Two-Stage Spinoff Asset Impairment Theory and Evidence

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Abstract

This paper analyses the decision of a firm to spinoff a subsidiary in one or two steps. We provide theory and evidence showing that due to resolution of a two-dimensional asymmetric information an initial carve-out of a subsidiary is followed by a spinoff or deemed a failure and bought back. The initial carve-out step, in a two-step spinoff brings about valuation consensus among stakeholders which allows a value increasing spinoff to take place in the second step. Without the minority carve-out of a subsidiary the two-dimensional asymmetric information problem blocks a value increasing spinoff. These two-dimensions of asymmetric information consist of 1) spinoff synergy and 2) asymmetric valuation due to after effects of an economic shock. The economic shock allows the managers to impair the assets of a class of stakeholders (such as workers). We show that this asset impairment is a significant factor in spinoffs.

Key words: Two-Stage Spinoff, Equity Carve-out, Restructuring, Divestiture, Multi-Dimensional Information Asymmetry, Agency Costs, Stakeholder Conflict; JEL Classifications: G32; G34

1. Introduction

Let us focus on the "one or two-step spinoff decision". That is, a firm (the parent) can divest a subsidiary through a (one-step) spinoff, which is a tax-free pro-rata distribution of over 80% of the shares of its wholly owned subsidiary to its shareholders and does not provide the parent with a cash infusion. Alternatively, in the first-stage the parent can sell up to 20% of its subsidiary in an IPO to raise cash. This 20% equity carve-out is then followed by a spinoff in a second stage (the 20% limit in USA ensures that the carve-out is tax-free).

Two-stage (two-step) spinoffs are less frequent than one-stage spinoffs. For example, only 17 out of 121 spinoffs reported by Low (2002) from 1992-99 are done in two-steps. In October 2002, an investment research firm (www.spinoffadvisors.com) stated that nine out of 21 spinoffs reviewed in that year were the final step of a two-step spinoff. Michaely and Shaw (1995) identify a firm's access to the capital market as the crucial decision factor in divesting either through a spinoff or a carve-out. A pioneering empirical study by Klein, Rosenfeld, and Beranek (1991) shows that a minority equity carve-out is usually the first step of a two-step spinoff, or the carve-out is undone by the firm through a buyback of the carved equity. In other words, one may view minority equity carve-outs as either a "success" leading to a two-step spinoff or a "failure" which is followed by an equity buyback. They also show that successful two-step spinoffs (the eventual sell off) generate abnormal positive returns for both the parent and the subsidiary, while failed two-step spinoffs usually follow a below average subsidiary performance that is offset after the eventual buyback of the shares by the parent.

In a theoretical study of the two-step spinoff, Perotti and Rossetto (2007) model carve-outs as a strategic option. The holder of this option has the right to later spin off or buy back the subsidiary. They propose that the option value justifies the additional costs of going through two-steps. Zingales' (1995) modeling of a firm's decision to go public also has implications for a two-stage spinoff. In that IPO model, the owners of the firm maximize the proceeds from an eventual sale, by carving out a minority stake prior to the sale of the remaining shares. The owners use two distinct markets to maximize their proceeds: 1) the capital market to sell the cash flow claims to dispersed shareholders and, 2) a market for buyers of control rights. However, Zingales' (1995) focus is on analyzing a private firm that goes public. Applying that model to the decision of a public firm to spin off a subsidiary in one or two stages requires some modifications.

We present a theory for making two-step spinoff decisions based on the consequences of the expected future change in value of the claims of various stakeholders when there is multi-dimensional asymmetric information. We show that when a one-step spinoff can impair asset claims of a claimant class (e.g. bondholders, bankers, customers, lawsuit claimants, workers, managers, the government, etc.). The impaired asset claim problem can lead to imposition of additional costs that effectively block a value-

increasing spinoff. A two-step spinoff generates value by using the market information generated after (the first step of) a minority equity carve-out to overcome this "claimant asset impairment problem" in two steps. We refer to this theory as the "asset impairment theory of two-step spinoffs".

In contrast to the sparse literature on two-step spinoffs, which includes a few empirical and a couple of theoretical papers, there is a comprehensive literature on carve-outs and spinoffs as stand-alone one-step processes. Schipper and Smith (1983) and others assert that there is a divestiture gain due to refocusing of the parent and subsidiary operations. Rajan, Servaes and Zingales (2000), show that there is a distortion in fund allocation in diversified firms. Ahn and Denis (2004) confirm this insight; however, they suggest that the value gain is due to improved investment efficiency following a spinoff. Colak and Whited (2007) account for measurement error in Tobin's q and find no evidence of improvements in investment efficiency. Hence, the divestiture gain hypothesis through financing of new and existing projects is questioned.

Several authors estimate that the spinoff announcements are followed by an additional market-adjusted stock return of two to 3.5% for the parent. However, Veld and Veld-Merkoulova (2004) extend the abnormal return analysis to the European market and find no economically or statistically significant long-run excess returns and conclude that regardless of the existence of information asymmetry, European capital markets efficiently react to spinoff announcements. Vijh (2002) uses a sample of 336 carve-outs from 1980–97 and provides evidence for a divestiture gain from equity carve-outs. Abarbanell, Bushee and Raedy (2003) find that heterogeneous investment strategy and fiduciary restrictions affect institutional demand for spun off stocks. Although abnormal trading volume after the spinoff is associated with changes in institutional holdings; this does not cause abnormal returns for either the parent or the subsidiary.

This paper, not only considers abnormal returns to shareholders, but also focuses on a fair share for a stakeholder. That is, we consider a corporate governance framework where the managers maximize the shareholders' wealth while a constraint imposed by a class of stakeholders is binding or violated. This analysis is complicated by the asymmetric information and stakeholders' ability to fight their wealth expropriation given the costs of such actions. The "asset impairment theory of two-step spinoffs" is a prescriptive theory. It provides a managerial tool for deciding between a one-step and a two step spinoff.

Following the above introduction and literature review, in section 2 we develop the two-step spinoff asset impairment theory and calculate the value of the claims of various stakeholders prior and after a restructuring event. Section 3 prescribes how a manager should go about announcing a two-step spinoff. This section uses asset impairment theory to analyze the announcement decision prior to a carve-out and following that event. Section 4 focuses on a carve-out and its wealth consequences. In particular, we focus on the non-trivial case when one unit gains value at the expense of the other following a carve-out. Section 5 analyzed the second post-carve-out restructuring event. Section 6 presents a set of concise managerial decision rules which are derived from asset impairment theory. Section 7 considers a large number of spinoffs in practice. It discusses the rationale for carve out and its eventual two-step spinoff based on synergy and asset impairment claims (or lawsuits) which fit the "asset impairment theory of two-step spinoffs". Finally, a conclusion is drawn in section 8.

2. The Asset Impairment Theory

The theory of asset impairment considers a situation where a divestiture (spinoff, carve-out, or sale of a subsidiary) is expected to violate a binding constraint that is imposed by a stakeholder. The asset impairment theory may be best understood in the context of examples. Section 6 considers a variety of real world cases that are explained by this theory. Let us highlight four examples that help explain decisions in asset impairment theory as follows: 1) Marriott corporation spins off its hotel management services from its hotel properties as discussed in Parrino (1997); 2) Siemens sells its mobile devices division forming a subsidiary called BenQ-Siemens; 3) Altria, considers spinning off Kraft while facing a large tobacco litigation; and 4) Tie Communication carves-out Technicom International.

These divestitures all include a stakeholder whose assets may be impairment as a consequent of the restructuring decision. That is, in the Marriott spinoff, the debtholders stand to lose their claim on the assets of the management service entity. In the Siemens' mobile device sale, the workers lost their employment safeguards provided under the German corporate governance system, as they become employees of a Taiwanese corporation. In fact Siemens agreed to pay 700 Million Euros to get the Taiwanese firm to take

their subsidiary off their hand! The tobacco lawsuit claimants in the Altria case would have lost their claims on Kraft's assets if there would have been a one-step spinoff. Finally, following the restructuring of Technicom International, a lawsuit alleged that a carve-out created value for the shareholders of Tie Communication through dissemination of false optimistic information which impaired the asset of the new investors in Technicom International.

In our model, we narrowly focus on a manager's decision to do a spinoff in one or two steps in order to maximize shareholders' wealth while considering the consequences of potentially violating a stakeholder constraint. Therefore we abstract from implications of asset impairment theory for divestitures that are done through trade or asset sales. Our spinoff model is a decision tree which has two periods as depicted in Fig 1. The bottom branch of the tree represents a one-step spinoff decision and the top branch a two-step spinoff. At time-0 in period 1, the managers realize that spinoff increases expected firm value either due to synergy or due to expropriation of the wealth of a stakeholder (or a combination of these two factors). The stakeholders do not observe whether the spinoff increases shareholder wealth through impairing the value of their assets or due to synergy. Therefore, there is an unobservable "asset impairment" problem.

This is one dimension of information asymmetry in our two-dimensional model. A second dimension of information asymmetry causes the shareholders and stakeholders to under-value the firm due to conglomeration managerial agency costs. The conglomeration agency problem arises from the fact that claimants have different information regarding the management's actions being in the best interest of the shareholders. That is, by forming a conglomerate the managers may seek to be in command of a larger firm that increases managerial wealth at the expense of the shareholders. In addition, through a spinoff the mangers may seek to expropriate wealth from a stakeholder.

If the manger decides to go ahead with a one-step spinoff, then in our model the second player which is a stakeholder whose asset is subject to impairment makes the next move. It decides whether to contest the spinoff (in a court of law or through other means such as a strike called by the workers' union, etc.) or to accept it. In case that the stakeholder accepts the spinoff as value enhancing, the management

carries it out unopposed. Otherwise, the management faces an expensive contested spinoff scenario (as in the Marriott case where the management was forced by legal action to propose a revised spinoff plan). This stakeholder action is shown by the doted-line in the lower branch of the decision tree in Fig. 1. Depending on the expected costs that stakeholders may impose, the management does either a carve-out or a spinoff. That is, the managers decide whether to move on the one-step spinoff or the two-step spinoff branches of the decision tree in Fig. 1 by considering the expected values of two branches of the tree.

After a carve-out or a spinoff, in period 2, the stock prices of the two entities provide two separate market valuations for the parent and the carved out subsidiary. These valuations help mitigate the information asymmetry regarding the asset impairment problem. That is, a positive abnormal return for both the parent and the subsidiary indicates that the manager's carve-out decision has been a value increasing event for both the stockholders and the stakeholders, ruling out wealth expropriation as a primary motive. However, a positive abnormal return for only the parent (subsidiary) and a negative abnormal return for the subsidiary (parent) indicate that the restructuring has been a value increasing event for one party, at the expense of the other and therefore asset impairment is likely.

In addition, by spinning out a subsidiary, the managers reveal that they do not suffer from conglomeration agency costs. This resolves the second dimension of information asymmetry in our model. In a carve out, the conglomeration agency costs are reduced to the extent that investors expect the carve-out to be followed by a spinoff as a second restructuring event. Therefore, a manager that buys back a carved out subsidiary in that second restructuring event reintroduces this dimension of information asymmetry.

