unanimous about this argument. H.Fu (2002) finds that information asymmetry is reduced after the restructuring of the firm through equity carve-out. Subramaniam (1999) reported an improvement in the analysts forecast error after restructuring of firms through spin-off. However, Lundholm (1991) comes up with the conclusion that the public signal will increase the gap between informed and uninformed traders, instead of decreasing it as is normally perceived. This supports the notion that restructuring will not reduce the standard deviation among analysts as analysts have different level of private information. Huson and MacKinnon (2003) find that if Lundholm (1991) is right then the information asymmetry increases after a spin-off. They argue that the investors who have already some information about a portion of the firm, when the firm undergoes a spin-off, it gives more information to the market and instead of whipping away the informed investors' information edge, this additional information increases the precision of their private information. It gives rise to the idea, that analysts who have more private information before the restructuring become more precise in

their forecasts than the analysts who have less private information. This information difference may give rise to a situation where the divergence of belief increases instead of decrease after the restructuring.

Another aspect is, when there is restructuring of a firm, does the number of analysts following the parent changes, or the total number of analysts following both the parent and the subsidiary after the breakup, changes? Chemmanur and Liu (2011) posit in their theoretical paper that the number and quality of analysts' coverage increases following a restructuring. Gilson et al. (2001) show an increase in the analyst following with the breakups.

With this mix literature, we try to find in our third chapter: Does the information asymmetry increases or decreases after a carve-out? Also we test if the number of analysts following the parent firm increases or decreases after the carve-out event. We further test, whether the increase or decrease in the information asymmetry results from carve-out. We use standard deviation (STD) of earning per share (EPS) forecast to measure the divergence of belief[5] among the analysts, which is the result of asymmetry of information among the analysts. We hypothesize that the divergence of belief should decrease after the carve-out, as more information is available to the market. However, our results suggest that the divergence of belief increases after the carve-out instead of decreasing. Further we conceive that number of analysts should either increase due to more clear information about the parent after the carve-out or should decrease due to the departure of analysts, as they will be following the subsidiary only, after the carve-out. The first portion of this hypothesis is opposed on the basis of the increased STD of EPS. If the STD of EPS increases, the opacity or noise in the information increases, hence no attraction for the new analysts. The second portion of the hypothesis is rejected directly because the number of analysts increased. We do further tests to see if the carve-out component influences the analyst change in earning per share forecast after the carve-out. No significant figure is found in support of this hypothesis and we argue that the change in analysts' forecast may be attributed to other factors than to the carve-out itself. Then we test if the analysts' expectations for the subsidiary have any influence on the

[5] Divergence of beliefs is the opposite of consensus among analysts. It means the higher is the divergence of beliefs the lower is the consensus, or the standardard deviation among analysts' forecast is higher when there is higher divergence of beliefs

analyst change in EPS for the parent after the carve-out. Again we find no significant support for this idea.

As it can be guessed from the explanation above, we are working on the empirical aspect of equity carve-outs. We are using empirical methodologies to test our hypothesis. The hypotheses are constructed on the basis of rationality and in the light of literature. We use samples to test our hypothesis. These samples are initially US based, and in the last chapter, we go international.

Following the French resume below, we present our detailed work in different chapters. Numbering of tables, figures and graphs start from '1' in each chapter with their respective chapter number and would look like '1-1' for chapter 1 and '2-1' for chapter 2 and so on.

Resumé en Français

Introduction générale

Les émissions de titres sont des activités très importantes et visibles dans le cycle de vie de toute entreprise. Eckbo (2008) dit que la décision d'une entreprise d'émettre des titres fait appel à tous les domaines essentiels de l'économie financière, notamment la théorie de valorisation des actifs, la gouvernance d'entreprise, la théorie de la structure du capital, les incitation à l'investissement des dirigeants, la théorie des contrats et des institutions financières. De plus, lors de l'émission de nouveaux titres, il est nécessaire de se conformer à de nombreuses réglementations, de prendre en considération les différents moyens d'émissions et leurs coûts, ainsi que la stratégie globale de l'entreprise et certains autres aspects[6]. Les levées de capitaux propres peuvent se faire de diverses manières. Elles se font sous forme d'introduction en bourse (IPOs) ou d'augmentation de capital (SEOs), mais également via des options d'achat d'actions ou de titres de dette convertible, avec différentes catégories d'actions en fonction des droits de votes ou de dividendes préférentiels et de manière publique ou privée.

Dans le cadre de ce travail, nous traiterons des introductions en bourse (IPOs), et plus précisément, de l'introduction en bourse de filiales de groupes côtés (equity carve-outs).

Lors d'une introduction en bourse classique, une entreprise émet des actions sur le marché avec des informations et une expertise de marché limitées. Les motivations à émettre de nouvelles actions via une introduction en bourse (IPO) peuvent être très diverses. La plupart des raisons mentionnées dans la littérature sont : la restructuration du capital, la levée de capitaux pour des dépenses d'investissement, le financement de nouveaux projets, la valorisation de l'entreprise par le marché, le financement de fusions ou d'acquisitions, etc. Lors d'une introduction en bourse (IPO), les dirigeants doivent faire face à de nouveaux parti-prenants (les nouveaux souscripteurs) mais doivent également passer par un processus qu'ils n'ont jamais expérimenté.

[6] Pour des informations sur le processus d'émission et les règlements, les coûts, etc., consultez le manuel de Finance d'Entreprise de Espen Eckbo (volume1).

L’ "equity carve-out" est une terminologie utilisée pour les introductions en bourse des filiales d'une entreprise. Après l'introduction en bourse, la filiale possède son propre conseil d'administration et sa propre équipe de gestion, distincts de la société mère. Les informations financières de la filiale sont également séparées et celle-ci doit se conformer entièrement aux règles de l’autorité de marchés, comme une introduction en bourse conventionnelle. Les actions vendues lors du placement d'actions d’une filiale peuvent être soit vendues par les actionnaires existants (actions secondaires) ou créées sous forme de nouvelles actions vendues par la filiale (actions primaires). La plupart du temps, l’introduction en bourse d’une filiale se fait majoritairement sous la forme d’émissions de nouvelles actions pour des raisons fiscales (éventuellement accompagnées d’un nombre restreint d’actions secondaires). En effet, contrairement à une action primaire, la vente d’une action secondaire est considérée fiscalement comme un gain en capital imposable.

Le produit provenant de ces opérations est employé à différentes fins, par exemple pour rembourser les dettes, pour de nouveaux investissements, pour l’acquisition d'autres entreprises, pour des dépenses de recherche et développement, pour financer le développement ou le marketing, pour financer des valeurs arrivant à échéance, pour des besoins de fond de roulement ou d'autres objectifs plus généraux de l’entreprise.

Intéressés par l'importance de l’introduction en bourse de filiales, de son effet sur la richesse des actionnaires et de l'ampleur des informations révélées, nous avons décidé d'explorer l'effet de ces ‘carve-outs' sur la valorisation et le contenu de l'information divulguée. Les trois chapitres suivants adressent des questions liées à l'information et la valorisation, en s’attachant à donner des réponses argumentées et statistiquement significatives à ces questions.

Dans la suite de cette section, nous récapitulerons notre travail.

Placement d'actions d'une filiale et information sur les effets de richesse

Dans ce chapitre nous essayons de répondre à la question "Quand les effets[7] de richesse d'un placement d'actions d'une filiale sont-ils connus par le marché? " utilisant un échantillon d'introductions en bourse sur une période allant de 1985 à 2007. Dans les placements d'action de filiale, la société mère détient une part significative de la filiale en question (carved-out subsidiary). Contrairement aux introductions en bourse classiques[8], les investisseurs peuvent déjà échanger sur le marché secondaire non-rationné durant la période de book-building de la filiale. Cette caractéristique unique permet au marché d'anticiper le rendement initial des actions de la filiale. Nous montrons que l'information principale concernant le rendement initial de la filiale est observable dans les rendements de la société mère au cours de la période de book-building de l'introduction en bourse. Nous démontrons également que cela correspond au moment où le marché connaît l'effet de richesse dû à l'introduction en bourse de la filiale pour les actionnaires existants.

Bien que le phénomène d' "effet de richesse" soit bien établi dans la littérature, le moment précis de la réalisation de cet effet par le marché n'est pas très étudié. Dans le présent chapitre, nous avons essayé de découvrir le moment auquel le marché peut anticiper cet effet de richesse. Nous avons essayé de répondre à cette question en utilisant la séparation entre gain et perte de Loughran et Ritter (2002) par la mesure d'inégalité suivante :

*[actions conservées par la société mère + actions secondaires vendues] *[prix offert – point médiane] + actions conservées par la société mère * [P-OP] > [P-OP] * [actions secondaires vendues + actions primaires vendues * (actions conservées par la société mère / actions détenues par tous)]*[9].

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[7] Dans ce chapitre, l'effet de richesse est l'impact du placement d'action d'une filiale sur la richesse des actionnaires existants. Soit leur richesse augmente ou diminue quand il y a des introductions en bourse d'une filiale dans laquelle la société mère (actionnaires anciens ou existants) maintient une partie importante de propriété. Par Introduction en bourse ou Introduction en bourse d'une filiale, nous voulons dire le Placement d'actions d'une filiale.

[8] Les introductions en bourse conventionnelle sont les introductions en bourse des entreprises qui introduit des actions en bourse pour la première fois par eux-mêmes.

[9] 'P' est le cours de clôture du premier jour de bourse et 'OP' est le prix offert.

Nous montrons que l'information concernant l'effet de richesse est évidente au cours de la période de book-building de l'introduction en bourse. Benveniste et al. (2008) affirme que, comme les investisseurs peuvent échanger sur les marchés des actions de la société mère au cours de la période de book-building, les changements dans la valorisation de la filiale peuvent être observés par les changements du cours de l'action de la société mère. Nous pouvons utiliser cette conclusion et ajouter que le cours de l'action de la société mère peut être utilisé pour prédire l'effet de richesse provenant de l'introduction en bourse de la filiale. Nous démontrons néanmoins que l'effet de richesse lié au placement d'actions de la filiale n'est pas connu du marché avant l'offre. Cependant, il peut être observé indirectement dans le cours de l'action de la société mère déjà cotée sur le marché.

Pour notre étude, nous utilisons un échantillon de 136 "carve-outs". Pour l'extraction de données, nous avons suivi Benveniste et al. (2008). La source principale pour la collecte de données est SDC (Securities Data Company). Les introductions en bourse retenues comportent uniquement des offres de filiales de sociétés cotées en bourse. Nous avons exclu les partenariats, les fiducies de placement immobilier *(mieux connues sous leur acronyme anglais REITs pour Real Estate Investment Trusts*), les fonds fermés, les émissions de parts et l'American Depositary Receipt (ADR). Notre étude est menée sur le marché des États-Unis sur une période de 23 ans allant de 1985 à 2007. Seules les entreprises cotées sur la Bourse de New York (NYSE), l'American Stock Exchange (AMEX) et le NASDAQ ont été retenue. Toute société ayant un code de classification industriel normalisé (Standard Industrial Classification, abrégé en SIC) entre 6000 et 6999 a été considérée comme société financière et a, par conséquent, été exclue. Pour les sociétés mères, les cours sont extraits de CRSP (Center for Research in Security Prices) en utilisant le PERMNO[10], et à partir de COMPUSTAT en utilisant la GVKEY [11].

Nous avons utilisé FACTIVA pour identifier la date à laquelle l'introduction en bourse était vue pour la première fois dans les actualités (c.-à-d. la date de dépôt). Le nombre d'actions en circulation et les données concernant le prix offert ainsi que le cours de clôture au lendemain

[10] Le PERMNO est un numéro d'identification unique d'un titre qui est assigné par CRSP à chaque valeur de manière permanente.

[11] GVKEY est un identifiant unique défini par COMPUSTAT pour chaque société pour suivre la société au fil du temps étant donné que le nom, le CUSIP ou le ticker peut changer au fil du temps.

de l'offre ont été initialement extraite de la base de données SDC, mais pour des raisons de fiabilité, ils ont été ensuite été revérifiés avec la base de données CRSP.

Nous employons la méthodologie des études d'événements pour calculer le rendement anormal à la société mère autour de l'annonce d'introduction de la filiale, sur la période de book-building, ainsi que lors de l'offre et de la cotation de la filiale sur le marché. Pour comprendre la relation entre les rendements anormaux et l'effet de richesse, nous avons utilisé une régression linéaire (méthode des moindres carrés ordinaires - MCO) en incluant des variables de contrôle.

Après la collecte des données, nous avons d'abord calculé l'effet direct de richesse et l'effet de richesse relatif à l'introduction de la filiale pour les actionnaires de la société mère, au moment de l'offre et de la cotation ainsi que l'effet de richesse combiné de l'ensemble de l'introduction en bourse. Puis, nous avons calculé le rendement anormal du cours de la société mère à quatre instants différents du processus d'introduction de la filiale, c.-à-d. à l'annonce de l'opération, pendant le book-building, à l'offre des titres et à la première cotation. Avec ces résultats, nous avons examiné les relations entre le rendement anormal de la société mère et l'effet de richesse. Nous observons que si l'effet de richesse à l'introduction en bourse est nul ou négatif, le rendement anormal à de société mère au cours de la période de book-building est négatif, mais non significatif. Cependant, si l'effet de richesse est positif, le rendement anormal de la société mère est positif et fortement significatif (à 1%) et la différence entre le rendement anormal ayant un effet de richesse négatif et le rendement anormal ayant un effet de richesse positif est également très significative. Cette différence entre le rendement anormal à l'effet de richesse négatif et positif, est significative seulement au cours de la période de book-building du processus d'introduction en bourse de la filiale.

Après avoir réussi à établir une relation entre le rendement anormal de la société mère et l'effet de richesse, nous régressons ensuite le rendement anormal de la société mère à quatre moments du processus de l'introduction en bourse (au dépôt, pendant le book-building, à l'offre et à la cotation), sur la richesse relative à l'offre, à la cotation, pour toute la période d'introduction et sur le rapport des commissions d'émission au montant émis en présence de diverses variables de contrôle. Nous constatons (tableau 1-8, chapitre 1) que les rendements anormaux de la société mère au cours de la période de book-building sont liés positivement et

significativement (au niveau de 1%) à l'effet de richesse relatif à l'offre, à l'effet de richesse relatif à la cotation et à l'effet de richesse relatif à l'introduction en Bourse. Le rendement anormal de la société mère au moment du dépôt, à l'offre et à la cotation de l'introduction en bourse et sa relation avec la richesse relative et d'autres variables sont également analysés (le tableau 1-7, 1-9, 1-10 (chapitre 1)). Nous constatons que le rendement anormal de la société mère au moment du dépôt, à l'offre et à la cotation de la filiale est positif mais non significativement lié à la richesse relative à l'offre, à la cotation et à l'introduction en bourse.

Concernant la révélation de l'information, la période observée (c.-à-d. la période de book-building) est en conformité avec Benveniste et Spindt (1989) qui affirment que le prix d'émission et le nombre d'actions émises est dépendant de l'information acquise par les placeurs pendant le processus de book-building. Nous présentons dans notre étude, qu'au cours de la période de book-building, le marché (investisseurs) peut également observer l'information qui peut aider à anticiper l'effet de richesse de l'émission. Les résultats de Thompson (2010) impliquent que l'information publique disponible avant l'offre de mise sur le marché puisse être employée pour en prévoir le rendement initial. Nous soutenons Thompson (2010) argumentant que le cours des actions de la société mère est une information publique, disponible au cours de la période de book-building de la mise sur le marché de la filiale. Loughran et Ritter (2002) montrent des résultats similaires au sujet d'une introduction en bourse conventionnelle, ils affirment que l'information publique n'est pas entièrement incorporée dans le prix de l'offre.

Conclusion

L'information est la clé de tout investissement et plus l'information est disponible pour les investisseurs, plus ils sont à même de prendre des meilleures décisions d'investissements. Il y a un grand débat dans la littérature sur la disponibilité de l'information liée à la valorisation de l'introduction en bourse et sur la révélation de l'information liée à la sous-valorisation de l'introduction en bourse. Nous avons regardé cette question du point de vue de l'introduction en bourse de filiales qui étaient entièrement détenues par leurs sociétés mères. Nous avons

étudié l'effet de richesse de ces mises sur le marché ainsi que sa prise en compte pour les actionnaires existants et nous avons constaté que l'effet de richesse d'une introduction en bourse d'une filiale est bien prévisible avant l'offre d'émission. Bien que la valeur exacte de l'effet de richesse ne puisse pas être prévue avant l'offre, les variations de prix de l'action de la société mère fournissent aux investisseurs des éléments permettant d'anticiper les résultats de la nouvelle émission.

Cotation en bourse d'une filiale: Un signe d'une faible opportunité de croissance?

Dans ce chapitre, nous expliquons que dans un secteur industriel où les opportunités de croissance futures sont faibles, l'entreprise peut choisir de coter en bourse une partie de ses filiales. Cet argument provient des résultats de Nanda (1991) qui affirme que les entreprises dotées d'actifs sous-valorisés et d'actifs de leurs filiales survalorisées, choisissent d'introduire en bourse certaines de leurs filiales plutôt que de procéder à une augmentation de capital. Nos résultats dans cet article abondent dans ce sens. Selon nos résultats, les industries recourant à ce type de procédé sous soumises à une performance inférieure. Ces industries sont associées à une faible performance opérationnelle mesurée sur la base des flux de trésorerie, de rentabilité et de la marge bénéficiaire. Dans notre étude, nous disposons de 193 observations, qui remplissent nos exigences pour l'analyse. Dans notre échantillon, 97 industries différentes sont identifiées sur la base des 4 chiffres de code SIC. Cet échantillon inclut seulement les introductions en bourse où la filiale appartient à une entreprise, qui est déjà cotée. La période d'étude porte de 1987 à 2006 soit 20 années. Nous utilisons principalement SDC (Securities Data Company) comme base de données concernant les cotations de filiales. Sur base des études existantes en la matière, nous excluons de l'échantillon les fonds fermés, les fiducies de placement immobilier *(mieux connues sous leur acronyme anglais REITs pour Real Estate Investment Trusts*), les partenariats, l'American Depositary Receipt (ADR) et les émissions de parts. Les filiales ayant le code SIC (Standard Industrial Classification) compris entre 6000 et 6999 ont été considérées comme des sociétés financières et ont été par conséquent retirées de l'échantillon initial. Seules les émissions répertoriées sur la bourse de New York, l'American Stock Exchange et le NASDAQ (National Association of Securities Dealers Automated Quotations) ont été inclues dans l'échantillon.

Sur base de cet échantillon, nous analysons notre première hypothèse, qui postule que les industries où les cotations de filiales se produisent ont une performance réduite au cours des années suivantes car le secteur industriel ne propose pas de réelles perspectives de croissance. Nous régressons la performance (mesurée par le flux de trésorerie, la rentabilité d'exploitation et la marge bénéficiaire) sur une variable muette appelée DCarve en présence des effets fixes

de l'année et du secteur. Nous utilisons la méthodologie des « differences-in-differences (Diff-in-Diff) » en utilisant les données de panel. DCarve est une variable explicative égale à "1" si l'entreprise est dans l'industrie où une cotation de filiale s'est produite pendant les trois dernières années et "0" si l'entreprise n'est pas dans ce type d'industrie. Une régression des moindres carrés ordinaire (MCO) est utilisée dans cette perspective.

Nous constatons que les industries où des filiales se voient introduites sur les marchés financiers pendant les trois dernières années affichent des flux de trésorerie, une rentabilité et une marge bénéficiaire négatifs et significatifs (mesures de performances).

Quand nous parlons des cotations de filiales, nous comprenons, à la lumière de la littérature, qu'il s'agit le plus souvent d'une disposition temporaire et transitoire. Klein et al (1991) déclarent que 39 des 40 introductions de filiales qui se sont produites avant 1983 dans leur échantillon ont été suivies d'un deuxième événement, suggérant que ce procédé soient des dispositions provisoires plutôt qu'un outil permanent de restructuration. Les filiales introduites sont ensuite rachetées, scindées ou revendues. Les approches théoriques de Perotti et de Rossetto (2007) impliquent que quand le motif sous-jacent d'une cotation de filiale est de libérer la valeur de la filiale, la probabilité de rachat dans ce contexte augmentant. Desai et al. (2011) déduisent sur la base de Perotti et de Rossetto (2007) que si la libération de la valeur d'une filiale est l'intention de la société mère, alors la société mère cherche à développer sa synergie avec sa filiale, et donc, l'acquisition d'une telle filiale, soit par la société mère ou par un acquéreur tiers, est imminente. Ces études prouvent que les libérations de filiale sont normalement suivies d'un deuxième événement, et l'un des événements possibles est l'acquisition. Nous comprenons que la cotation de filiale est une activité de cession, tandis que l'acquisition est une activité d'investissement. Nous affirmons que, si une cession dans une industrie est suivie d'un investissement dans cette même industrie, alors ces deux activités devraient avoir un impact sur la création de valeur à la fois de la société mère investisseuse et cessionnaire de la société mère. Cet impact devrait être similaire et symétrique.

Un grand nombre d'études de la littérature sur les cotations de filiale confirment que le rendement anormal cumulatif de la société mère est positif et significatif. Ces études incluent, Dereeper et Mashwani (2013), Wagner (2004), Hulburt (2003), Mulherin et Boone (2000), Vijh (1999, 2002). Dans notre travail actuel, nous examinons s'il y a un impact sur la création

de valeur dans un contexte de fusion et d'acquisition, où les acheteurs sont présents dans les industries où les cotations de filiale se produisent. Nous constatons que les acheteurs potentiels sur ce type de marché affichent une rentabilité plus basse lors des trois dernières années que lorsqu'aucune cession de filiale n'a lieu. Nos résultats sont en accord avec notre intuition et statistiquement significatifs.

Pour compléter ces résultats, nous utilisons des données de fusions et d'acquisition, extraite de la section de fusions et d'acquisitions Securities Data Company (SDC) et de la base de données CRSP (Center for Research in Security Prices). Ces données sont réparties sur une période de 22 ans courant du 1er janvier 1990 au 31 décembre 2011. Au cours de cette période, nous disposons de 18459 accords de fusions et d'acquisitions, parmi lesquels 3671 sont en lien avec notre étude. Cela signifie que 3671 accords de fusions et d'acquisition sont formulés dans les industries où une cotation de filiale s'est produite pendant les trois dernières années de l'activité. Les acheteurs dans notre échantillon sont des sociétés américaines publiques cotées en bourse tandis que les entreprises cibles sont des entreprises publiques, privées ou filiales (mais pas nécessairement des entreprises américaines). De plus, l'acquéreur doit acquérir 100% de l'entreprise cible après l'opération tout en devant posséder au moins 50% de cette même entreprise avant l'acquisition. La transaction doit être supérieure à un million de dollars et doit représenter au moins 1% de la capitalisation boursière de l'acquéreur 11 jours avant l'annonce de l'événement. Les cotations quotidiennes du titre de l'acquéreur sont extraites à partir de la base de données CRSP pendant 300 jours de bourse avant l'annonce de l'événement. Les données comptables de l'acquéreur pour la fin d'année, immédiatement avant l'annonce, sont extraites de la base de données COMPUSTAT. De même, les opérations multiples annoncées le même jour par la même entreprise ne sont pas incluses dans notre échantillon.

Sur base de cet échantillon, nous régressons les rendements cumulés anormaux de l'acheteur au moment de l'annonce dans un premier temps sur la variable factice DCarveT (DCarveT est égal à "1" si l'entreprise cible est dans l'industrie où une cotation de filiale s'est produit pendant les trois dernières années, et égal à "0" dans le cas contraire), et ensuite dans une second temps sur la variable DCarveT et sur une liste étendue d'autres variables de contrôle comme celles utilisées par Golubov et al. (2015). Les résultats montrent que le rendement

cumulé anormal des acheteurs ayant mené une opération d'acquisition dans une industrie où des filiales ont été introduites en bourse au cours des trois dernières années est inférieur aux acheteurs non présents sur ce type de marché.

Nous régressons ensuite la performance boursière sur DCarve en ajoutant le modèle de Fama et French (1993) à trois facteurs (prime de risque du marché, capitalisation boursière Small Minus Big et High Minus Low valeur comptable / valeur de marché) pour contrôler s'il existe une différence de performance boursière entre les industries où des filiales sont cotées et celles où ce n'est pas le cas. L'approche des « Differences-in-differences (Diff-in-Diff) » utilisant les données de panel est employée pour mesurer la moyenne cumulative de rendements boursiers. Nous constatons qu'il n'existe pas de différence significative de rendement boursier entre les deux types d'industrie.

Enfin , nous régressons la prime portant sur quatre semaines sur la variable DCarveT et un ensemble de variables de contrôle comprenant le Q de Tobin, l'augmentation du cours de l'action, les flux de trésorerie, la taille relative, la valeur de l'opération, le lien entre l'acquéreur et l'industrie visée, une offre publique d'achat (variable muette égale à 1 s'il y a lieu, 0 sinon), une offre hostile (variable muette égale à 1 s'il y a lieu, 0 sinon), le mode de paiement (cash ou actions) et le niveau de participation de l'acquéreur dans la cible avant l'opération afin de contrôler si l'acquéreur paye une prime plus importante pour les opérations portant sur les industries ou des cotations de filiales se produisent. Dans ce dernier cas, le rendement anormal cumulé devrait logiquement être plus faible.

Nous ne trouvons aucune différence significative sur le niveau de la prime payée entre les opérations réalisées dans les industries où des filiales sont introduites en bourse et celles où ce n'est pas le cas.

Conclusion

Dans les recherches antérieures, la cotation de filiale a essentiellement été étudiée selon la manière dont la cession a été réalisée et selon l'impact qu'elle créait sur la richesse des

actionnaires de la société mère. A notre connaissance, la performance de l'industrie de la firme introduite en bourse, est un aspect des cotations de filiales qui n'a pas encore été largement exploré. Nous avons remarqué que les industries où de telles introductions en bourse se produisent sont celles où les opportunités de croissance sont faibles. Les entreprises de ces secteurs affichent une performance inférieure au cours des années suivantes et en particulier au cours des trois années suivantes par rapport aux industries où aucune de ces activités n'est recensée. Nous analysons en particulier la rentabilité d'exploitation, la marge bénéficiaire et les flux de trésorerie

Nous pouvons imaginer que si la performance est réduite au cours des années suivantes, les entreprises acheteuses qui s'engagent dans des opérations de fusions-acquisitions dans ces secteurs industriels devraient également souffrir d'une performance réduite. Pour vérifier cette assertion, nous avons calculé les rendements cumulatifs anormaux des acheteurs dans ces industries. Nous montrons que ces entreprises acheteuses affichent des rendements cumulés anormaux inférieurs aux entreprises qui investissent dans des industries où aucune introduction en bourse de filiale ne s'est présentée au cours des trois dernières années.

Introduction en bourse d'une filiale, divergence des croyances et suivi des analystes

Lors d'une introduction en bourse d'une filiale, la société mère vend une fraction (habituellement petite) de sa filiale (normalement complètement possédée) au grand public pour augmenter son capital. Avant ce procédé, les capitaux de la filiale et de la société mère sont agrégés et l'information que le marché perçoit des rapports de gestion de la société mère est également agrégée. Dans cette situation, le marché ne peut distinguer clairement la valeur de la société mère de celle de la filiale. Si cette assertion se trouvait vérifiée alors les acteurs du marché ne pourraient pas correctement anticiper les futurs flux de trésorerie ou encore les bénéfices par action de la société mère et de la filiale. De plus les erreurs de prévision, l'écart type de la prévision des bénéfices par action, la divergence d'analyse ou encore des croyances devraient également atteindre des niveaux plus importants.

Après la cotation en bourse de la filiale, les investisseurs devraient disposer davantage d'informations et donc de fait, si le marché se trouve davantage informé, les erreurs de prévision et la divergence des croyances chez les analystes devraient s'en trouver réduites. Il s'agit d'un résultat déjà exploré par la littérature.

