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The Effect of Investor Disagreement on Wealth Gain from Corporate Spinoff Announcements

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ABSTRACT

This study empirically tests the implication of theories of differences of opinion (DO) model. We extend Kim (2017)'s bivariate analysis of the effect of investor disagreement on stock prices to a multivariate analysis. The prior literature has examined sources for wealth gains generated from spinoff announcements based on the assumption that managers act rationally to maximize the shareholder value. Thus, rational investors react positively to spinoff decisions. However, these motives—value creation through a spinoff by reducing information asymmetry, by focusing on core business, or by splitting up a large portion of assets to a spun-off—at best have limited power to explain wealth gains. Using a sample of corporate spinoff announcements in the U.S, we show that not only because investors have different priors and interpret information differently, but also because they react to the announcement in the manner that is consistent with the idea of limited attention, the disagreement factor, which is defined by such investor behavior account for a significant fraction of the cross-sectional variation in the announcement abnormal returns.

Keywords: Differences of opinion, Investor Behavior, Corporate Spinoff

1. Introduction

Temporal surges in trading volume of stocks associated with a firm's public announcement of a major event—such as, earnings, stock splits, spin-offs and mergers and acquisitions—are well known, and the literature abounds linking the temporal volume surge to contemporaneous mispricing of stocks which astute investors can take advantage of a short-lived, fleeting market anomaly. Numerous analytical reasons have been advanced as being accountable for the anomaly, such as the actions

of informed traders vs. irrational noise traders, the presence of information asymmetry between managers and shareholders and liquidity shocks [See Grossman and Stiglitz, 1980; Kyle, 1985; Admati and Pfleiderer, 1988; Foster and Viswanathan, 1993; Kim and Verrecchia, 1994, Wang, 1994, Tkac, 1999, Lo and Wang, 2000].

However, these analyses are based upon the framework of rational expectations models in which agents share common priors and interpret information in the same way. Departing from this dominant analytical framework, Banerjee and Kremer (2010) set forth a dynamic difference-of-opinion (henceforth DO) model in which investors have heterogenous beliefs and interpret information differently. In particular, Focusing on a change in the level of disagreement

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induced by an infrequent, yet a material event, Banerjee and Kremer's model is able to generate those patterns in trading volume and to explain a positive relation between trading volume and overpricing without assuming exogenous noisy processes typically employed in noisy rational expectations models.

Kim (2017A) empirically investigate the implications of Banerjee and Kremer's model by applying their idea of a change in the level of DO into Miller (1977)'s static DO model. Specifically, selecting corporate spinoff announcements by the U.S public firms from 1964 to 2005 as material information event, he estimates several measures of disagreement from trading volume and examines changes in the levels of DO among investors and their impacts on price reactions days surrounding the announcements of corporate spinoffs. He documents that the levels of DO jump during the announcement period, indicating widely differential interpretation about the spinoff news among investors. However, the magnitude of the increase (i.e., disagreement shock) is negatively related to the ex-ante levels of DO, which are the levels of DO in a typical trading day— in contrast to the levels in the announcement period (i.e., the event levels of DO). More importantly, he shows that it is the dynamic relation between the ex-ante levels of DO and the disagreement shocks that causes a negative correlation between the ex-ante levels of DO and the abnormal returns of the sample firms.

However, Kim (2017A) study focuses only on the bivariate relationship between “disagreement proxies” and stock price change from spinoff announcements. This price change, a mean price gain induced by the announcements referred to as wealth gain or wealth effect, is well documented and considered a stylized fact in corporate finance literature. Researchers have investigated causes for the wealth effect based on the premise of rational economic agents such that managers act rationally to maximize the shareholder value, and thus rational investors react positively to spinoff decisions. What they found is that firms create value through a spinoff by reducing information asymmetry, by focusing on core business, or by splitting up a large portion of assets to a spun-off subsidiary.