Another difference between a carve-out and a spinoff is that the stakeholders are less likely to contest a carve-out, because 1) it brings in a cash flow representing the value of the carved entity to the parent company, 2) it reduces the expected managerial conglomeration agency costs; and 3) it settles, the stakeholders concern regarding potential impairment of their assets through two separate market valuations. Note that this is not the case in a spinoff, as there is no positive cash flow to the parent that potentially benefits a stakeholder that would end up with a sole claim against that entity as a consequence of the

restructuring. Therefore, only stockholders stand to benefit from a spinoff and the asset impairment of stakeholders can be a prominent concern.
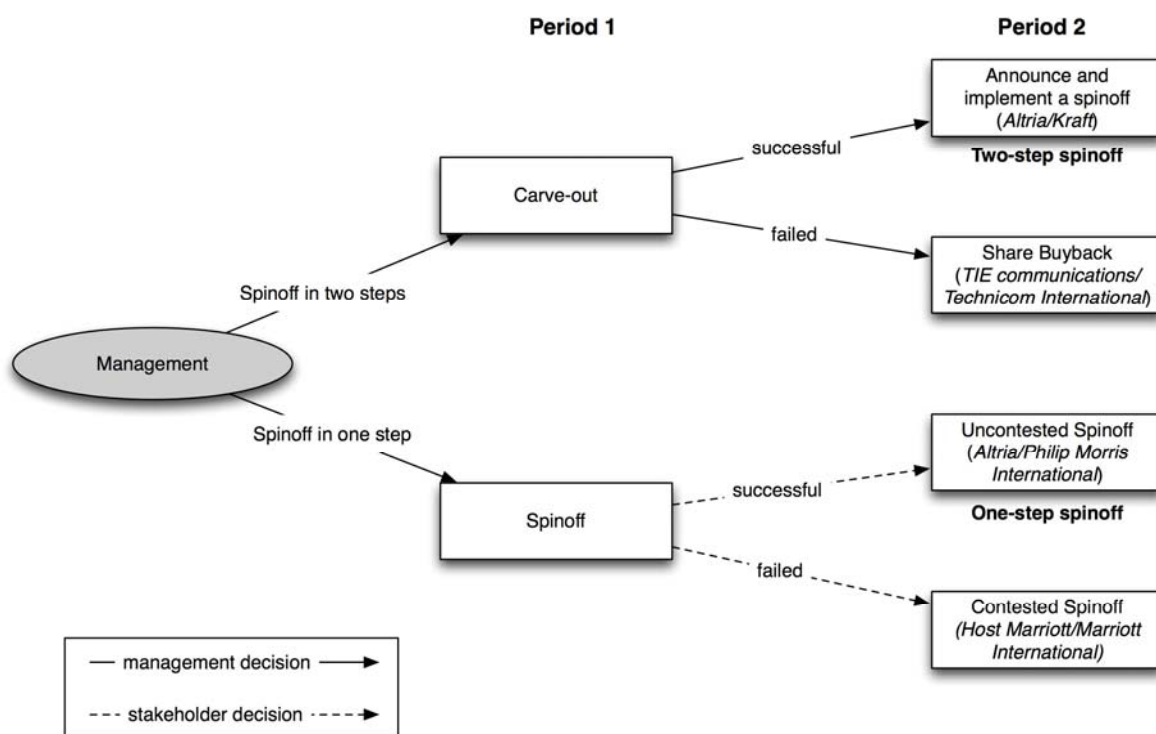

Fig.1.One or two-step spinoff decisions according to asset impairment theory with relevant examples in parenthesis.

Let us formally specify our model by assuming that the stakeholder whose asset is potentially impaired has a claim that reduces the firm value. Then, in our model, the investors, the managers, and the stakeholder adjust the firm value V by subtracting either C^1_H for a high stakeholder claim with a subjective probability p or C^1_L for a low stakeholder claim with probability of 1 - p (See Table 1). This model is a distant relative of a model introduced in Nanda (1991).

Columns 2 and 3 of Table 1 show that after a spinoff one unit of the firm alone shoulders the stakeholder claim. Column 4 shows that when the two units (the parent and the subsidiary) are combined in a conglomerate, they together share the stakeholder claim. Table 1, refers to the parent and subsidiary

with the more general terminology of unimpaired and impaired units, because the stakeholder claim may be either against the parent or against the subsidiary. For example, in the Siemens Infineon case in Table 6, the workers had a claim against the subsidiary, while in the Altria case, Tobacco litigants' claim was against the parent company.

Table 1
Stakeholder asset-claim valuation effects in subsidiary-parent spinoff.
In this table, $-C^1_H$ ($-C^1_L$) stand for high (low) stakeholder liability costs.

Stakeholder	Unimpaired Unit	Impaired Unit	Conglomerate
Asset Claim	-	$-C^1_H$ $-C^1_L$	$-C^1_H$ $-C^1_L$

Let's make an additional theoretical adjustment for synergy or dis-synergy in combining a parent and a subsidiary. Table 2, lists this adjustment according to asset impairment theory. Row 1 applies when there is merger synergy in combining the subsidiary and the parent. Column 2, Row 1 shows that when the subsidiary is a stand-alone firm, its value decreases by either a high dis-synergy of C^2_H or a low dis-synergy of C^2_L compared to its value in a conglomerate with the parent. Column 3 Row 1 shows that the parent's value also decreases after a spinoff by the same amount. Column 4 Row 1 shows that if the two firms are merged, there is an increased value of either $2C^2_H$ or $2C^2_L$. Row 2 models dis-synergy in combining the two units. Row 3 and 4 show scenarios where there is no synergy/dis-synergy value to the merger (so the conglomerate synergy in Column 4 under these rows is zero). More specifically, in Row 3, a weak subsidiary is draining value from a strong parent and in Row 4 a strong subsidiary is adding value to a weak parent. In these two "propping up" cases, one firm gains in a stand-alone situation by exactly the amount that the other firm loses. The remaining scenarios where the merger is value neutral or when synergy gain and loss values differ is not modeled in Table 2, as those do not add significantly to our study.

Asset impairment theory considers both violations of shareholder wealth maximization and stakeholder wealth expropriation as managerial agency problems. We model these agency problems by adding an additional term m to the spinoff valuation by various stakeholders. This term reflects management quality as assessed by a stakeholder under information asymmetry which relates to management's tendency to shirk its duty to safeguard that stakeholder's rights. For simplicity we scale this parameter and take m =

0 to mean the initial state of the cost associated with this agency problem. In other words, the management quality term m measures the extent that the mangers are an off balance sheet liability as viewed by a given class of stakeholders.

Table 2.
Modeled synergies in subsidiary-parent spinoff.
C^2_H (C^2_L) stands for high (low) synergy effect.

Synergy Effect	Subsidiary	Parent	Conglomerate
Merger synergy	$-C^2_H$ $-C^2_L$	$-C^2_H$ $-C^2_L$	$2C^2_H$ $2C^2_L$
Merger dis-synergy	C^2_H C^2_L	C^2_H C^2_L	$-2C^2_H$ $-2C^2_L$
Propping up a weak subsidiary	$-C^2_H$	C^2_H	0
Propping up a weak parent	C^2_H	$-C^2_H$	0

Let us now incorporate these agency problems in valuation equations and further assume that the stakeholders share the same information set as the shareholders. To develop the asset impairment theory, we need to specify the valuation of the parent and the subsidiary as stand-alone firms and as a conglomerate, by shareholders, managers, and the stakeholder. Depending on the particular detail of a case, the impaired asset claim may be on the subsidiary or to the parent. To generally model this impaired claim in Table 3, we use the term's "impaired unit" and the "unimpaired unit" as we did in Table 1.

To incorporate the synergy modeled in Table 2 in our valuation, we postulate that due to information asymmetry, stockholders adjust the firm value V, with a naïve probability 0.5 by either C^2_H for a high synergy or C^2_L for a low synergy effect, while the management observes the actual synergy, dis-synergy ($\pm C^2$). Therefore, Row 1 of Table 3 shows a synergy value adjustment of ½ ($C^2_H + C^2_L$) for each firm by shareholders, while Row 2 shows a synergy adjustment of C^2 for each firm by the management. [2]

Since after a spinoff, the stakeholder has no claim on the firm labeled as the "impaired unit", Row 3 Column 2 of Table 3 is crossed out. In fact, that crossed out cell represents the asset impairment that is studied in the "asset impairment theory of two-step spinoffs". In addition, we assume that there is no

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[2] Note that the general form of the subjective probability modeled as p is assume to be equal ½ here for simplicity.

information asymmetry regarding the stakeholder's claim in Table 3, therefore all claimants make an

adjustment of $-p\, C^1_H - (1\text{-}p)\, C^1_L$ for the expected value of that claim.

Table 3.
Conglomeration and Subsidiary-Parent spinoff valuation by stakeholders.
$-C^1_H$ ($-C^1_L$) is high (low) stakeholder claim. C^2_H (C^2_L) is high (low) synergy effect. V^1 (V^2) stands for firm value of the parent (subsidiary).

Asset Valuation by	Impaired Unit	Unimpaired Unit	Conglomerate
Shareholders	$V^2 + \frac{1}{2}(C^2_H + C^2_L)$	$V^1 - p\, C^1_H - (1{-}p)\, C^1_L + \frac{1}{2}(C^2_H + C^2_L)$	$V^1 + V^2 - p\, C^1_H - (1{-}p)\, C^1_L - (C^2_H + C^2_L)$
Managers	$V^2 + C^2$	$V^1 - p\, C^1_H - (1{-}p)\, C^1_L + C^2$	$V^1 + V^2 - p\, C^1_H - (1{-}p)\, C^1_L - 2C^2$
Stakeholder	$\cancel{V^2 + \frac{1}{2}(C^2_H + C^2_L)}$	$V^1 - p\, C^1_H - (1{-}p)\, C^1_L + \frac{1}{2}(C^2_H + C^2_L)$	$V^1 + V^2 - p\, C^1_H - (1{-}p)\, C^1_L - (C^2_H + C^2_L)$

Comparing the values in Table 3, Row 3, we may conclude that if the stakeholder's valuation of

the unimpaired unit in Row 3 Column 3 of that table exceeds the conglomerate value of Row 3 Column 4,

then there would not be an asset impairment problem. In this case, the synergy gains from a spinoff more

than makes up for the asset impairment losses caused to a stakeholder. Therefore, the stakeholder will not

be harmed by the spinoff. Mathematically, this simplifies to the "*asset impairment condition*" that a

stakeholder will not oppose a spinoff because of a possible dilution of its claim, as long as the following

inequality holds:

$$V^2 < 1.5(C^2_H + C^2_L) \qquad\qquad (1)$$

Therefore, asset impairment theory predicts that it is optimal for the stakeholder to block any

restructuring that leads to an "impaired asset unit", unless a relatively small portion of the equity value V^2

is at stake. A firm's subsidiary value may not be smaller than the gains from spinoff synergy or $1.5(C^2_H +$

$C^2_L)$ as equation (1) requires. In that case, the firm may carve out a minority of its subsidiary's shares that

is smaller than a multiple (of 1.5 times) of the synergy gain from restructuring. In that case, the stakeholder

will not have an economic reason to oppose the restructuring.