De plus, le nombre d'analystes suivant la société mère devrait être plus élevé lorsque filiale et mère demeurent ensemble que lorsque la filiale est cotée séparément. En effet, certains analystes peuvent n'être intéressés que par la société mère alors que d'autres uniquement par la filiale. Ces deux profils combinés d'analystes représentent un nombre plus important que si l'on additionnait les analystes suivant uniquement la filiale ou suivant uniquement l'entreprise mère. Cette intuition peut conduire à deux raisonnements différents. Ainsi, si la filiale se trouve cotée séparément, les analystes uniquement intéressés par la filiale vont cesser de suivre la société mère ce qui aura pour conséquence immédiate de voir le nombre d'analyses de la société mère chuter. Néanmoins la séparation de la filiale et de la société mère rend l'information concernant la société mère plus claire, ce qui peut avoir pour effet d'attirer de nouveaux analystes qui auraient voulu la suivre mais ne le pouvait pas jusqu'alors à cause de l'opacité de l'information provenant des différentes filiales

Nous analysons 155 introductions en bourse de filiales pour étudier les intuitions précédemment développées. Notre source principale de données est SDC (Securities Data Company). Nous ne retenons que le cas de filiales de sociétés mères cotées. Nous avons exclu les partenariats, les sociétés d'investissement immobilier (REITs), les fonds fermés, les émissions de parts et l'American Depositary Receipt (ADR). Notre période d'échantillon s'étend sur 12 ans de l'année 2000 jusqu'en 2011. Les données sont extraites des places boursières importantes aux USA, Royaume-Uni, Australie, Allemagne, France, Italie, Hong Kong, Chine, Canada et Singapour y compris la bourse de New York, la bourse Américaine, NASDAQ, la bourse Japonaise, la bourse de Singapour, la bourse de Paris, la bourse de Francfort, la bourse de Londres, la bourse de Hong Kong, la bourse de Shanghaï, la bourse Australienne, et la bourse de Toronto.

Toute société ayant un code SIC (Standard Industrial Classification) compris entre 6000 et 6999 a été considérée comme une société financière et ont été par conséquent écartées de notre échantillon. Nous ne retenons que les actions ordinaires. L'essentiel de nos données proviennent de la base de données SDC et lorsque l'information n'était pas disponible, nous avons accédé à la base de données EDGAR sur le site du SEC (Securities and Exchange Commission). Concernant les sociétés mères, les cotations des titres et autres données comptables sont extraites du CRSP (Center for Research in Security Prices) en utilisant le PERMNO[12], et COMPUSTAT en utilisant le GVKEY[13]. Pour le nombre des analystes et les données de prévision de bénéfice par action, nous avons utilisé I/B/E/S (Institutional Brokers' Estimate System). Nous avons inclus les introductions en bourse de filiales pour lesquelles nous avons au moins deux analystes qui suivaient la société mère avant et après l'événement, ainsi qu'au moins deux autres analystes suivant la filiale après l'événement.

Puisque les données sont réparties sur plusieurs bourses, les devises sont différentes pour les sociétés selon le pays d'origine. Pour annuler l'effet de devise, et pouvoir raisonner sur base d'une devise commune pour calculer la sous évaluation, nous avons extrait le cours quotidien

[12] Le PERMNO est un numéro d'identification unique de sécurité qui est assigné par CRSP à chaque valeur de manière permanente.

[13] GVKEY est un identifiant unique défini par COMPUSTAT pour chaque société pour tracer la société au fil du temps comme le nom de la société, CUSIP ou le symbole de sécurité (ticker) peut changer au fil du temps.

de toutes les devises en Dollar Américain. Les taux de change quotidiens ont été extraits de Thomson Reuters Data Stream pour convertir la devise en Dollar Américain pour toutes les entreprises. Le nombre des introductions en bourse, leurs années respectives et le produit de ces introductions en bourse sont montrés dans le tableau 3-2 et le graphique 3-1 du chapitre 3.

Nos résultats suggèrent qu'après l'introduction en bourse d'une filiale, l'écart type de la prévision du bénéfice a augmenté ce qui va à l'encontre des prédictions issues de notre première hypothèse. Nous avons suivi cet écart type pendant trois ans c'est-à-dire pendant l'année en cours et les deux années suivantes. Au moment de l'introduction en bourse, l'écart type des prévisions de bénéfice de la société mère diminue mais il augmente de manière durable dans les années qui suivent. La différence d'écart type des prévisions d'analystes avant l'évènement d'introduction en bourse de la filiale et après est significativement différente de 0 (à un seuil de 5%). Les résultats pendant la deuxième et troisième année sont néanmoins mixtes.

La deuxième intuition en lien avec la première hypothèse que nous nous sommes proposés de discuter plus tôt porte sur le nombre d'analyses suivant la société mère avant et après l'introduction en bourse de la filiale. Nos résultats suggèrent que le nombre d'analystes suivant la société mère augmente au lieu de diminuer après cet évènement. Il s'agit donc d'un résultat opposé à nos prédictions. La deuxième intuition derrière notre première hypothèse était que le nombre d'analyste suivant la société mère pouvait augmenter après l'introduction en bourse de la filiale car l'information la concernant devenait plus lisible ou bien au contraire ce nombre pouvait diminuer car certains analystes n'auraient été intéressés, dans le fond, que par la seule filiale. La première partie de cette deuxième intuition s'oppose avec l'augmentation de l'écart type des bénéfices prévus. Si cet écart type augmente alors l'opacité de l'information concernant la société mère augmente et cela ne devrait guère aider à attirer de nouveaux analystes. La deuxième partie de l'hypothèse est directement rejetée car le nombre d'analystes augmente au lieu de diminuer. Cette augmentation est en outre documentée par Lang et Lundholm (1996). Ces derniers suggèrent que le nombre d'analystes augmente avec le nombre d'information divulguée par l'entreprise et une introduction en bourse d'une filiale en amène un changement informationnel conséquent étant donné que les deux entités deviennent cotées séparément. Chemmanur et Liu (2011) expliquent dans leur

article théorique que la qualité de la couverture et le nombre d'analystes augmentent suite à une restructuration.

Une régression des moindres carrés ordinaires nous amène des éléments afin d'évaluer notre seconde hypothèse. Nous évaluons si les caractéristiques de l'introduction en bourse de la filiale ont un impact sur l'évolution du nombre d'analystes. Nous n'obtenons aucun résultat significatif et nous pouvons affirmer que d'autres facteurs que l'introduction en bourse de la filiale en elle-même sont la cause de cette évolution. Nous proposons une régression visant à mesurer si les attentes des analyses sur la filiale en elle-même après l'introduction en bourse ont une influence sur le nombre d'analyste. Le résultat est non significatif.

Conclusion

L'introduction en bourse d'une filiale est un évènement majeur durant la vie de l'entreprise. Cela devrait amener davantage d'information sur le marché et donc réduire l'asymétrie d'information qui pouvait exister avant l'introduction en bourse. Sur base de cette assertion, nous supposons que l'écart type de la prévision du bénéfice par action de la société mère va diminuer après l'introduction en bourse de la filiale car davantage d'informations circuleront sur le marché. Les résultats que nous obtenons n'abondent pas pleinement dans ce sens mais offrent de larges perspectives de discussion. Nous constatons que les analystes s'éloignent d'un consensus après l'introduction en bourse d'une filiale alors que l'information devrait être plus transparente.

Notons que les caractéristiques de l'introduction en bourse de la filiale n'ont aucune influence significative sur le consensus des analystes ou encore leur nombre. De plus, les attentes des analystes vis-à-vis de la filiale n'ont également aucune influence significative sur l'évolution du nombre d'analystes suivant la société mère. Néanmoins il subsiste un faible effet à long terme ce qui peut amener à penser que l'introduction en bourse d'une filiale puisse apporter un meilleur suivi à long terme pour la société mère. Enfin, nous disposons de quelques résultats intuitifs montrant que la divergence d'opinions des analystes augmente avec leur nombre.

Chapter 1: Equity Carve-Outs and Revelation of Information about Wealth Effects

Abstract

In this chapter we tried to answer the question "when are the wealth effects[14] of a carve-out IPO known by the market?" using a sample of equity carve-outs offered over the period of 1985-2007. In equity carve-outs, the parent firm holds a significant fraction of the carved-out subsidiary. Contrary to conventional[15] IPOs, investors can trade in parent's stock in the non-rationed market during the book-building period of the subsidiary. This unique characteristic let the market pre-empt the initial return to the subsidiary shares. We show that the major information, regarding the initial returns of the subsidiary, is observable in the share returns of the parent firm during the book-building period of the carve-out IPO. We demonstrate that this is the time when the market knows the wealth effect, to the old shareholders, due to the carve-out.

[14] In this chapter, wealth effect is the impact of carve-out IPO on the wealth of existing shareholders. Whether their wealth increases or decreases when there is an IPO of the subsidiary in which the parent firm (old or existing shareholders) maintain a non-trivial portion of ownership. By IPO or IPO of a subsidiary we mean carve-out IPO.

[15] Conventional IPOs are IPOs of firms that go public for the first time by themselves.

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1. Introduction

To start, consider the example of Expedia Inc., which was a subsidiary of Microsoft Inc.

Expedia Inc. issued 5.2 million shares (13.6% of its total shares) in its November 1999 initial public offering. Goldman Sachs & Co and Morgan Stanley Dean Witter & Co were the lead underwriters. The filing range submitted to SEC was $10- $12 per share. Shares were sold to investors for $14 per share, reaping proceeds of $72.8 million. The closing price per share on the first day of trading was $53.44. Keeping in view the sale price per share and the closing price on the first day of trading, Expedia Inc. left about $205 million on the table. It means that the issuing company surrendered about $205 million in underpricing. Why so? Why did the issuer give away this much big amount in underpricing? This question has been a big puzzle for the economists since long. Loughran and Ritter (2002) tried to answer this question under the spotlight of prospect theory. The theory predicts, that the issuer will sum the loss of wealth (as a result of underpricing) on shares sold, with the wealth gain (caused by the price jump) on the shares retained, resulting in a net increase in the wealth of pre-issue shareholders.

The CEO of the Expedia Inc. Richard N. Barton had 158128 unvested shares in Microsoft Inc. These shares were converted to about one million Expedia shares at the time of IPO. Taking the midpoint ($11) of the price range ($10-$12), the CEO's shares would have estimated value of $11 million that he was expecting before the offering. At the closing of the first trading day, this value rose to about $54 million, 391% increase in this part of his wealth in a few weeks. Though a big amount of money was left on the table on the shares sold because of underpricing, but at the same time, he found that his wealth has increased by millions of dollars. If we analyze the wealth effect of this IPO in the light of Loughran and Ritter's (2002) prospect theory explanation, we find that pre-issue shareholders find themselves in much better position. The gains, as a result of this IPO, were far more than the amount of money left on the table. Only 13.6% of total shares were sold in the issue, which suffered underpricing, but the price jump, as the result of this issue, will add value to the rest of 86.4% of the shares. On one side, underpricing is diluting the pre-issue share holders, on

the other side; these shareholders are having good news of unanticipated increase in their wealth.

Underpricing can be viewed as wealth creation for those investors who purchase the shares issued in an IPO in the offer or at any price below the closing price on the first day of trading. It can also be viewed as un retained wealth for the existing shareholders who sell the shares in the IPO at a price below the price, which the market would be willing to give for it (Certo, S. et al. 2001). Though underpricing can be viewed as the un retained wealth for the existing shareholders, it also add value to the retained shares. In this chapter we will be studying the timing of the market knowledge of the overall wealth effect of a carve-out from the perspective of existing shareholders.

The phenomenon of wealth effect is well established in literature, but when does the market know about this wealth effect? In this chapter, we tried to find out the time, when the market can pre-empt about this wealth effect. We tried to answer this question by splitting Loughran and Ritter's (2002) loss and gain measuring inequality in parts, which we explain in section 4. Loughran and Ritter's (2002) loss and gain measuring inequality is:

*[Retained by parent after + secondary shares sold by parent] * [offer price - midpoint] + Retained by parent after * [P-OP] > [P-OP] * [secondary shares sold + Primary shares sold (Retained by parent after / retained by all)]* [16] (1)

We would like to mention, at this level of the study, to be clear for the readers, that our study has nothing to do with the prospect theory in its true sense. We will only make use of the above inequality to calculate the wealth effect, and will not comment on or complement the prospect theory.

We assume that when a firm carves out its subsidiary, there is an impact on the wealth of the existing shareholders (share holders before the carve-out) and that this impact is more obvious

[16] In equation (1) 'P' is the first trading day close price and 'OP' is the offer price

during the book-building period of the carve-out. In a carve-out, the parent firm sells a fraction (usually a small fraction) of its subsidiary to the general public to raise capital. As the parent holds a non-trivial fraction of the asset of the carved-out subsidiary both before and after the IPO, we argue that value revision in the subsidiary will have impact on the shares' return of the parent firm and this will be more obvious during the book-building period. Other way around, we can say that the underpricing of a carved-out subsidiary could be pre-empted from the information, integrated in the share price of the already trading parent firm.

We show that information regarding wealth effect is evident during the book-building period of the carve-out IPO. We demonstrate, albeit, the wealth effect is not known to the market, before the offering, it can be observed indirectly in the share prices of the parent firm already trading in the market. We tried to establish a relationship between the abnormal return to the parent and the wealth effect and observe that if the wealth effect at IPO is zero or negative, the abnormal return to the parent during book-building period is negative but not significant. However, if the wealth effect is positive, abnormal return to the parent is positive and highly significant (at 1%). The difference between the negative abnormal return (when wealth effect at IPO is zero or negative) and positive abnormal return (when wealth effect at IPO is positive) is also highly significant.

Further, our spotted time (i.e. book-building period), regarding the information revelation is in congruence with Benveniste and Spindt (1989) who argue that issuing firm's price and number of shares to be issued is contingent upon the information acquired by its underwriter(s) during the book-building process. During this time the market reveals the true value of the issue and in return the issuer compensates this true revelation of information by investors in the form of underpricing its shares.

The difference between Benveniste and Spindt (1989) and our work is the direction of flow of information. Benveniste and Spindt (1989) talk about the information revelation from the market to the firm during book-building period, on the basis of which the firm decides the price and number of shares to be issued. We present in our study, that during book-building period, the market (investors) can also observe information that can help pre-empt the wealth effect of the issue.

Bradley and Jordan (2002) find that firms with greater over-hang will have greater underpricing because cost of underpricing to the issuer declines with the increase in overhang[17]. We compliment Bradley and Jordan (2002) when they say that firms with greater over-hang will have greater underpricing, as the significant difference in negative and positive abnormal return in relation to the wealth effect in our results, goes in line with their notion. If the existing shareholders will sell only a small portion of their shares, they will be enjoying the positive wealth effect and their wealth will be increased significantly after the underpricing of carve-out IPO, and hence their concern about underpricing will not be severe[18].

2. Literature review

An extensive review of the finance literature reveals the fact that pricing of initial public offerings (IPOs) is one of the most examined phenomena in both the theoretical and empirical paradigms. Perhaps, the main factor behind the attraction of researchers to this phenomenon is the underpricing of these IPOs which is a common factor in almost all the countries of the world, and which according to Ibbotson, Sindelar and Ritter (1994), exceeds 18% on average.

The underpricing phenomenon is under the lime light of researchers since long, and since then different theories have been put forwarded to explain the reasons. This phenomenon was first studied by Reilly and Hatfield (1969) who argue that issues, that increase in price in the beginning will tend to have greater return than average in the next year. Contrary to Reilly and Hatfield (1969), McDonald and Fisher (1972) stated that new issue will follow the efficient market rule, the initial downward bias in price will be adjusted by the market and the initial price behavior will not be significantly indicative of the price behavior after one week to the end of the year.

[17] Bradley and Jordan (2002) refer the unsold shares, during the IPO, as the overhang. It is calculated as pre-IPO shares retained for all share classes divided by the total number of shares filed (primary plus secondary shares filed).

[18] If the existing shareholders will sell a small portion of their shares in the IPO and the IPO is underpriced, though the underpricing will reduce the proceeds to the firm, but will increase the personal wealth of existing shareholders. The shares that they sold in the offer will be underpriced and will result in loss to their personal wealth. The shares that they did not sell in the offer will bring profits to the extent of underpricing. So the less they sell in the offer, the more will be the good news in case of underpricing.

Rock (1986) presented the winner's curse explanation of underpricing. This is a theoretical model in which it is assumed that underpricing is the result of information asymmetry. To incite the uninformed investors to invest in "bad issues", the issuers underprice the new issue to the extent to compensate the uninformed investors for the bias in the allocation of new issue,[19] as informed investors will only invest in "good issues". Issuers and underwriters underprice the new issue to keep the uninformed investors in the market. Rock's model implies that higher risk firms should have, on average, higher initial returns than low risk firms. Ritter's (1984) results, however, do not support this explanation of underpricing as he points out that if 'hot markets' occur only in particular periods then Rock's model implies that the risk composition of IPOs is changing over time.

Beatty & Ritter (1986) further developed the Rock's model and argue that there is a positive relation between ex ante uncertainty about the value of IPO and it's underpricing. As the ex ante uncertainty increases, the winner's curse problem intensifies. This ex ante uncertainty and systematic risk are not the same. They argue that smaller offerings, keeping other things the same, have substantially higher average initial returns, as their ex ante uncertainty is higher than the bigger offerings. An implication of the finding that ex ante uncertainty about the value of IPO is positively related to underpricing is that if the level of ex ante uncertainty is endogenous, the issuer has an incentive to reduce this uncertainty by disclosing information voluntarily. Carter and Manaster (1990) extended the Rock's theory[20] and suggest that the greater the proportion of informed investor capital participating in an IPO, the greater is the equilibrium price run-up. Michaely and Shaw (1994) also presented results that are consistent with Rock's (1986) winners' curse explanation of why firms underprice. Their results show that in markets where investors know in advance, that institutional investors are not there for competition, IPOs are not underpriced.

Another explanation for underpricing comes from Allen-Faulhaber (1989). This model assumes that there is information asymmetry among the market participants as in the winner's curse model. In winner's curse model, the informed investors (institutional investors) have the information edge over the issuer and the underwriters, here in this model, only the issuer

[19] For further insight, consult Rock (1986) to understand the information difference between the informed and uninformed investors and the concept of winner's curse.

[20] He argues that uniformed investors are compensated for the risk of trading against the superior information in the form of IPO price run-up.

knows better. This is the firm going public who knows the true future value. Allen Faulhaber (1989) argue that firms with favorable future prospects, find it optimal to signal their good quality by underpricing their issue and that investors know that only the best can recover their costs of underpricing in the seasoned equity offerings. Similarly, Welch (1989) suggests that firms choosing to underprice their IPOs, in fact, pursue a multiple issue strategy, which means they have a long term planning about the pricing of the issue and the proportion of firm going public. More precisely, they have planning for a seasoned offering after the IPO and IPOs are generally the signaling device about the value of the firm. Grinblatt and Hwang (1989) model relates the variance of firm's cash flows (project risk; here IPO risk) to the degree of underpricing. The model claims that given the issuer's fractional holdings, the degree of underpricing is an increasing function of the variance (uncertainty) of the firm, which is consistent with Rock's model tested by Beatty and Ritter (1986).

Contrary to the conventional IPOs, carve-out subsidiaries have been trading in the market as part of their parents. The continuously trading parent can be an avenue for the information about the value of the new shares issued by the subsidiary and hence, investors can end up with a more precise value. Under this unique characteristic of carve-outs, adverse selection models would predict a less severe underpricing in a carve-out.

Benveniste and Spindt (1989) argue that the issuing firm's price and number of shares to be issued is contingent upon the information acquired by its underwriter(s) during the book-building process. If the information from the investors is favorable, the price is adjusted upward and this leads to proportionately higher underpricing. Therefore, the partial adjustment theory predicts that underpricing is positively related to the price revision during the book-building period. The empirical implications of the model were first tested by Hanley (1993), who finds that, issues with upward revisions were underpriced the most. Loughran and Ritter (2002) also posit that the IPOs, where the offer price is revised upward, leave a lot of money on the table. Other studies like Bradley and Jordan (2002) and Thompson (2010) also support this hypothesis. The underwriters often ration the allocation of shares to the investors, and reward investors for truthfully revealing their private information, by underpricing the issue[21]. Generally the issues are oversubscribed and underwriters allocate

[21] Ghosh et al. (2012) posit that rationing allows underwriters to compensate informed investors through more favorable allocations. Cornelli and Goldreich (2003) have similar observation.

shares to investors in proportion of their interest that they have expressed during the book-building process. Benveniste and Spindt (1989) state that public information cannot be used to predict the initial returns as this information should be fully incorporated in the offer price[22]. However, Loughran and Ritter (2002) demonstrate that initial returns and market returns before the offering are correlated, suggesting that public information is not fully incorporated in to the offer price. Bradley and Jordan (2002) argue that substantial portion of IPO underpricing is predictable using different variables that are available well before the offer date of the IPO. Hanley (1993) found that the percent change in the NASDAQ index during waiting period is positively and significantly related to underpricing i.e. increase (decrease) in initial returns are associated with positive (negative) changes in the market during time period that lapses between filing of preliminary prospectus and offer date. However, Lowry and Schwert (2004) conjecture that though underwriters disregard some of the public information while setting the final offer price, it seems that they incorporate the vast majority of the public information in the final offer price which is consistent with Benveniste and Spindt (1989).

Higher initial returns fall costly both on issuer and the underwriter, then why they tilt to underprice. Baron (1982) conjecture that underwriters benefit from underpricing as it makes it easier to find clients for IPOs and reducing the marketing cost. Loughran and Ritter (2002) argue that though the underwriters get a reduced gross spread as a result of lower offer price (as gross spread is typically negotiated before the establishment of the final offer price and raising offer price will automatically increase the gross spread), investors will engage in rent seeking behavior for being prioritized in allocation of shares in hot IPOs. This rent seeking behavior bestows underwriters of increased profits than if they would simply concentrate on the gross spread. Also, underwriters may reap the benefits of this loss in the form of future business with satisfied clients and by the reputational capital of a successful IPO. The appealing question is why the issuers agree to underprice? Loughran and Ritter (2002) tried to resolve this puzzle under the limelight of the prospect theory. When an IPO is underpriced, the issuers suffer wealth losses due to the low price received for the issue that was worth a better price in the market. At the same time, the existing shareholders get the good news of a price jump in their retained shares. So on one side, their ownership is diluted and they receive

[22] Public information means the information regarding the offering characteristics and returns to the market etc.

less money for the shares sold, the price jump in the share prices, on the other side, increases their wealth to a higher level than they anticipated before the offering. The prospect theory predicts that if the issuers integrate the wealth loss due to underpricing on the shares sold with the apparent wealth gains on the retained shares due to price jump, they would not get upset about underpricing. Ljungqvist and Wilhelm (2002) find that institutions that provide more favorable information during the book-building period are rewarded with higher allocations. Ljungqvist and Wilhelm (2005) show that IPO firms are less likely to change their underwriters in the subsequent offerings when behavioral proxies indicate that they are satisfied with the IPO underwriters' performance[23]. Loughran and Ritter (2002) prospect theory does not distinguish between the private and public information, and argue that underpricing is a form of indirect compensation to the underwriters. However, book-building theories like Benveniste and Spindt (1989) announce underpricing as equilibrium return and argue that high initial returns are compensation to investors for revealing their valuable private information about the value of the IPO firm. In both the cases, rationing of IPO shares is a critical aspect. If IPO shares are not rationed, the investors will have less incentive to reveal their private information truthfully during the book-building period of the IPO.

In an equity carve-out, the parent firm holds a significant fraction of the subsidiary both before and after the issue. The parent continues to hold a controlling stake in the carved-out subsidiary and hence the value of the subsidiary is reflected in the continuously trading parent shares, which are of course not rationed (Prezas, Tarimcilar and Vasudevan 2000). Benveniste et al. (2008) argue, that, as investors can trade directly in the un rationed shares of the parent during the book-building period of the carved-out subsidiary, changes in the valuation of the ongoing subsidiary could be tracked through the price change in the parent firm. Thompson (2010) results imply that public information available before the carve-out offering can be used to predict the initial return of a carve-out. Loughran and Ritter (2002) also hold the same notion about the conventional IPOs that public information is not fully incorporated in the offer price.

[23] The proxies are defined as the relative size of the CEO's wealth loss due to underpricing of the new issue and his (perceived) wealth gain due to the price jump of his retained shares relative to a reference point which Loughran and Ritter assume as the midpoint of the indicative price range at the time of filing with securities and exchange commission.

Bradley and Jordan (2002) found that firms with greater over-hang will have greater underpricing because cost of underpricing to the issuer declines with the increase in overhang. Habib and Ljungqvist (2001) empirical findings corroborate the prediction that an important determinant of underpricing is the extent of the wealth loss to the selling shareholders. They argue that degree of equilibrium underpricing depends on the extent of the insider selling. The more shares they sell the greater the incentive to reduce underpricing. This is because of the fact that the wealth loss in case of selling more in an underpriced IPO will be higher compared to selling less. This is in line with Barry (1989) who argues that existing shareholders will be more concerned with underpricing if they participate more by offering more of their ownership. The underlying phenomenon is the same, i.e. if shareholders are selling more of the shares and the issue is underpriced, they will lose the wealth on shares they sold in the offer. These papers unveil the fact that one of the 'behind the scene' factors that can mitigate or aggravate the underpricing of the going public firm is the wealth effect on the existing shareholders.

In this chapter, we calculate the wealth effect of carve-out IPOs along the continuum of the IPO process and try to see the relationship of wealth effect with the abnormal return to the parent firm. We want to know that at which time the investors can have information about the wealth effect of a carve-out, in the presence of an already listed and trading parent. We find that the market knows about the value of the carve-out subsidiaries during the book-building period through the venue of their parent firms' share prices. Our findings are in line with Benveniste and Spindt (1989) who conclude that the information revelation takes place during book-building process, however, their information revelation is from market to the firm, whereas, our findings reveal that in the presence of a trading parent, the market can also get information about the wealth effect of the issue during this time. Also, our results support the papers where public information is termed as a source for pre-empting the underpricing of IPOs. It includes Loughran and Ritter (2002), Benveniste et al. (2008) and Thompson (2010).

The rest of the chapter is arranged in this sequence: Section 3 contains sample selection and data description, section 4 contains the wealth effect, section 5 contains information regarding abnormal returns to the parent firm, section 6 contains the results and section 7 concludes the work.

3. Sample selection and data description

3.1. Sample Selection

In data extraction, we follow Benveniste et al. (2008). The main source for data collection is SDC (Securities Data Company). In our sample, we have observations of 136 IPOs. These IPOs comprises only offers from subsidiaries of listed companies. We exclude partnerships, real estate investment trusts (REITs), closed end funds, unit offerings and American depository receipts (ADRs). Our market of study is US and the time limit extends over a period of 23 years starting from 1985 to 2007. In the beginning, we had a sample of 549 IPOs but after applying certain criteria (explained in the lines ahead) we were left with the present number of 136 IPOs. The criteria of sample selection start with the idea that IPOs that were issued in stock exchanges other than New York Stock Exchange, American Stock Exchange and NASDAQ are excluded from the sample. Table '1-1' shows the distribution of sample per year in each stock exchange.

After filtering for exchange, our sample shortened to 476 observations. To be sure that the IPOs are really the IPOs of subsidiaries of already listed companies, and that they are not part of parent, we use CUSIP (Committee on Uniform Securities Identification Procedures) codes. The criteria is, if CUSIP of company going public and that of its ultimate parent are the same, we consider them as incompatible to our requirements and if the CUSIPs are different, we assume them to be true subsidiaries. For counter check, we consult Dow Jones Factiva for news wires, to confirm that the subsidiaries are fully owned subsidiaries of the parent company or parent owns a major portion of the subsidiary. We checked 60 IPOs randomly on Dow Jones Factiva and got a general perception that the information regarding the relationship of companies in SDC (Securities Data Company) is almost true; however we confronted situations in which the information in SDC is not the same as on Dow Jones Factiva. After this exercise our sample reduced to 337.

After having this data, we go for further specifying our data and we eliminate the financial companies from our sample. Any company having SIC (Standard Industrial Classification)

code within the range of 6000 and 6999 are considered financial companies and hence are removed.

Table 1-1: Represent total number of issues per year and per stock exchange in respective years of study

Years	Total Issues	AMEX	NYSE	NASDAQ
1985	4		2	2
1986	11	4	1	6
1987	10	1	3	6
1988	4	1	3	
1989	6	1	2	3
1990	2		1	1
1991	11	2	1	8
1992	5			5
1993	7		2	5
1994	6	1	2	3
1995	1			1
1996	13	3	4	6
1997	8	2		6
1998	6	1	3	2
1999	12		4	8
2000	11		4	7
2001	8		6	2
2002	0			
2003	0			
2004	4		2	2
2005	2		1	1
2006	3		3	
2007	2		1	1
Total Number of Issues	136	16	45	75

After this filter we are left with 226 observations. The data filtered so far contains only common shares. A big portion of this information is taken from SDC, however for some companies information is not available and we accessed to EDGAR database on the United States' SEC (Securities and Exchange Commission) website. Companies that have no

information in SDC database about the parent's ownership percentage before and after the issue and for which we could not find the information elsewhere manually, were eliminated from the sample.