In this paper, we break away from the framework of rational investors, and examine the effect of their non-rational behavioral characteristic on wealth gain. To do so, we bring Kim (2017A)'s main result to a more stringent test. Specifically, we investigate the effect of the ex-ante level of DO of a firm or a firm's attribute that is defined by investors' disagreement about the firm's prospect on a price change days surrounding its spinoff announcement. Moreover, we test whether this non-rational behavioral factor, even after controlling for the other known rational factors, can provide an incremental explanatory power for wealth effect.

In addition, the contradictory findings on information asymmetry effects (Krishnaswami and Subramaniam, 1999; Huson and MacKinnon, 2003) and the inconsistency of findings related to the effect of focus factor (Daley et al., 1997; Desai and Jain, 1999; Veld and Veld-Merkoulova, 2008) on the wealth gain warrant the examination of these important factors respectively. Therefore, to obtain more reliable results for these factors we re-examine these important empirical issues with a larger sample of corporate spinoffs, compared to these previous studies, announced in the U.S during a 41-year period from 1964 to 2005.

In section II, we re-examine each of three known determinants of wealth gain from spinoff announcements. The results of cross-sectional regression analyses are reported and discussed in section III. Section VI concludes the paper.

II. Control Variables: Known Determinant of Wealth Gain

A. Information Asymmetry

Krishnaswami and Subramaniam (1999) argue that for firms with multiple business units, information asymmetry between managers and investors arises because investors observe an aggregate cash flow to the entire firm while managers discern actual cash flows to individual divisions. Hence, if a firm is

undervalued due to information asymmetry problem, then the management has an incentive to split up the firm into independently traded units through a spinoff to attain a fair market value. They propose the information hypothesis that there should be a decline in information asymmetry after the completion of a spinoff, and abnormal returns during the spinoff-announcement period should be greater the higher the level of information asymmetry since investors anticipate a higher valuation of a firm as a result of reduction in information asymmetry.

Using several proxies for information asymmetry based on analysts' earnings forecasts, they document a significant decrease in those proxies from the pre-spinoff to the post-spinoff period. They also find that their sample firms have significantly larger values in those proxies than the control samples do. These results seem to indicate that information asymmetry problem is motivation behind a decision to implement a spinoff. Furthermore, they find a significantly positive relationship between the level of information asymmetry and announcement abnormal returns.

However, Huson and MacKinnon (2003) offer an opposite view. They argue that corporate spinoff will not improve information asymmetry problem, but rather to exacerbate it. They contend that a spin-off can provide an informational advantage to informed investors who possess superior knowledge about either a parent firm or its subsidiary. For the parent firm prior to spinoff, there is no informational edge for the informed over the uninformed because the complexity of the parent's operations may be equally daunting to both groups of investors. But a spinoff creates an opportunity to capitalize on the informed investors' specialized knowledge on the parent or the subsidiary.

Huson and MacKinnon (2003) use the residual standard deviation of stock returns as an indicator of information environment, and document a significant increase in the indicator from the pre-spinoff to the post-spinoff period. Interestingly, they find that the significant increase in the indicator is only observed for the firms that engage in focus-increasing spinoff. This evidence further supports their contention that the

exploitation of informational advantage by the informed investors would be greater for focus-increasing spinoffs. In other words, a spinoff reduces the inherent diversification benefit, or the mitigation in the information asymmetry engendered by having multiple business units within a firm (i.e. conglomerate). The authors also present evidence for the deterioration in information asymmetry from the pre- to the post-spinoff using proxies derived from market microstructure theories (i.e., the effective spread and price impact), and show that the increase is restricted to focus-increasing firms. An out-of-sample test of the information hypothesis comes from Veld and Veld-Merkoulova (2004). For a sample of 156 spinoffs which occurred in 15 different European countries for the period 1987-2000, they find no evidence of a significant relationship between announcement abnormal returns and the levels of information asymmetry though they employ the same proxies for information asymmetry as Krishnaswami and Subramaniam (1999) use.