Assuming that a manager does not suffer from conglomeration agency problems, he (she) makes

the carve-out decision based on the following factors: 1) the asymmetrically held information about

conglomeration synergy; 2) the probability that a carve-out leads to an eventually successful spinoff; 3) the

costs of undoing a failed carve-out through an eventual buyback of the carved out shares; and 4) manager's assessment of stakeholder's ability to block a spinoff.

The expectation regarding the eventual success of the spinoff in item 2) is calculated by multiplying a subjective probability q_s that the carve-out leads to an eventual spinoff (two-step spinoff) and the probability $(1-q_s)$ that it fails and the managers buy back the cheaper failed carved out subsidiary (Klein, Rosenfeld, and Beranek (1991) provide a justification for our modeling by showing that a carve-out is either bought back or leads to a spinoff).

Equation (1) models the stakeholder's valuation, let us now consider the managers decision. They know that a spinoff is profitable; however, given the stakeholder's valuation they can only carve out a minority stake. In this case, the manager will decide to carve out the subsidiary if the expected value of the carve-out leading to a successful spinoff exceeds the conglomeration value. Assuming that a carve-out has a cost of z_c and may generate an additional buyback cost of Z in case of a failed carve-out, ex ante, manager's carve-out decision rule may be written as follows:

$$q_s [(V^2 + C^2) + V^1 - p\ C^1{}_H - (1-p)\ C^1{}_L + C^2] + (1 - q_s)\ [V^1 + V^2 - p\ C^1{}_H - (1-p)\ C^1{}_L - 2C^2 - Z] - z_c$$
$$> [V^1 + V^2 - p\ C^1{}_H - (1-p)\ C^1{}_L - 2C^2]$$

The above decision rule states that the expected benefit of a carve-out based on its probability of successfully leading to a spinoff and the complementary probability of leading to a failed carve-out that is bought back by the manager at a cost of Z should exceed the current value of the conglomerate[3].

Mathematically, this carve-out decision rule simplifies to the condition that expected spinoff synergy $q_s (4\ C^2)$ should be greater than the current cost of a curve out z_c, plus expected future carve-out failure cost of $(1-q_s)\ Z$:

$$q_s (4C^2) > (1-q_s)\ Z + z_c$$

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[3] Costs and benefit of a post-carve-out second structuring event can also be modeled here. However, the stakeholders may be able to delay or fight an eventual spinoff for an uncertain period of time. The managers may not be eager to do a second restructuring. Finally, the costs and benefits of that event may be too uncertain from the point of view of shareholders without the resolution of asymmetric information at the current pre-carve-out stage. Therefore, we feel that modeling a carve-out with the assumption that the additional costs and benefits of the second restructuring event are approximately equal pre-carve-out is the most precise method.

This decision rule only applies to the time of a minority carve-out event. There is a second separate two-step spinoff decision to be made. That decision is made after the uncertainty about success or failure of the initial carve-out and the asset impairment problem with the stakeholder is resolved. That future decision can be made according to the tool provided in section 4 below. Let us proceed by examining the implications of the theory for announcing a two-step spinoff.

3. The Pre-Carve-out Two-Step Spinoff Announcement

After a detailed observation of current spinoff announcements, we could not spot an actual announcement for a two-step spinoff. Normally, a carve-out or a one-step spinoff is announced. An implication of asset impairment theory is that if the stakeholders were certain that the carve-out would be followed by a spinoff (that is, a two-step spinoff was announced), then, they would react to the expected wealth expropriation caused by the eventual spinoff. Therefore, a curve-out event would cause the same reaction from stakeholders as a one-step spinoff event. Consequently, the management, considering the impaired asset problem has an incentive to keep quiet about the second step of a two-step spinoff.

Keeping quiet about an eventual spinoff makes that event less likely in the minds of investors and the stakeholders than officially announcing the event. A less likely spinoff would mean a smaller expected gain from the spinoff synergy for the investors and smaller expected asset impairment for the stakeholders. That is, an unannounced two-step spinoff enhances the economic justification for a carve-out from the view point of stakeholders at a cost of reducing expected spinoff gains from the view point of the shareholders. By economic justification, we mean that the stakeholders conclude that there is conglomeration dis-synergy rather than inferring that the restructuring is done to expropriate their wealth. Formally this insight is summarized as follows:

Theorem 1 *(two-step spinoff announcement) When, there are synergy gains from a spinoff and the management can convincingly show that the revenue raised from issuing a minority stake in a carve-out does not impair the assets of a stakeholder under asymmetric information, then it is optimal not to announce the second step of a planned two-step spinoff if and only if asymmetric information hinders the*

managements' ability to convincingly prove that there is spinoff synergy (a one-step spinoff is not undertaken to solely expropriate wealth from a stakeholder).

Proof. See the Appendix.

In other words, if the managers were able to convince the stakeholders that a post-carve-out spinoff would not impair their assets, then they should also be able to do the same for a one-step spinoff. That is, an announced two step spinoff may occur under the same circumstances as a one-step spinoff under asset impairment theory.

So far we have attempted to show that the lack of announcement of two-step spinoff in practice, prior to a carve-out, fits with our theoretical model. Let's now, focus on the aftermath of the carve-out.

4. The Carve-out under Asset Impairment Theory

A carve-out provides separate market values for the two units of a conglomerate and thereby resolves information asymmetry about conglomeration synergy. When both the parent and the subsidiary clearly gain value post-carve-out, one may conclude that the carve-out is wealth increasing due to conglomeration dis-synergy (or underpricing is resolved). Similarly, if both units lose value, then there is conglomeration synergy and one should not go through with a spinoff as a second restructuring event. Let us focus on the more difficult case of one unit gaining at the expense of the other.

Appling asset impairment theory to that "propped up" case, the valuation of the parent and the subsidiary as two stand-alone firms and as a conglomerate, by shareholders, managers, and the stakeholder is summarized in Table 4. This table makes a distinction between valuation pre-carve-out under asymmetrically held information about synergy in column 5 and post-carve-out valuation in Column 4.

Once, the information asymmetry about conglomeration synergy is resolved, the shareholders adjust the firm value V, with the same synergy, dis-synergy $(+ (-) C^2)$ value as the management. Therefore, Rows 1-3 of Table 4 show the same propped valuation from the points of view of managers, shareholders, and the stakeholders. There is an adjustment of $- C^2$ for the unimpaired unit as a stand-alone firm by shareholders and the management and a corresponding adjustment of $+ C^2$ for the impaired unit in this propped up case.

Note that the $- C^2$ charge cannot be against the impaired unit, because in that case the right-hand-side of inequality (1) would be negative. Then, the stakeholders have an incentive to block a carve-out of any size.

Row 1 (and 3), Column 5 of Table 4 shows that the shareholders (stakeholders) underpriced pre-curve-out by adjusting the conglomerate value by a dis-synergy of $- (C^2{}_H + C^2{}_L)$, while row 1, column 4 shows that post-carve-out this mispricing is removed. That is, post-carve-out, the shareholders agree with the management's Pre-carve-out valuation.

Note that, since the stakeholder has no claim on the impaired unit after the restructuring, Row 3 Column 2 of this table is crossed out and represents the asset impairment that is studied in the "asset impairment theory of two-step spinoffs". There is no information asymmetry post-carve-out regarding the stakeholder claim or synergy in table 4, therefore all claimants value the firms the same, except that the stakeholders are deprived from the value in column 2, row 3 and as we will discuss below, there is valuation consequences related to managerial conglomeration agency costs.

Table 4, shows that in the propped up case there is a gain from the carve-out for the shareholders (comparing the pre-carve-out conglomerate value to the post-carve-out valuation of two stand-alone firms) and may be written as follows:

$$V^2 - C^2 + V^1 - p\, C^1{}_H - (1{-}p)\, C^1{}_L + C^2 \ - z_c > \ V^1 + V^2 - p\, C^1{}_H - (1{-}p)\, C^1{}_L - (C^2{}_H + C^2{}_L)$$

Table 4.
Carved out subsidiary in conglomeration with the parent and subsidiary-parent carve-out valuation by stakeholders.
$-C^1{}_H$ ($-C^1{}_L$) is high (low) stakeholder liability costs. C^2 is the synergy effect. V^1 (V^2) stands for firm value of the parent (subsidiary).

Stakeholders	Unimpaired Unit	Impaired Unit	Conglomerate Post-Carve-out Valuation	Conglomerate Pre-Carve-out Valuation
Shareholders	$V^2 - C^2$	$V^1 - p\, C^1{}_H - (1{-}p)\, C^1{}_L + C^2$	$V^1 + V^2 - p\, C^1{}_H - (1{-}p)C^1{}_L + 0$	$V^1 + V^2 - p\, C^1{}_H - (1{-}p)\, C^1{}_L - (C^2{}_H + C^2{}_L)$
Managers	$V^2 - C^2$	$V^1 - p\, C^1{}_H - (1{-}p)\, C^1{}_L + C^2$	$V^1 + V^2 - p\, C^1{}_H - (1{-}p)\, C^1{}_L$	$V^1 + V^2 - p\, C^1{}_H - (1{-}p)\, C^1{}_L$
Stakeholder	~~$V^2 - C^2$~~	$V^1 - p\, C^1{}_H - (1{-}p)\, C^1{}_L + C^2$	$V^1 + V^2 - p\, C^1{}_H - (1{-}p)\, C^1{}_L + 0$	$V^1 + V^2 - p\, C^1{}_H - (1{-}p)\, C^1{}_L - (C^2{}_H + C^2{}_L)$

Mathematically, this carve-out gain simplifies to the condition that carve-out removes conglomeration underpricing, as long as the synergy gain or $(C^2{}_H + C^2{}_L)$ exceeds the carve-out cost of z_c:

$$(C^2{}_H + C^2{}_L) > z_c$$

Also note that $(C^2_H + C^2_L)$ is the expected value under the naïve probability for high and low synergy. After removal of information asymmetry, the uncertainty about this random variable is removed and it takes the "certain" value of $2C^2$. Also note that the term, $- (C^2_H + C^2_L)$ in our modeling can simply be an irrational underpricing. Therefore, our carve-out gain accommodates a situation where, the stockholders underprice (even irrationally).

The minority carve-out step makes it possible for the shareholders to ultimately attain a new perspective: that for instance a strong parent is being dragged down by a weak subsidiary or there is no conglomeration dis-synergy. The carve-out step of a possible two-step spinoff allows the parent to achieve a carve-out gain while avoiding a clear risk that the stakeholders would block an attempted spinoff. In a first step, the minority carve-out enables the management to make the subsidiary's shares publicly available without significantly impairing the asset claim of the stakeholders. In addition, a carve-out generates value. Let us formally state the value enhancement consequences of a carve-out in the following theorem.