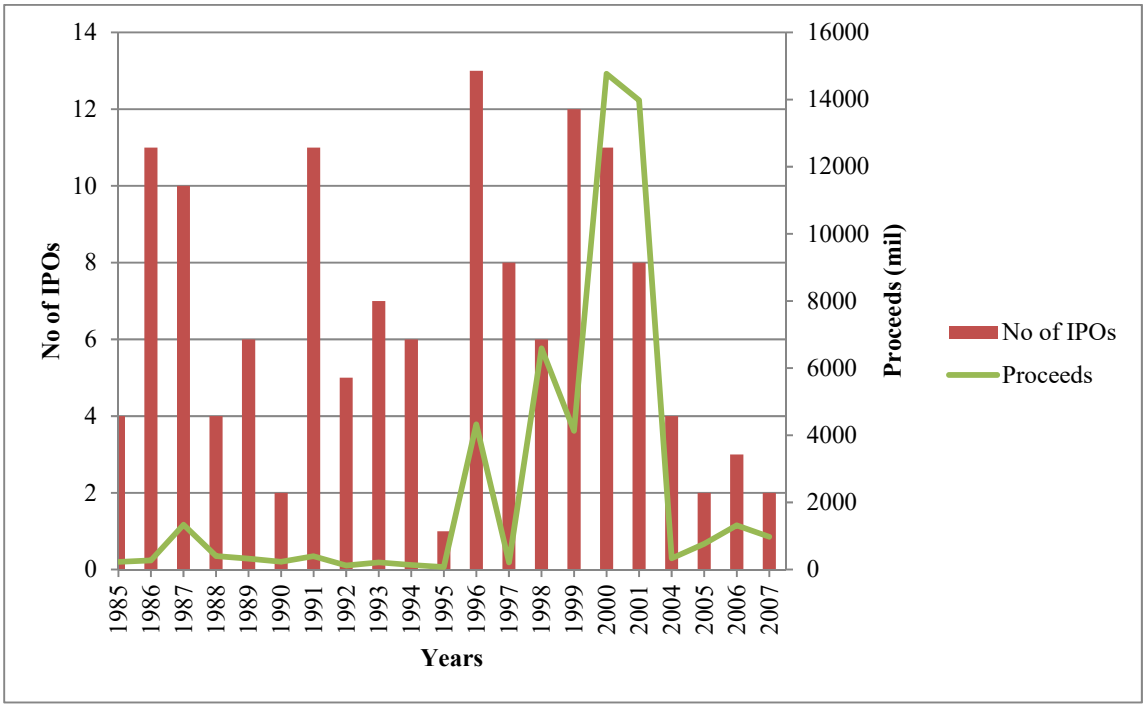
Table 1-2 Representing number of IPOs, their respective years and proceeds

YEAR	NUMBER	Proceeds (mil)
1985	4	229,6
1986	11	274,17076
1987	10	1335,6375
1988	4	401,4
1989	6	325,2
1990	2	233,775
1991	11	397,55
1992	5	122,45
1993	7	215,3375
1994	6	140,175
1995	1	75
1996	13	4325,591077
1997	8	215,6125
1998	6	6588,517821
1999	12	4134,415
2000	11	14768,23
2001	8	13977,52375
2004	4	335,547
2005	2	768,6
2006	3	1318,311336
2007	2	977,15

We are left with 206 observations. Next we search for the prices of parent firm. For parent firms, the share prices are extracted from CRSP (Center for Research in Security Prices) using

PERMNO[24], and COMPUSTAT using GVKEY[25]. This further reduced our sample size because of the unavailability of this information for several firms due to several reasons (like parents are listed on non US exchange and hence have no PERMNO, name and CUSIP have changed and could not be located etc.).

Graph 1-1: Representing number of IPOs, their respective years and Proceeds.



After completion of the overall elimination process, in the end we are left with 136 IPOs, which correspond to our requirements. We use Factiva to identify the date when the IPO was first seen in the news (i.e. the announcement date). Out of 136 observations, 26 were announced before or after the filing date (filing date is the date when the IPO is filed with the SEC). Of these 26 observations, 14 were seen in the news before the filing date and 12 were

[24] A PERMNO is a unique security identification number, which is assigned by CRSP to each security permanently.

[25] GVKEY is a unique identifier defined by COMPUSTAT for each company to trace company over time as company name, CUSIP or ticker may change over time.

reported after the filing. In the rest of 106 cases, announcement date and filing date are the same. Number of shares outstanding and data for offer price and closing price one day after the offer are initially taken from SDC database, but for the reason of reliability, cross-checked with CRSP database. Number of IPOs, their respective years and the proceeds from these IPOs are shown in table '1-2' and graph '1-1' above.

3.2. Variables

The variables that are examined in this chapter are discussed in this section. We study the abnormal return (AR) to the parent at filing, during book-building, at offer and at listing of the carved-out IPO. The AR is defined for each point of the IPO process continuum. AR at filing shows the part of AR at the date of filing and one day after the filing (F, F+1). AR during book-building comprises return during filing plus two day and offer minus one day (F+2, O-1). AR at offer is return at offer date (O) and AR at listing is return on listing of the IPO and one day after the listing day (L, L+1). We represent wealth at the offer date as 'Wealth O', wealth at listing date as 'Wealth L' and wealth for the whole IPO as 'Wealth IPO'. Figure 1-1 below shows the time-line of a carve-out IPO, AR and wealth effect.

Other variables include number of days, same industry, high tech, percentage prime, underwriter rank, log proceeds, proceeds, filing spread, relative size, relative wealth at offer, relative wealth at listing relative wealth at IPO, relative gross spread, leverage, market to book ratio (MTB) and growth. Each variable is either explained in their corresponding tables and/or in appendix 1.

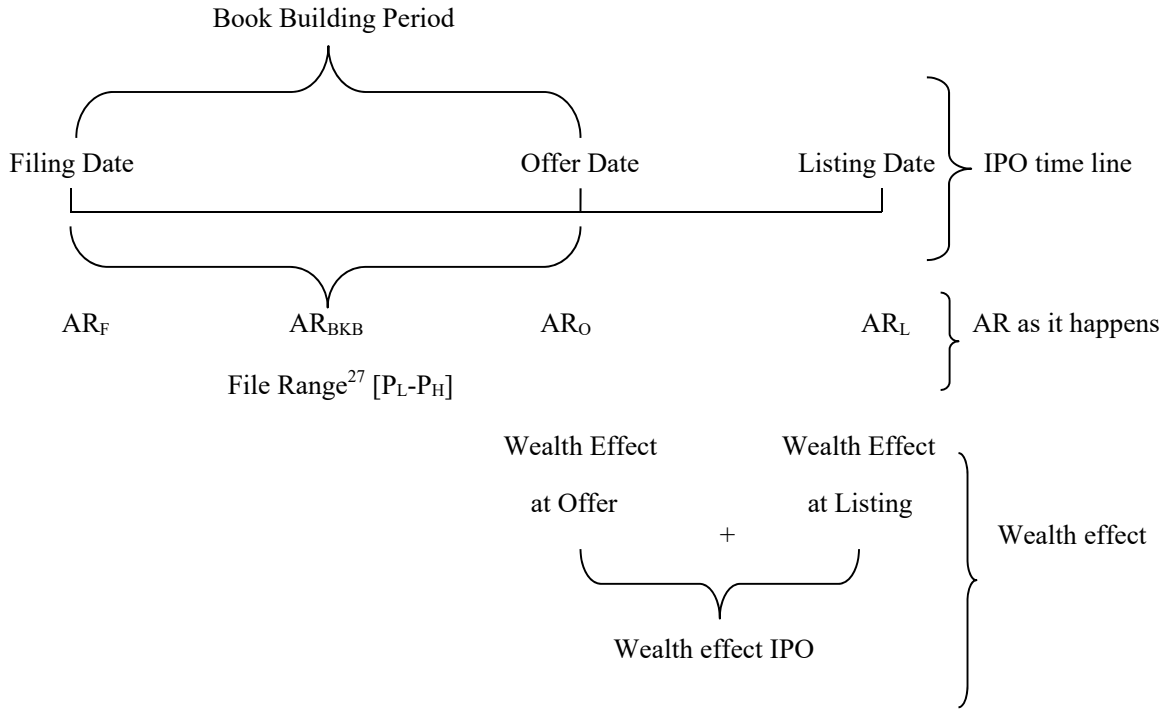
3.3. Descriptive statistics

Table 1-3 reports the summary statistics of offering characteristics extracted for the carve-out IPOs in our sample. Subsidiaries in our sample take 77 days on average to go public. In our sample, 36% of the subsidiaries and their parents are in the same industry, the first two digits of the SIC codes are the defining source. Around 39% of the subsidiaries are from the high

tech industries (3 digits SIC codes 283, 357, 366, 367, 381, 382, 383, 384, 737, 873, and 874)[26]. The proportion of primary shares to secondary shares is quite high in our sample. About 89% of the shares issued were primary shares i.e. new shares issued by the ongoing public firm. Underwriter rank averages 7.94 in our sample on the scale of 1-9. This ranking is based on Loughran and Ritter (2004) update of Carter and Manaster (1990) tombstone measure. The mean gross proceeds that the subsidiaries file with the Securities and Exchange

Figure 1-1: Time line of a carve-out IPO, AR and wealth effect

This figure shows the timing of different events that occur during the 'going public process' of a carve-out. The figure also illustrates the points where we study the abnormal returns to the parent firms and also the wealth effect of these carve-outs that are observed during our study. AR_F is abnormal return at filing, AR_{BKB} is abnormal return during book-building, AR_O is abnormal return at offer and AR_L is abnormal return at listing.



[26] The definition follows Benveniste et al. (2008) and SDC definition of "High Tech Industry group"

[27] P_L is lower price of the filing range and P_H is the upper price of the filing range

Table 1-3 Descriptive statistics

N days is the number of days between filing date and offer date. Same industry is a dummy variable equal to '1' if the parent and subsidiary have the same first two digit SIC code and '0' if they do not share the same first two digit SIC code. High-tech is also a dummy variable carrying '0' if subsidiary is not in high-tech industry and '1' if it is in high-tech. They are classified by the first three digit SIC codes 283, 357, 366, 367, 381, 382, 383, 384, 737, 873, 874. Percent prim is the percentage of primary shares in the new issue. Underwriter rank represents the rank of lead underwriter (investment banker) and is based on the Loughran and Ritter (2004) update of Carter and Manaster (1990) tombstone measure of ranking. Log proceeds are log(proceeds). Proceeds are the proceeds for the IPO. Filing spread is [(price high - price low)/((price high + price low)/2)]. Relative size is subsidiary market value / parent market value. Leverage is debt / equity ratio. Mtb is market price per share / book value per share. Growth is [{this year sales (turnover) – previous year sales (turnover)} / (previous year sales (turnover)*100)]

	N	Mean	Median	Lower Quartile	Upper Quartile	Standard deviation
N days	136	77.49	59.00	44.00	85.00	65.14
Same industry	136	0.36	0.00	0.00	1.00	0.48
High tech	136	0.39	0.00	0.00	1.00	0.49
Percent prim	136	0.89	1.00	1.00	1.00	0.25
Underwriter rank	136	7.94	8.75	8.00	9.00	1.68
Log proceeds	136	17.99	17.68	16.82	18.78	1.62
Proceeds (mil)	136	374.22	47.67	20.10	144.00	1285.72
Filing spread	136	0.16	0.15	0.12	0.18	0.06
Relative size	136	0.63	0.43	0.17	0.85	0.68
Leverage	128	2.11	1.33	0.74	2.28	3.64
Mtb	128	2.73	1.97	1.30	3.46	3.16
Growth	128	17.28	11.90	-10.92	25.87	55.02

Commission (SEC) is about $374.22 million having median of $47.67 million. The evident difference between the two measures can be attributed to the presence of very large issues in the sample (up to about $10.62 billion).

The average leverage is about 2.11 and market to book ratio is 2.72. The growth recorded in our sample averages 17.28. The average relative size (calculated as subsidiary market value divided by parent market value) in our sample is 63% which means that the average subsidiaries carved-out were of high value whose market value would be equal to the 63% of the market value of the parent firm . Subsidiaries of such big value would be expected to have a non-trivial impact on the value of parent firm, and hence the value revision in the parent firm could be used to pre-empt the value of the subsidiary well before the offering. Albeit, not tabulated, parents post IPO stake in the subsidiary averages 74.55 %, however there is variation in the percent of subsidiary held by the parent after the IPO. This percentage varies from 34.40% (Kinder Morgan Mgt LLC) to 98% (NRG Energy Inc.). In addition to this, 89 firms have information available about the lock-up period. The average lock-up period is 210 days. The minimum is 90 days and maximum is 730 days. Most frequently found in the sample is 180 days of lock-up period.

4. Wealth effect of carve-out subsidiary

In this part, we see the wealth effect of the carve-out subsidiary on the parent using the Loughran and Ritter (2002) wealth calculating equation. We believe that the wealth change information is not available before the offer of the issue, so we calculate this wealth effect at offer and listing of the issue and the combined effect gives us the wealth effect of the whole IPO. If we see table 1-4, we observe that the average wealth at offer in our analysis is $-9.07 million, whereas, wealth at listing is $349.97 million and the wealth at IPO, being a combined effect of the offer and listing, is $340.90 million. The big difference in mean and median wealth can be attributed to the existence of very large firms in the sample.

Consider the first portion of Loughran and Ritter (2002) wealth equation:

[Retained by parent after offer + secondary shares sold by parent] * [offer price - midpoint] (2)

The above portion of the Loughran and Ritter's inequality represents the wealth effect at offer date of the IPO. This is the information that is available till the offer date and can be used to calculate the wealth of the existing shareholders of the parent firm. If the offer price is higher than the midpoint of the filing range (midpoint is considered a reasonable expected price by the issuers), a positive wealth impact is observed as the existing shareholders are getting more than the expected amount. If the midpoint is higher than the offer price, the negative wealth impact is observed. However, this wealth effect is according to the offer date and not the listing date.

Table 1-4: Wealth effect of carved-out subsidiary on its parent at different points of IPO process

Wealth O is the wealth at offer date of IPO. Wealth L is wealth at listing date. Wealth IPO is the combined wealth of 'wealth at offer' and 'wealth at listing'. Gross spread is the amount paid as gross spread to the underwriters and is calculated as [(percent gross spread * proceeds)/100]. Relative wealth O is (wealth offer/parent market value). Relative wealth L is (wealth at listing/parent market value). Relative wealth IPO is (wealth IPO/parent market value). Relative gross spread is (gross spread/parent market value).

	N	Mean	Median	Standard Error	T test	Pr T test
Wealth O (in mil $)	136	-9.07	0.00			
Wealth L (in mil $)	136	349.97	5.03			
Wealth IPO (in mil $)	136	340.90	5.14			
Gross spread (in mil $)	133	15.67	3.15			
Relative wealth O (in %)	136	-3.08**	0.00	17.53	-2.05	0.042
Relative wealth L (in %)	136	3.98***	0.55	9.99	4.64	0.000
Relative wealth IPO (in %)	136	0.90	0.56	21.15	0.50	0.621
Relative gross spread (in %)	133	1.09***	0.43	2.13	5.93	0.000

Literature (e.g. Loughran and Ritter, 2002) support the notion that if there is upward offer price revision (i.e. offer price is set towards the upper end of the filing range or beyond), there is higher underpricing at the listing of the IPO than if there is downward price revision. They reported a 4% underpricing for issues where final offer price is below the lower end of the file range and, on average, 32% first day return for issues, which are priced above the maximum of filing range. Hanley (1993) first documented the relationship between underpricing and the revision of offer price. The average wealth at offer in our analysis is $-9.07 million. However, the time period between offer and listing is so short (normally a day) that wealth effect at offer may not be of that importance to the issuers.

Wealth effect at listing can be calculated from:

*Retained by parent after * [P-OP]* ***- [P-OP] * [secondary shares sold + Primary shares sold (Retained by parent after / retained by all)]*** ***(3)***

The first non-bold *italic* portion above represents the wealth that the issuers will have after the carve-out IPO is listed on some stock exchange. The higher the portion retained by the issuer, provided there is positive price jump, the higher will be the positive wealth effect on this portion of their investments. The bold *italic* portion represents the amount of money they will lose when the IPO will be listed on the stock exchange. Again, to be simple, the smaller the dilution of their share in the business, the smaller will be the loss impact on the wealth of issuers if there is a positive increase in the price of the new issue on the listing. We observe a positive wealth effect at listing in our sample, which averages about $349.97 million and the overall wealth effect at the IPO is $340.90 million. The average gross spread in our sample is $15.67 million. Gross spread is a cost to the issuer and it will reduce the wealth of issuer by the amount it holds. To sum up on the basis of these observations, we end up with the fact that the firms in our sample have a positive wealth effect on the existing shareholders and that each issuer firm, on average, got a value addition of about $325 million ($340.90 – $15.67) as a result of the carve-out.

Now see the relative wealth at offer, listing and IPO. Though the wealth at offer and listing are significant at 5% and 1% respectively, but they are quite in opposite direction, and the relative wealth at IPO is not significant at all. In the previous portion we only discussed the direct wealth effect and produced results in amounts. Here we see the wealth effect relative to the size of the parent firm. We observe a negative wealth effect at offer (-3.08% significant at 5% level) and a positive and highly significant wealth effect at the listing of the IPO (3.98% significant at 1% level).Whereas, the relative wealth of the whole IPO (combined effect of wealth at offer and listing) is positive but insignificant.

5. Abnormal return to the parent firm

After examining the wealth effect in the previous section, here, we want to see the relationship between the wealth effect and the abnormal return to the parent firm throughout

Table 1-5 Abnormal returns to the parent firm from filing to listing of the carve-out subsidiary

AR filing represents the abnormal return to the parent firm on the filing date and one day after filing. AR during book-building is the abnormal return to the parent during book-building period i.e. from third day of filing to one day before the offer date. AR at offer is abnormal return at the offer date and AR at listing is the abnormal return to the parent at listing date and one day after listing. N is number of firms observed in the sample.

	N	Mean	Median	Standard Error	T test	Pr T test
AR at filing (F,F+1)	136	0.0199***	0.0053	0.0731	3.18	0.0018
AR during bookbuilding (F+2,O-1)	128	0.0702***	0.0548	0.2304	3.45	0.0008
AR at offer (O)	136	-0.0188***	-0.0022	0.0738	-2.97	0.0036
AR at listing (L,L+1)	136	-0.0214***	-0.0101	0.0660	-3.78	0.0002

the IPO process. We have already discussed the wealth effect, however to accomplish our analysis we need to find out the abnormal returns to the parent firm during the IPO process.

We calculate these returns in relation to the S&P 500 index using Karafiath[28] (1988) event study methodology. There is a significant change in the return to parent firm during the period when they file for carving out their subsidiary to the listing of the carved-out subsidiary.

We can clearly observe in table 1-5 that the parent shares significantly outperform the market at filing and during the book-building period. However, the underperformance of the parent shares at the offer and listing is also evident. In our results, when a subsidiary files for going public, the shares price of their parents are appreciated by almost 2% in comparison to the market conditions prevailing at the moment of filing. This percentage is similar to Schipper and Smith (1986) who reported a positive and significant abnormal return of 1.83% to the parent on the announcement of equity carve-outs. Similarly, Allen and McConnell (1998) find an average abnormal return of 2.12% to the parent firm during three days surrounding the announcements of the carve-outs. This means that the carving out of the subsidiary brings good news to the parent shareholders and the market receives it as a positive indication. This appreciation in the price of the parent shares becomes stronger during the book-building period of the IPO when the underwriters try to dig up the market for information about the value of the IPO. The average price jump in the parent shares in our sample during book-building is recorded as 7% which is also statistically highly significant at 1%. This percentage is similar to Benveniste et al. (2008) who reported 7% ($p = 0.02$) share price increase for the parent adjusted for S&P 500 returns during its subsidiary's pre-IPO book-building period. The information revelation theories like Benveniste and Spindt (1989) may be an explanation to this high outperformance. According to them, this is the time when the informed investors reveal the true information about the value of the ongoing public firm and for this true revelation of information, the investors are compensated in the form of underpricing. We argue, that this significant outperformance of the parent shares in 'before' listing period could be used as a source of information in pre-empting the wealth effect of the subsidiary IPO. At

[28] According to this study, the traditional event study (a two step process) results could be obtained in one step by attaching a vector of (0, 1) dummy variables to the right side of the market model regression. For each observation in the event window (forecast interval) there is one dummy variable that has a value of 1 on that observation only and zero elsewhere.

offer, the parent slightly, though significantly, underperforms the market by 1.88% and this underperformance continues till the second day of listing on the stock exchange when it becomes 2.14%. This finding is in line with Benveniste et al. (2008) who found a -1.74% return to the parent in initial trading period (i.e. from offer to initial trading date).

6. Results

6.1. Mean differences in the abnormal returns to the parent

As we stated earlier, there was a significant abnormal return to the parent firm throughout the IPO process of the subsidiary firm in relation to the market during that time period. At filing and during the book-building period this return was positive, however at offer and listing the parent underperformed the market. In this section, we discuss whether the abnormal return to the parent is somehow related to the wealth effect of the subsidiary IPO. We calculated the wealth effect using Loughran and Ritter (2002) explanation of wealth gain and wealth loss. The Loughran and Ritter inequality is:

*[Retained by parent after + secondary shares sold by parent] * [offer price - midpoint] + Retained by parent after * [P-OP] > [P-OP] * [secondary shares sold + Primary shares sold (Retained by parent after / retained by all)]*

They argue that if this condition is met then the wealth gain for the pre-issue shareholders will be greater than the amount of money left on the table in the issue and the issuer will find himself contented. We calculated the wealth effect at offer, listing and then at IPO as a whole in table 1-6. At every point, the negative wealth effect and positive wealth effect cases were separated and the difference between the two was also recorded. Then the relationship of these observations with the abnormal return (abnormal return at filing, during book-building, at offer and at listing plus one day) to the parent firm is analyzed. We observe that when the wealth effect at the offer date is negative, abnormal return to the parent during book-building is 1.88% but is not significant. However, when the wealth effect is positive, the abnormal

return during book-building period is much higher i.e. 12.39%, which is highly significant at 1% level. The difference between the two abnormal returns is also highly significant (at 1%). We conjecture that this finding is in line with literature (e.g. Loughran and Ritter, 2002) which support the notion that if there is upward offer price revision (i.e. offer price is set towards the upper end of the filing range or beyond), there is higher underpricing at the listing of the IPO than if there is downward price revision. Loughran and Ritter (2002) report a 4% underpricing for issues where final offer price is below the lower end of the file range and, on average, 32% first day return for issues, which are priced above the maximum of filing range. We align our results with this literature in the understanding that the upward price revision normally results in high underpricing which in turn results in positive wealth effect.

The relation between the wealth effect at listing date and abnormal return to the parent during the book-building period also give results in the same pattern with slight adjustments. This time, at negative wealth effect, the abnormal return is 1.56% but not significant. At the positive wealth effect, abnormal return to parent is 9.59%, which is highly significant at 1%. The difference here is also significant but at 10% level.

Wealth effect for the whole IPO depicts that if the wealth effect at the IPO is negative, the abnormal returns to the parent firm during the book-building period will be negative, but this result is not significant. Whereas, if the wealth effect at the IPO is positive, the abnormal return to the parent during the book-building period is recorded as 12.53%, which is also highly significant at 1% level. The difference between the two abnormal returns is also highly significant (at 1% level). It means that abnormal return to the parent can be used to predict the underpricing of 'on going public' firm. This observation brings us in line with Benveniste et al. (2008) who argue that in the presence of a continuously trading parent the market wide information is subsumed in the parent firm specific information during the book-building period. Intuitively, this finding is in line with the Loughran and Ritter (2002) argument that an increase in market during period prior to IPO results in increased initial day returns.

In the rest of the table, we can see other significant figures showing significant relationships between the negative and positive wealth effect (at offer, listing and the IPO as a whole), and abnormal returns to the parent firm through the continuum of the IPO process. However the difference between the abnormal returns at wealth gain and wealth loss is not significant

elsewhere. This difference is only significant during the book-building period. At filing of the IPO with the SEC, the abnormal return to the parent is positive and highly significant (2.03% at 1% level) when the wealth effect at offer is negative. When the wealth effect is positive the abnormal return to parent is positive and significant (1.9% at 10% level). However, both the returns are not different from each other. At the listing, the abnormal return is significant only when there is positive wealth effect but the difference at negative and positive wealth effect is not significant.

The combined effect of wealth loss or gain at offer and listing gives the wealth effect at IPO and the difference in the abnormal return to the parent is not significantly different.

Abnormal return to the parent at offer is significantly negative (-2.4% at 5% level) when there is negative wealth effect at the offer, even when the wealth effect is positive the abnormal return is negative but not significant this time (-1.2). The difference between the two is not significant. Wealth effect at the listing date also have negative abnormal return to the parent which is significant at 5% level but the difference between negative and positive wealth effect is not significant. The abnormal return to the parent at offer of the IPO due to negative and positive wealth effect at IPO are not different significantly.

Similarly, there is a negative value revision in parent shares at listing of the IPO when there is negative or positive wealth effect at offer date and listing date of the IPO. However, abnormal return to parent at listing of IPO due to negative and positive wealth effect at offer and listing of IPO is also not significantly different.

We can clearly see that during the book-building period of the subsidiary, the market increases the value of the parent firm without knowing the exact price of the new issue. Hence, we argue that all information regarding the wealth that will occur at the offer and at the listing, due to the availability of the exact price, is observable during the book-building period in the prices of the parent shares. This finding goes in line with Benveniste and Spindt (1989) who argue that the information revelation takes place during the book-building period.

Table 1-6: Abnormal returns to the parent firm and the mean differences in AR to the parent due to negative and positive wealth effect of the carve-out

Wealth O < 0 represents the negative wealth effect at the offer of the issue. Wealth O > 0 shows the positive wealth effect at the offer of the issue. Wealth L < 0 stands for the wealth effect at the listing of the issue. Wealth L > 0 represents the positive wealth effect at listing of the issue. Wealth IPO < 0 means negative wealth effect at the IPO (it is the combined effect of both offer and listing). Wealth IPO > 0 shows the positive wealth effect at the IPO. 'Difference' is the difference between the negative and positive wealth effect. AR at filing (F, F+1) represents the abnormal return to the parent firm on the filing date and one day after filing. AR during book-building (F+2, O-1) is the abnormal return to the parent during book-building period i.e. from third day of filing to one day before the offer date. AR at offer (O) is abnormal return at the offer date and AR at listing (L, L+1) is the abnormal return to the parent at listing date and one day after listing.

		Wealth at the Offer Date			Wealth at the Listing Date			Wealth for all the IPO		
		Wealth O < 0	Wealth O > 0	Difference	Wealth L < 0	Wealth L > 0	Difference	Wealth IPO < 0	Wealth IPO > 0	Difference
AR at filing	Mean	0.0203***	0.019*	0.0013	0.0075	0.0254***	-0.018	0.0159*	0.0226**	-0.007
(F,F+1)	N	71	67		44	94		60	78	
	T test	2.66	1.92	0.10	0.86	3.15	-1.35	1.97	2.50	-0.54
AR during book-	Mean	0.0188	0.1239***	-0.105***	0.0156	0.0959***	-0.08*	-0.002	0.1253***	-0.127***
building (F+2,O-1)	N	66	64		41	89		56	74	
	T test	0.93	3.65	-2.68	0.66	3.57	-1.88	-0.09	4.16	-3.25
AR at offer (O)	Mean	-0.024**	-0.012	-0.012	-0.03**	-0.013**	-0.017	-0.024**	-0.014*	-0.009
	N	71	67		44	94		60	78	
	T test	-2.63	-1.48	-0.95	-2.16	-2.03	-1.29	-2.29	-1.88	-0.74
AR at Listing	Mean	-0.015*	-0.028***	0.0134	-0.023**	-0.021***	-0.002	-0.015*	-0.026***	0.0112
(L,L+1)	N	71	67		44	94		60	78	
	T test	-1.92	-3.51	1.2	-2.07	-3.22	-0.2	-1.74	-3.57	0.99

6.2. Regression analysis

In the previous discussion, we observed abnormal returns to the parent firm throughout the IPO process, albeit, returns were positive and highly significant at the filing and during the book-building period, but were negative and highly significant at the offer and listing of the carved-out IPO. Further, we document that the pricing of carved-out subsidiary could be pre-empted through the window of the parent share price performance during the book-building period of the subsidiary. Since the share price of the parent firm during the book-building period have a positive and significant relationship with the wealth effect of the IPO, any increase or decrease in share price can be translated in to the wealth gain and wealth loss which in turn could give clues of underpricing or overpricing of the IPO[29].