With the conflicting evidence on the effect of information asymmetry on spinoff, we investigate whether the information hypothesis holds with our spinoff sample, which is larger in size and covers a longer period as compared to the studies by Krishnaswami and Subramaniam (1999) and Huson and MacKinnon (2003). Since this paper is an extension of Kim (2017A), we use the same sample that includes the publicly traded companies in the U.S that announced and completed corporate spinoff during a 41-year period from 1964 to 2005.¹⁾ As measures for information asymmetry, we use the estimated values in Kim (2017B) of analyst earning forecast dispersions (*DISP1* and *DISP2*), the idiosyncratic volatility of the residuals of the market model of stock returns (*SIGMA*), and Corwin and Schultz (2012)'s measure of the effective spread (*CSSPRD*) (see Section 5.1 and 5.2 of Kim, 2017B) for the estimation details for these proxies). In addition, we include a measure of liquidity developed by Amihud (2002). It is defined as the daily ratio of absolute stock return to its dollar trading volume, or *ILLIQ*. Since it measures a daily price change per

1) Since we use the same sample as Kim (2017A), the detail of the sample collection procedures and its summary statistics are not reported here.

dollar trading volume, it is in fact a measure of price impact or market illiquidity for a stock.

First, we test statistical significances of the differences in changes in those five proxies for information asymmetry from the pre-spinoff to the post-spinoff period. Note that we examine changes in information asymmetry for the parent firms. To measure the proxies (*DISP1*, *DISP2*, \overline{CSSPRD} , \overline{ILLIQ} and *SIGMA*) in the post-spinoff period, we use the same length of the estimation period as the pre-spinoff (or pre-event) period. The post-spinoff period begins on the day following the ex-date and ends on the 250th-trading day or (ED+1, ED+250) in which ED stands for the ex-date of a spinoff. In this time window, we also

calculate the mean of daily estimates of *CSSPRD* and *ILLIQ*, and estimate *SIGMA* for each sample firm. For *DISP1* and *DISP2*, we compute the mean of monthly estimates of *DISP1* and *DISP2* based on the standard deviation of analysts' earnings forecasts from the Unadjusted Summary File in the Institutional Broker Estimate System (IBES) database for a 12-month period, starting from a month after the ex-date month.

Table 1 presents the sample mean and the median of each liquidity measures in the pre- and post-spinoff periods. In Panel 1, we group *CSSPRD*, *ILLIQ*, and *SIGMA* together, and label them as market-based liquidity. In Panel 2, we put *DISP1* and *DISP2* together since these measures are derived from the analysts'

Table 1. Changes in Information Asymmetry from the Pre-Spinoff to the Post-Spinoff Period

	Obs	Mean			Median		
		Pre	Post	Diff	Pre	Post	Diff
Panel 1. Market-based liquidity							
<i>CSSPRD</i>	202	0.775	0.968	-0.193 ^a	0.650	0.709	-0.058 ^a
<i>SIGMA</i>	202	0.023	0.025	-0.002 ^a	0.020	0.021	-0.001 ^b
<i>ILLIQ</i> (x 10 ⁶)	202	0.145	0.311	-0.166 ^a	0.008	0.009	-0.001 ^a
Panel 2. Analysts' earnings forecasts							
<i>DISP1</i>	163	0.227	0.192	0.035	0.051	0.074	-0.024 ^a
<i>DISP2</i>	163	0.007	0.013	-0.005 ^b	0.003	0.005	-0.001 ^a
Panel 3. Focus-increasing and Non-Focus-increasing (market-based liquidity)							
Focus	134						
<i>CSSPRD</i>		0.725	0.939	-0.214 ^a	0.600	0.658	-0.058 ^a
<i>SIGMA</i>		0.022	0.025	-0.003 ^a	0.019	0.020	-0.001 ^b
<i>ILLIQ</i> (x 10 ⁶)		0.133	0.344	-0.211 ^b	0.015	0.015	0.000 ^a
Non-Focus	68						
<i>CSSPRD</i>		0.875	1.027	-0.152 ^b	0.690	0.822	-0.133 ^a
<i>SIGMA</i>		0.024	0.025	-0.001	0.021	0.022	0.000
<i>ILLIQ</i> (x 10 ⁶)		0.168	0.245	-0.077	0.005	0.005	0.000
Panel 3. Focus-increasing and Non-Focus-increasing (analysts' earnings forecasts)							
Focus	106						
<i>DISP1</i>		0.095	0.143	-0.047 ^a	0.049	0.071	-0.021 ^a
<i>DISP2</i>		0.007	0.013	-0.005 ^c	0.003	0.005	-0.002 ^a
Non-Focus	57						
<i>DISP1</i>		0.471	0.282	0.189	0.054	0.081	-0.027 ^c
<i>DISP2</i>		0.007	0.012	-0.005 ^c	0.003	0.004	-0.001