Theorem 2 *(Carve-out Value Enhancement Theorem): Carve-outs generate value, when the gain by one unit is at least equal to the reduction of value of the other unit post-carve-out, in addition to when both units' value increases. If and only if the following conditions are met: 1) there is multi-dimensional information asymmetry about conglomeration synergy and managerial conglomeration agency costs; 2) managers assign conglomeration dis-synergy or at least know that a weak unit is propped up by a strong unit; 3) the shareholders assign conglomeration dis-synergy (or underprice); 4) the management can convincingly show that the revenue raised from issuing a minority stake in a carve-out does not impair the assets of stakeholders under asymmetric information, when the stakeholders have the power to block a carve-out.*

Proof. See the Appendix.

The above theorem relies on information asymmetry. That is, investors do not know the spinoff synergy/dis-synergy. The crucial insight that derives the carve-out gain is that shareholders value the

conglomerate less than the sum of its spun off units. This valuation may be due to shareholder pre-carve-out underpricing or conglomeration dis-synergy may in fact exist. A carve-out allows management to enhance firm value by revealing that there is conglomeration dis-synergy or the firm value is underpriced due to the fact that a weak unit has distorted the conglomerate performance.

The goal of the two-step process in our methodology is to credibly reveal that management is taking strategic actions to enhance firm value by reducing market mispricing. Through this process, management generates value without violating claimant interests (stakeholder claim) that impose a binding constraint on the firm.

To justify the assumption that fixed claimants' ability to impose a constraint is the crucial ingredient of the asset impairment theory of two-step spinoffs, consider the Marriott example. In that case, the parent spins off the hotel management company and retains the real estate ownership. According to court allegations and other accounts, that one-step spinoff was a strategy by Marriott to expropriate wealth from its debtholders. In that example, the spinoff of the subsidiary does not take place (in one step) as originally planned because a crucial ingredient of asset impairment theory of spinoffs that a claimant class should be able to reasonably argue wealth expropriation as it is about to happen and to ask for relief from a court, the government, or a regulatory body is present. Other examples are discussed in table 6 . [4]

In those practical examples, some carve-outs are spun off (a post-carve-out spinoff is implemented) and others are bought back (a conglomerate is created). That is, there are no restructuring examples in our table that persist in a minority carved out state. Note that this observation agrees with Klein, Rosenfeld, and Beranek, (1991). Let us formally state and prove this insight in the following theorem.

Theorem 3 *(Carve-out Instability Theorem). Post-Carve-out resolution of multi-dimensional asymmetry makes the carve-out solution (a minority traded stake in the subsidiary) a sub-optimal solution. A long-lived or a permanent carve-out is a sub-optimal state due to managerial conglomeration agency problems or stakeholder asset impairment problems.*

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[4] The original spinoff was eventually modified by Marriott to appease debtholders.

Proof. See the Appendix.

Post-carve-out resolution of information asymmetry regarding the spinoff synergy either fully justifies a second-step spinoff or shows that there is no justification for that restructuring. In the later case, both shareholders and the stakeholder benefit from a buy back. In addition, conglomeration agency problems or asset impairment problems are not an impediment to a buy back. Therefore a buy back is a consequence of a failed carve-out (when both firms lose value post-carve-out).

When a carve-out enhances value, then there would be reason to show that wealth expropriation from stakeholders is not the primary motivation behind the carve-out decision. This weakens stakeholders' ability to fight a value enhancing spinoff. A manager that does not suffer from conglomeration agency problems is therefore inclined to do a spinoff following a successful value enhancing carve-out. Therefore, a carve-out is not permanent, as it is optimally either bought back or spun off.

A special case is when there is no conglomeration dis-synergy (positive or zero synergy), but the firm gains from a carve-out by taking advantage of a stakeholder (See table 6 last row for the Fairfax example). In this case, post-carve-out-value of the firm increases at the expense of the stakeholder. As long as the value of this expropriated wealth exceeds the conglomeration synergy loss (which may also be zero), a carve-out generates value by making it possible to take advantage of a stakeholder. In this case, if the stakeholder has the power to fight and undo the carve-out, then it is bought back. Otherwise, the mangers have an incentive to extract additional wealth from that stakeholder through a post-carve-out spinoff. Let us explore this secondary restructuring event in section 5.

5. The Second Restructuring (Post-Carve-out Spinoff) Event

Take the case that a carve-out is implemented and the information asymmetry regarding spinoff synergy is resolved. The management has the choice to either proceed to a post-carve-out spinoff or buy back the subsidiary or continue the carve-out state indefinitely. That choice helps resolve the managerial conglomeration agency information asymmetry. That is, if the managers decide for a spinoff as a second step restructuring, this conveys information regarding lack of managerial conglomeration agency problem

Column 3 of Table 5 adds a term "$m_{spinoff}$" to the valuation of the unimpaired unit as a stand-alone firm by all parties. Column 4 of this table adds a term "$m_{carve-out}$" to show an increase in assessed management quality due to a positive outlook for the successful completion of the two-step spinoff. Column 1 of Table 5 provides the value of the spun off unit (that is to be run by a new management team of unknown conglomeration agency costs). Therefore, it does not make any adjustment for managerial quality. Since there are no information asymmetries, all parties value the conglomerate pre or post spinoff as $V^1 + V^2 - p\ C^1_H - (1-p)\ C^1_L - 2C^2$. [6]

It is optimal for the stakeholder to attempt to block the spinoff, unless the costs of fighting it, L makes the fight not economically worthwhile. That is, the stakeholders receive the spinoff valuation of unimpaired unit in Row 3 Column 3 of Table 5 unless they fight the spinoff. The opposition to a spinoff will not be economically justified when; the expected conglomerate value that these claimants receive if they are successful in blocking the spinoff with probability p_w minus the costs L is smaller than the spinoff value of the unimpaired unit. That is,

$$V^1 - p\ C^1_H - (1-p)\ C^1_L + C^2 + m > (V^1 + V^2 - p\ C^1_H - (1-p)\ C^1_L - 2C^2)\ p_w + (V^1 - p\ C^1_H - (1-p)\ C^1_L + C^2 + m)\ (1 - p_w) - L$$

In the above equation $m = [m_{carve-out,}\ m_{spinoff}]$ depending on the likelihood of the spinoff. This condition simplifies to the condition that these claimants will not oppose an announced post-carve-out spinoff that dilutes their claims, as long as the following inequality holds:

$$V^2 < 3C^2 + m + L/\ p_w$$

That is, the value of the spun off entity V^2 (which is denied the stakeholders post-spinoff), should be smaller than their expected gain from spinoff synergy $3C^2$, plus the costs of fighting it L scaled by the chances of success, plus the value enhancement due to lack of managerial conglomeration agency costs.

Assuming that a spinoff costs z and buying the subsidiary back (failure) is Z, ex ante, manager's post-carve-out spinoff announcement rule may be written as follows:

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[6] One can also easily model the case that the current management team remains in charge of the impaired unit. An example is the Marriott case in Table 6.

$$q_s [(V^2 + C^2) + V^1 - p C^1_H - (1-p) C^1_L + C^2 + m] + (1 - q_s) [V^1 + V^2 - p C^1_H - (1-p) C^1_L - 2C^2 - Z] - z$$

$$> [V^1 + V^2 - p C^1_H - (1-p) C^1_L - 2C^2]$$

The above announcement rule states that the expected benefit of a spinoff based on its probability of success and complementary probability of failing; so that it is bought back by the manager at a cost of Z should exceed the conglomerate value.

Mathematically, this second-step spinoff announcement rule simplifies to the condition that expected spinoff synergy plus management quality adjustment, $q_s (4 C^2 + m)$ should be greater than the expected spinoff failure cost of $(1-q_s) Z$:

$$q_s (4C^2 + m) > (1-q_s) Z + z$$

This decision rule only applies to a second step spinoff (post-carve-out). Let us formally state this post-carve-out restructuring decision in the following theorem.

Theorem 4 *(Post-Carve-out Restructuring). Spinoff dominates a buyback as a post-carve-out restructuring, if and only if 1) $q_s (4C^2 + m) > (1-q_s) Z + z$ and 2) $3C^2 + m + L/ p_w > V^2$*

Proof. See the Appendix.

Theorem 4 relies on the insight that a post-carve-out spinoff depends on the stakeholders and the management's decisions. Managers gain from removal of conglomeration agency costs (an additional value of $m = m_{spinoff}$). These costs are only partially mitigated in a carve-out ($m = m_{carve-out}$). Managers need to balance these gains against the costs of a spinoff. The stakeholders suffer from asset impairment. However, they are convinced that there is a benefit from resolution of the conglomeration agency problem and there is spinoff synergy which may outweigh the costs of fighting to stop the final spinoff. Let us summarize these and other decisions that asset impairment theory recommends in section 6.

6. The Canonical Decision Rules of the Asset Impairment Theory: One or Two-Step Spinoff?

Let us summarize our decision rules in Fig. 2. These rules allow the management to choose between one and two-step spinoffs based on the asset impairment theory. The first row in Fig. 2 labels management's two-step spinoff decision points in periods 1-2. The second row provides the relevant decision rules based

on expected costs and benefits. The third row shows the stakeholder's decision to fight or put up with a wealth expropriating managerial spinoff. In this figure both the management and the stakeholder reevaluate their decision in each period independently. More specifically, in a carve-out scenario in period 1, the management concludes that the expected benefit of a carve-out (under the probability of successfully leading to a spinoff) exceeds the costs of a failed carve-out (under the complementary probability of failing). In the second-step of a spinoff, the management judges that the expected loss from the stakeholder blocking the spinoff is smaller than the expected gain when they fail to block the spinoff.

In the second period in Fig. 2 in row 2, the managers reevaluate the benefit of the spinoff by considering the valuation effects of the market's judgment about management quality. They then announce the second step of the spinoff when the benefit from expected spinoff synergy plus management quality adjustment, exceeds the expected carve-out failure cost. In the second period in Fig. 2 in row 2, the management implements a spinoff if expected spinoff synergy ($2\,C^2$) exceeds the expected spinoff cost of z.