In this part, we analyze the regression results of our study. We regress the abnormal return to the parent against various variables at four points on the continuum of the IPO process. We find (table 1-8) that abnormal returns to the parent during the book-building period are positively and significantly (at 1% level) related to the relative wealth at offer, relative wealth at listing, relative wealth at IPO and relative size. However, at listing the relation between abnormal return to the parent and relative size is not significant. This means that the shares prices of the parent firm during the book-building period can be a good source of information to the investors to pre-empt the wealth effect of the ongoing public firm. Benveniste and Spindt (1989) also report that the information about the value of the going public firm is revealed during the book-building period. Though their results were in relation to the conventional IPOs, where the firms go public for the first time by themselves, we argue that in case of carve-out, this is the book-building period when a big portion of information is known to the market. We can say, like Benveniste et al (2008), that in the presence of trading parent firm, parent firm specific information can be used as a proxy to the market wide information. As parent information is general public information during the book-building period of the subsidiary IPO, we support the notion of Loughran and Ritter (2002) who argue

[29] The wealth gain and loss can be more informative if the existing shareholders sell only a small portion of their shares

that public information is partly incorporated in the final offer price and that average initial day return will be predictable based on public information.

In order to take the accounting information onboard, we include some accounting data of the parent firm in our analysis to see if any relationship can be observed with the abnormal return to the parent. For this purpose we extracted data about leverage, market to book ratio and growth rate of the parent firms. During book-building, a negative relation is found between abnormal return, and leverage and market to book ratio, but the relationship is not significant. Relationship between growth rate and abnormal return is positive and insignificant, except in the presence of relative wealth at listing as there is a negative relationship between them. Relationship between abnormal return to the parent and other variables like number of days (from filing to offer), same industry, high tech, percentage of primary shares in the issue, underwriter rank, log proceeds and filing spread (filing range) is not significant.

Abnormal return to the parent at the filing of the IPO and its relationship with relative wealth and other variables was also analyzed (table 1-7) and we find that abnormal return to parent at the filing of the subsidiary IPO is positively but insignificantly related to the relative wealth at offer, listing and IPO. However, percentage of primary shares in the issue is negatively and significantly (at 1% level) related to the abnormal return at filing. Similarly, leverage is also negatively and significantly (at 1% level) related to abnormal return. It means that the abnormal return to the parent at the filing of the subsidiary IPO is better explained by the percentage of new shares offered in the issue and the leverage of the parent firm. The higher the number of new shares offered for issue, the lower would be abnormal return to the parent and vice versa. Similarly, the lower the leverage of the parent firm, the higher would be the increase in price of parent shares.

We then regress the abnormal return to the parent against the same variables at the offer date (table 1-9) and the listing (table 1-10) of the subsidiary IPO. Positive but insignificant relationship is found between abnormal return and the relative wealth. The relationship with other variables is also insignificant. However, we find that relative gross spread is positively and significantly (at 5% level) related to the abnormal return to the parent at the listing of the subsidiary IPO.

Table 1-7: Regression for abnormal returns to the parent at filing of the carve-out

Relative wealth offer is (wealth offer/parent market value). Relative wealth listing is (wealth at listing/parent market value). Relative wealth IPO is (wealth IPO/parent market value). Relative gross spread is (gross spread/parent market value). N days is the number of days between filing date and offer date. Same industry is a dummy variable equal to '1' if the parent and subsidiary have the same first two digits SIC code and '0' if they do not share the same first two digit SIC code. High-tech is also a dummy variable carrying '0' if subsidiary is not in high-tech industry and '1' if it is in high-tech. They are classified by the first three digit SIC codes 283, 357, 366, 367, 381, 382, 383, 384, 737, 873, 874. Percent prim is the percentage of primary shares in the new issue. Underwriter rank represents the rank of lead underwriter (investment banker) and is based on the Loughran and Ritter (2004) update of Carter and Manaster (1990) tombstone measure of ranking. Log proceeds are log(proceeds). Proceeds are the proceeds for the IPO. Filing spread is [(price high - price low)/((price high + price low)/2)]. Relative size is subsidiary market value / parent market value. Leverage is debt / equity ratio. Mtb is market price per share / book value per share. Growth is [{this year sales (turnover) – previous year sales (turnover)} / (previous year sales (turnover)*100)]

Dependent variable: Abnormal return at Filing				
	1	2	3	4
Intercept	0.09989	0.13757	0.12192	0.12942
	(1.08)	(1.39)	(1.29)	(1.33)
Relative wealth offer	0.04916			
	(0.96)			
Relative wealth listing		0.09627		
		(1.15)		
Relative wealth ipo			0.05174	
			(1.30)	
Relative gross spread				-0.66192
				(-1.09)
N days	0.00010	0.00007	0.00009	0.00010
	(0.44)	(0.32)	(0.41)	(0.43)
Same industry	-0.01881	-0.02044	-0.01910	-0.02020
	(-1.25)	(-1.37)	(-1.28)	(-1.35)
High tech	0.01766	0.01402	0.01490	0.01613
	(1.18)	(0.91)	(0.98)	(1.07)
Percent prim	-0.07485***	-0.07699***	-0.07890***	-0.07497***
	(-2.73)	(-2.79)	(-2.84)	(-2.74)
Underwriter rank	0.00047	-0.00029	-0.00008	0.00038
	(0.10)	(-0.06)	(-0.02)	(0.08)
Log proceeds	-0.00095	-0.00197	-0.00153	-0.00236
	(-0.20)	(-0.40)	(-0.31)	(-0.47)
Filing spread	-0.00994	-0.03850	-0.01391	-0.03264
	(-0.09)	(-0.34)	(-0.12)	(-0.29)
Relative size	0.02063*	0.00961	0.01609	0.03150**
	(1.84)	(0.72)	(1.45)	(1.93)
Leverage	-0.00512***	-0.00516***	-0.00516***	-0.00506***
	(-2.75)	(-2.78)	(-2.78)	(-2.73)
Mtb	-0.00162	-0.00171	-0.00164	-0.00141
	(-0.73)	(-0.78)	(-0.75)	(-0.64)
Growth	0.00001	-0.00003	0.00000	-0.00001
	(0.13)	(-0.19)	(0.02)	(-0.09)
N	118	118	118	118
R^2	0.1850	0.1881	0.1909	0.1871
R^2 Adjusted	0.0918	0.0953	0.0984	0.0942

Table 1-8: Regression for abnormal returns to the parent during book-building of the carve-out

All variables are detailed in table 1-7 and appendix 1

Dependent variable: AR during Book-building				
	1	2	3	4
Intercept	0.07567	0.47946	0.36232	0.09514
	(0.28)	(1.60)	(1.36)	(0.30)
Relative wealth offer	0.73024***			
	(4.82)			
Relative wealth listing		1.06121***		
		(4.19)		
Relative wealth ipo			0.68465***	
			(6.11)	
Relative grosss pread				-1.30763
				(-0.66)
N days	0.00064	0.00026	0.00053	0.00044
	(0.94)	(0.38)	(0.82)	(0.59)
Same industry	-0.02133	-0.04322	-0.02682	-0.03693
	(-0.48)	(-0.95)	(-0.64)	(-0.76)
High tech	0.02501	-0.00980	-0.00930	0.03963
	(0.56)	(-0.21)	(-0.22)	(0.80)
Percent prim	-0.07121	-0.07590	-0.11676	-0.00818
	(-0.88)	(-0.91)	(-1.49)	(-0.09)
Underwriter rank	0.00926	0.00179	0.00232	0.01222
	(0.65)	(0.12)	(0.17)	(0.77)
Log proceeds	-0.00870	-0.01975	-0.01627	-0.01082
	(-0.60)	(-1.32)	(-1.19)	(-0.66)
Filing spread	0.18973	-0.19904	0.10594	-0.10363
	(0.56)	(-0.59)	(0.34)	(-0.28)
Relative size	0.15023***	0.01977	0.08635***	0.14153***
	(4.52)	(0.49)	(2.77)	(2.66)
Leverage	-0.00060	-0.00091	-0.00104	-0.00013
	(-0.11)	(-0.16)	(-0.20)	(-0.02)
Mtb	-0.00316	-0.00436	-0.00358	-0.00328
	(-0.48)	(-0.65)	(-0.58)	(-0.45)
Growth	0.00046	-0.00006	0.00024	0.00022
	(1.16)	(-0.15)	(0.65)	(0.51)
N	118	118	118	118
R^2	0.2747	0.2413	0.3466	0.1178
R^2 Adjusted	0.1918	0.1546	0.2720	0.0170

Table 1-9: Regression for abnormal returns to the parent at offer of the carve-out

All variables are detailed in table 1-7 and appendix 1

	Dependent variable: AR at Offer			
	1	2	3	4
Intercept	-0.09962 (-0.97)	-0.04874 (-0.45)	-0.07696 (-0.74)	-0.09085 (-0.84)
Relative wealth offer	0.03782 (0.67)			
Relative wealth listing		0.12584 (1.37)		
Relative wealth ipo			0.05159 (1.17)	
Relative gross spread				-0.22552 (-0.34)
N days	-0.00030 (-1.18)	-0.00033 (-1.30)	-0.00030 (-1.20)	-0.00031 (-1.20)
Same industry	0.02084 (1.25)	0.01923 (1.17)	0.02077 (1.26)	0.01993 (1.20)
High tech	0.00190 (0.11)	-0.00358 (-0.21)	-0.00116 (-0.07)	0.00197 (0.12)
Percent prim	-0.01167 (-0.38)	-0.01710 (-0.56)	-0.01682 (-0.55)	-0.00961 (-0.32)
Underwriter rank	-0.00529 (-0.98)	-0.00642 (-1.18)	-0.00590 (-1.09)	-0.00522 (-0.97)
Log proceeds	0.00806 (1.50)	0.00670 (1.23)	0.00748 (1.39)	0.00761 (1.36)
Filing spread	-0.01539 (-0.12)	-0.04235 (-0.34)	-0.01495 (-0.12)	-0.03139 (-0.25)
Relative size	-0.00805 (-0.65)	-0.02120 (-1.45)	-0.01205 (-0.98)	-0.00535 (-0.30)
Leverage	0.00011 (0.06)	0.00005 (0.02)	0.00007 (0.04)	0.00014 (0.07)
Mtb	0.00186 (0.76)	0.00176 (0.72)	0.00184 (0.76)	0.00191 (0.78)
Growth	0.00001 (0.08)	-0.00004 (-0.24)	0.00000 (0.00)	-0.00000 (-0.03)
N	118	118	118	118
R^2	0.0632	0.0757	0.0714	0.0602
R^2 Adjusted	-0.0439	-0.0299	-0.0347	-0.0472

Table 1-10: Regression for abnormal returns to the parent at listing of the carve-out

All variables are detailed in table 1-7 and appendix 1

Dependent variable: AR at Listing				
	1	2	3	4
Intercept	0.12561 (1.39)	0.09730 (1.01)	0.11155 (1.21)	0.07750 (0.83)
Relative wealth offer	-0.02692 (-0.54)			
Relative wealth listing		-0.07088 (-0.87)		
Relative wealth ipo			-0.03247 (-0.84)	
Relative grosss pread				1.01177* (1.74)
N days	0.00012 (0.52)	0.00013 (0.61)	0.00012 (0.54)	0.00011 (0.48)
Same industry	-0.00143 (-0.10)	-0.00041 (-0.03)	-0.00133 (-0.09)	-0.00028 (-0.02)
High tech	-0.01551 (-1.06)	-0.01258 (-0.83)	-0.01367 (-0.92)	-0.01184 (-0.81)
Percent prim	-0.01060 (-0.40)	-0.00810 (-0.30)	-0.00767 (-0.28)	-0.00560 (-0.21)
Underwriter rank	-0.00010 (-0.21)	-0.00038 (-0.08)	-0.00062 (-0.13)	-0.00060 (-0.13)
Log proceeds	-0.00692 (-1.46)	-0.00615 (-1.28)	-0.00655 (-1.38)	-0.00472 (-0.97)
Filing spread	-0.06110 (-0.55)	-0.04372 (-0.40)	-0.06016 (-0.55)	-0.04534 (-0.42)
Relative size	-0.01244 (-1.13)	-0.00477 (-0.37)	-0.00978 (-0.90)	-0.03135** (-1.99)
Leverage	-0.00014 (-0.08)	-0.00011 (-0.06)	-0.00012 (-0.06)	-0.00020 (-0.11)
Mtb	0.00324 (1.50)	0.00330 (1.54)	0.00325 (1.51)	0.00288 (1.35)
Growth	0.00002 (0.17)	0.00005 (0.39)	0.00003 (0.24)	0.00005 (0.40)
N	118	118	118	118
R^2	0.0677	0.0718	0.0713	0.0912
R^2 Adjusted	-0.0388	-0.0342	-0.0348	-0.0127

In nutshell, we argue that the price change in the parent shares during the book-building period of the subsidiary IPO, are a good indicator of the wealth effect of the carve-out. If there is a positive abnormal return to the parent shares, it indicates that there will be a positive wealth effect of the carve-out and hence underpricing.

7. Conclusion

Information is the key to any investment and the more the information is available to the investors, the better they are in the position to take decisions about their investments. There has been a great debate in literature on the availability of information about the pricing of IPOs and revelation of information about the underpricing of IPOs. We took the discussion in to equity carve-outs where the ongoing public firms are wholly owned subsidiaries of the parent firms, which themselves are already listed in some stock exchange. We studied the wealth effect of the carve-outs on the existing shareholders and find that the wealth effect of a carve-out is predictable well before the offering of the issue. Though the exact value of the wealth effect may not be predicted before the offer, the already trading parent shares can provide a window to the investors to pre-empt the expected outcome of the new issue.

Using the profit and loss measuring inequality of Loughran and Ritter (2002), we document that positive wealth effect on the existing shareholders of the ongoing public firm can be traced back in price increase in the shares of the already trading parents during the book-building period of the carve-out. Our results support the partial adjustment theory of Benveniste and Spindt (1989) when they argue that information revelation about the value of the IPO firm takes place during the book-building period of the IPO. Our findings are also in line with the Loughran and Ritter (2002) argument that public information can be used to predict the initial day return of the IPO; after all in case of a carve-out, the already trading parent share price is public information. We conjecture that if investors focus on the movement of share prices of the already trading parent during the book-building period, they may need less additional efforts in making their investment decisions.

We would like to differentiate our work from that of Benveniste and Spindt (1989) information revelation, as the difference in both works is non-trivial but subtle to grasp.

Benveniste and Spindt (1989) talk about the information revelation from the market to the firm, however, we say the opposite i.e. the information revelation to the market. This is important to mention because when we talk about information revelation, we may some times ignore the direction of information.

Further, Benveniste et al. (2008) present in their work, that the returns to the parent during book-building process of the subsidiary IPO can be used to predict the underpricing of the subsidiary IPO. We in our work, present that the returns to the parent firms during the book-building period of the subsidiary IPO (carve-out) can be used to predict the wealth effect of the carve-out on the existing shareholders. The results may seem similar in first place, for those who may not capture the difference between underpricing and wealth effect, but we believe that after this explanation, things are more clear.

As mentioned earlier in the sample selection section, our data comprises U.S market only and hence, our specific methodology for our work is U.S specific. In US, firms must abide by the rules and regulations of SEC (securities and exchange commission), when they plan for an IPO. It is only possible in U.S market, and other markets like it, to name the IPO process on four different points, i.e. filing, book-building, offering and listing. It is due to this possibility, that we are able to find the specific time of the wealth effect of a carve-out. In other countries, we do not have necessarily the same IPO process and hence may not have similar results. Even in countries where there is book-building method used for an IPO the results may be different for different reasons. For example, in our sample it takes a firm about 77 days on average, from filing date to offer date, in US market. This period may be shorter or longer in other countries and it may have impact on the results.

Also, we are working on the book-building setup of IPO process, only, which gave us our present results. If we go out of this setup, we may need a different way to ask our present question and may need a different methodology to find the time of information revelation about the wealth effect of carve-outs.

The sample used in this work is small, but fortunately, is not much different from the previous work in literature (e.g. Benveniste et al. (2008) used 176 carve-out IPOs for their study). We used every source available to us to get our data, including hand collection of different data.

We believe that, if more data would be available, our results would be more precise and convincing, though the present results are non-trivial.

This chapter provides us information about the time, at which one can have information about the wealth effect of a carve-out. This is, indeed, useful information that can help investors in making educated decisions about their investments. However, this information is on firm level. Being rational, one believes that a decision should not be based on one particular aspect. If a firm level analysis provides us with such useful information, a wider analysis can further enhance our knowledge. We believe, that at this moment, it is rational to take our discussion a step forward and study some larger perspectives of carve-outs. Having said that, in the next chapter, we discuss some industry aspects of carve-outs. Are carve-out decisions specific, to specific industries, at specific times? Are carve-outs capable of sending some signal about the industry prospects? We will try to establish a relationship between the carve-out decision and the performance of industries in the post-carve-out period.

Chapter 2: Equity carve-outs: A sign of low opportunity industry?

Abstract

Equity carve-outs[30] have been studied since long, but the main focus of previous studies has been the firm level impact of carve-outs. We take this discussion to the industry level and argue that equity carve-outs, on average, are carried out in industries, where opportunities are low. These industries have low operating performance, gauged on profitability, cash flow and profit margin compared to industries where there are no carve-outs. In addition to this evidence, we find that the merger and acquisition activities, in which the targets are in industries where carve-out activities happened in last three years of the M&A activity, bidders have less value created compared to mergers where the target industry has no carve-out activity. Both, the low operating performance of industries three years post carve-outs and low value created by bidders having targets in industries where carve-outs happen, signal that industries where carve-outs take place have low opportunities ahead.

[30] Equity carve-outs is the terminology used by researchers for the initial public offering (IPO) of a subsidiary of a firm.

1. Introduction

In this chapter, we try to explain and statistically validate our argument that in industry, where the future opportunities are low, assets are carved-out by the firms. This argument took its roots from the findings of Nanda (1991) who claims that firms who's assets are undervalued and who's subsidiary assets are overvalued, choose for a carve-out rather than a seasoned equity offering. According to our findings, industries, where carve-out activities take place, underperform their peer industries where carve-out activities did not take place. These industries have low operating performance measured on the basis of cash flows, profitability and profit margin.

To further advocate these findings, we test whether there is impact on value creation in merger and acquisition events. Not to our surprise, we find that bidders, who bid in industries having carve-outs in last three years, have low value created than bidders who bid in industries having no carve-outs in the last three years before the event. Our findings are intuitively convincing and statistically significant.

The decision, whether to go for a seasoned equity offering or an equity carve-out, may be affected by the established fact about seasoned equity offerings, that they lead to the value destruction of the parent firms after the issue. According to Shipper and Smith (1986), the only equity issuance that looks like to have value creation and not value destruction for the parent firm is equity carve-out. Vijh (1999, 2002) and Mulherin and Boone (2000) argue that the market, in contrast to SEOs, views equity carve-outs favourably. In an equity carve-out, a parent firm issues stocks in its wholly owned subsidiary to raise capital from general public. It is an IPO but the stocks are issued in the subsidiary. Nanda (1991) argues that though an equity carve-out is similar to IPO in issuance mechanism, the information environment of seasoned equity offering is more close to that of equity carve-out.

If Shipper and Smith (1986) are correct, then why is this specific kind of equity issuance different from the rest? One possible explanation could be that of Nanda (1991) who finds in his theoretical work that firm, which is undervalued by the market, will resort to send its subsidiary in to the market, given the fact, that the market overvalues the subsidiary assets.

This idea is analysed on the basis of asymmetry of information, supporting the school of thoughts that support the notion of higher management knowledge about the firm than the market.

If we take on this idea of information asymmetry, and consider that the management knows better than the investors and that the management want to act in the best interest of existing shareholder and want to accrue them, the issuance of equity in a wholly owned subsidiary can intuitively be a signal of low asset quality of the subsidiary. Slovin et al. (1995) observe in their work that the competitors of the carved-out entity have a decrease in their value, and they interpret this decrease in value as a supporting evidence for the notion, that the divisions divested in carve-outs are overvalued before the divestiture. As Vijh (2002) argue in his work that subsidiaries that are carved-out are typically in different industries than that of the parent themselves, the notion of overvaluation of carved-out divisions and subsidiaries can be taken forward to the next level, i.e. the industry level, and can be analysed if those industries perform different than the industries where carve-outs do not happen. We address this question in our work, and find a significantly different performance of the differently identified industries (industries where carve-outs happen and industries where carve-outs do not happen).

Further, when we talk about carve-outs, we understand, in the light of literature, that decision of a carve-out is of temporary nature or is a transitory arrangement, most of the time. (Only 8% of carved out companies, after 5 years of carve-out remain under the clear control of the issuing company (Annema et al. 2001)). Klein et al. (1991) state that 39 of the 40 carve-outs that occurred before 1983 in their sample were followed by a second event, suggesting that carve-out are temporary arrangements rather than a permanent restructuring tool. Carved-out subsidiaries are either followed by a re-acquisition, spin-off or are sell-off. Perotti and Rossetto (2007) theoretical work infers that when the underlying motive of an equity carve-out is to unlock the value of subsidiary, the likelihood of acquisition in this type of carve-outs increases. Desai et al. (2011) conjecture on the basis of Perotti and Rossetto (2007) that if unlocking value of subsidiary is the intention of the parent firm, then the parent is interested in understanding its synergy with the subsidiary, and therefore, the acquisition of such carved-out subsidiary, either by the parent or by the third party acquirer, is imminent.

These studies show that carve-outs are normally followed by a second event, and one of the possible events is, acquisition. We understand that carve-out is a divestment activity, where as an acquisition is an investment activity. We argue that, if a divestment in an industry is followed by an investment in that industry, both these activities should have impact on the value creation of both the investing and divesting parents, and that this impact should be align in an inverse relationship. In other words if the parents of the carved out subsidiaries have high value created on the announcement of carve-out in an industry, the acquiring firms bidding in those industries should have low value created in their deals, and vice versa. A vast number of studies in literature on carve-outs confirm that the parent cumulative abnormal announcement stock return is positive and significant. These studies include, Dereeper and Mashwani (2013), Wagner (2004), Hulburt (2003), Mulherin and Boone (2000), Vijh (1999, 2002). Eckbo (2008) also reported a sample-size-weighted average of 1.9% for a total of 1050 cases of carve-outs in 8 different studies. In our present work, we report a negative abnormal return to the acquirer bidding in industries where carve-outs happen in the last three years, which supports our argument.

As our study addresses questions on industry basis, we use the differences-in-differences approach to see the difference in impact of M&A activity on the CAR of acquirers, bidding in classified target industries. We classify the targets' industry on the basis of carve-out activity (targets' industry where carve outs happen and targets' industry where carve-outs do not happen). The underlying purpose of this follow up is the notion that, if the industries having carve-outs have low operating performance in years ahead, the bidders, with targets in industries having carve-outs, should have low value created compared to bidders with targets in industries having no carve-outs occurred in last three years prior to the acquisition event. Our findings support this notion.

In our knowledge, no study has been done before, on the performance of industries where carve-outs happen. Also, we could not find a single study, which address the value creation by merger and acquisitions in the specific context of industries where carve-outs happen, in relation to the rest of the industries. Our findings imply that investors can possibly interpret carve-outs as part of an exit strategy by the parent firms and that carve-outs can be an indication that the industries of the carved-out firms have poor opportunities in the future.

2. Literature review

Our work in this chapter relates mainly to two literatures: literature on equity carve-outs and slight literature on acquisitions. The in-depth study of carve-outs has explored the carve-outs phenomenon to a great extent. Price reaction to a carve-out event, performance of carved-out firms, possible reasons of carve-out etc. has been addressed in literature. But with exceptions of few studies on industry level, all the literature is addressing these all and other questions at firm level. This niche in literature gave us a chance to take the discussion to the industry level.

Nanda (1991) in his theoretical paper argue that firms, which are undervalued by the market and its subsidiaries are overvalued by the market, will opt to carve-out the subsidiary instead of offering its own equity to the market. Similarly, Nanda and Narayanan (1999) argue in their work that the division that is divested is the division that is overvalued before the divestiture, and that the divested division has performed poorly. They further say that the reason of divestiture is that the firm itself is undervalued. Besides this direct evidence, some indirect evidence comes from John and Ofek (1995) who find that even in the year of sale, the operating margins of the firms who divest, improve. In this case, assuming that the time required implementing changes in the rest of the business and attaining the benefits after divestment is not sufficient, simply suggests that the sold asset was undergoing a poor performance. Nanda and Narayanan (1999) further state that as the firm will choose for divestiture because it is undervalued, its share price should rise on the announcement of the divestiture. Nanda (1991) has derived a similar result. As an empirical evidence, Dereeper and Mashwani (2013) report positive abnormal return to the parent firm on the announcement of equity carve-out. Slovin et al. (1995), Hite et al. (1987), Klein (1986), Jain (1985), and Rosenfeld (1984) are among others who report positive stock price reaction for the divesting firms at the announcement of divestitures.

Moeller, Schlingemann, and Stulz (2004) report that in 1980 to 2001, the 12000 mergers that happened in US, firms spent over 3.4 trillion dollars on them in this time period. On the announcement of merger bids, acquiring firms lost more than 303 billion dollars during this time period. Malmendier and Tate (2008) say on page 22 paragraph 2, “Psychologists suggest

that individuals are especially overconfident about outcomes they believe are under their control and to which they are highly committed. Both criteria apply to mergers. The CEO gains control of the target. And a successful merger enhances professional standing and personal wealth". But mergers and acquisitions, on the announcement of the deal, have different responses from the market and the cumulative abnormal return to the acquirer has mix effect in the literature. Malmendier and Tate (2008) argue in their paper that if the frequency of mergers increases due to the overconfidence of CEOs, it will prompt a lower mean market reaction to the announcement of merger bid and also lower mean deal quality. It may be due to the overconfidence of CEO in our sample that despite the low performance of target industries, the acquirers bid for acquisitions, but this is beyond the scope of our current topic. Alexandridis, G. et Al. (2008) find a significant positive relation between the divergence of belief about the value of stock and the returns to the acquiring firms at the announcement of the deal with a private target.

Fuller, K. et al. (2002) report an average cumulative abnormal return of 1.8 % for a total sample of takeovers (N= 3135) over the time period of 1990 to 2000. They further divide their sample on the basis of type of target (private, subsidiary or public target) and method of payment (cash or stock). They find that bidders have significantly positive returns when bidding for private (CAR = 2.1% at 1% significance level) or subsidiary (CAR = 2.8% at 1% significance level) targets and significantly negative returns when bidding for public target (CAR = 1% at 5% significance level). They further that the returns to acquirer are significantly negative if the public target is paid in stocks (CAR=1.9% at 5% level) and have insignificant returns if the public target is paid in cash. On the contrary, if the acquirer acquires private target or a subsidiary target, then regardless of the method of payment, the returns to the acquirer are significantly positive.

Using a sample of 2511 attempted mergers and tender offers over the period from 1988 to 2000, Officer (2003) reports -1.16% (significant at 1% level) cumulative abnormal return to the bidder. This CAR is measured over the event period of 7 days (-3, 0, +3) where 0 is the bid announcement date. In a sample of 12,023 acquisitions, over a period of 1980 to 2001, Moeller et al. (2004) report an average cumulative abnormal return of 1.1% (significant at 1%) at announcement of the acquisition. They further analyse the abnormal return sorted on

acquirer size and find that the abnormal returns to large acquirers is not significant (0.076 %) whereas, the abnormal returns to small acquirers is significantly positive (2.32% significant at 1% level). Using a sample of 388 acquisitions over the period of 1990 and 1999, Moeller (2005) find announcement return of -2.9% to the acquirer. Similarly Moeller et al. (2007) report an announcement return of 0.8% in all sample, -2.3% when target is public and paid all in stock and in all cash deal the returns are 0.7%. For private targets, the average cumulative abnormal return is 3.4% when the deal is all stock.

With these mix results in literature about the M&As and some useful knowledge of carve-outs, we pursue our arguments, and perform some tests and analyse our results in the text ahead. Our work is arranged in this sequence: Section 3 contains sample selection and description, section 4 contains results and section 5 concludes the work.