Note: The statistical significances are estimated using the parametric paired *t*-tests for the differences in the means and the non-parametric Wilcoxon signed rank tests for the differences in the medians. ^{a, b, and c} indicate the significance at the 1, 5, and 10% respectively.

earnings forecasts. Note that *DISP1* and *DISP2* capture information asymmetry between insiders of a firm and analysts who follow the firm. It means that both reflect information asymmetry among a subset of market participants. However, the market-based liquidity proxies estimated with the data generated from the market seem to be a better proxy for information asymmetry, since they reflect information asymmetry between the informed and the uninformed more broadly.

As shown in the table, for all the proxies for information asymmetry, there is a significant deterioration from the pre-spinoff period to the post-spinoff period. The differences in the means (except *DISP1*) and the medians of all market-based liquidity measures are negative and significant at the 1% level. The cost of trading shares (*CSSPRD*) on average increases by 0.19% and the price impact of trading volume is also larger in the post-event period. The presence of the informed traders seems to be more intensified as it is indicated by the greater mean value of *SIGMA* in the post-spinoff period. In particular, even in *DISP1* and *DISP2*, the worsening information environment after the completion of a spinoff is evident. Though *DISP1* decreases in the post-event period, it is not significant. Yet, because of the high non-normality of *DISP1* and *DISP2*, the test of the difference in the median between *DISP1* and *DISP2* is more reliable. We find the differences in the medians are significantly negative for both measures at the 1% level.

Therefore, we find no support for the information hypothesis related to corporate spinoff. As our results show, there is no enhancement, but rather deterioration in information asymmetry. It also implies that a positive relation between spinoff announcement returns and information asymmetry might not be due to investors' recognitions of expected improvement in a firm's value through a spinoff. Perhaps, there is no relation at all between these two variables. In fact, none of the Spearman correlations between the liquidity proxies and announcement abnormal returns are significant except *ILLIQ*.

In Panel 3, we examine whether the exacerbation of information asymmetry is confined to the sample firms that spin off unrelated subsidiaries (i.e., focus-increasing spinoff). We define a focus-increasing spinoff as a

firm that creates a subsidiary whose two-digit Standard Industrial Classification (SIC) code is different from that of the parent (Desai & Jain, 1999). Otherwise, we classify a firm as a non-focus-increasing spinoff. Consistent with Huson and MacKinnon (2003), we find that all measures of market-based liquidity in the focus-increasing sample decrease significantly in the post-spinoff period, while those of the non-focus-increasing sample experiences no significant change from the pre-spinoff to the post-spinoff period (except *CSSPRD*, which increase on average by 0.15%). For the focus-increasing firm, the differences in the means and the medians of all the market-based liquidity proxies between the pre-spinoff and the post-spinoff period are significant at the 1% level.

In addition, in Panel 4 the same inference can be drawn from *DISP1* and *DISP2*. A significant increase in both measures is consistently observed only in the focus-increasing firms. Thus, the results in Panel 3 and 4 reinforce the finding in the Panel 1 and 2. If the information hypothesis is valid, we should observe a greater improvement in information asymmetry for focus-increasing spinoffs than for non-focus-increasing spinoffs. Our findings here contradict the hypothesis.