Row 3 of Fig. 2 summarizes a stakeholder's asset safeguard condition based on expected costs and benefits of fighting a spinoff for that stakeholder. This condition allows us to analyze the central role of stakeholder conflict in a two vs. one step spinoff decision. Our stakeholder conflict problem is different from an agency problem. Here, a claimant group is imposing a constraint on the firms' activities *ex-post* to safeguard its claim against potential wealth expropriation by the firm (which happens to be value increasing for the organization as a whole). In particular, debtholders, investors, the government or workers may file an injunction in court to block an overall value-increasing spinoff that will potentially harm their interest. In contrast, agency costs are incurred when *ex ante* a second best contract imposes a suboptimal solution. For example, when the debt is issued the contract fully charges the firm for all potential future wealth expropriation in its pricing of that security.
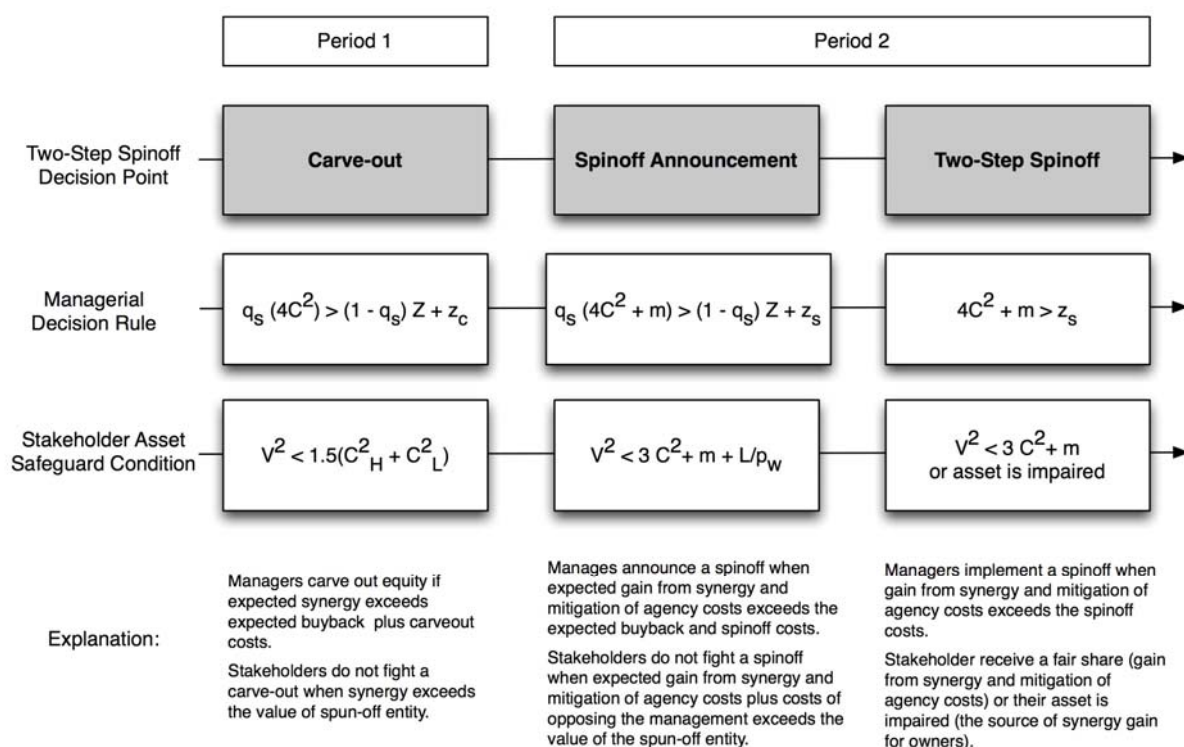
Fig.2.Two-step spinoff decision rules and stakeholder assets safeguard condition according to spinoff asset impairment theory.

Fig. 2 summarizes the canonical asset impairment theory rules for making a two-step spinoff. Prior to arriving at a two-step spinoff decision, the management needs to evaluate whether the less costly and uncomplicated restructuring method of one-step spinoff is a better solution. Theorem 5 formally specifies this decision rule.

Theorem 5 *(One vs. Two-Step Spinoff).*

Two-step spinoff dominates one-step spinoff, if and only if 1) $q_s (4C^2) > (1-q_s) Z + z_c + z$ and 2) there is asset impairment and 3) $V^2 < 1.5(C^2_H + C^2_L)$.

Proof. See the Appendix.

In the above theorem, both in case of a two step-spinoff or a one-step spinoff, the managerial valuation shows a net gain from spinoff due to conglomeration dis-synergy. However, if a spinoff is

blocked by the stakeholders whose assets cannot be impairment, then a carve-out can create wealth by resolving this asset impairment problem.

Asset impairment theory may best be understood with reference to real-world two-step spinoffs and carve-outs. Section 7 considers a number of relevant examples.

7. Application of Asset Impairment Theory to Practice

Let us focus on a well researched example in Parrino (1997). In that case, Marriott Corporation initiated a restructuring following the financial constraints faced during a recession in USA. Prior to the restructuring Marriott had shifted from a hotel ownership to a business strategy of developing franchised hotels and selling them under a contract which required payments of management service fees. Due to the weak real estate market in 1990, Marriot was unable to sell its developed hotel properties. The firm carried the debt of these unsold hotels. At the same time, due to lower occupancy rates during that recession, cash-flows from hotel operations declined. The required interest payments on hotel property reportedly were a factor in Marriott decision to separate its management services from its hotel property ownership business. That is, Marriot undertook a spinoff to return to its hotel franchise business model which it could have not implemented by selling hotels directly to franchisees during that recession. Marriott placed its hotel properties in a corporate shell and spun them off, while maintaining the right to manage the hotels.

The spin-off plan allocated most of Marriott's debt to its parent corporation, which owned the hotel properties. Those hotels were generating low cash flows and had to service a high debt level and pay a significant amount of management fees. Moody's downgraded Marriott's debt in 1992, due to its low interest coverage ratio. In contrast, the management subsidiary had little debt and generated significant cash through the management fees.

The bondholders were not protected against this restructuring through an implicit bond covenant. Despite this, the bondholders formed a committee and filed a class-action suit against Marriott with the aim of reversing the spinoff decision. The bondholders' opposition did succeed in stopping the 1992 spinoff

plan. This failed spinoff management decision fits the asset impairment theory as depicted in the bottom branch of Fig 1.

A modified spinoff plan was negotiated with the bondholders and implemented in 1993. That spinoff caused a relatively lower ratio of book-debt to total capital and higher interest-coverage for the parent firm (than would have resulted from the 1992 planned spinoff).

Therefore, Marriott mangers aimed at expropriating debtholders' wealth (as was successfully argued in a court of law). Parrino (1997) documents a decline in the total firm value and a wealth transfer from bondholders to shareholders resulting from the Marriott spinoff.

One may argue that Marriott might have achieved its goal of capturing synergy value from the restructuring by undertaking a carve-out of its hotel management company instead of spinning it off in one step. In that case, the debtholders would have benefited from a positive cash infusion equal to the market value of their potentially expropriated debt-claim through restructuring. Post-carveout market values of Marriott's property management company and Real Estate Company would have resolved asymmetric information regarding conglomeration synergy and managerial commitment to value enhancement. This could have mitigated the asset impairment problem.

The Siemens restructuring of its subsidiary Infineon is another example for asset impairment in carve-outs and spinoffs. In 1999 Siemens carved-out an unprofitable subsidiary that had about 43,000 former Siemens employees. In a post-carve-out event in Dec. 2001, Siemens sold shares of Infineon in open market to cut its stake in that subsidiary to less than 50%. Consequently, Infineon CEO Ulrich Schumacher was freed from Siemens' influence to implement his own growth strategy (something that he has publicly requested). In particular, four Siemens board members of Infineon were removed. Siemens also benefited from the fact that it no longer was required to report the subsidiary's losses in its accounts. In 2006, Infineon's memory products division was carved out and a new company called Qimonda AG was formed. That company eventually went bankrupt and 13,000 workers lost their jobs. These workers had reasonably protected-jobs under German corporate governance as a Siemens employee prior to the above restructurings.

There were two dimensions of information asymmetry that made this wealth expropriation possible: 1) there is information asymmetry on spinoff synergy that results from Infineon management being freed from Siemens' influence; and 2) there is also information asymmetry regarding staff reduction being the source of value enhancement for Siemens.

This example, high lights the corporate governance implications of asset impairment theory in practice. That is managers are focused on maximizing shareholder wealth (or at least enhancing shareholder value) subject to a constraint imposed by workers (that they should receive a fair-wage, severance pay, etc.) Managers' ex-post attempt, to enhance shareholder value through violating the stakeholder imposed constraint is an asset impairment problem. Information asymmetry makes it difficult for the parties to observe asset impairment. Shareholders also cannot fully observe managerial value enhancement efforts (motives for the spinoff) or the spinoff synergy.

The carving out of Technicom International by the Tie Communication is an example of a carve-out that was bought back by the firm in a second step. In that case, a lawsuit alleged that the management of Tie Communication committed fraud by disseminating false and optimistic information about Technicom International following and during the curve-out. In our terminology, that lawsuit alleges that the carve-out enhanced shareholder value of Tie Communication through impairing the asset of the new investors (and short sellers) in Technicom International. (See Fig.1, period 2 under share buyback).

The new shareholders were the stakeholder with a potential asset impairment problem in the above case. These shareholders had asymmetric information regarding, 1) synergy in holding the two firms together and, 2) managements' intension to impair the asset of new shareholders by raising relatively cheap funds through a carve-out. In other words, the management might have used the carve-out investors as a source of temporary capital by artificially inflating the price of Technicom stock through false dissemination of good news.

As alleged in court, issuing overpriced shares and later on buying back these shares at lower market prices raises capital at a cheap rate as opposed to directly raising funds from other financing sources. The specific allegations were that the parent's management caused Technicom to issue press releases which

misrepresented the company's sales agreements and earnings prospects and reported illusory sales to the parent by the subsidiary. These misrepresentations falsely inflated the subsidiary's reported sales and earnings to record levels, causing substantial increase in stock price. Within a year, partly due to more realistic statements by Technicom, the value of the subsidiary's stock dropped by about 90%. The parent repurchased the carve-out shares in a second post-carve-out act at substantial savings. This motive for a spinoff fits the asset impairment theory. [7]

The carve-out of CNX Gas by Consol Energy is another example to consider. CNX's main asset was the rights to coal methane gas in 4.5 billion tons of coal reserves owned or controlled by Consol. Historically, Consol, vented away the gas instead of capturing and selling it, something that most other coal companies did then. Consol started selling the gas in 1982 through its subsidiary CNX. Initially, Consol utilized CNX's cash to prop up its struggling coal business.

In August 2006, Consol carved out and privately placed CNX which had $20 million in cash on its books and no debt. According to Consol management the IPO in January 2007 was implemented to reflect its true value in its stock price. They also reported that CNX had 1.1 trillion cubic feet of proven coal-bed methane gas-reserves valued at about $3 billion at the time of the carve-out. Consol promised expanding production, acquisitions, dividends, stock repurchases by CNX and implied a spinoff as a post-carve-out event. In particular, the CEO of Consol said in an interview that "the main reason Consol retained more than 80 percent ownership is so that, if it chooses, it can eventually turn its CNX stake over to Consol shareholders in a tax free spinoff"[8]

Within 4 years of the carve-out, CNX shares increased by 21 percent and Consol's shares increased by about 15 percent. By then, Consol owned 123 million of CNX's 151 million shares, but only controlled half of the company's board of directors. Despite, the unofficial two-step spinoff preannouncement (as mentioned above), Consol made an agreement with T. Rowe Price, its block shareholder and a minority

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[7] See http://www.leagle.com/xmlResult.aspx?xmldoc=19881654836F2d818_11531.xml&docbase=CSLWAR2-1986-2006
[8] See http://www.post-gazette.com/pg/06106/682337-28.stm

CNX stockholder to repurchase CNX at $38.25, freezing out controlling shareholders. These stakeholders brought the *CNX Gas Corporation Shareholders Litigation* against Consol in Delaware Court to fight their asset impairment.[9]

The asset impairment problem in this case is difficult to observe as there are two dimensions of information asymmetry. 1) There may be synergy due to CNX gas using consol property without license fees or dis-synergy due to Consol being propped up by CNX, 2) It could have been that the management impaired the asset of the new shareholders (due to the controlling shareholder freeze out) in order to enhance old shareholder value.