3. Sample selection and description

Equity carve-outs are operations where all previous researchers have faced problems regarding the availability of data. The main impact of these problems is a limited number of observations in previous studies relating to carve-outs. We are no exception regarding this problem. In our sample, we have 193 observations, which fulfil our requirements for the analysis. In the sample, 97 different industries are identified on the basis of 4 digit SIC code. This sample includes only those carve-outs where the subsidiary belongs to a firm, which is already listed on stock exchange. The time period covered in the sample extends from 1987 to 2006 making overall 20 years. For carve-out data, SDC (Securities Data Company) is used as a major source of information. For the carve-out data, following previous studies, closed end funds, real estate investment trusts (REITs), partnerships, American depository receipts (ADRs) and unit offerings are excluded from the sample. Subsidiaries having SIC (Standard Industrial Classification) code within the range of 6000 and 6999 are considered financial companies and hence are removed from the initial sample. Only issues that are listed on New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ (National Association of Securities Dealers Automated Quotations) are included in the sample. To be sure that the carve-outs are really the IPOs of subsidiaries of already listed companies, and

that they are not part of parent, we use CUSIP (Committee on Uniform Securities Identification Procedures) codes.

Table 2-1: Sample for carve-outs

This table presents the descriptive statistics for our sample of carve-outs over a period of 20 years from 1987 to 2011. The calculations in this table are based on data taken from SDC (Security Data Company). Our dataset does not contain financial firms (SIC between 6000 and 6999), American depository receipts (ADRs) and real estate investment trusts (REITs) following other studies done on carve-outs. All the parent firms in our dataset are listed firms on three main US stock exchanges i.e. NYSE, AMEX and NASDAQ. YYYY is the year of carve-out spreading over the period of 20 years. Num_deal is the number of deals in the respective years. Avg_proceeds are the average proceeds received from the carved-out subsidiaries in the given year. Med_proceeds is the median of proceeds in the respective years. Avg_carved-out is the average percentage of subsidiary being carved-out by the parent firm in its offering. Avg_UP is the average underpricing of the carved-out subsidiary shares one day after the offering. Pct_horz is the percentage of carve-out activity done in the same industry, meaning both the parent and subsidiary are in the same industry.

YYYY	Num_deal	Avg_proceeds	Med_proceeds	Avg_carved-out	Avg_UP	Pct_horz
1987	20	53.81	14.78	0.2294	0.0520	0.3000
1988	7	55.43	42.00	0.3343	0.3294	0.2900
1989	8	38.89	22.05	0.2848	0.1317	0.2500
1990	3	77.29	41.88	0.2077	0.0317	0.6700
1991	13	47.66	32.50	0.2915	0.0942	0.2300
1992	18	24.24	21.78	0.2722	0.1288	0.7200
1993	25	35.91	26.25	0.3212	0.1009	0.6800
1994	21	37.24	24.00	0.3304	0.0391	0.7600
1995	4	43.82	44.60	0.3823	0.1542	0.5000
1996	18	54.27	43.98	0.2688	0.2548	0.4400
1997	8	30.90	21.45	0.2015	0.0387	0.5000
1998	6	44.43	38.51	0.2408	0.2713	0.6700
1999	17	142.69	95.40	0.2651	0.5206	0.5900
2000	11	200.49	117.76	0.1680	0.6136	0.3600
2001	10	112.77	110.25	0.3007	-0.0076	0.3000
2002	1	101.25	101.25	0.2350	0.1151	0.0000
2003	0	n.a.	n.a.	n.a.	n.a.	n.a.
2004	0	n.a.	n.a.	n.a.	n.a.	n.a.
2005	1	267.19	267.19	0.3380	0.3132	0.0000
2006	2	286.67	286.67	0.0755	0.4825	0.5000
Total	193	67.92	47.67	0.27	0.18	0.50

The criteria is, if the CUSIPs are different we think them to be true carve-outs but if CUSIP of company going public and that of its ultimate parent are the same, we consider them as in

compatible to our requirements and are hence removed from the sample. For counter check, we consult Dow Jones Factiva for news wires, to confirm that the subsidiaries are fully owned subsidiaries of the parent company or parent owns a major portion of the subsidiary. After following the above stated criteria, as shown in table 2-1, we have 193 deals (carve-outs) in time frame of our study.

The number of deals is not stable over the sample period and is changing from year to year. The weighted average proceeds from these deals accounts for about $68 million with median of $47,67 million. In this sample period, parent firms have, on average, 77 percent post IPO stakes in their subsidiaries, meaning 27% of subsidiaries were sold in the IPO. The average underpricing of the issued shares during this period and in this sample is 18 percent. In our previous work, Dereeper and Mashwani (2013), where we have almost the same sample, the average CAR (cumulative abnormal return) calculated for the parent firm at the event of announcement of the carve-out (event window of -2 to 2), accounts for about 2 percent (significant at 1%). Eckbo (2008) also reports in his book (referring to different studies e.g. Wagner 2004 and others) a positive abnormal return to the parent in the event of announcement. We have 50 percent deals in same industry i.e. the parent and the subsidiary both belong to same industry. Operational performance, including profit margin, profitability, and cash flow is extracted from COMPUSTAT.

We follow Golubov et al (2015) for our sample of M&As, which is similar to most samples in literature, with slight changes. Mergers and acquisitions data is extracted from the mergers and acquisition section of Securities Data Company (SDC) and CRSP (Center for Research in Security Prices) database. This data spreads over the period of 22 years starting from January 1, 1990 to December 31, 2011. Table 2-2 gives description of this data. During this time period, we have 18459 merger and acquisition deals in total, among which 3671 deals are concerned. It means that 3671 mergers and acquisition deals occurred in the industries where carve-out happened in the last three years of the activity. Bidders in our sample are US public listed companies whereas the target firms are public, private or subsidiary firms (not necessarily US firms). Further, the acquirer must acquire 100% of the target firm, however, it should own

Table 2-2: Sample for Mergers & Acquisitions

This table presents the descriptive statistics for our sample of mergers and acquisitions. Bidder is always listed in our sample, where as target can be listed or not. Data is taken from SDC. YYYY is the year for corresponding M&A activity. #Deals is the total number of deals done in a particular year. #Deals "concerned" is the number of M&A deals done in the industry where carve-out happened in the last three years. It shows that one fifth (1/5) of the total deals that happened during 1990 to 2011 belong to industries where carve-outs happened in the last three years. Avg_deal_value represents the average deal value each year in the sample, corresponding to the total number of deals (#Deals). Median deal_value is the median of deal value for the total deals happened in a particular year. Relsize is the relative size of the deal calculated as the ratio of target size to acquirer size. Private is an indicator variable equal to "1" if the target is private. Stock is indicator variable which is equal to "1" if the target is paid in stock. Horz is an indicator variable equal to "1" if deal is horizontal (if target and acquirer are in the same industry)

YYYY	#Deals	#Deals "concerned"	Avg deal_value	Median deal_value	Relsize	Private	Stock	Horz
1990	343	56	94.50	15.00	0.3766	0.3644	0.1633	0.5600
1991	371	67	61.28	12.00	0.3038	0.4151	0.1941	0.6000
1992	503	106	69.40	12.49	0.3715	0.4831	0.2425	0.6200
1993	659	145	102.11	14.87	0.3509	0.4492	0.2140	0.6000
1994	807	219	121.61	14.90	0.6423	0.4808	0.2169	0.5700
1995	942	306	172.38	22.00	0.3321	0.5000	0.2675	0.6100
1996	1 145	290	180.92	25.00	0.2792	0.5100	0.2524	0.5800
1997	1 519	285	178.46	24.00	0.2996	0.5425	0.2291	0.6000
1998	1 512	365	308.79	29.00	0.2422	0.5258	0.2004	0.6000
1999	1 302	407	491.22	35.58	0.2635	0.5100	0.2350	0.6200
2000	1 139	501	640.03	45.00	0.2092	0.5338	0.2678	0.6000
2001	870	388	379.52	35.61	0.2399	0.4483	0.1701	0.6000
2002	822	284	208.72	27.75	0.1735	0.4586	0.0949	0.6300
2003	762	182	182.36	31.00	0.1869	0.4751	0.0892	0.6300
2004	902	49	248.53	38.96	0.1774	0.5488	0.0599	0.6500
2005	889	2	441.51	42.50	0.1712	0.5219	0.0574	0.6500
2006	863	3	402.56	46.50	0.1690	0.5342	0.0510	0.6000
2007	889	8	372.61	45.37	0.1939	0.5591	0.0315	0.6100
2008	622	8	265.30	42.37	0.2517	0.5498	0.0418	0.6500
2009	466	0	625.67	37.69	0.2009	0.4678	0.0687	0.6200
2010	556	0	416.63	77.42	0.1806	0.5000	0.0360	0.6300
2011	576	0	475.24	76.17	0.1759	0.5434	0.0226	0.6200
Total	18459	3671	304.98	30.79	0.2595	0.5065	0.1588	0.6101

less than 50% of the target firm before the acquisition. The transaction should exceed one million dollar, and it should be at least one percent of the acquirer market capitalization 11 days before the announcement of the event. The daily stock price data of the acquirer is extracted from CRSP for 300 trading days prior to the announcement of the event. The accounting data of the acquirer for the year-end, immediately prior to the announcement, is acquired from COMPUSTAT. Multiple deals announced on the same day by the same firm are not included in the sample.

The weighted average deal value for our sample is $305 million where the median deal value reports about $31 million. Relative size calculated as deal value divided by market value of acquirer is 26 percent, on average. The deals where target was a private firm makes, on average, about 50 percent of the sample. Deals where targets were paid in stocks makes about 16 percent on average where as the horizontal deals make 61 percent of the sample, on average. CRSP is used to measure the returns to the whole market and the Fama-French three factors are taken from Fama-French web site.

4. Results

4.1. Regression for operational performance

In pursuit of our first hypothesis, which states that industries where carve-outs happen have low performance in years ahead or carve-outs happen because there is low future opportunity, we embark on our first regression. The performance is measured here by cash flow (Income before extraordinary items (IBC) divided by total assets), profitability (Operating income before depreciation (OIBDP) divided by total assets) and profit margin (Income before extraordinary items (IB) + depreciation and amortization (DP) divided by sales (SALE). These proxies are calculated by using items from COMPUSTAT. We conceive that these proxies for the performance can better unveil the underlying phenomenon of low opportunity or high opportunity. To measure the relationship of carve-out activity and the performance of

industry or to understand one of the possible reasons that persuade the parent firm to relinquish power by opting equity carve-out, we regress the different performance indicators on a dummy variable called DCarve in the presence of year and industry fixed effects. It is important to mention about the methodology, that we use differences-in-differences (DD) approach using panel data. DCarve is an indicator variable equal to "1" if the firm is in the industry where carve-out occurred in the last three years and "0" if the firm is not in the industry where carve-out occurred in the last three years. An OLS regression is used to serve the purpose.

Regression line is:

$$\mathrm{Perf}_{i,s,t} = \alpha_s + \alpha_t + \beta \mathrm{DCarve}_{s,t} + \varepsilon_{i,s,t} \qquad (1)$$

Where 'Perf' is the performance (measured through cash flow, profitability and profit margin which are defined in the above paragraph) of firm 'i', belonging to the industry 's', during period 't'. α_s and α_t are industry and time fixed effect and "$\mathrm{DCarve}_{s,t}$" is indicator variable equal to 1 if the industry 's' at time 't' had a carveout during the past three years.

Table 2-3 presents the results of our regression. We see in our results that, in industries where carve-out happen in the last three years, there is a negative cash flow, which is statistically significant at 5 percent.

Profitability, another measure of performance, is also negative and significant at 5 percent level, which is further a relief and support to our hypothesis. The final proxy used for performance, i.e. the profit margin, is also negative and significant at 10 percent level. All proxies for performance indicate, that in industries, where carve-outs happen, performance in the coming years (three years in our calculations) is significantly lower than industries where carve-outs do not happen.

In our understanding, it is not because the carve-outs cause the lower performance, as carve-outs are not an activity that occur in bulk, but it looks like the parent firms perceive and expect low performance in the given industry in the coming years and hence they embark on the decision to carve-out. We argue that carve-outs do not result the low performance of the

industries but contrary to that, the perceived low performance of industries may incite the carve-outs. Though 50 percent of carve-outs in our sample happen in same industry, the logic behind this could be the understanding of the parent firm that they should get rid of as much of their assets in the low opportunity industries as possible to minimize the loss as they foresee it. On the other hand, the average cumulative abnormal return to the parent firm is

Table 2-3: Regression for effect of carve-out on performance

This table presents if there is any difference in the performance of industries where carve-outs happen and performance of industries where carve-outs do not happen.

Regression line is $Perf_{i,s,t} = \alpha_s + \alpha_t + \beta DCarve_{s,t} + \varepsilon_{i,s,t}$

Where *Perf i*s the performance (measured through cash flow, profitability and profit margin) of firm i, belonging to the industry s, during period t. α_s and α_t are sector and time fixed effect and $DCarve_{s,t}$ is indicator variable equal to 1 if the industry s at time t had a carve-out during the past three years. Cash flow, profitability and profit margin are defined in appendix 2

	(1)	(2)	(3)
	Cash_Flow	Profitability	Profit_Margin
DCarve	-0.0173**	-0.0160**	-0.0164*
	(0.011)	(0.036)	(0.084)
Year Dummy	Yes	Yes	Yes
Sector Dummy	Yes	Yes	Yes
N	113995	113995	113995
Adj. R-Sq	0.010	0.004	0.008

positive and significant at announcement of carve-out, as mentioned in sample description, which depicts that the market is also not optimistic about the future performance of the carved-out firm, potentially because the market as a whole has negative perception of the underlying industry.

Another explanation could be that, the parent might have foreseen the low opportunity of the industry, but there is possibility that those parents who think they can sustain the growth and performance despite the fact the industry as a whole is in crisis, will decide to send their very proper information in to the market for evaluation. After all if they would have the idea to get rid of its assets, they would sell the whole subsidiary, not only 27 % on average. This discussion is beyond the scope of this chapter and should be explored. Here, we stick to the initial hypothesis developed in the light of literature.

4.2. Regression for CAR of the acquirer

After discussing and having significant proof that performance in industries, having equity carve-outs in the last three years, is lower than industries where no such activity takes place, we go deeper in to our pursuit. If our results in the previous regressions are true, then we expect that the cumulative abnormal returns (CAR) of the acquirer bidding in the industry of above stated characteristics should be different from other industries, or to be more specific, CAR of bidders in these specific industries should be lower than other industries. We regress the CAR of bidder at announcement, first on the dummy variable DCarveT (DCarveT is equal to one if the target firm is in industry where equity carve-out happened in the last three years, and zero if other wise), and then in the presence of DCarveT on an extensive list of other control variables, found in several high quality studies on acquirer returns (Masulis et al. (2007), Golubov et al. (2012), Harford et al. (2012)), to see if the CAR is different. We follow Golubov et al. (2015), for bidder size, free cash flow, Tobin's Q, idiosyncratic stock return volatility (sigma), stock price run-up, and leverage. Besides these, we also include deal-specific controls variables, like relative size, relatedness of the industry of target (dummy), tender offer (dummy) and hostile dummy. Also a set of interactions between target listing status and the payment method (Pub X Cash, Pub X Stock, Priv X Cash, Priv X Stock, Sub X Cash) are added as the controls.

The OLS regression line is:

$$CAR_{i,t} = \alpha_s + \alpha_t + \beta DCarveT_{i,t} + \gamma Firm\ Charcteriscics_{i,t} + \delta Deal\ Characteristics_i + \varepsilon_{i,t} \quad (2)$$

Where *'CAR'* is the cumulative abnormal return to firm 'i' at time 't', DCarveT is the dummy variable equal to 1 if the target firm is in industry where carve-out happened in the last three years and 0 if otherwise.

We can observe in table 2-4, that our hypothesis still stands true. The CAR of bidders who bid in the industries where equity carve-out happened in the last three years is significantly lower than the bidders who bid in industries where no carve-out activity happened in the last three years. Firstly, we regress the CAR of bidder on DCarveT and we see that we have lower CAR for the industries where carve-outs happen. The difference in the CAR is significant at 10%. Then we add year fixed effect to the regression, and the results become stronger, the difference in CAR increases and the level of significance increases to 5%. In the next level we add all the control variables along with year fixed effect and the story remains the same, with a slight increase in the difference of CAR. The level of significance of the difference remains at 5% level. After the addition of another fixed effect (bidder sector fixed effect), the difference in CAR between the bidders, bidding in carve-out industry and non carve-out industry, becomes more significant (1 % level). Eliminating the bidder sector fixed effect and replacing it by bidder fixed effect decrease the level of significance but the results are still significant at 10%.

These results support our hypothesis that if an acquirer acquires a firm in the industry where there have been carve-out activity happened in the last three years, its CAR will be lower and will have low value created as a result of acquisition deal. These results are in line with the results of the regressions performed for the performance of industry where carve-outs happened in the last three years. The parent firms, who decide to go for a carve-out, have positive abnormal return on announcement; the performance of the industry of carve-out declines in the next three years; and now the CAR of the acquirer in the carve-out industry is reduced. All these results lead to the conclusion that bidding in the industry of carve-out is not a good idea in terms of value creation.

Table 2-4: Regression for CAR acquirer

In this table, we present if the CAR of an acquirer bidding in the industry of carve-out is different from those who do not bid in the industry of carve-out. DCarveT is the indicator variable equal to "1" if the acquirer bids in the industry where carve-out happened in the last three years and "0" other wise. Other variables are explained in appendix 2

$$CAR_{i,t} = \alpha_s + \alpha_t + \beta DCarveT_{i,t} + \gamma Firm\ Charcteriscics_{i,t} + \delta Deal\ Characteristics_i + \varepsilon_{i,t}$$

	(1)	(2)	(3)	(4)	(5)
	CAR	CAR	CAR	CAR	CAR
DCarveT	-0.00429**	-0.00525**	-0.00578**	-0.00493***	-0.00518*
	(0.046)	(0.019)	(0.015)	(0.004)	(0.075)
Ln_bidder_size			-0.00353***	-0.00359***	-0.0154***
			(0.000)	(0.000)	(0.000)
Tobin's Q			-0.00118**	-0.000921	0.00103
			(0.037)	(0.152)	(0.218)
Run_up			-0.00547***	-0.00546**	-0.00495***
			(0.001)	(0.034)	(0.009)
Free cash flow			0.00402	0.00418	-0.00417
			(0.646)	(0.539)	(0.752)
Leverage			0.0166***	0.0116**	-0.0308**
			(0.007)	(0.048)	(0.015)
Sigma			0.519***	0.554***	0.287*
			(0.000)	(0.003)	(0.099)
Relsize			0.00189***	0.00181	0.00837***
			(0.192)	(0.217)	(0.001)
Relatedness			-0.00106	0.000105	-0.000902
			(0.484)	(0.948)	(0.662)
Tender_offer			0.000272	-0.0000658	-0.000696
			(0.944)	(0.982)	(0.869)
Hostile			-0.00737	-0.00617	-0.0146
			(0.453)	(0.594)	(0.198)
Pub X Cash			0.00399	0.00448	-0.000726
			(0.244)	(0.214)	(0.854)
Pub X Stock			-0.0332***	-0.0325***	-0.0344***
			(0.000)	(0.000)	(0.000)
Priv X Cash			-0.00156	-0.00101	0.000565
			(0.434)	(0.528)	(0.815)
Priv X Stock			0.0107***	0.0115***	0.0176***
			(0.003)	(0.000)	(0.000)
Sub X Cash			0.00508***	0.00507**	0.00406*
			(0.009)	(0.047)	(0.076)
Const	0.0148***	0.00558	0.0385***	0.0365***	0.190***
	(0.000)	(0.223)	(0.000)	(0.001)	(0.000)
Year FE	No	Yes	Yes	Yes	Yes
Industry bidder FE	No	No	No	Yes	No
Bidder FE	No	No	No	No	Yes
N	18459	18459	18456	18456	18456
Adj. R-sq	0.000	0.008	0.041	0.040	0.036

The rest of the control variables are mostly showing the expected signs, which are consistent with the previous studies, albeit, they are not significant, always. Acquirer size and interaction term of public target and stock payment are the most consistently significant (at 1% level) variables across all the three regressions in which they are added. They are negatively associated with the acquirer CAR, which is consistent with the literature (Golubov, A., et al. 2015, Harford, J. et al. 2012, Golubov, A., et al. 2012, Moeller et al. 2004).

The interaction term of private target and stock payment is also highly significant across all the three regressions, and is positively associated with the acquirer CAR. This positive association with the acquirer CAR is also consistent with the literature (Harford, J., Humphery-Jenner, M. & Powell, R., 2012; Fuller, K. et al. 2002). The different sign of the interaction term 'public target and stock payment' and interaction term 'private target and stock payment' could be because of the reason that bidder receive better price when he buys private firms. The underlying reason behind this could be the liquidity effect as Fuller, K. et al. (2002) explain in their work. Public traded firms are easier to be sold compared to private firms. This difference of liquidity makes the public firms more attractive and the private firms less attractive and less valuable. The acquirer understands it and captures this discount while bidding for the private firms.

Further, the different sign of interaction terms 'public and cash' and 'public and stock' is also in line with findings of Travlos (1987) who argue that lower announcement returns accrue to the acquirers who acquire public firms with stock payments. Stock price run-up is negatively associated with the acquirer CAR and is highly significant at 1% in its first and third regression but is significant at 5% in the second regression. Golubov, A., Yawson, A. & Zhang, H., (2015) have reported similar association of price run-up with the CAR of the acquirer.

Tobin's Q is also negatively associated with the acquirer's CAR but is significant only in first regression where there is not bidder sector fixed effect and bidder fixed effect. Sigma is highly significant at 1% level and is positively associated with the bidder CAR. Relative size is also positively and highly significant (at 1%). Asquith et al (1983) also report a positive and significant relationship between bidding firm CER (cumulative excess return) and the relative size of target firm's equity. Leverage is significant at 1% and 5%, but the association in not

consistently positive or negative, though it is consistent with the literature. In the absence of bidder fixed effect, leverage is positively and significantly related to abnormal returns which is in line with Maloney et al. (1993) as they say that firms with higher leverage normally make better acquisitions than firms with lower leverage. Free cash flow, relatedness, tender offer, hostile and interaction term of private target and cash payments are not significant but their signs are mostly consistent with the previous studies.

4.3. Regression for stock performance

Previously, we look in to differences of the operational performance of industries where carve-outs happen and industries where these events do not happen. Now we want to check, if there is any difference in the stock performance of industries where carve-out events happen and industries where they do not. We regress the stock performance on DCarve in the presence of Fama-French (1993) three factors (market risk premium, small minus big *market capitalization*, and high minus low *book to market ratio*) in table 2-5. Differences-in-differences (DD) approach using panel data is used to measure the cumulative average of stock returns. The OLS regression line is:

$$R_{i,s,t} = \alpha + \alpha' DCarve_{s,t} + \beta(MKRTF_t) + \gamma(SMB_t) + \delta(HML_t) + \varepsilon_{i,t} \qquad (3)$$

Where $R_{i,s,t}$ is return on stocks to firm i, in industry s, at time t. "$DCarve_{s,t}$" is indicator variable equal to 1 if the industry 's' at time 't' had a carve-out during the past three years. We can see, that the returns on stocks of industries where carve-outs happen are not different from the returns on stocks of industries where there was no carve-out in the last three years.

These results show that the carve-outs may be a signal of low operational performance in the years ahead in a given industry, but the stock performance is not different in years ahead despite the fact that carve-outs happen in given industries.

Table 2-5: Regression for stocks performance

This table presents if there is any difference in the performance of stock returns of firms belonging to industry of carve-out and performance of stock returns of firms not belonging to the industry of carve-out. Regression line is :

$$R_{i,s,t} = \alpha + \alpha' DCarve_{i,t} + \beta(MKRTF_t) + \gamma(SMB_t) + \delta(HML_t) + \varepsilon_{i,t}$$

where $R_{i,s,t}$ is return on stocks to firm i, in industry s, at time t.

We regress stock returns on Fama-French three factors (market risk premium, small minus big {market capitalisation} and high minus low {book to market ratio}) and DCarve (indicator variable, equal to 1 if firm is in industry where carve-out happened in the last three years, and 0 other wise).

	(1)	(2)	(3)	(4)	(5)	(6)
	Returns	Returns	Returns	Returns	Returns	Returns
DCarve	0.000994	0.00104	0.00109	0.000575	0.000564	0.000603
	(0.483)	(0.460)	(0.441)	(0.705)	(0.708)	(0.690)
MKTRF		1.052	1.029		1.052	1.029
		(0.000)	(0.000)		(0.000)	(0.000)
SMB			0.623			0.622
			(0.000)			(0.000)
HML			0.257			0.257
			(0.000)			(0.000)
Sector dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
N	307967	307967	307967	307967	307967	307967
Adj. R-sq	0.013	0.128	0.144	0.013	0.127	0.143

4.4. Regression for checking premium effect

After observing that the industries where carve-outs happen have low performance in the years ahead, and that acquirers undertaking mergers ad acquisition activities in such industries have low value created, some doubts may prevail about these results. One of the doubts may be to question the level of premium paid in the deals undertaking in such industries. As Roll (1986) argue that the managers of acquiring firms may overpay in acquisition deals because the managers may suffer from hubris. The notion is, if acquirers pay high premium in the acquisition deals happening in the industries of carve-outs compared to other industries, then the CAR of the acquirer should logically be low in the carve-out industries. To clarify this doubt, in table 2-6 we regress the premium for four weeks on the dummy variable DCarveT and an extensive list of control variables including Tobin's Q, share price run-up, free cash flow, relative size, deal value, relatedness of acquirer and target industries, tender-off (dummy equal to 1 if yes, 0 other wise), hostile (dummy equal 1 if yes), method of payment if cash or stock and toehold.

The regression line is:

$$Premium_i = \alpha + \beta DCarveT_{i,t} + \gamma Firm\ Charactersitics_{i,t} + \delta Deal\ Characteristics_{i,t} + \varepsilon_{i,t} \quad (4)$$

In the first regression, when only DCarveT is used as independent variable, we see that no significant difference exists in the premium paid in deals occurred in carve-out industries and deals occurred in non carve-out industries. After adding the extensive list of control variables and certain fixed effects, the results sustain and we observe no significant change in premium paid in the deals occurring in the two different categories of industries.

Further we see that Tobin's Q and share price run-up are positively and highly significantly related to the premium paid in deals. Deal value is negatively and highly significantly related to the premium paid. Both the payment methods (cash and stock) are significantly related to the premium; however, the level of significance does not remain the same. In addition, the cash is positively related, whereas stock is negatively related to the premium.

Table 2-6: Regression for checking the premium effect

In this table we present regression results for checking if the premium paid in M&A deal can be the possible reason for lower CAR noticed in table 2-4. Pr4w in table below stands for premium for four weeks. We observe that the premium paid in deals, in industries where carve-outs happen, are not significantly different from deals other industries. The control variables are explained in appendix 2.

$$Premium_i = \alpha + \beta DCarveT_{i,t} + \gamma Firm\ Charactersitics_{i,t} + \delta Deal\ Characteristics_{i,t} + \varepsilon_{i,t}$$

	(1)	(2)	(3)	(4)
	Pr4w	Pr4w	Pr4w	Pr4w
DCarveT	0.0310	0.0130	0.0207	0.0238
	(0.288)	(0.648)	(0.521)	(0.383)
Tobin's Q		0.0176***	0.0151***	0.0158***
		(0.001)	(0.003)	(0.000)
Run_up		0.0864***	0.0906***	0.0874***
		(0.000)	(0.000)	(0.000)
Free cash flow		-0.145	-0.0975	-0.118
		(0.241)	(0.247)	(0.277)
Relsize		0.00922	0.0130	0.0125
		(0.443)	(0.218)	(0.317)
Ln_deal		-0.0347***	-0.0363***	-0.0336***
		(0.000)	(0.000)	(0.000)
Relatedness		-0.00751	-0.00283	0.00233
		(0.733)	(0.907)	(0.896)
Tender_offer		0.0510*	0.0417	0.0445
		(0.068)	(0.112)	(0.119)
Hostile		0.133*	0.101	0.112*
		(0.013)	(0.108)	(0.088)
Cash		0.0650**	0.0557*	0.0656*
		(0.024)	(0.089)	(0.090)
Stock		-0.0488*	-0.0542***	-0.0498**
		(0.072)	(0.007)	(0.015)
Toehold		0.0205	0.0267	0.0206
		(0.729)	(0.689)	(0.748)
Const	0.601***	0.619***	0.630***	0.645***
	(0.000)	(0.000)	(0.000)	(0.000)
Year FE	Yes	Yes	Yes	Yes
Sector target FE	No	No	No	Yes
Sector bidder FE	No	No	Yes	No
N	2189	2189	2189	2189
Adj. R-sq	0.024	0.064	0.056	0.056

Further, the free cash flow and industry relatedness are negatively related to the premium, though the relationship is not significant. Relative size, tender-offer, hostile and toehold are positively related to the premium. However, the relation is not significant.