B. Industrial Focus

A conventional view in corporate finance is that the diversification of a firm's business portfolio destroys shareholders' value (see Martin & Sayrak, 2003 for a review on the topic). Under this view, the stocks of diversified firms are traded at a discount, which is commonly known as a conglomerate (diversification) discount. Originally, Berger and Ofek (1995) document that diversified firms (compared to the sum of imputed stand-alone values of their segments) are, on average, valued at a discount of 13% to 15% and that the extent of loss in value is less severe for a diversified firm composed of related business units. John and Ofek

(1995) study the effect of corporate divestiture in the form of sales of assets. They show that disposition of assets leads to an increase in profitability of the remaining assets, and document that the improvement in profitability

is generally limited to firms that sold off assets unrelated to their core business.

Corporate spinoffs offer a relative simple way to eliminate diversification discount by providing a demonstrable mean for a firm to improve its business focus. Daley et al. (1997) initially find that significantly positive announcement abnormal returns are limited to focus-increasing spinoffs because investors rationally expect performance improvement only from these spinoffs. Desai and Jain (1999) examine the long-term performance of a sample of spinoffs from 1975 to 1991, and document that only focus-increasing firms earn significantly positive announcement and long-term abnormal returns.

If one believes in the existence of diversification discount, the decision to reduce diversification obviously signals positive news to the market. Furthermore, the decision to divest non-core or unrelated business units will logically attract a more positive response from investors. Nevertheless, our result in the previous section may provide a somewhat nuanced view on the role of “focus factor” (i.e., whether a spinoff is focus-increasing or not). As we show in the previous section, there are significant deteriorations across all the measures of information asymmetry only for focus-increasing firms. This result suggests that if investors expect reduction in information asymmetry only for focus-increasing spinoff, then this expectation might have a negative effect on the announcement returns of firms which implement a focus-increasing spinoff. However, given our strong evidence for the positive effect of focus factor on announcement returns, we consider that the effect of focus factor dominates any negative effect of exacerbated information problem involving a spinoff.

We also note that virtually all previous empirical works on the determinants of announcement abnormal returns study the corporate spinoffs undertaken in the United States before the year of 2000. In fact, a majority of these works collect a sample of spinoffs occurred prior to 1992. Moreover, a recent study of Veld and Veld-Merkoulova (2008) provide an interesting result: focus factor and information asymmetry do not have the expected significant positive relation with abnormal announcement returns for a sample of U.S. spinoffs from 1995 to 2002. Therefore, we reexamine the validity of the stylized fact: Only focus-increasing firms experience positive abnormal returns. Compared to the previous studies, our analysis is expected to deliver a more reliable result for the role of focus factor with a larger sample of corporate spinoff spanning 41-year period from 1964 to 2005.

We define a focus-increasing spinoff as a firm that creates a subsidiary whose two-digit SIC code is different from that of its parent. Otherwise, we classify a firm as a non-focus-increasing spinoff. In Table 2, we report the mean and the median of the cumulated raw returns (RAW) and the cumulated abnormal returns (CAR) over the three-day event period, (AD-1, AD+1) for the sample period. AD stands for the announcement date of a spinoff. In addition, in each panel we also report the mean and the median of the focus-increasing and the non-focus-increasing samples (See Section V of Kim, 2017A for the estimation details of announcement abnormal returns).

In Table 2, for the entire sample period, both the mean and the median of RAW and CAR are significantly different from zero at the 1% level. However, notice that for the focus-increasing as well as for the non-focus-increasing firms, the means and the medians

Table 2. Stock Returns: Focus-Increasing vs. Non-Focus-Increasing Spinoff

	Obs	Raw return (RAW)		Market-model adjusted (CAR1)		Mean adjusted (CAR2)	
		Mean	Median	Mean	Median	Mean	Median
All sample	218	3.93 ^a	2.76 ^a	3.36 ^a	2.58 ^a	3.52 ^a	2.59 ^a
Focus	146	4.37 ^a	2.76 ^a	4.08 ^a	2.50 ^a	3.97 ^a	2.69 ^a
Non-focus	72	3.03 ^a	2.76 ^a	1.89 ^b	2.72 ^a	2.62 ^a	2.39 ^a
Difference		1.34	0.00	2.19 ^c	-0.22	1.35	0.30