The two-step spinoff of Kraft from the tobacco business of Altria is another noteworthy cae. In that case, there was expected opposition by Tobacco lawsuit claimants to a value increasing (one-step) spinoff, as it would have impaired their asset by depriving them from a claim on Kraft's assets post-spinoff. The market information showing a carve-out synergy, allowed a post-carve-out second event restructuring through a spinoff[10].

In that case, if the value of the Altria had decreased and Kraft gained value following its carve-out, then the Kraft stockholders would have expropriated wealth from the lawsuit claimants in the product liability suit against Altria in a second step spinoff. A negative abnormal return for both the parent and the subsidiary in the carve-out would have indicated that a post-carve-out spinoff was expected to be a value-decreasing event for both parties. Therefore, information asymmetry regarding conglomeration dis-synergy in a Tobacco firm holding a food company would have been resolved. In addition, market participants could have observed whether the management was in fact enhancing shareholder value by limiting the lawsuit claim or by spinning off a value draining unit.

The carve-out of Odyssey Re Holding Corp. by Fairfax Financial Holdings Ltd is one more example. At the time of this carveout there were two important factors affecting the conglomerate: 1) the firm was reportedly "in the midst of seven lean years" of operations, and 2) the subsidiary had to restate

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[9] See http://blogs.law.harvard.edu/corpgov/2010/07/13/practical-implications-of-cnx-gas-on-controlling-shareholder-acquisitions/
[10] Abnormal return calculations for the Altria-Kraft two-step spinoff are available from the authors upon request.

several years of financial results in order to fix accounting errors related to finite reinsurance contracts. There was an ongoing SEC investigation of the subsidiary's accounting practices. Allegedly, Fairfax raised funds and shifted the risk of that investigation by carving out the subsidiary. Soon after, the SEC investigation was dropped and Fairfax's finances improved, it repurchased the subsidiary. There was a lawsuit by shareholder's of the subsidiary regarding impairment of their assets with the specific allegations that the Odyssey Re directors violated their feudatory duty in going along with that repurchase.

 This alleged asset impairment was difficult to observe due to two dimensions of information asymmetry. 1) Market participants could not observe the synergy in restoring the conglomeration of the insurance and reinsurance businesses; and 2) they could not directly ascertain that the risk of a SEC investigation was a factor in the carve-out. Focusing on the possibility that the motivation for the carve-out was to enhance old shareholder value by impairing new shareholders' assets helps in a full analysis of that restructuring. Asset impairment theory facilitated this.

These examples, suggest that many carve-outs and spinoffs have specific reasons tied to taking advantage of a stakeholder (asset impairing carve-outs). Finance research in this restructuring area does not fully account for this asset impairment problem.

For example, a seminal paper by Vijh (2000) relates the announcement period returns of the carve-outs to the following "divestiture-based explanations" proposed by Schipper and Smith (1986) and others: 1) refocusing of the parent and subsidiary operations; 2) financing of new and existing projects; 3) reducing the complexity of stock valuation; 4) and enabling an eventual spinoff or third-party acquisition. Vijh's combined evidence rejects the asymmetric information hypothesis and supports the divestiture gains hypothesis of carveouts. Some carveouts in the above studies have primary reasons that are at odds with the above "divestiture-based explanations". For example, in the case of Bally's, the regulators would have only issued a casino license to a firm without a prior organized crime affiliation. Bally's CEO at the time had alleged organized crime affiliation. A carve-out in that case might have helped the subsidiary to secure a gambling license despite the parent's lack of qualifications.

8. Empirical Study

To provide evidence for our theory, we gathered data from DataStream files for all US IPO's in the period of 1970-2016. In a first step, using Edgar search of US regulatory filings and Google search of relevant news files we identified the IPO's that were subsidiary of another firm. In a second step, we gathered spinoff or buyback news of that firm after IPO from the same sources. Finally we collected stock price data for these firms for one year prior and one year post carve out and their second restructuring event if there was one.

.In addition, we undertook a text analysis methodology which identified 5 binary independent variables from the regulatory filings and news sources as follows: 1) an economic shock giving rise to valuation uncertainty (= 1 for yes and no = 0). In addition if subsidiaries stock price variance increased then a higher valuation uncertainty was indicated. If subsidiaries' stock price increased and the parents stock price decreased, then a less risky parent and a higher risk and potentially higher payoff subsidiary was indicated.

2) Wealth Appropriation (yes=1, otherwise 0). If the carve out proceeds were used by the parent then we indicated that there was wealth appropriation. If parent's stock price increased and subsidiary's price decreased, then wealth appropriation was also documented. 3) Managerial Agency Cost: did the news reports consider the management as an off balance sheet liability or an asset? (Asset =1 Liability = 0). 4) Was the two stage spin off initially announced or only the curve out stage was reported (announced = 1 or unannounced = 0). 5) Spin off synergy: was there clear reasons for an expected gain from the spin off (yes=1, no=0).

The dependent variable was also binary: carve out followed by spinoff (two stage spinoff = one) or carve out not followed by spin off (repurchase, canceled, selloff, etc. = 0).

The results of our empirical study are summarized in the following tables. Table 6 shows that existence of economic shocks which give rise to two dimensional asymmetric information and an unannounced second spinoff event are two significant variables that affect a firm's decision to undertake

the more expensive two-step spinoff restructuring process in USA instead of a one-step spinoff decision by the similar firms.

Table 6. General Linear Model: Two or one step spin off versus Economic shock and announced second event

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Factor                            Type     Levels  Values
Economic shock / Valuation Unce   fixed       2      0, 1
Wealth Appropriation Yes=1        fixed       2      0, 1
Managerial Agency cost Yes=1      fixed       2      0, 1
(un)announced Two stage Spinoff   fixed       2      0, 1
Spinoff Synergy Yes=1             fixed       2      0, 1


Analysis of Variance for Dependent variable: two stage s, using Adjusted SS for
     Tests

Source                            DF   Seq SS   Adj SS   Adj MS      F      P
Economic shock / Valuation Unce    1  1.20088  0.29073  0.29073   3.23  0.095
Wealth Appropriation Yes=1         1  0.00170  0.16269  0.16269   1.81  0.202
Managerial Agency cost Yes=1       1  0.30461  0.11107  0.11107   1.24  0.286
(un)announced Two stage Spinoff    1  1.00752  0.93311  0.93311  10.38  0.007
Spinoff Synergy Yes=1              1  0.00069  0.00069  0.00069   0.01  0.932
Error                             13  1.16882  1.16882  0.08991
Total                             18  3.68421


S = 0.299848   R-Sq = 68.27%   R-Sq(adj) = 56.07%


Unusual Observations for Dependent variable: two stage s

      Dependent
      variable:
Obs  two stage s      Fit   SE Fit  Residual  St Resid
  8      0.00000  0.53871  0.16511  -0.53871     -2.15 R
 11      0.00000  0.52258  0.15374  -0.52258     -2.03 R

R denotes an observation with a large standardized residual.
```
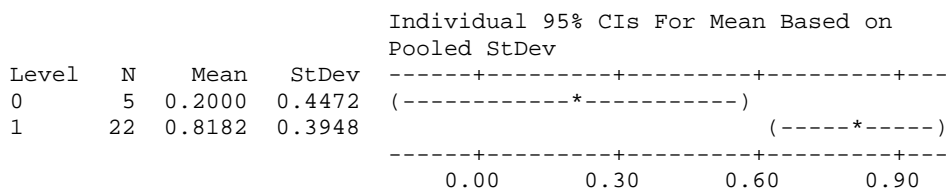
In particular, Table 7 shows that a two step spinoffs may be identified from similar one step spinoffs by existence of economic shocks which give rise to two dimensional asymmetric information.

Table 7. One-way ANOVA: Two or one step spin off versus Economic shock

```
Source                     DF    SS     MS     F      P
Economic shock / Valuati   1   1.557  1.557  9.56  0.005
Error                      25  4.073  0.163
Total                      26  5.630

S = 0.4036   R-Sq = 27.66%   R-Sq(adj) = 24.76%


                             Individual 95% CIs For Mean Based on
                             Pooled StDev
Level   N    Mean    StDev  ------+---------+---------+---------+---
0       5   0.2000  0.4472  (------------*-----------)
1       22  0.8182  0.3948                            (-----*-----)
                            ------+---------+---------+---------+---
                               0.00      0.30      0.60      0.90

Pooled StDev = 0.4036
```
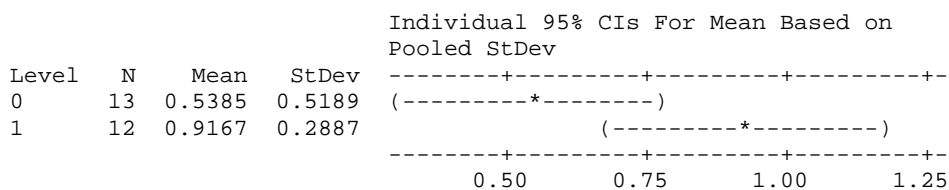
Table 8 shows that asymmetric information due to spinoff synergy is a significant
factor that separates the decision to do a two vs. one step spin off.

Table 8. One-way ANOVA: Dependent variable: two stage s versus Spinoff Synergy Yes=1

```
Source                     DF    SS     MS     F      P
Spinoff Synergy Yes=1      1   0.893  0.893  4.95  0.036
Error                      23  4.147  0.180
Total                      24  5.040

S = 0.4246   R-Sq = 17.71%   R-Sq(adj) = 14.13%


                             Individual 95% CIs For Mean Based on
                             Pooled StDev
Level   N    Mean    StDev  --------+---------+---------+---------+-
0       13  0.5385  0.5189  (---------*--------)
1       12  0.9167  0.2887                   (---------*---------)
                            --------+---------+---------+---------+-
                                 0.50      0.75      1.00      1.25

Pooled StDev = 0.4246
```
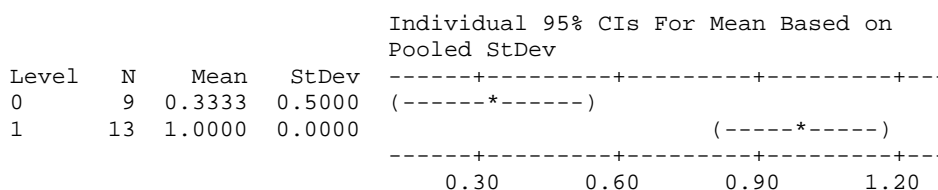
The following empirical result in Table 9, supports our theorem regarding
announcement of two step spin offs.

Table 9. One-way ANOVA: Dependent variable: two versus (un) announced Two stage