These results affirm at this stage, that the low value created by the bidders after bidding in the industry where carve-out happened in the last three years is not because of the high premium paid by the bidder for such deals but looks like the difference arise because of the fact that bidder bid in carve-out industry.

5. Conclusion

Equity carve-outs have been studied in the past as a mean of divestiture and its impacts on the parent shareholders' wealth. Also, the underlying reasons for the choice of this route of divestiture and its consequences have been studied. One area, to the best of our knowledge that is not yet explored, is the industry performance. While peeking in to this niche, we come to know that industries where carve-outs happen are industries where the opportunities are bleak. These industries suffer from low operating performance in the years ahead. Our findings reveal that over the period of three years post-carve-out, the performance of industries where carve-outs happen is low compared to industries where there is no carve-out activity. The performance is surrogated by profitability, profit margin and cash flow. Our findings are relieved by findings in some former studies. For example, we observe in literature that at the announcement of carve-out, the parent firms receive a significantly positive abnormal return［Dereeper and Mashwani (2013), Slovin et al. (1995), Hite et al. (1987), Klein (1986), Jain (1985), and Rosenfeld (1984)］. This finding intuitively leads to spur the notion that, either the subsidiary is not performing well or the future opportunities in the subsidiary industry are not good.

Even after having significant proof about our argument, we do not content with these results and proceed to the next step, which can approve our results or can disapprove our results so

far, leaving no ground for us to establish our point. The notion is, 'if there is low performance in these specific industries, it should transfer some impact of this low performance to the acquiring firms, which engage in mergers and acquisition activities in these industries.' To check for the validity of this argument, we calculate the cumulative abnormal returns (CAR) to the firms bidding in industries where carve-out activities happen in the last three years, before the acquisition announcement date, and perform difference-in-difference analysis (where the control group is containing the firms bidding in industries where carve-out activities did not happen in the last three years before the announcement of acquisition). We find significant evidence that the firms bidding in carve-out industries have low value created than those, which bid in non carve-out industries.

During our analysis, we also performed test to see the difference in stock performance of industries where carve-out events happen, and industries where they do not. Our results show that the stock performance in industries where carve-outs happen is not different in years ahead, from industries where carve-outs did not happen. It means that the carve-outs may have some information for the future operational performance but not for the stock performance.

Further, the argument of Roll (1986) 'that the managers of acquiring firms may overpay in acquisition deals because the managers may suffer from hubris' lead us to the notion that, if acquirers pay high premium in the acquisition deals, happening in the industries of carve-outs, compared to other industries, then the CAR of the acquirer should logically be low in the carve-out industries. If this would be case, then our previous results regarding the CAR of acquirer would be in jeopardy. To eliminate this doubt, we perform tests and find that the lower CAR for the bidders after bidding in the industry where carve-out happened in the last three years is not because of the high premium paid by the bidder for such deals. It looks like the difference in CAR arise because of the fact that bidder bids in carve-out industry.

With these two evidences in hand, we are now in the position to pre-warn investors that they should be careful while investing in firms belonging to industries where carve-out activities happen, as the future is bleak in these industries.

In our future continuation of this work, we would like to see the returns to acquirer in long run as well. We believe that it will provide further insight in to the subject. We also think that it will be interesting to see in to the CAR of some particular cases, where carve-outs happen and, those carved-out firms are later acquired by some acquirer. It may be an interesting study to check for the difference in CAR of acquirers acquiring a carved-out subsidiary and CAR of other acquirers.

As mentioned in the previous chapter, our data for the carve-outs remains small, though not the same as previous chapter. The variation in the number of observations from chapter one to chapter two is due to the different requirements of the analysis. In the first chapter, our requirements were stricter than in this chapter. The sample size remains small because we collect data for firms that are listed on three major stock exchanges of United States (NYSE, AMEX and NASDAQ) only. Further, we understand that, not only the sample of carve-outs is small for capturing the industry performance, but also, the sample of carve-outs in each industry to capture its impact on the CAR of mergers and acquisitions in that industry is also too small compared to the sample of mergers and acquisitions themselves. In other words, the sample of carve-outs is too small compared to that of mergers and acquisitions data. But keeping in mind the data used in literature, we argue that our data is not far from previous studies (e.g. Benveniste et al. (2008) used 176 carve-outs for their study).

Our results are U.S specific and we argue that the results may change from country to country due to different laws in different countries and regions. For example, in this present work, we develop our question on the basis of Nanda (1991) who claims that firms who's assets are undervalued and who's subsidiary assets are overvalued, choose for a carve-out rather than a seasoned equity offering. This seems like a voluntary action by the parent to fulfil its financial needs or it may be a part of the strategy to focus. Now, what if we take this discussion further to countries or regions where a carve-out may not be a voluntary action but may be a choice made by the parent in order to abide by laws and regulations in that country or region. For example, if in Europe it is not allowed by law to grow beyond certain limit, and the firm grows beyond that limit, in this situation, the firm has different choices to get in line with the limitations of law and one of the choices is carve-out. However, in this situation, the decision is not voluntary for financing or strategy but is to abide by the law. In such a situation, the

results will be different from those in U.S. Despite the fact that our data is not far from the ones used in literature, we understand that if more data would be available, our results could be more precise. If international data is used, using certain conditions (e.g. standardizing the reasons of carve-outs for non-US firms, selecting the issues using book-building method only etc.) it may increase the number of carve-outs, but again, caution will be required to interpret the results. Further we believe that instead of using carve-outs, some other proxy of divestment can also be used to see the opportunities in given industries.

Having talked about the industry perspective of carve-outs and its ability of giving signals or information, we understand that analysts are a major source of outside information production and most of the time, analysts focus on particular industries, where they specialize. Also, literature says that restructuring makes outsiders to produce more information about the restructured firm. One question that may be interesting to ask is: do carve-outs make analysts to produce better information? Do carve-outs reduce the inter-analysts' disagreements? Do carve-outs make the issuing parent firm less opaque and make more analysts to follow it? In the next chapter, we talk about this perspective of carve-outs. We will study the firm level information content of carve-outs and will go global instead of staying in the US market.

Chapter 3: Equity carve-outs, divergence of beliefs and analysts' following

Abstract

In this chapter we try to find out the impact of a carve-out[31] on the standard deviation of earning per share (EPS)[32] forecast (divergence of belief)[33] and the number of analysts following the firm. We were expecting that the standard deviation of EPS forecast will decrease after the carve out as more information will be available to the analysts, once a subsidiary will be partially sold in to the market. But results revealed that the standard deviation of EPS forecast increases rather than decreases. For the number of analysts following the parent, we hypothesized that fewer analysts will be following the parent after the carve-out as some analysts specialized in the subsidiary business may leave the parent and start following the subsidiary. However, the results show that the number of analysts following the parent increases on average after the carve-out and the difference between the number of analysts before and after the event is significant.

[31] Carve-out is the equity carve-out which means the initial public offering (IPO) of a subsidiary of a parent firm.
[32] EPS is the earning per share forecast by the analysts
[33] Divergence of beliefs is the opposite of consensus among analysts. It means the higher is the divergence of beliefs the lower is the consensus, or the standardard deviation among analysts' forecast is higher when there is higher divergence of beliefs

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1. Introduction

In an equity carve-out, the parent firm sells a fraction (usually a small fraction) of its subsidiary (usually wholly owned) to the general public to raise capital. Before the carve-out, the assets of both the subsidiary and the parent are combined and the information that the market receives from the parent in its reports is consolidated. In this situation, the market may not be clear about the separate value of both the subsidiary and the parent. If the above statement is true, the market players may not be able to forecast the future cash flows or earning per share (EPS) for the parent and subsidiary correctly. Besides the forecast error, the standard deviation of EPS forecast or the inter-analyst divergence or divergence of belief will also be high.

After the carve-out, when both entities will be listed in the market, it is believed that more and clearer information will be available to the investors. So, on one side, when the market will be more informed, the forecast error should be minimized, which is previously established in literature. On the other side, we argue, that the divergence of belief among the analysts should also be reduced.

Similarly, when the market is following the single composite firm, the number of analysts following the parent would be higher when the subsidiary and parent remains together than when the two are listed separately. This intuition arises as a result of the idea, that some analysts may be interested in the parent and the others may be interested in the subsidiary, and together they make a larger number than if they are separate. This intuition may culminate in two directions when there is a carve-out. On one side, as the argument points out, the analysts interested in or specialized in the subsidiary asset will leave the parent firm resulting in reduction in the number of analysts following the parent. On the other side, as after the carve-out, the parent asset will be more clear and the market will receive clearer information, those potential analysts who wanted to follow the parent asset but due to opacity could not do so before, will rush to it and the number of analysts following the parent will increase.

We want to check in this chapter, if the above stated intuitions are true. Referring to the idea of divergence of belief, our results suggest that after the carve-out, the standard deviation

(STD) of EPS forecast increases instead of decreasing which is against our first hypothesis. We observe this movement through the time period of three years, i.e. STD of EPS forecast for the current year (year 0), the next year (year 1) and the year after (year 2)[34]. Our results show that as we go towards the event of carve-out, in forecast for the current year, this divergence decreases but after the carve-out, it starts increasing and continue to increase. The difference in before and after carve-out STD is significantly (5% level) different from zero. Results for second and third year of forecast are mixed.

The second intuition that we discussed earlier is about the number of analysts following the parent firm before and after the carve-out. Our results suggest that the number of analysts following the parent increases instead of decreasing. This is also against our first hypothesis. Our first hypothesis states that the number of analysts should either increase due to more clear information about the parent after the carve-out, or should decrease due to the departure of analysts who are specialized in or/and are interested to follow the subsidiary assets. The first possibility is opposed on the basis of the increased STD. If the STD increases, the opacity or noise in the information increases, hence no attraction for the new analysts. The second possibility is rejected directly as the number of analyst increases, not decreases. It means that the number of analysts following the parent increases but not because of the decrease in opacity, but because of some thing else. The increase in analyst following is also documented by Lang and Lundholm (1996) who present in their paper that the analyst following increases with the increase in disclosures by the firm, and in case of a carve-out we have an increased disclosure as the two entities are listed separately after the carve-out. Chemmanur and Liu (2011) also posit in their theoretical paper that the number and quality of analysts' coverage increases following a restructuring.

We test a second hypothesis to see if the carve-out component[35] influences the analyst change in earning per share forecast after the carve-out. No significant figure is found in support of this hypothesis and we argue that the change in analysts' forecast may be attributed to other factors than to the carve-out itself.

[34] Analysts may forecast for several years and we address the forecast for up to three years in our present work.
[35] Characteristics of carve-outs

Then we test if the analysts' expectations for the subsidiary have any influence on the analyst change in EPS for the parent after the carve-out. Again we find no significant support for this idea.

We observe in our findings that the carve-out is increasing the noise and that it is more difficult for the analysts to forecast the future of the firm after the carve-out than before the carve-out.

To be straight, we test the following three hypotheses:

1- The standard deviation of earning per share forecast and the number of analysts following the parent firm will be reduced after the carve-out.

2- The carve-out component influences the analysts' change in earning per share forecast.

3- The analysts' expectations for the subsidiary influence the analyst change in earning per share forecast for the parent.

Our results are opposing all these hypotheses.

2. Literature review

In this section, we would like to discuss the theoretical and empirical literature related to our hypotheses. Chemmanur and Liu (2011) posit in their theoretical paper that the number and quality of analysts' coverage increases following a restructuring. This statement is made on the basis of the notion that restructuring makes outsiders to produce more information about the restructured firm and that financial analysts are the major source of information production about the firm, so the number and quality of analysts coverage should be expected to increase following a restructuring. Similarly, H.Fu (2002) finds that information asymmetry is reduced after the restructuring of a firm through equity carve-out.

Nanda and Narayanan (1999) investigate the information asymmetry between the firm insiders (managers) and the market (investors) by assuming that market can observe the aggregate cash flows of the whole firm, but the individual cash flows are not observable which may lead to the misevaluation of the securities of the parent firm. In their model, they develop a rationale that before splitting, the firm is undervalued and after splitting the firm in to its components will make each component more observable for the investors and hence market can value the components more easily and accurately than the combined whole. After equity carve-out, the firm is required by law to provide detailed disclosures in the 8K and 10K statements of all the separate information of the carved-out division and the rest of the parent company. This additional disclosure makes the operations of the parent firm more transparent and reduces its opacity. So, after the carve-out, some of the information that was once the privilege of managers is now public to both informed and uninformed investors and hence equity carve-outs reduce the asymmetry of information about the firm and help create value for the firm. This finding gives rise to the notion, that when more and more information is available to the market, analysts (market actors) can better forecast the earning per share (EPS). In other words, we can say, that the earning per share forecast for the parent firm should be more accurate when there is an equity carve-out and that the standard deviation of EPS forecast should decline following an equity carve-out. The findings of Frankel and Li (2004) reinforce the inference that investors investing in firms with greater analysts'

following face reduced information asymmetry and that analyst following substitutes for the informativenss of the financial statements.

Lundholm (1991) comes up with the conclusion that the public signal will increase the gap between informed and uninformed traders, instead of decreasing it as is normally perceived. This supports the notion that restructuring will not reduce the standard deviation among analysts as analysts have different level of private information.

Huson and MacKinnon (2003) find that if Lundholm (1991) is right then the information asymmetry increases after a spin-off. They argue that the investors who have already some information about a portion of the firm, when the firm undergoes a spin-off, it gives more information to the market and instead of whipping away the informed investors' information edge, this additional information increases the precision of their private information. It gives rise to the idea, that analysts who have more private information before the restructuring become more precise in their forecasts than the analysts who have less private information. This information difference may give rise to a situation where the divergence of belief increases instead of decreasing after the restructuring.

Chemmanur and Paeglis (2001) argue that there is statistically significant increase in analyst following after restructuring. They measure the number of analysts following a particular firm at the end of the fiscal year preceding the announcement of restructuring and at the end of the fiscal year after the restructuring event. They report that the number of analysts increases by 2.9 after carve-outs and that this increase is statistically significant.

Gilson et al. (2001) show an increase in the analyst following with the breakups. According to their analysis, prior to the breakup, in fiscal year -2 and -1, on average 16.5 and 15.6 analysts cover the combined firm. However, after the breakup, in +1 year, 20.9 different analysts cover the parent and the subsidiary firms, which is significantly higher than the number of analysts before the breakup. In year +2 and +3, this coverage further increases to 21.6 and 22.3 analysts, predominantly because of the increase in coverage of the subsidiary firm. For the breakup firms, there is 45% increase in total analyst coverage.

Best et al. (1998), analysing the spinoffs, use analysts' earnings forecast as a surrogate for market expectations of future performance with the understanding that such forecast contain

valuable information. They argue that relative size of the returns in the announcement period is dependent on the accuracy of prior information to the market participants. They divide their sample in to low prediction error group and high prediction error group. For both the low-prediction error firms and high prediction error firms, the mean abnormal returns are significant at 1% level. However, the mean abnormal return for the high prediction error firms is significantly larger than the mean abnormal return for low prediction error firms (4.91% and 1.30% respectively). Their findings suggest that spinoff announcements for low prediction error firms reveal less (beneficial) information than for high prediction error firms which simply means that spinoff helps correct the prediction error by providing information to the market.

Gilson et al. (2001) examine whether the breakups result in any improvements in the analysts' forecasting ability, and analyse the analysts' earning forecast accuracy. The mean absolute forecast errors for both the parent firms and subsidiary firms decline from the ones before the breakup. For the parent firms, it declines from 2.28% in year +1 to 1.52% in year +3. It is recorded for the subsidiaries in year +1, +2 and +3 as 1.55%, 1.84% and 1.78% respectively. This improvement is attributed to the additional information availability after the break up and to the fact that specialized analysts are better in utilizing their specific industry expertise for the after-breakup firms. It can be inferred from these findings that more information may give rise to a decrease in the standard deviation of the earning forecast among analysts as more and more information will be available to them and all will be able to converge closer to a single forecast.

Bliss (1997) reports a significant improvement in the analysts earning forecast accuracy for the parent firms after a spin-off. Krishnaswami and Subramaniam (1999) report an improvement in the analysts forecast error after restructuring of firms through spin-off. They use analysts forecast error and standard deviation of forecast (along three other measures) as a proxy for asymmetry of information and study 118 firms engaged in spin-off during the period of 1979 to 1993. Their results show a significant decrease (over 78%) in the analysts' forecast error after the event of spin-off. The difference between the mean and median of the forecast error before the spin-off and after the spin-off is significantly different from zero at a

significance level of 1%. They also analyse the change in standard deviation of forecast and found a significant (5% level) decrease in standard deviation after the spin-off.

Dunn and Nathan (1998) argue about consensus analysts earnings forecast that as the level of a company's diversification increases, analysts become less accurate in their earnings forecasts and have more inter analyst disagreements about the forecasts. They decompose the total diversification in to related (when company diversifies in related businesses) and unrelated (when company diversifies in unrelated businesses) components and find that analysts are less accurate and have more disagreements as unrelated diversification increases in a particular company. They further report that there is no significant impact on the inter analysts' disagreement and analysts' earnings forecast, when there is related diversification in a company. These findings give rise to the notion, that when there is a carve-out activity undertaken by a firm, and the underlying motive of the carve-out is focusing on the main business, the analysts will be more accurate and have lesser inter-analysts disagreements. In other words, the standard deviation of earning per share forecast for the parent firm will be reduced when there would be a carve-out activity carried out for focusing on the core business. Also, it infers that if the carve-out is carried out for purposes other than focusing, there will be no significant impact on the inter-analysts' disagreements.

Bhushan (1989) present an inverse relationship between the number of analysts following a company and the number of segments in that particular company. He reports that an increase in the number of segments in a particular company results in the decrease in the number of analysts following that particular company. This idea gives rise to the inference that a decrease in the number of segments will result in an increase in the number of analysts following that company because things will be more clear and will be easy for analysts to forecast. So, in the same sense, if a company undergoes a carve-out (sell a portion of a wholly owned subsidiary), the number of analysts following the company should increase.

Baldwin (1984) addresses the impact of segment disclosure requirement by SEC adopted in 1970, and effective in 1971, on the ability of analysts to forecast earnings. He finds that for multi-segment firms, the line of business disclosure requirement made analysts able to better forecast the earnings of the firm. This finding supported the judgment that segment reporting would help the users of those reports. His findings support the notion that information

disclosure would minimise the asymmetry of information between insiders and the market and that the analysts with more information will be able to forecast more accurately. It supports the idea that when segments are separated from the firm through spinoff or carve-out and those segments operate separately in the market, more and more disclosure should be made and analysts have more and more information available to make more educated earnings forecasts. It can intuitively support the idea that as more and more information is available to the analysts, the standard deviation among their forecasts should be reduced or we can say the divergence between the different analysts would be minimised.

Swaminathan (1991) addresses the problem of inter-analyst earning forecast disagreement, which he calls the divergence of belief. In 1970, SEC required firms that comprised of multi-segments, to disclose segment income and revenues in their 10-K reports. Swaminathan studied the impact of the SEC mandated segment disclosure on the divergence of belief. The results suggest that after the SEC requirements to disclose the segment information, the divergence of belief reduces significantly. He also observes that the magnitude of decrease in the divergence of belief is directly proportional to the number of segments in the particular firm. If we see in to the results of Bhushan (1989) and Swaminathan (1991), we can infer that the number of analysts following a company decreases as the number of segments in that company increases and hence the magnitude of decrease in divergence of belief increases.

Lang and Lundholm (1996) present in their paper that the analyst following increases with the increase in disclosures by the firm and have more unanimity among analysts' earning forecasts. Their study suggests that with more upcoming disclosure policies by the firms attract more analysts to the firm either because of the fact that it will increase the demand for the analysts' reports or because it will reduce the cost of providing those reports as it will be easily available to the analysts with out the employment of their private efforts and resources. Regression for the forecast dispersion and disclosure shows that there is significantly negative relation between the forecast dispersion and firm disclosures. It means that the higher the disclosure the firm decide to do, the lower will be the divergence of belief among analysts or we can say that the standard deviation of earning per share forecast will decrease as more and more information is provided by the firm to the analysts. It may support the idea that in case of a carve-out when there will be a separate listing of a subsidiary in a stock exchange, firms

will be required to disclose more and more information about the subsidiary and the parent information will be more isolated and visible.

According to the literature reviewed above, we understand that restructuring affect both the number of analysts following a firm and the divergence of believe. About the divergence of belief, some studies argue that it increases after restructuring while others report a decrease after restructuring. Our findings, however, support the first argument.

3. Descriptive statistics

Table 3-1 presents the summary statistics of the sample extracted for the carve-out IPOs. In our sample, the average underpricing is 26.8%. Primary shares comprise 77% of our sample, which means that, on average, 77% of the shares issued in the carve-out are new shares and 23% are secondary shares or existing shares.

In this sample, the relative size of the issue is 12.3% which means that the total proceed from the carve-out is 12.3% of the market value of the respective parent firm. This percentage varies and ranges from as low as 0.1% to as high as 62.4%. Identified on the basis of first two digits of SIC (standard industrial classification) code, 54% of the carved-out subsidiaries has different industry from those of their parents, whereas the remainder 46% has the same industry. Further, on average, 72% of subsidiaries and parents have the same nation. The average leverage of the parent is about 22% whereas the operating income is 12.8%. The market value of parent is, on average, 10975.42 million dollars and the proceeds of the issue are 411.472 million dollars.

4. Sample selection

In our sample, we have observations of 155 carve-outs. The main source for data collection is SDC (Securities Data Company). These IPOs comprises only offers from subsidiaries of

Table 3-1: Descriptive statistics

Underpricing is the percentage difference in offer price and the share price on the close of first trading day. Percept Prime is the percentage of primary shares (new shares) in the offering. Relative size is the size of the issue in relation to the size of the parent firm (Proceeds sum of all markets/Market value of Parent). Same industry is the variable, which explains if the subsidiary and the parent firms are in the same industry or different industries. It is a dummy variable equal to '0' if the parent and subsidiary have the same first two digit SIC code and '1' if they do not share the same first two digit SIC code. Same nation explains if the nation of the parent and subsidiary are same. Leverage is the leverage (debt to equity ratio) of the parent. EBITDA on sales is the earning before interest, taxes, depreciation and amortization on sales of the parent firm. MVP is the market value of the parent firm. Proceeds are the proceeds from the carve-out.

Variable	NO.	Mean	Median	Std	Min	Max	T Test	P Value
Underpricing	155	26.797	6.687	52.454	-72.941	193.750	6.36	<.0001
Percent Prim	155	0.770	1.000	0.323	0.000	1.000		
Relative size	155	0.123	0.055	0.157	0.001	0.624		
Same industry	155	0.542	1.000	0.499	0.000	1.000		
Same Nation	155	0.723	1.000	0.449	0.000	1.000		
Leverage	155	0.217	0.210	0.165	0.000	0.828		
EBITDA on Sales	155	0.128	0.118	0.238	-0.765	0.809		
MVP (mil)	155	10975.42	2175.25	25349.00	38.872	203954.320		
Proceeds (mil)	155	411.472	120.750	964.589	3.225	8680.000		

listed companies. We exclude partnerships, real estate investment trusts (REITs), closed end funds, unit offerings and American depository receipts (ADRs). Our sample period extends over a period of 12 years starting from 2000 to 2011. Data is extracted from major stock exchanges in US, United Kingdom, Australia, Germany, France, Italy, Hong Kong, China, Canada and Singapore including New York Stock Exchange, NASDAQ, Japan stock exchange, Singapore stock exchange, Paris stock exchange, Frankfurt stock exchange,

London stock exchange, Hong Kong stock exchange, Shanghai stock exchange, Australian stock exchange, Toronto stock exchange.

To be sure that the IPOs are really the IPOs of subsidiaries of already listed companies, and that they are not part of parent, we use CUSIP (Committee on Uniform Securities Identification Procedures) codes. The criteria is, if CUSIP of company going public and that of its ultimate parent are the same, we consider them as incompatible to our requirements and if the CUSIPs are different we consider them to be true subsidiaries.

After having this data, we go for further specifying our data and we eliminate the financial companies from our sample. Any company having SIC (Standard Industrial Classification) code within the range of 6000 and 6999 are considered financial companies and hence are removed. The data filtered so far contains only common shares as security type. A big portion of this information is taken from SDC, however for some companies information was not available and we accessed to EDGAR database on the United States' SEC (Securities and Exchange Commission) website.

Next we search for the prices of parent firms. For parent firms, the share prices and other accounting data are extracted from CRSP (Center for Research in Security Prices) using PERMNO[36], and COMPUSTAT using GVKEY[37]. This further reduces our sample size due to the unavailability of this information for several firms due to several reasons (like parents of US listed subsidiaries are listed on non US exchange and hence have no PERMNO, name and CUSIP are changed and can not be located etc.). For the number of analysts and earning per share forecast data, we use I/B/E/S[38]. After completion of the overall elimination process, in the end we are left with 155 IPOs, which correspond to our requirements.

Number of shares outstanding and data for offer price and closing price one day after the offer are initially taken from SDC database, but for the reason of reliability, cross-checked with CRSP and COMPUSTAT database. As the data is spread over multiple stock exchanges, the currencies are different for different companies based on the country of origin. To nullify the

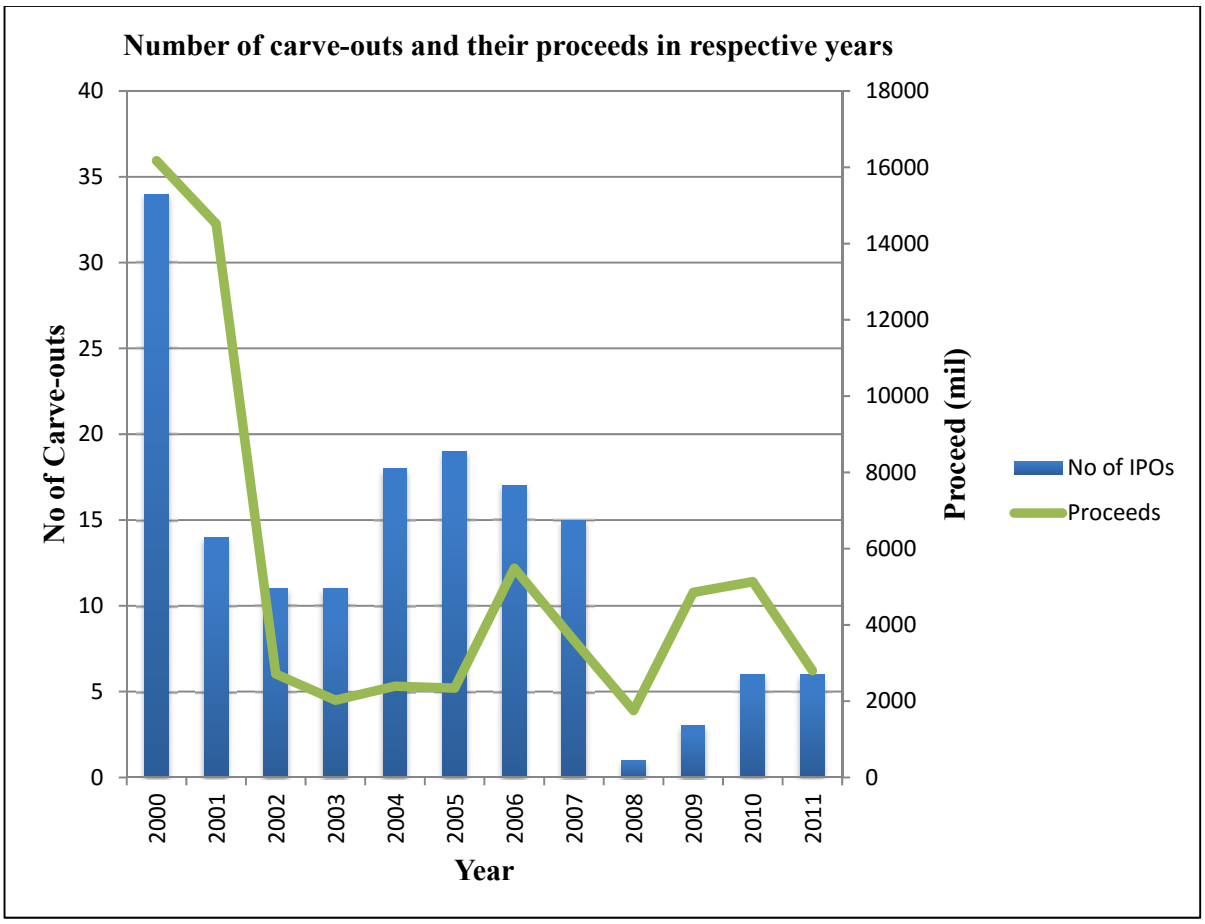
[36] A PERMNO is a unique security identification number which is assigned by CRSP to each security permanently.
[37] GVKEY is a unique identifier defined by COMPUSTAT for each company to trace company over time as company name, CUSIP or ticker may change over time.
[38] Institutional Brokers' Estimate System

currency effect, and have some common currency for calculating the underpricing, we extract daily currency rates of all currencies in US dollar. Daily currency exchange rates are extracted from Thomson Reuters DataStream to convert the currency to US dollar for all firms. Number of IPOs, their respective years and the proceeds from these IPOs are shown in table 3-2 graph 3-1.