Note: The statistical significances are estimated using the parametric paired *t*-tests for the differences in the means and the non-parametric Wilcoxon signed rank tests for the differences in the medians. ^{a, b, and c} indicate the significance at the 1, 5, and 10% respectively.

are positive and significantly different from zero mostly at the 1% level, which indicates that abnormally positive price reaction is not merely confined to the focus-increasing samples. Furthermore, we find that the means and the medians of RAW and CAR for the non-focus-increasing sample do not differ significantly from those of the focus-increasing sample, except the mean of market-adjusted abnormal returns (significant at the 10% level). This result does not corroborate the stylized fact documented in the literature that the market reacts more positively to focus-increasing spinoffs or the notion that significantly positive abnormal returns are restricted to focus-increasing spinoffs. Though in general the focus-increasing sample earns higher abnormal returns during the announcement period, there is no statistically significant differences in CAR between the focus-increasing and non-focus-increasing spinoffs.

C. Size of Spun-off Subsidiary

In corporate spinoffs, the proportion of a parent firm's assets split to its subsidiary has been shown to be a strong explanatory variable for wealth effect (i.e., an on-average positive abnormal return) from spinoff announcements. We refer the variable as the relative size of a subsidiary (henceforth relative size), which is the ratio of the size of a parent to that of its spun-off unit. Miles and Rosenfeld (1983) show that large spinoffs (i.e., large values in relative size) earn significantly larger positive abnormal returns than small-size spinoffs do. Krishnaswami and Subramaniam (1999) with a sample of spinoffs in the U.S and Veld and Veld-Merkoulova (2004) with a similar sample in Europe confirm that relative size is an important determinant for the cross-sectional variation in abnormal returns associated with spinoff.

However, we note that the effect of relative size is a unique empirical phenomenon rather than a validation of a theoretical prediction. It lacks a priori reasoning as to why there is a negative correlation between relative size and announcement abnormal return. One possible link is advanced by Maxwell and Rao (2003). That link is the transfer of wealth

from bondholders to stock holders, or the wealth transfer hypothesis. They note that while the prior literature on this topic (Hite and Owers, 1983; Schipper and Smith, 1983) finds no evidence for the hypothesis, these studies are constrained by the limited sample size and access to bond price data. They posit a specific source of the wealth transfer, namely collateral loss. The idea is that since a spinoff involves a transfer of a portion of a (parent) firm's assets, the spinoff leads to a loss in collateral to the bondholders (Galai and Masulis, 1976). This is because the firm's assets are served as collateral to current bondholders. An empirical implication of this theory is that the greater is the size of a subsidiary relative to its parent, the returns to the stockholders would be greater, but those to the bondholders would be lower.

Accordingly, we include "relative size" as a control variable in the regression analyses in the sections to follow. We define the relative size of a subsidiary as the ratio of its market capitalization at the end of the month in which the ex-date occurs to the market capitalization of its parent firm at the end of the month prior to a spinoff announcement month. In addition, we include the natural log of the market capitalization of a parent firm at the month end prior to the announcement month as an additional control variable (Size).

III. Cross-Sectional Analysis

A. Full Study Period from 1964 to 2005

We evaluate the effect of disagreement factor on stock price reactions around corporate spinoff announcements by pooled regressions. The estimation model is as follows:

$$CAR_i = \alpha_0 + \alpha_1 * DisFactor_i + \alpha_2 * Shock_i + \alpha_3 * IA_i + \alpha_4 * Focus_i + \alpha_5 * RelativeSize_i + \alpha_6 * Size_i + e_i$$

We regress CAR on a constant, disagreement factor (DisFactor: \overline{LNTO} , $\overline{Detrend}$, \overline{UV} , \overline{RESD} , or \overline{SUV})