```
Source                    DF     SS     MS      F       P
(un)announced Two stage    1   2.364  2.364  23.64   0.000
Error                     20   2.000  0.100
Total                     21   4.364

S = 0.3162   R-Sq = 54.17%   R-Sq(adj) = 51.87%


                                Individual 95% CIs For Mean Based on
                                Pooled StDev
Level   N    Mean   StDev  ------+---------+---------+---------+---
0       9   0.3333  0.5000 (------*------)
1      13   1.0000  0.0000                      (-----*-----)
                           ------+---------+---------+---------+---
                             0.30      0.60      0.90      1.20

Pooled StDev = 0.3162
```

9. Conclusion

Parrino's (1997) analysis of the Marriott clinical study shows that claimant conflict caused that one-step spinoff to fail economically (costs exceeded benefits). Our paper is a generalization of that insight showing that claimant conflict can be a crucial factor for deciding between a two-step and a one-step spinoff. We also generalize a common philosophy that guides methodology in the academic field of finance. That is, instead of formulating managerial decisions based on solely maximizing shareholders' wealth we consider the implications of manager's decisions on a stakeholder's wealth and their potential reaction to those decisions.

We advocate valuation that accounts for the asymmetric information held by each stakeholder. That valuation should also consider that stakeholders' information sets are dynamic, as they change with the analyst reports and other publicly available sources of information through time. In the asset impairment theory, valuation effects are tied to information about the following factors: 1) conglomeration synergy or dis-synergy, (2) managerial conglomeration agency cost, and (3) stakeholder asset impairment problem. These valuation effects can make a two-step spinoff Pareto optimal over a one-step process.

We provide a general theory for making two-step spinoff decisions that considers the expected future change in value of the claims of various stakeholders when there is multi-dimensional asymmetric

information. That is, 1) managers' quality and 2) the spinoff synergy / dis-synergy are privately known by one side. We focus on analyzing stakeholder conflicts dynamically. In our theory, as the firm's circumstances change over time, the stakeholders could decide to block or not to block a spinoff. For them to do so, it is crucial that they can reasonably argue wealth expropriation as it is about to happen and to ask for relief from a court or a regulator. Therefore, the ability to fight wealth expropriation by law or other means is a significant element of our analysis.

The two-step spinoff process is initiated when the management believes that the firm can realize a higher stand-alone value as two separate units than a conglomerate. However, it cannot justify a spinoff due to an asset impairment problem. In this case, the investors benefit from a two-step spinoff, since the synergy gain is fully realized following the post-curve-out divestiture. The stakeholders can block a 100% (one-step) spinoff on the grounds that it was not economically justified, but solely undertaken to expropriate their wealth. In contrast, they may not be able to block a carve-out; hence a two-step spinoff may be a feasible alternative.

Through the market valuation, post-carve-out, the information asymmetry regarding merger synergy is resolved. Then, announcing and implementing the second step of a successful two-step spinoff process conveys additional information regarding lack of managerial conglomeration agency costs. In this case, both units gain from removing dis-synergy associated with conglomeration and one unit gains from mitigation of conglomeration agency costs. Therefore, the shareholders benefit from a two-step spinoff.

The stakeholders may also benefit immediately after the spinoff due to their claims on assets of a more valuable parent (impaired unit) company. Of course, the stakeholders lose their claim on the subsidiary's (unimpaired unit) assets. This can be seen as an economically justifiable dilution of stakeholder claims.

The stakeholders who experience wealth expropriation need to prove that the carve-out is an unfair method of diluting their claim, rather than a business activity with legitimate economic purpose. A one-step spinoff process is therefore, much more likely to be blocked than a two-step process which involves

an initial minority carve-out. That process helps the managers to prove conglomeration dis-synergy through market valuation.

In a two-step spinoff, the release of credible information during the IPO process of a carve-out can change erroneous or naïve information about merger dis-synergy. Successful execution of a complex two-step spinoff process also reduces information asymmetry about managements' quality. When the manager's insider information is unfavorable, there is no incentive to undertake a carve-out which releases that unfavorable information to the public. In that case, management will not implement a two-step spinoff.

This paper develops a corporate governance tool that advocates maximizing shareholder wealth considering the claim of another stakeholder. The stakeholder claim may also not necessarily be their fair-share. We mean that stakeholders may impose costs by fighting for their fair share (to resist asset impairment). However, the result of that fight depends on the stakeholder's power to oppose the management.

In asset impairment theory, shareholders may underprice the firm irrationally. That is, Lamont and Thaler's (2003) mispricing hypothesis can be accommodated. Managers, then, carve-out a firm in an attempt to mitigate the market mispricing. A carve-out may provide intense analysis of an IPO offering which may mitigate irrational underpricing due to lack of information.

The spinoff synergy in asset impairment theory may also be solely based on wealth expropriation of a stakeholder's claim. For example, in the textbook justification for synergy one states that a single accounting department may perform the duties of two separate accounting units. An alternative explanation is that the synergy gain is obtained by expropriating the wealth of the accounting workers!

References

Abarbanell, J. S., Bushee, B.J. and Raedy, J.S., 2003. Institutional investor preferences and price pressure: the case of corporate spin-offs. Journal of Business 76, 233-261.

Ahn, S., and Denis, D., 2004. Internal capital markets and investment policy: evidence from corporate spinoffs. Journal of Financial Economics 71 (3), 489-516.

Beneish, M.D., Jansen, I.P., Lewis, M.F. and Stuart, N.V., 2008. Diversification to mitigate expropriation in the tobacco industry. Journal of Financial Economics 89, 136–157.

Colak, G. and Whited, T.M., 2007. Spin-offs, divestitures, and conglomerate investment. Review of Financial Studies 20(3), 557-595.

Hunt, Peter, 2007. Structuring Mergers & Acquisitions: A Guide to Creating Shareholder Value, Aspen Publishers, Inc.; 3 edition.

Klein, A., Rosenfeld, J. and Beranek, W., 1991. The two stages of an equity carve-out and the price response of parent and subsidiary stock. Managerial and Decision Economics 12(6), 449–460.

Lamont, O.A. and Thaler, R.H., 2003. Can the market add and subtract? Mispricing in tech stock carve-outs. Journal of Political Economy 111 (2), 227-268.

Low, A., 2002. A study of two-step spinoffs. Financial Markets, Institutions and Instruments 11, 337-347.

Michaely, R. and Shaw, W. H., 1995. The choice of going public: spin-offs vs. carve-outs. Financial Management 24 (autumn), 5-21.

Mikkelson, W.H. and Ruback, R.S., 1991. Targeted repurchases and common stock returns. Rand Journal of Economics 22, 544-561.

Nanda, V. 1991. On the good news in equity carveouts. *Journal of Finance* 46 (December): 1717-1737.

Parrino, R., 1997. Spinoffs and wealth transfers: the Marriott case. Journal of Financial Economics 43, 241-274.

Perotti, E., and Rossetto, S., 2007. Unlocking value: equity carve outs as strategic real options. CEPR Discussion Paper No. DP6268.

Rajan, R., Servaes, H., and Zingales, L., 2000. The cost of diversity: the diversification discount and inefficient investment. Journal of Finance 55, 35-80.

Schipper, K. and Smith, A., 1983. Effects of recontracting on shareholder wealth – the case of voluntary spin-offs. Journal of Financial Economics 12, 437-467.

Veld, C. and Veld-Merkoulova, Y.V., 2004. Do spin-offs really create value? The European case. Journal of Banking and Finance 28, 1111-1135.

Vijh, A. M., 2002. The positive announcement-period returns of equity carveouts: asymmetric

information or divesture gains? Journal of Business 75(1), 153–190.

Zingales, L., 1995. Insider ownership and the decision to go public. Review of Economic Studies 62 (3),

425-448.

Appendix Proofs

1. Proof of Theorem 1

Adding expected values of the parent and the subsidiary, the combined shareholder valuation for the two

firms after the spinoff, called "$\Sigma_{\text{S-spinoff}}$" is as follows:

$$\Sigma_{\text{S-spinoff}} = V^1 + V^2 - (p\ C^1_H + (1\text{-}p)\ C^1_L) + (-)\ (C^2_H + C^2_L) \tag{1}$$

The dis-synergy or synergy effects are reversed for a conglomerate, so the shareholders value it as

follows: $\Sigma_{\text{S-conglomerate}} = V^1 + V^2 - (p\ C^1_H + (1\text{-}p)\ C^1_L) - (+)\ (C^2_H + C^2_L)$ (2)

The management values the two stand-alone entities together after a spinoff, $\Sigma_{\text{M-spinoff}}$ and as a

conglomerate, $\Sigma_{\text{M-conglomerate}}$ as follows: $\Sigma_{\text{M-spinoff}} = V^1 + V^2 - (p\ C^1_H + (1\text{-}p)\ C^1_L) + (-)\ 2C^2$ (3)

$$\Sigma_{\text{M-conglomerate}} = V^1 + V^2 - (p\ C^1_H + (1\text{-}p)\ C^1_L) - (+)\ 2C^2 \tag{4}$$

$\Sigma_{\text{1-spinoff}}$, the expected value of the payoff to the stakeholders in a spinoff is as follows:

$$\Sigma_{\text{1-spinoff}} = \text{Min}\ \{(V^1 + (-)\ \tfrac{1}{2}\ (C^2_H + C^2_L),\ (p\ C^1_H + (1\text{-}p)\ C^1_L)\} \tag{5}$$

In case of conglomeration, the stakeholder claim is on $V^1 + V^2 - (+)\ (C^2_H + C^2_L)$ and has the following

expected value: $\Sigma_{\text{1-conglomerate}} = \text{Min}\ \{(V^1 + V^2 - (+)\ (C^2_H + C^2_L),\ (p\ C^1_H + (1\text{-}p)\ C^1_L)\}$ (6)

Substituting conglomeration dis-synergy in equations (1)-(4) and comparing equations (1)-(2) and (3)-(4)

=> $\Sigma_{\text{S-conglomerate}} + 2(C^2_H + C^2_L) = \Sigma_{\text{S-spinoff}}$ and $\Sigma_{\text{M-conglomerate}} + 4C^2 = \Sigma_{\text{M-spinoff}}$. Substituting spinoff synergy in