Table 3-2: Number of carve-outs and their proceeds in their respective years

Year	No. of Carve-outs	Proceeds (mil)
2000	34	16173,077
2001	14	14518,549
2002	11	2711,037
2003	11	2023,491
2004	18	2392,398
2005	19	2342,05
2006	17	5485,929
2007	15	3595,533
2008	1	1751,695
2009	3	4850,46
2010	6	5133,398
2011	6	2800,493
Total	155	63778,11

Graph 3-1: Number of carve-outs and proceeds in their respective years of issue



5. Distribution of sample

Table 3-3 represents the distribution of carve-outs according to the year of issue and the stock exchange where they are listed. The time period is spread over the year 2000 to 2011. Total of 155 issues in this period correspond to our selection criteria. Out of these 155 issues, 34 are issued in 2000, which is the highest number in all the years under discussion. Second highest number is recorded in 2005 i.e. 19 issues. 2004 has third highest number of issues. In 2008, the lowest number of issues corresponds to our selection criteria, where we have only one observation, which met all our required criteria.

If we see to the number of issues according to the corresponding stock exchange, we can see that New York Stock Exchange (NYSE) has the highest number of issues. These issues are not equally distributed among the years of study and the numbers vary from 0 to 6 in the twelve years. Second stock exchange that has the highest number of issues is NASDAQ where 21 carve-out subsidiaries (corresponding to our selection criteria) are listed during the period of our study. Hong Kong Stock Exchange (HONGK) has contributed 20 issues to our sample. The zero visible in the table does not mean that there are no issues in those years in those stock exchanges but simply explains the fact that the issues in those slots are not in accordance to our requirements.

6. Results

6.1. EPS standard deviation and number of analysts

Table 3-4 panel A, explains the movement in standard deviation (SD) of earning per share (EPS) forecast and the number of analysts following the parent firm before and after the carve-out. The notion we conceive reflects that the standard deviation of EPS forecast should be higher before the carve-out, as the subsidiary is inside the parent firm. After the carve-out, when the subsidiary will be trading in the market, the standard deviation of EPS should diminish, as more information is available to the analysts. But the results are telling a different story.

If we see to the mean standard deviation in year 0 (current year of expectation) we observe that standard deviation is decreasing as we move from T-2 to T-1 but after the year of the event T+0, it starts increasing and in T+1 it is higher than T-1 and, in T+2, it continues to increase. This positive movement of standard deviation is statistically significant at 5 per cent level. Findings of Swaminathan (1991) infer that more disclosure should reduce the SD of EPS, but here, we see the opposite. SD of EPS forecast in year 1(EPS expectations for the next year) gives some mixed effects. It can be observed that SD is first increasing from T-2 to T-1 and then starts decreasing and continue to decrease till T+2, but the figures here are not

Table 3-3: Distribution of issues per year and per stock exchange

Distribution of the sample of 155 firms that is part of our analysis. These firms have completed the carve-out in 2000 to 2011. Security Data Company (SDC) is the main source of extraction for the carve-outs. Appendix 3 explains the names of stock exchanges on top row.

Issue Year	Total Issues	NYSE	NASDAQ	AUSLA	HKGEM	SINGP	TOKY	FRANK	TORON	PARIS	JASDAQ	HONGK	SHANG	AIM	MILAN	LON
2000	34	4	10	2	1	5	1	7	2	2	0	0	0	0	0	0
2001	14	6	2	2	1	1	0	0	0	0	2	0	0	0	0	0
2002	11	1	1	0	0	1	4	0	0	0	2	1	1	0	0	0
2003	11	0	1	1	0	0	5	0	0	0	2	1	1	0	0	0
2004	18	5	3	0	1	0	2	0	0	0	1	3	1	2	0	0
2005	19	1	3	0	0	0	1	1	2	0	5	4	0	1	1	0
2006	17	5	0	1	0	0	2	0	2	0	2	3	0	1	1	0
2007	15	2	1	0	0	2	0	2	0	0	2	4	0	1	0	1
2008	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2009	3	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0
2010	6	2	0	0	0	1	0	0	0	0	0	1	0	0	1	1
2011	6	4	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Total Number of Firms	155	31	21	6	3	10	15	10	7	2	16	20	3	5	3	3

significant. The SD for year 2 (EPS expectations for the third year) shows that SD remains stable in T-2 and T-1 but become too high in T+1. In T+2 the SD falls but is still higher than SD before the event. This difference is also statistically significant at 5 per cent level.

Looking at the table vertically, we observe that SD of EPS forecast increases, most of the time, as we go down the table. It can be a supporting evidence for the notion, that analysts know more and better about the present year compared to the next year or the years after.

Number of analysts following the parent firm before and after the carve out should also be affected when the event of carve-out happens. We hypothesize that the number of analysts following the parent firm should decrease after the event as some of the analysts specialized in the line of subsidiary may stop following the parent and may start following the subsidiary. However, the results are not supporting this notion. The number of analysts following the parent remains stable in the preceding two years of the event. After one year of the carve-out, there is an increase in the number of analysts but in the second year, the number falls down to the level, prevailing in the years before the carve-out. The change in number of analysts through time is statistically insignificant. The numbers of analysts in year 1 show some change but the change is not significant. Analysts following the parent before the event are less than after the event or we say that the average number of analysts following the parent rises after the carve-out. In this year the change is more visible, though not significant.

In year 2, the average number of analysts following the parent decreases compared to year 0 and year 1. However, if we observe the analysts following the parent before and after the event, we can clearly see that the number of analysts increases after the carve-out. This positive change in number of analysts is significant at 5% level. Our findings are in line with those of Bhushan (1989) who presents an inverse relationship between the number of analysts following a company and the number of segments in that particular company. Gilson et al. (2001) show an increase in the analyst following with breakups. They say that the number of analysts following the composite firm before breakup is significantly low than the combined number of analysts following the parent and subsidiary firms separately. Here for the parent, we see an increase in analysts following after the carve-out, and in coming paragraphs we will see that the subsidiaries, which had no followings before the carve-outs have a significant

following after the carve-outs. Together, the combined analysts' following after the carve-out is more than the analysts' following of composite firm before the carve-out.

Table 3-4: Standard deviation of EPS forecast and Number of Analysts following the firm Before and After the Carve-out

In panel A, STDY0, STDY1 and STDY2 are the standard deviation of earning per share forecast for current year (year0), next year (year1) and the year after (year2) of the parent firm. No of analysts Y0, Y1, and Y2 are the number of analysts following the parent in current year (year0), next year (year1) and the year after (year2). In panel B, STDY0, STDY1 and STDY2 are the standard deviation of earning per share forecast for current year (year0), next year (year1) and the year after (year2) of the subsidiary firm. No of analysts Y0, Y1, and Y2 are the number of analysts following the subsidiary in current year (year0), next year (year1) and the year after (year2)

Panel A (Parent)							
Data	Stat	T-2	T-1	T+0	T+1	T+2	T Test (T-2 T-1 vs T+1 T+2)
STDY0	N	119	128	132	133	130	
STDY0	MEAN	0,212	0,17	0,247	0,223	0,411	2.09 (0.0377)*
STDY0	MEDIAN	0,09	0,091	0,093	0,075	0,094	
STDY1	N	120	125	132	133	128	
STDY1	MEAN	0,297	0,495	0,358	0,326	0,262	-1.39 (0.1667)
STDY1	MEDIAN	0,128	0,137	0,13	0,134	0,157	
STDY2	N	88	95	101	104	115	
STDY2	MEAN	0,239	0,237	0,363	0,576	0,325	2.20 (0.0285)**
STDY2	MEDIAN	0,167	0,178	0,17	0,193	0,161	
No of Analysts Y0	N	155	155	155	155	155	
No of Analysts Y0	MEAN	10,426	10,419	9,994	10,961	10,271	0.27 (0.7899)
No of Analysts Y0	MEDIAN	9	9	9	10	9	
No of Analysts Y1	N	155	155	155	155	155	
No of Analysts Y1	MEAN	10,252	10,458	10,561	11,065	10,845	0.80 (0.4222)
No of Analysts Y1	MEDIAN	9	9	9	10	9	
No of Analysts Y2	N	155	155	155	155	155	
No of Analysts Y2	MEAN	4,477	5,316	5,548	6,265	6,058	2.54 (0.0115)**
No of Analysts Y2	MEDIAN	2	3	4	3	4	

Table 3-4: *Continues….*

Panel B (Subsidiary)					
Data	Stat	T+0	T+1	T+2	T Test
STDY0	N	68	120	107	
STDY0	MEAN	0,143	0,164	0,121	0.01 (0.9927)
STDY0	MEDIAN	0,086	0,051	0,051	
STDY1	N	68	118	104	
STDY1	MEAN	0,313	0,447	0,354	0.60 (0.5511)
STDY1	MEDIAN	0,129	0,111	0,096	
STDY2	N	51	80	79	
STDY2	MEAN	0,284	0,255	0,36	0.25 (0.8049)
STDY2	MEDIAN	0,156	0,121	0,118	
No of Analysts Y0	N	154	155	155	
No of Analysts Y0	MEAN	2,383	6,374	6,903	8.28 (< .0001)***
No of Analysts Y0	MEDIAN	0	4	4	
No of Analysts Y1	N	154	155	155	
No of Analysts Y1	MEAN	2,448	6,258	7,013	8.05 (< .0001)***
No of Analysts Y1	MEDIAN	0	4	4	
No of Analysts Y2	N	154	155	155	
No of Analysts Y2	MEAN	1,474	3,394	3,69	5.84 (< .0001)***
No of Analysts Y2	MEDIAN	0	1	1	

If we see the table vertically, we can observe that less and less or same number of analysts is following the parent firm as we go through the period of three years. In year 0 (current year) the number of analysts is most of the time highest followed by year 1 (next year) and year 2 (year after next year) simultaneously. In year 0 and 1, the numbers are same or are with little difference but in year 3 compared to year 1 and 2, there is a huge difference. We can infer that most of the analysts are not sure about the future of the firm or are lacking enough information to forecast, and hence do not want to give their analysis.

Table 3-4, panel B, summarizes the standard deviation of EPS forecast and the number of analysts following the subsidiary firm after the carve-out. Here we see an increase in the mean

STD from year 0 (current year) through year 2. For the current year (year 0) the mean standard deviation is low in T+0, it increases in time T+1 and decreases in T+2 to a level even below the T+0. In year 1, the STD increases as we move from T+0 to T+1 and then decreases in T+2 but to a level higher than T+0. In year 2, it first decreases in T+1 and then increases in T+2. Although, there is a movement in STD in all the three years of analysis, it is never significant.

The number of analysts, following the subsidiary, changes as we move from T+0 (the year of event) to T+1 and T+2. In year 0 (current year) this number increases in T+1 and continue to increase in T+2. This increase is highly significant at 1% level. Similarly in year 1, the number of analysts increases as we move from T+0 to T+1 and T+2 and increase here is also highly significant at 1% level. In year 3, though, there is a decrease in the overall following by the analysts, but if we look to the movement from T+0 to T+1 and T+2, we can clearly see a highly significant (at 1%) increase in number of analysts. Gilson et al. (2001) show an increase in the analyst following with breakups. They say that the number of analysts following the composite firm before breakup is significantly low than the combined number of analysts following the parent and subsidiary firms separately. We have similar results.

The number of analysts following the subsidiary is same in year 0 and year 1 but there is a sharp decrease in the number of analysts in year 2. Again, we can say, the analysts are not sure about the future of the subsidiary or are having low quality information and hence, lesser number of analysts is forecasting the EPS of the subsidiary.

6.2. Difference in standard deviation and number of analysts through the term of analysis before and after the carve-out

Table 3-5, panel A and B, represents the difference in the standard deviation and the number of analysts following the parent firm and the subsidiary through the term of the analysis (year 0 through year 2) before and after (T-2 T-1 T+0 T+1 T+2) the carve-out. We can see that the difference in standard deviation of EPS forecast of the parent firm in year 1 and year 0

decreases slightly from time T-1 compared to T-2. But after the carve-out event, the difference in STD increases in T+1 and T+2 compared to T-1 and T-2. The mean difference of STD before and after the carve-out is positive and significant at 5% level. The mean difference in standard deviation of EPS in year 2 and year 0 give some mixed effect but the difference is not significant.

Vertically, the difference in Year 2 and 0 is more than the difference in year 1 and 0. As the analysts try to forecast the distant years, the standard deviation in the EPS forecast increases. This seems obvious because as we try to forecast the EPS for longer period, the information phenomenon reduces the accuracy of our forecasts. For the current year we have more information available and is more reliable than for the next year and for the year after and so on. So as we move forward in our forecasts, the logical outcome will be the less accurate forecasts for the distant years.

If we analyse the mean difference in the number of analysts following the parent firm in year 1 and year 0, and year 2 and year 0, before and after the carve-out, we find some significant results. We see that the difference in number of analysts following the parent in year 1 and year 0 is narrowing as we move towards the year of the event. After the event, the difference continues to narrow down till T+2. The difference in number of analysts in year 1 and year 0 before and after the carve-out is significantly different from zero. The significance level is 1%. If we observe carefully, we see that the number of analysts following the parent is increasing through time (year 0 to year 1) before (T-2 to T-1) and after (T+1 to T+2) the carve-out. Before the carve-out, more analysts were following the parent in year 0 than year 1 but the analysts following in year 1 is continuously increasing and after the carve-out more analysts were following the parent in year 1 than year 0.

We see that the difference in number of analysts following the parent in year 2 and year 0 is narrowing as we move from T-2 to T+2. The difference in number of analysts in year 2 and year 0 before and after the carve-out is significantly different from zero. Here also, the significance level is 1%. The mean difference in the number of analysts following the parent in Year 2 and year 0 shows that much more analysts are following the parent in year 0 than year 2 both before and after the carve-out, but interestingly, the difference is again narrowing down and after the carve-out, this behaviour continues.

Table 3-5: Difference in STD and N through the term of the analysis before and after the Carve-out

In this table 0,1 and 2 attached with variables represent the respective years i.e. current year, next year and the year after respectively. In Panel A, Diff_STD10 is the difference in standard deviation for the parent in the current year (year0) and next year (year1). Diff_STD20 is the difference in standard deviation for the parent in the current year (year0) and the year after (year2). Diff_N10 is the difference in number of analysts following the parent in current year and next year. Diff_N20 is the difference in number of analysts following the parent in current year and the year after. In panel B, Diff_STD10 is the difference in standard deviation for the subsidiary in the current year (year0) and next year (year1). Diff_STD20 is the difference in standard deviation for the subsidiary in the current year (year0) and the year after (year2). Diff_N10 is the difference in number of analysts following the subsidiary in current year and next year. Diff_N20 is the difference in number of analysts following the subsidiary in current year and the year after.

Panel A (Parent)							
Data	Stat	T-2	T-1	T+0	T+1	T+2	T Test (T-2 T-1 vs T+1 T+2)
Diff_STD10	N	115	124	131	131	127	
Diff_STD10	MEAN	1,457	1,323	1,91	1,522	2,258	2.07 (0.0388)**
Diff_STD10	MEDIAN	1	0,814	0,986	0,951	1,126	
Diff_STD20	N	87	94	101	104	114	
Diff_STD20	MEAN	1,998	2,891	2,525	2,49	3,089	0.71 (0.4784)
Diff_STD20	MEDIAN	1,184	1,243	1,191	1,267	1,493	
Diff_N10	N	135	141	147	155	155	
Diff_N10	MEAN	-0,04	-0,026	0,053	-0,001	0,05	2.95 (0.0033)***
Diff_N10	MEDIAN	0	0	0	0	0	
Diff_N20	N	135	141	147	155	155	
Diff_N20	MEAN	-0,609	-0,533	-0,469	-0,456	-0,416	4.73 (< .0001)***
Diff_N20	MEDIAN	-0,621	-0,5	-0,471	-0,4	-0,364	

Table 3-5: *Continues….*

Panel B (Subsidiary)					
Data	Stat	T+0	T+1	T+2	T Test
Diff_STD10	N	64	113	103	
Diff_STD10	MEAN	1,267	2,442	2,205	2.67 (0.0081)***
Diff_STD10	MEDIAN	0,748	1,493	1,25	
Diff_STD20	N	49	77	79	
Diff_STD20	MEAN	3,076	3,818	4,044	1.04 (0.2977)
Diff_STD20	MEDIAN	1,708	2	2,599	
Diff_N10	N	75	155	151	
Diff_N10	MEAN	0,051	-0,028	-0,024	-2.59 (0.0106)***
Diff_N10	MEDIAN	0	0	0	
Diff_N20	N	75	155	151	
Diff_N20	MEAN	-0,357	-0,503	-0,503	-2.79 (0.0055)***
Diff_N20	MEDIAN	-0,333	-0,5	-0,5	

For the subsidiary, the T-2 and T-1 are not available as the subsidiary is not on the market before the carve-out. The difference, in STD of EPS forecast of the subsidiary in year 1 and year 0, increase in T+1 and T+2. The change in this difference is significant at 1% level. The difference in year 2 and year 0 is also increasing, and this difference is more than the difference in year 1 and year 0, but the figures here are not significant. Looking in to the difference in number of analysts following the subsidiary, we can observe that after the carve-out, lesser analysts are giving their forecast in year 1 than year 0. The difference here is significant at 5% level. In year 2, the number of analysts following the subsidiary decreases highly compared to year 0 and the difference in number of analysts following the subsidiary in the event year and the years after is significantly different from zero (at 1% level).

6.3. Regression analysis

In this section we regress the change in standard deviation of earning per share forecast and number of analysts following the parent after the carve-out, over the time period of the

Table 3-6: Regression for the change in STD and N after the carve-out

Underpricing is the percentage difference in offer price and the share price on the close of first trading day. Percept Prime is the percentage of primary shares (new shares) in the offering. Relative size is the size of the subsidiary in relation to the size of the parent firm (Proceeds sum of all markets/Market value of Parent). Diff_sic is the variable, which explains if the subsidiary and the parent firms are in the same industry or different industries. It is a dummy variable equal to '0' if the parent and subsidiary have the same first two digit SIC code and '1' if they do not share the same first two digit SIC code. Same nation explains if the nation of the parent and subsidiary are same. Leverage is the leverage (debt to equity ratio) of the parent. EBITDA on sales is the earning before interest, taxes, depreciation and amortization on sales of the parent firm. AVG_STDY0SUB, AVG_STDY1SUB and AVG_STDY2SUB are the average standard deviation in EPS forecast for the subsidiary in current year (year0), next year (year1) and the year after (year2). AVG_NY0SUB, AVG_NY1SUB and AVG_NY2SUB are the average number of analysts following the subsidiary in current year, next year and the year after.

	1	2	3	4	5	6
Dependent variables	ΔSTDY0	ΔSTDY1	ΔSTDY2	ΔNY0	ΔNY1	ΔNY2
Intercept	-0.12446	-0.61157	-1.42699	2.06937	3.10331	3.65554
	(-0.37)	(-1.38)	(-1.75)	(0.84)	(1.23)	(1.79)
UP	-0.00149	-0.00188	-0.00619	0.00874	0.00940	0.00637
	(-1.09)	(-1.04)	(-1.80)*	(0.77)	(0.81)	(0.63)
Primary	0.24208	0.42356	1.02852	-1.11363	-1.42036	-2.19875
	(1.30)	(1.73)*	(2.28)**	(-0.76)	(-0.94)	(-1.78)*
Relative_size	0.15431	0.60294	-0.37913	4.00946	1.98295	-0.34752
	(0.30)	(0.87)	(-0.30)	(1.24)	(0.60)	(-0.13)
Diff_sic	-0.19409	0.19299	0.19934	-0.78251	-0.83367	-0.11642
	(-1.48)	(1.14)	(0.59)	(-0.81)	(-0.84)	(-0.13)
Same_nation	0.12061	0.24736	0.53990	-0.96367	-1.04771	-1.03733
	(0.67)	(1.04)	(1.25)	(-0.80)	(-0.86)	(-1.03)
Leverage	-0.76047	-0.76958	-1.59098	0.31460	-0.65836	-1.54362
	(-1.56)	(-1.15)	(-1.14)	(0.09)	(-0.19)	(-0.51)
EBITDA_on_Sales	0.55117	0.37473	1.68543	-0.68365	-2.69499	-1.55868
	(1.55)	(0.82)	(1.98)*	(-0.30)	(-1.15)	(-0.85)
AVG_STDY0SUB	0.34116			-2.95023		
	(1.21)			(-1.40)		
AVG_NY0SUB	0.00837			-0.11447		
	(0.92)			(-1.51)		
AVG_STDY1SUB		0.06511			-1.44473	
		(0.66)			(-2.73)***	
AVG_NY1SUB		0.01980			-0.03915	
		(1.68)*			(-0.51)	
AVG_STDY2SUB			1.42879			-0.42623
			(2.17)**			(-0.61)
AVG_NY2SUB			0.05060			0.09439
			(1.57)			(0.99)
R^2	0.2417	0.2707	0.4473	0.1628	0.2138	0.2223
Adj. R^2	0.0497	0.0788	0.1841	0.0063	0.0627	0.0177

analysis (three years), against underpricing, primary shares, relative size, industry, nation, leverage, EBITDA on sales and the average standard deviation and average number of analysts following the subsidiary over time. It is to verify, if the change observed in Table 3-4 is a direct impact of the carve-out. In table 3-6, we see no significant figures in year 0. Though the average standard deviation of EPS and average number of analysts following the subsidiary in year 0 are positively related to the variation in standard deviation of the EPS of the parent in year 0, but the relation is not significant.

The average number of analysts following the subsidiary and the average standard deviation are negatively and insignificantly related to the variation in number of analysts following the parent in year 0.

The average standard deviation and the average number of analysts in year 1 are positively related to the variation in standard deviation on parent in year 1. The relationship between number of analysts and variation in standard deviation is significant at 10%. However, the relationship between the variation in number of analysts following the parent in year 1 and the average standard deviation of the subsidiary in year 1 is negative and highly significant at 1% level. The change in standard deviation of the parent in year 2 is positively and significantly (5% level) related to the average standard deviation of the subsidiary in year 2. Through out the table, the change in number of analysts following the parent is negatively (sometime significantly) related to the average standard deviation and average number of analysts following the subsidiary in all the three years of analysis. However, for year 2, the average number of analysts following the subsidiary is positively, though insignificantly, related to the change in number of analysts following the parent.

Underpricing in negatively related to change in standard deviation in all the years (0,1 and 2) and this relationship is significant at 10% in year 2. However, underpricing is positively (insignificantly) related to the change in number of analysts through out the period of analysis. Percentage of primary shares issued in the carve-out is positively related to the variation in standard deviation of the parent and the relation is significant at 10% and 5% in year 1 and year 2 respectively. However, it is negatively related to the change in number of analysts following the parent firm, and the relation is significant at 10% in year 2. Relative size is positively related to the change in standard deviation of the parent firm in year 0 and 1 and is negatively related in year 2. Similarly, it is positively related to change in number of

Table 3-7: Regression for the variation in change in STD through term of the analysis

Underpricing is the percentage difference in offer price and the share price on the close of first trading day. Percept Prime is the percentage of primary shares (new shares) in the offering. Relative size is the size of the subsidiary in relation to the size of the parent firm (Proceeds sum of all markets/Market value of Parent). Diff_sic is the variable, which explains if the subsidiary and the parent firms are in the same industry or different industries. It is a dummy variable equal to '0' if the parent and subsidiary have the same first two digit SIC code and '1' if they do not share the same first two digit SIC code. Same nation explains if the nation of the parent and subsidiary are same. Leverage is the leverage (debt to equity ratio) of the parent. EBITDA on sales is the earning before interest, taxes, depreciation and amortization on sales of the parent firm. AVG_STDY0SUB is the average standard deviation in EPS forecast for the subsidiary in current year (year0). AVG_NY0SUB is the average number of analysts following the subsidiary in current year.

	1	2	3	4
Dependent variables	ΔDiff_STDY0/Y1	ΔDiff_STDY0/Y2	ΔDiff_NY0/Y1	ΔDiff_NY0/Y2
Intercept	0.58863	0.13430	0.12288	0.32331
	(0.48)	(0.06)	(1.02)	(2.76)
UP	0.00068576	-0.00054058	0.00013480	-0.00036208
	(0.14)	(-0.06)	(0.25)	(-0.68)
Primary	-0.20153	-0.39833	0.00493	-0.08399
	(-0.30)	(-0.30)	(0.07)	(-1.18)
Relative_size	-1.38220	0.90731	0.01987	-0.19149
	(-0.68)	(0.23)	(0.12)	(-1.15)
Diff_sic	0.32232	0.67988	-0.01227	0.04332
	(0.69)	(0.74)	(-0.25)	(0.92)
Same_nation	0.45587	0.30970	-0.05353	-0.13992
	(0.69)	(0.25)	(-0.91)	(-2.46)**
Leverage	-1.72551	-1.20167	0.22095	-0.03923
	(-0.97)	(-0.31)	(1.25)	(-0.23)
EBITDA_on_Sales	-0.61075	-4.28430	-0.01562	-0.06868
	(-0.43)	(-1.51)	(-0.12)	(-0.54)
AVG_STDY0SUB	0.68146	0.32790	0.32463	0.05785
	(0.55)	(0.14)	(2.64)***	(0.49)
AVG_NY0SUB	0.02305	0.09670	-0.00194	0.00030939
	(0.59)	(1.35)	(-0.44)	(0.07)
R^2	0.2433	0.3147	0.1868	0.2011
Adj. R^2	0.0493	0.0784	0.0257	0.0428

analysts following the parent in year 0 and 1 but negatively related in year 2. We tried to capture the relationship between variation in standard deviation (and variation in number of analysts following the parent) and other control variables like different SIC (different industry) same nation, Leverage and EBITDA on sales. They are insignificantly related except the EBITDA, which is positively and slightly significantly (10%) related to the change in the standard deviation of the parent in year 2.

In table 3-7, we regress the variation in the difference of standard deviation in year 0 and year 1, and year 0 and year 2, against underpricing, primary shares, relative size, industry, nation, leverage, EBITDA on sales, average standard deviation and average number of analysts following the subsidiary in year 0.

We observe that the change in difference in standard deviation in year 0 and 1 and year 0 and 2 are positively related to the average standard deviation of EPS of the subsidiary and average number of analysts following the subsidiary. However, the relation is not significant. We can also observe that this relationship is becoming weaker for the average standard deviation and stronger for the average number of analysts following the subsidiary, as we go from the variation in difference in standard deviation in year 0 and 1 to year 0 and 2.

The average standard deviation of EPS of the subsidiary in year 0 is positively and significantly (highly significant at 1% level) related to the variation in the difference (between year 0 and 1) of number of analysts following the parent. The average number standard deviation in positively, though insignificantly, related to variation in the difference (between year 0 and 2) of number of analysts following the parent. The average number of analysts following the subsidiary is negatively and insignificantly related to the change in difference (year 0 and 1) in the number of analysts following the parent. This relation becomes positive in change in difference (year 0 and 2). Here we see that the relationship between average standard deviation in year 0 and the change in difference in number of analysts following the parent gets weaker as we move from difference in year 0 and 1 to difference in year 0 and 2. However the relation between average number of analysts following the subsidiary and the change in difference in number of analysts following the parent gets stronger from difference in year 0 and 1 to difference in year 0 and 2. The relationship with other variables is not significant except one. Relation of change in difference in number of analysts in year 0 and 2 and the same nation was negative and significant at 1% level.