equations (5) and (6) => $\Sigma_{\text{1-conglomerate}} < \Sigma_{\text{1-spinoff}}$ if, $\tfrac{1}{2}(C^2_H + C^2_L) < (p\ C^1_H + (1\text{-}p)\ C^1_L)$ or $V^2 - (C^2_H + C^2_L) <$

$\tfrac{1}{2}(C^2_H + C^2_L)$. In economic terms, $\tfrac{1}{2}(C^2_H + C^2_L) < (p\ C^1_H + (1\text{-}p)\ C^1_L)$ means that spinoff expropriates

stakeholders' wealth if their expected claim exceeds the expected synergy gain. Or $V^2 - (C^2_H + C^2_L) <$

$\tfrac{1}{2}(C^2_H + C^2_L)$. That is, the asset impairment condition in equation 1 is satisfied. If the asset impairment

condition is violated, then the stakeholders can impose costs by arguing against spinoff in court. Hence, there is a "spinoff stakeholder conflict". However, the management may chose to undergo a minority carve-out of value V^2, such that $V^2 < 1.5(C^2_H + C^2_L)$ => $V^1 + V^2 - (p\ C^1_H + (1-p)\ C^1_L) – (C^2_H + C^2_L) > V^1 – (p\ C^1_H + (1-p)\ C^1_L) + \frac{1}{2}\ (C^2_H + C^2_L)$ => $\Sigma_{\text{1-spinoff}} > \Sigma_{\text{1-conglomerate}}$

For the only if proof, note that if the management could publicly justify a full distribution of all shares of the subsidiary, then a one-step spinoff dominates a two-step spinoff due to its lower costs. QED

2. Proof of Theorem 2

Pre-carve-out, asymmetrically informed shareholders subtract value (or underprice) due to conglomeration dis-synergy and value a conglomerate as follows:

$$\Sigma_{\text{S-conglomerate-pre-carve-out}} = V^1 + V^2 – (p\ C^1_H + (1-p)\ C^1_L) – (C^2_H + C^2_L) \tag{1}$$

Post-carve-out, asymmetrical information regarding synergy is resolved. Therefore, shareholders assign the same conglomeration dis-synergy adjustment as the managers and value a conglomerate as follows: $\Sigma_{\text{S-conglomerate-post-carve-out}} = V^1 + V^2 – (p\ C^1_H + (1-p)\ C^1_L) - (C^2 + (-) C^2) \tag{2}$

The term $- (C^2 + (-) C^2)$ indicates that we either have the (at least condition of) one unit being propped up by the other in conglomeration or a conglomeration dis-synergy. Shareholders assign a combined value of $\Sigma_{\text{S-carved-out}}$ to the two separate firms post carve-out (See Table 4, columns 2-3):

$$\Sigma_{\text{S-carved-out}} = (V_2 – (+) C_2) + ((V_1 – (p\ C^1_H + (1-p)\ C^1_L) + C2) = V^1 + V^2 – (p\ C^1_H + (1-p)\ C^1_L) + 0 \tag{3}$$

=> $V^1 + V^2 – (p\ C^1_H + (1-p)\ C^1_L) + (C^2 + (-) C^2) > V^1 + V^2 – (p\ C^1_H + (1-p)\ C^1_L) - (C^2_H + C^2_L)$

=> $\Sigma_{\text{S-conglomerate-pre-carve-out}} + (C^2_H + C^2_L) + (C^2 + (-) C^2) = \Sigma_{\text{S-Carve-out}}$

The management values the two entities post-carve-out, $\Sigma_{\text{M-carve-out}}$ as follows:

$$\Sigma_{\text{M-carve-out}} = (V^1 + C^2) + (V^2 – (p\ C^1_H + (1-p)\ C^1_L) + (C^2 + (-) C^2)) \tag{4}$$

The management values the two entities in a conglomerate, $\Sigma_{\text{M-conglomerate}}$ as follows:

$$\Sigma_{\text{M-conglomerate}} = V^1 + V^2 – (p\ C^1_H + (1-p)\ C^1_L) - (C^2 + (-) C^2) \tag{5}$$

That is, if one unit is propped up by the other, $\Sigma_{\text{M-conglomerate}} = \Sigma_{\text{M-carve-out}}$ and when the managers assign conglomeration dis-synergy, then $\Sigma_{\text{M-conglomerate}} + 4C^2 = \Sigma_{\text{M-carve-out}} => \Sigma_{\text{M-conglomerate}} \leq \Sigma_{\text{M-carve-out}}$

The shareholder valuation prevails in the market place and therefore, pre-carve-out, there is a loss of $(C^2_H + C^2_L)$ in firm value due to lack of synergy. Presence of an additional stakeholder claim makes a spinoff of the subsidiary sub-optimal (also see Theorem 1). However, a carve-out is feasible. Following the carve-out, the uncertainty about synergy is resolved. Therefore, the total firm values increases by $(C^2_H + C^2_L)$ based on shareholders' valuation. In addition, for the propped up case, there is a reduction in one firm's value and an increase in the other firm's value or there is a gain in both unit values. Post-carve-out, the shareholders observe the new market prices, update their information set, and agree with the management on conglomeration synergy.

For the if-and-only-if in part 1), note that if there is no asymmetric information about synergy, then both the mangers and the shareholders identically value the firm pre and post-carve-out. Therefore, carve-out generated no economic value. For part 2), note that if the managers assign conglomeration synergy, then they will not implement a carve-out. For condition 3), note that if the shareholders do not underprice or assign conglomeration synergy, then they will not assess a gain to carving the two units out. For part 4), note that if the managers cannot convincingly show that the gain from issuing a minority stake in a carve-out does not impair the assets of the stakeholders under asymmetric information, the stakeholders block the carve-out to protect their assets against impairment. If it is not possible for the stakeholder to impose costs on the firm by seeking protection against asset expropriation, then a one-step spinoff dominates a two-step process. QED

3. Proof of Theorem 3

Case 1) Post-carve-out both units gain value (or one unit gains more than the other loses value), then the information asymmetry regarding synergy is resolved and conglomeration dis-synergy is revealed to the market. A post-carve-out spinoff adds value by showing that the management does not suffer from

managerial conglomeration agency problem. That is, keeping control of a majority stake in a carved-out subsidiary demonstrates managerial conglomeration agency cost and therefore is a sub-optimal solution. i.e., $m_{spinoff} > m_{carve-out.}$

Case 2) Post-carve-out both units lose value (or one unit loses more than the other gains in value), then the information asymmetry is resolved and conglomeration synergy is revealed to the market. That is, the carve-out is a sub-optimal solution and the management may enhance value by buying the carved out subsidiary back.

Case 3) there is a reduction in one unit's value and an equal increase in the other unit's value. The shareholder valuation prevails in the market place and therefore, pre-carve-out, there is a loss of $(C^2_H + C^2_L)$ in firm value due to lack of synergy. Following the carve-out, the uncertainty about synergy is resolved. Therefore, the total firm values increases by $(C^2_H + C^2_L)$ based on shareholders' valuation. The shareholders observe the new market prices, update their information set, and agree with the management on conglomeration synergy. In this case, the purpose of carve-out is to generate value by removing shareholder underpricing.

The plausible explanation for the resulting carve-out state to persist indefinitely is managerial conglomeration agency problems. That is, there is no synergy reason for managers to indefinitely hold a majority carve-out stake in a weak unit that is propped up by a strong unit. Therefore a carve-out solution is dominated by a post-carve-out second restructuring spinoff solution.

However, a manager that suffers from conglomeration agency problem would prefer to retain a majority stake in a carved out entity to consume perks associated with conglomeration. Therefore, a long-lived or a permanent carve-out is a sub-optimal state due to managerial conglomeration agency problems.

In case 3), the reduction in one unit's value (impaired unit) may be due to the management impairing the asset of a stakeholder (wealth expropriation). Then the unimpaired unit post-carve-out is expected to gain by the amount of expropriated wealth. In this case, either the stakeholder successfully fights the wealth expropriation and forces a buy back of the carved out entity or the stakeholder does not fight (or loses the fight against) asset impairment. It is then, optimal for the managers to spinoff the

impaired-unit to fully protect the unimpaired unit from stakeholder claims. (Expropriate wealth from all the shares as opposed to a minority holding in the impaired unit. QED

4. Proof of Theorem 4

$q_s (4C^2 + m) > (1-q_s) Z + z => q_s [(V^2 + C^2) + V^1 - p C^1_H - (1-p) C^1_L + C^2 + m] + (1 - q_s) [V^1 + V^2 - p C^1_H - (1-p) C^1_L - 2C^2 - Z] - z > [V^1 + V^2 - p C^1_H - (1-p) C^1_L - 2C^2] => \Sigma_{M\text{-conglomerate}} < E (\Sigma_{M\text{-spinoff}} - costs)$

Therefore, the managerial valuation shows a gain from spinoff. A spinoff completely resolves managerial conglomeration agency costs (which are partially mitigated in a carve-out). There is asset impairment because a carve-out was done in the first step of the restructuring instead of a spinoff. The spinoff is not blocked by the stakeholders, as long $3C^2 + m + L/ p_w > V^2 => V^1 - p C^1_H - (1-p) C^1_L + C^2 + m > (V^1 + V^2 - p C^1_H - (1-p) C^1_L - 2C^2) p_w + (V^1 - p C^1_H - (1-p) C^1_L + C^2 + m) (1 - p_w) - L$

Therefore, the stakeholder gains from a spinoff and does not block it.

For the only if part note that when $q_s (4C^2 + m) < (1-q_s) Z + z$ then a spinoff destroys value and when $(1 - p_w) (V_1 - p C^1_H - (1 - p) C^1_L + \frac{1}{2} (C^2_H + C^2_L)) + m + L + 1.5(C^2_H + C^2_L) p_w < V^2 p_w,$ then, the stakeholders find it optimal to block the spinoff.

According to carve-out instability theorem, $q_s (4C^2 + m) > (1-q_s) Z + z$ is a special case when the carve-out generates value. In other cases (when it destroys value) a carve-out must be bought back.

5. Proof of Theorem 5

$q_s (4C^2) > (1-q_s) Z => q_s [(V^2 + C^2) + V^1 - p C^1_H - (1-p) C^1_L + C^2] + (1 - q_s) [V^1 + V^2 - p C^1_H - (1-p) C^1_L - 2C^2 - Z] > [V^1 + V^2 - p C^1_H - (1-p) C^1_L - 2C^2] =>$ that is $\Sigma_{M\text{-conglomerate}} < E (\Sigma_{M\text{-spinoff}} - costs)$

Therefore, the managerial valuation shows a gain from spinoff. However, spinoff is blocked by the stakeholders whose assets cannot be impairment.

$V^2 < 1.5(C^2_H + C^2_L) => V^1 - p C^1_H - (1-p) C^1_L + \frac{1}{2} (C^2_H + C^2_L) > V^1 + V^2 - p C^1_H - (1-p) C^1_L - (C^2_H + C^2_L) =>$ Therefore, the stakeholder gains from a carve-out and does not block it.

For the only if part 1), note that if $q_s (4C^2) < (1-q_s) Z$, then the management finds that a carve-out destroys value. 2) If the stakeholder assets can be impaired, then a one step spinoff dominates. Because, $\Sigma_{\text{M-conglomerate}} < E (\Sigma_{\text{M-spinoff}} - \text{costs})$ for a minority stake implies that the gain would be even larger for an entire spun off stake. 3) If $V^2 > 1.5(C^2_H + C^2_L) \Rightarrow V^1 - p C^1_H - (1-p) C^1_L + \frac{1}{2} (C^2_H + C^2_L) > V^1 + V^2 - p$ $C^1_H - (1-p) C^1_L - (C^2_H + C^2_L) \Rightarrow$ the stakeholder lose value in a carve-out and do block it. QED