7. Conclusion

Carve-out is an event in the life of an organisation, which is normally considered that it reveals more information to the market and should reduce the noise in information prevailed before the carve-out. On the basis of this consideration, we hypothesized that the standard deviation of earning per share forecast will decrease after the carve-out, as more information will be available to the market. But we come across some different and interesting results. We find that the divergence of belief among the analysts increases after the carve-out instead of decreasing. Our results suggest that after the carve-out, the standard deviation (STD) of EPS forecast increases instead of decreasing which is against our first hypothesis. We observe this movement through the time period of three years, i.e. STD of EPS forecast for the current year, the next year and the year after. Our results show that as we go towards the event of carve-out, in the current year, this divergence decreases but after the carve-out, it starts increasing and continue to increase. The difference in before and after carve-out STD is significantly (5% level) different from zero. Results for second and third year of forecast are mixed. Our findings are in line with those of Bhushan (1989) who presents an inverse relationship between the number of analysts following a company and the number of segments in that particular company. Lundholm (1991) also comes up with the conclusion that the public signal will increase the gap between informed and uninformed traders, instead of decreasing it as is normally perceived.

Similarly, Huson and MacKinnon (2003) find that if Lundholm (1991) is right then the information asymmetry increases after a spin-off. They argue that the investors who have already some information about a portion of the firm, when the firm undergoes a spin-off, it gives more information to the market and instead of whipping away the informed investors' information edge, this additional information increases the precision of their private information. It gives rise to the idea, that analysts who have more private information before the restructuring become more precise in their forecasts than the analysts who have less private information. This information difference may give rise to a situation where the divergence of belief increases instead of decreasing after a carve-out.

Further we find that the number of analysts following the parent firm increases after the carve-out despite the fact that the carve-out increases the noise in information. It was initially hypothesized that the number of analysts should increase if the opacity decreases after the carve-out. But here, the opacity is increasing (presented by STD) and still the number of analysts is increasing. Gilson et al. (2001) show an increase in the analyst following with breakups. They say that the number of analysts following the composite firm before breakup is significantly low than the combined number of analysts following the parent and subsidiary firms separately. Interestingly we find that the carve-out component has no significant influence on the change in analyst standard deviation, and change in analysts' number.

The analysts' expectations for the subsidiary also, have no significant influence on the analysts' change in expectations for the parent in the current year, however, it has a little impact in long term, which may lead to the notion that carve-out have long term gains for the parent. And finally, we have some intuitive evidence that as the number of analysts following the parent increases, the standard deviation in their forecast also increases.

We tested, though not tabulated, that change in number of analysts and the change in standard deviation of earning per share forecast is not due to the time factor but is observed specifically after the event of carve-outs in the given sample. To verify this, we checked if this change occurs in comparable firms also? We collected comparable firms on the basis of size, industry and market and analysed them. We observe no such change in comparable firms. In these comparable firms, the number of analysts remains stable both, before and after the event of carve-out, and there is no significant change in the divergence of belief after the event.

Further, as our data is collected from different stock exchanges in multiple countries, country specific characteristics could be thought of having impact on results. To mitigate this doubt, we did all our analysis on US firms alone, but the results do not change qualitatively (not tabulated). Though it does not generalise that we would have exactly the same results as those of US for the rest of countries if analysed separately, but at least it rationalize the notion that country specific characteristics may not make big difference in this particular analysis.

The sample used in this chapter is small like the previous chapters and literature. Despite the fact that in this chapter we include data from multiple countries and do not limit ourselves to

the US data, our sample size is still small. If we would stay in US market, our sample would be too small for our analysis. This fact is the main reason that we go global for data selection in this chapter. The smaller number of firms in this chapter is mainly because of the fact that we need analysts' forecast for both the parent and subsidiary, both before and after the event of carve-out. Most of the data is dropped because either forecast for the parent is missing or for the subsidiary or for both. If analysts' forecast would not be required for our analysis, our sample would not be smaller enough; in fact it would be larger than the previous chapters because here we have global data.

Before pursuing this present idea and methodology, though not mentioned earlier, we also checked from another viewpoint, if carve-out improves information about the parent firms, which are quite complex (having multiple segments). The idea rooted from the fact that in complex parent firms, accounting information (e.g. sales and operating profits) are also quite complex and opaque. We wanted to see if the opacity of complex firms would be reduced after carve-outs. If a firm has multiple lines, and the firm goes for a carve-out in one business line, it is obvious that the market knows better about that business as the subsidiary going public is required by regulations to provide its own annual report. At the same time, carved-out business is a part of the parent as well. Whether, the additional information available due to carve-out also provides some deep insight about the parent firm as a whole. We did not find anything significant.

We believe that our results may be different and specific if we have a large sample to do our analysis. Also if separate countries would be analysed separately, given the condition that we would have enough data for each country, the results could be altered in that case also. If some specific industries would be analysed, it also could generate different results. Further, if data about only big carve-outs would be large enough to analyse, the results could be changed.

We cannot ignore the analysts' bias in their analysis. They can also be a possible reason of different results. A US analyst analysing a European firm may be bias in his analysis and similarly a European analyst may be bias towards Asian firms and so on. The analysts coverage databases are also not comprehensive and do not provide complete information all the time, which can affect the results.

General conclusion and limitations

Equity carve-outs are the IPOs of subsidiaries of firms. This phenomenon is well researched in the literature, but still there are areas, which need to be explored. In our present work we highlight some interesting features about the carve-outs. Our findings are multi-fold. Initially, we started with the firm level information provided by the carve-outs about the wealth effects of these operations in US market. Then, we look in to the industry level information content of such operations in US market and argue that carve-outs may be a sign of low opportunities in the concerned industries. And in the end, we take the discussion about the information content of carve-outs to the international market and argue that carve-outs may provide more information about the parent firm, but it does not reduce significantly the asymmetry or opacity of information.

Our first chapter presents results that may be useful for the investors in their decision-making about their investments in particular firms. As we know, carve-outs affect the wealth of both the existing shareholders and the wealth of the shareholders who purchase the shares in initial public offerings. This chapter provides information about this wealth effect directly for the existing shareholders, and indirectly for the new shareholders. We argue that, when there is a parent firm already trading in the market at the time of a subsidiary IPO (carve-out), the wealth effect of this IPO can be predicted by observing changes in prices of the already trading parents. We document that during the book-building period of the carve-out, if there is positive price change in stocks of the trading parent, it signals that there will be a positive effect on the wealth of the existing shareholders. The method used to calculate this wealth effect also predicts that if there will be positive wealth effect, intuitively there will be underpricing at the IPO, which will also affect the wealth of new shareholders who buy shares in the IPO. So we argue that if the investors observe the price movements in the parent shares during the book-building period of the carve-out, they can predict the wealth effect of the carve-out and the upcoming underpricing, well before the event.

Our second chapter also gives a signal to the investors about the future performance of industries where carve-out operations happen. We measure the operational performance of industries where carve-outs happen. We argue that the operational performance of industries

where carve-outs happen is lower in three years after the carve-out event, compared to industries where there happened no carve-out activity. We used cash flow, profit margin and profitability to measure the operational performance. It depicts that the opportunities in industries where carve-outs happen are bleak in the post event period. To strengthen our findings, we further test that if performance is low in such industries, the acquirers making acquisitions in such industries should have low value created compared to other industries. Our results stand still to the test, and show a lower CAR for the bidders who bid in industries where there were carve-outs in the last three years before the acquisition. Further, these results survive the premium test also. It means that the premium paid in M&A transactions in these specific industries are not different from the premiums paid in transactions other than these industries.

Out third chapter, is about the international market and not about US market, only. A normal perception about the carve-outs is that, the carve-out will provide more information to the market and this more information will help the market to make better decisions. We also conceived that, if carve-out is giving more information, it should decrease the divergence of belief among analysts about the earning per share forecast. We also hypothesised that the number of analysts following the parent firm should either decrease because after the carve-out, some analysts may stop following the parent firm as they may be interested to follow the subsidiary assets or the number of analysts should increase because now the parent firm is more visible separately from the subsidiary and those analysts who were interested to follow the parent assets but could not do so due to opacity can now do so due to more clear information about the parent. But we find that the divergence of belief increased after the carve-out, instead of decreasing. The divergence of belief increased, but the number of analysts increased also after the carve-out. It shows that the increase in number of analysts is not because of more clear information. Interestingly, we found that the carve-out component has no significant influence on the change in earning per share forecaste STD and change in analyst number. Further, the analysts' expectations for the subsidiary also, have no significant influence on the analysts' change in expectations for the parent in the current year, however, it has a little impact in long term, which may lead to the notion that carve-out have long term gains for the parent. One argument can be made, that the increase in number of analysts and the increase in divergence of belief may be due to time factor. We tested for it, though not

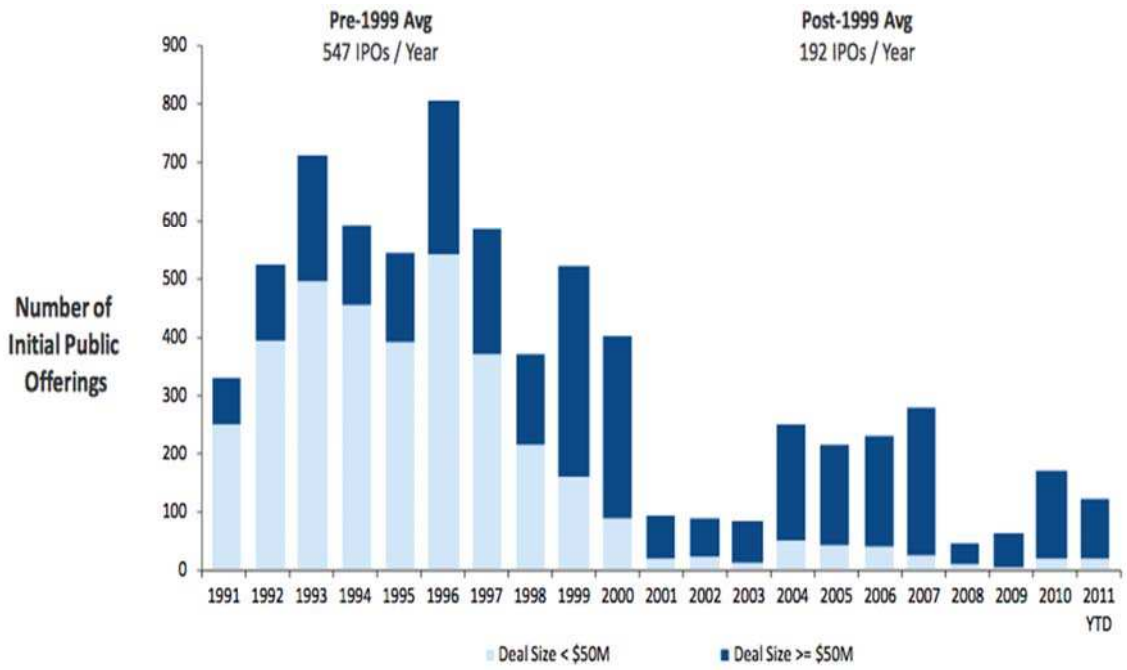
tabulated, by observing the change in number of analysts and change in divergence of belief in comparable firms, before and after the event. We find no significant change. Further, we separately tested the sample of US firms only, to see if we can observe different trends in analysts following and divergence of belief than the total sample. The results here are not different qualitatively from the total sample. It may be an answer to arguments related to country specific characteristics.

Like any study, our present work has several limitations. The first and foremost limitation is the small size of data. We have very small sample size in all our studies, which can be a point of objection by the critics. But, in our knowledge, we applied the best possible criteria for the sample selection in our given resources. Our samples are not significantly different from previous studies in equity carve-outs and in our domain (e.g. Woolridge et al. 2002, Benveniste et al. 2008, Desai, C. et al. 2011), which is a relief. The second limitation is the exclusion of financial firms from our sample. But to us, it is more a better decision than a limitation, as the accounting for financial firms is different from other firms and it would affect our overall results for the rest of industries. More over, in the previous research regarding carve-outs, financial firms are excluded, e.g. Desai, C. et al. (2011), Powers, E. (2003). Third, our studies are using data from the big stock exchanges only, especially in US (Woolridge et al. 2002, Allen, J.W. & McConnell, J.J., 1998). Again, this is mainly because of the specific requirements of the samples, and is backed by the knowledge that information about carve-outs is not easily available even for firms on big stock exchanges. Fourth, we are talking about the equity carve-outs of listed firms only (Allen, J.W. & McConnell, J.J., 1998, Woolridge et al. 2002). This may also be a cause of small sample size, but it was a requirement for our analysis that the parent information should also be available so that we can do comparative analysis where necessary. Fifth, we do not regard for the cultural aspects of different firms, both corporate culture and regional or country culture. It is because, the culture information is not easily available, and if we would incorporate it, it would reduce our sample size to a further lower level.

Besides the findings of our work, we also observe some changes in the IPO environment, which is beyond the scope of our work, but we think is necessary to mention. For example, we observe that the number of IPOs US market have declined substantially in the previous

decade compared to the 1990s. This means that the number of carve-outs have also declined, in the previous decade, as carve-out is also an IPO. There can be different reasons, which might be the cause of this decline. For example, we see multiple crises periods since 2001 till now, which mainly affected the stock exchanges.

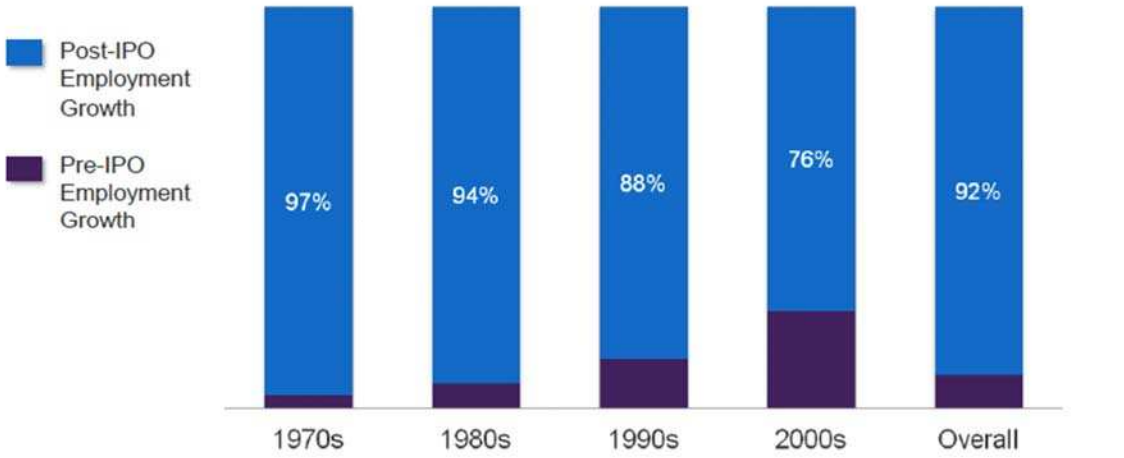
The number of emerging growth firms have ceased to go for an IPO more probably due to increased regulations and costs. According to the IPO task force report 2011, from 1991 to 1999, on average 547 IPOs occurred per year in US and majority of these IPOs were done for emerging growth firms (deal size < $50 million). How ever, post 1999 to 2011, on average 192 IPOs occurred per year and majority of them were large firms.



IPOs of emerging growth firms pre-1999 and post-1999 (*Source: IPO task force report 2011)*

The age of firms to go for an IPO has also increased ever since, i.e. in 1990s the average age was 4.5 years and in 2000s it is 9 years. Despite the fact that strong and accessible IPO

market is very important to the economic growth and prosperity, we still see the decline in this activity. But we believe that it cannot last for long like this, as it may result in some economic crises, for example the unemployment can increase too much if it continues. According to the IPO task force report, firms report 86% of job growth in a company after the IPOs during 2006 and 2011. Over all, this rate is 92%. It is quoted in the report that " up to 22 million jobs may have been lost because of our broken IPO market" and on the other hand US Labor Department statistics suggests that in 2011, the number of unemployed and underemployed Americans reached approximately 25 million. An economic activity of such important and serious impacts cannot be ignored for long.



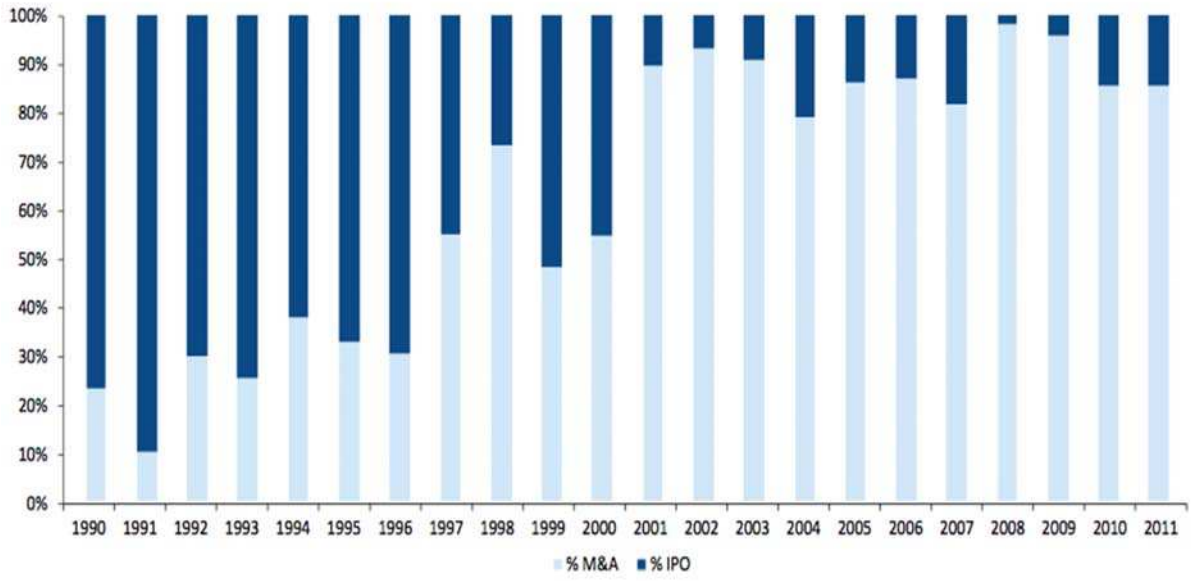
Pre-IPO and post-IPO employment growth (*Source: IPO task force report 2011)*

Other than the US market, European market also has a lower level of IPO activity than its capacity, due to its laws and regulations. Rainer Riess, head of the Federation for European Securities (Fese) says that three quarter of fundraising for European companies flows from banks, and only a quarter is raised on markets (Science Business, 9th April 2015). If Europe changes its policy of relying more on banks, and start encouraging small firms to go public for their financial needs, it will not only reduce the extra reliability and burden on banking

sector, but will also generate a large capacity of employment which is one of the major concerns of Europe today.

On one side, we see a decline in IPO activity in the US and Europe, on the other side, Asia is becoming more open to it. If we see the IPO activity in Hong Kong, excluding the crisis periods, the number of IPOs has relatively increased since 2007 (Source: J.Ritter, University of Florida). It will be interesting to see the major economic impact of this relative increase in IPOs in Asian markets.

We know about the IPO waves (Pástor, Ľ. & Veronesi, P., 2005, Ritter 1984) and merger and acquisition waves (Gärtner, D.L. & Halbheer, D., 2009, Linn, S.C. & Zhu, Z., 1997, Savor, P.G. & Lu, Q., 2009) from literature, but if we consider these two kinds of waves in relation to each other, we can see that there is a visible shift from IPOs to M&A if we compare it in 1990s and 2000 on ward. In 1990, IPOs are much more compared to M&As and then they start declining, and after 2000, the situation reverses completely. This means companies are getting larger and larger in the US market.



M&A VS. IPOs *(Source: IPO task force report 2011)*

It looks like the disappearance of IPOs is not a permanent phenomenon but is temporarily overtaken by the M&A wave, which economically thinking, will not last forever, and will be overtaken by any form of IPOs (conventional IPOs or carve-outs).

Companies may need in future to carve-out, spin-off or sell-off certain assets, probably for focusing on the main businesses or for better managing the firms. We believe that IPOs or carve-outs should not be considered as dead activities, but dormant, and not for long.

Appendix 1

AMEX	American Stock Exchange
NYSE	New York Stock Exchange
NASDAQ	National Association of Securities Dealers Automated Quotation
N	Number of observations
N days	Number of days between filing date and offer date
Same industry	Dummy variable equal to '1' if the parent and subsidiary have the same first two digit SIC code and '0' if they do not share the same first two digit SIC code
High Tech	Dummy variable carrying '0' if subsidiary is not in high-tech industry and '1' if it is in high-tech. They are classified by the first three digit SIC codes 283, 357, 366, 367, 381, 382, 383, 384, 737, 873, 874
Percent prim	Percentage of primary shares in the new issue
Underwriter rank	Underwriter rank represents the rank of lead underwriter (investment banker) and is based on the Loughran and Ritter (2004) update of Carter and Manaster (1990) tombstone measure of ranking.
Proceeds	Proceeds are the proceeds for the IPO

Log proceeds	Log of proceeds
Filing spread	Filing spread is [(price high - price low)/((price high + price low)/2)]
Relative size	Relative size is subsidiary market value / parent market value
Leverage	Leverage is debt / equity ratio
MTB	Market price per share / book value per share
Growth	Growth is [{this year sales (turnover) – previous year sales (turnover)} / (previous year sales (turnover)*100)]
Wealth O	Wealth at offer date of IPO
Wealth L	Wealth at listing date
Wealth IPO	Combined wealth of 'wealth at offer' and 'wealth at listing'
Gross spread	Gross spread is the amount paid as gross spread to the underwriters and is calculated as [(percent gross spread * proceeds)/100]
Relative wealth O	Wealth offer/parent market value
Relative wealth L	Wealth at listing/parent market value
Relative wealth IPO	Wealth IPO/parent market value
Relative gross spread	Gross spread/parent market value

AR at filing	AR filing represents the abnormal return to the parent firm on the filing date and one day after filing.
AR during book-building	AR during book-building is the abnormal return to the parent during book-building period i.e. from third day of filing to one day before the offer date
AR at offer	AR at offer is abnormal return at the offer date
AR at listing	AR at listing is the abnormal return to the parent at listing date and one day after listing

Appendix 2

Tobin's Q	Market value of the acquiring firm's assets divided by book value of its assets for the fiscal year prior to the acquisition. The market value of assets is equal to book value of assets plus market value of common stock minus book value of common stock minus balance sheet deferred taxes. The data are obtained from both CRSP and COMPUSTAT.
Leverage	The sum of the acquiring firm's long-term debt and short-term debt divided by the market value of its total assets measured at the end of the fiscal year prior to the acquisition. The data are obtained from both CRSP and COMPUSTAT.
Free cash flow	The acquiring firm's operating income before depreciation minus interest expense minus income tax plus changes in deferred taxes and investment tax credits minus dividends on both preferred and common share divided by its book value of total assets at the fiscal year-end before the announcement date from COMPUSTAT.
Sigma	Standard deviation of the market-adjusted daily returns of the acquirer's stock over a 200-day window (-210, -11) from CRSP.
Run-up	Market-adjusted buy-and-hold return of the acquirer's stock over a 200-day window (-210, -11) from CRSP.

Public	Indicator variable: one if the bid is for a public target and zero otherwise.
Private	Indicator variable: one if the bid is for a private target and zero otherwise.
Subsidiary	Indicator variable: one if the bid is for a subsidiary target and zero otherwise.
Cash	Indicator variable: one if the payment is pure cash and zero otherwise.
Stock	Indicator variable: one if the payment includes stock and zero otherwise.
Relative size	The deal value from Thomson Financial SDC divided by the market value of the bidding firm's equity 11 days prior to the announcement date from CRSP.
Relatedness	Indicator variable: one if the bidder and the target are operating in the same industries with a common two-digit Standard Industrial Classification (SIC) code and zero otherwise. Data from Thomson Financial SDC.
Hostile	Indicator variable: one if the deal is classified as 'hostile' by Thomson Financial SDC and zero otherwise.
Tender offer	Indicator variable: one if the deal is a tender-offer and zero otherwise. Data from Thomson Financial SDC.

Cash flow	Income before extraordinary items (IBC) divided by total assets.
Profitability	Operating income before depreciation (OIBDP) divided by total assets
Profit margin	Income before extraordinary items (IB) + depreciation and amortization (DP) divided by sales (SALE).

Appendix 3

Underpricing	Underpricing is the percentage difference in offer price and the share price on the close of first trading day
Percent Prime	Percept Prime is the percentage of primary shares (new shares) in the offering
Relative size	Relative size is the size of the issue in relation to the size of the parent firm (Proceeds sum of all markets/Market value of Parent)
Same industry (Diff_sic)	It is a dummy variable equal to '0' if the parent and subsidiary have the same first two digit SIC code and '1' if they do not share the same first two digit SIC code
Same Nation	Dummy variable equal to '1' if parent and subsidiary have same nation, and '0' if they have different nations
Leverage	Leverage is the leverage (debt to equity ratio) of the parent
EBITDA on sales	Earning before interest, taxes, depreciation and amortization on sales of the parent firm
MVP	Market value of the parent firm
Proceeds	Proceeds are the proceeds from the carve-out
HKGEM	Hong Kong Growth Enterprise Market
AUSLA	Australian stock exchange

SINGP	Singapore stock exchange
TOKY	Tokyo stock exchange
FRANK	Frankfurt stock exchange
TORON	Toronto stock exchange
PARIS	Paris stock exchange
JASDAQ	Japanese association of securities dealers automated quotation
HONGK	Hong kong stock exchange
SHANG	Shangai stock exchange
AIM	Alternative Investment Market
MILAN	Milan stock exchange
LON	London stock exchange
STDY	Standard deviation of earning per share forecast in year 'Y'
No of Analysts Y	Number of analysts following a firm in year 'Y'
Diff_STD10	Difference in standard deviation in the current year (year0) and next year (year1)

Diff_STD20	Difference in standard deviation in the current year (year0) and the year after (year2)
Diff_N10	Difference in number of analysts in current year and next year
Diff_N20	Difference in number of analysts in current year and the year after

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Evaluation, information et perspectives industrielles lors des scissions de filiales par introduction en bourse

Résumé

Nous étudions l'évaluation, l'information et les perspectives industrielles lors des scissions de filiales par introduction en Bourse (ECO). Dans notre première étude, nous estimons les effets de richesse aux différentes étapes d'une ECO et leur lien sur les rentabilités boursières anormales de la société mère de la filiale. Nous trouvons que c'est la période de construction du livre d'ordres de l'introduction en bourse qui permet au marché financier de mieux estimer les effets de richesse positifs pour la société mère. Dans notre second travail, nous avançons que les ECO sont effectuées dans les secteurs industriels où les firmes présentent des opportunités de croissance plus faibles en moyenne. Nous démontrons que les industries concernées par des ECO ont des performances opérationnelles (mesurées par la rentabilité d'exploitation, les liquidités générées et la marge opérationnelle) plus faibles. Nous montrons également que les fusions acquisitions réalisées dans les industries où une ECO a eu lieu durant les trois années précédentes créent moins de valeur pour l'offreur que les fusions acquisitions qui ne sont pas concernées par une ECO. La dernière étude de cette thèse analyse l'impact d'une ECO sur la divergence d'estimations des analystes financiers et sur le nombre d'analystes suivants la société mère. Nous trouvons que la divergence d'estimations et le nombre d'analystes augmentent après une ECO.

Mots Clés : Introduction en Bourse, Scissions de filiales par introduction en Bourse, Divergence d'estimation, Effet de richesse, Rentabilités anormales, Fusions et acquisitions, Information, Evaluation.

Valuation, Information and Industry Perspectives of Equity Carve-outs

Abstract

We study the valuation, information and industry perspectives of equity carve-outs. In our first paper, we study the wealth effect of equity carve-outs and its relationship with the abnormal returns to the parent firm. Using this relationship we find that during book-building period of equity carve-out, the returns to the parent firm can be used to pre-empt the wealth effect of equity carve-out. In our second paper, we argue that equity carve-outs, on average, are carried out in industries, where opportunities are low. We find that these industries have low operating performance, gauged on profitability, cash flow and profit margin compared to industries where there are no carve-outs. In addition to this evidence, we find that the merger and acquisition activities, in which targets are in industries where carve-out activities happened in last three years before the M&A activity, bidders have less value created compared to mergers where the target industry has no carve-out activity. In our third paper, we analyze the impact of carve-outs on the divergence of belief and the number of analysts following the firm. We find that divergence of belief increases after a carve-out and number of analysts following the firm increases, also.

Keywords: Key words: IPOs, Equity carve-outs, divergence of belief, wealth effect, abnormal returns, mergers and acquisitions, performance, information, valuation.

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