Table 3. Disagreement Factor and Announcement Abnormal Returns

	\overline{RESD}		$\overline{Detrend}$		\overline{RESD}		\overline{SUV}	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Constant	0.030 (0.000)	0.049 (0.280)	0.031 (0.000)	0.048 (0.285)	0.030 (0.000)	0.046 (0.309)	0.031 (0.000)	0.043 (0.340)
Dis.Factor	-0.082 (0.000)	-0.063 (0.002)	-0.068 (0.000)	-0.052 (0.003)	-0.078 (0.000)	-0.059 (0.003)	-0.050 (0.000)	-0.035 (0.011)
\overline{CSSPRD}		0.003 (0.724)		0.003 (0.687)		0.002 (0.781)		0.002 (0.786)
Focus		0.010 (0.214)		0.010 (0.191)		0.009 (0.238)		0.010 (0.217)
Relative size		0.009 (0.012)		0.010 (0.007)		0.009 (0.010)		0.010 (0.006)
Size		0.000 (0.917)		0.001 (0.824)		0.000 (0.911)		0.001 (0.804)
Obs	183	183	183	183	183	183	183	183
R^2	0.081 (0.000)	0.132 (0.000)	0.069 (0.000)	0.125 (0.000)	0.077 (0.000)	0.127 (0.000)	0.056 (0.001)	0.111 (0.001)

Note: The p -values for the significance of the coefficients are adjusted for heteroskedasticity and shown in parenthesis. The adjusted R^2 and the model F -statistic probability in parenthesis are reported in the last row. A coefficient with its p -values in bold indicates the significance at the minimum of the 10% level.

and control variables (IA:Information Asymmetry, Focus, Relative size and Size). For a proxy for information asymmetry (IA), we choose \overline{CSSPRD} among the IA proxies²⁾ we analyzed previously. The sample firms above the 95th and below the 5th percentile of CAR are removed from the sample. This reduces the size of the sample to 183 firms (the trimmed sample). The pre-event period is defined as a 250-trading -day period over AD-260 to AD-11 (AD is the announcement date). The dependent variable (CAR) is the abnormal return cumulated over the three days surrounding the date of a spinoff announcement, (AD-1, AD+1). A market model for daily returns is estimated over the pre-event period to compute abnormal returns. The market returns are the CRSP value-weighted portfolio of returns of all

NYSE/AMEX/NASDAQ stocks. The ex-ante level of DO or disagreement factor is measured by averaging daily estimates of a volume-based measure of DO (VDO: \overline{LNTO} , $\overline{Detrend}$, \overline{UV} , \overline{RESD} and \overline{SUV})³⁾ over the pre-event period. Similarly, the event level of DO is the mean of daily VDO estimates in the announcement period from AD-1 to AD+1. The estimation results for OLS models (Model 1, Model 2 and Model3) are presented in Table 3 and their heteroskedasticity adjusted p -values in parenthesis. First, in Model1 we estimate only the effect of disagreement factor without controlling for the known rational factor for the wealth gain and disagreement shock (*Shock* in the model specified above). As can be seen from the table, for any proxy for the disagreement factor (except \overline{LNTO}), it is significantly negatively related to CAR at the

2) We estimate all OLS models with five different proxies for information asymmetry employed in Table 1 and find that there is no material differences in regression estimates regardless of the choice of a proxy for information asymmetry.

3) We use the same estimated values of five trading volume-based measures of DO for disagreement factor as in our previous paper, Kim (2017B). Thus, for reference for the details of estimation, see Kim (2017B).

1% level of significance.

The insignificant relation between \overline{LNTO} and CAR can be attributed to an upward secular trend in trading activity in the U.S. stock market over the study period. Such trend is not observed for the other proxies for disagreement factor. The effect of a secular trend in \overline{LNTO} seems to confound the relationship between \overline{LNTO} and CAR. However, the coefficient of \overline{LNTO} is still negative, though insignificant. Given the effect of a secular trend in \overline{LNTO} , our discussion will focus on the interpretation of the result from the other four proxies for disagreement factor $\overline{Detrend}$, \overline{UV} , \overline{RESD} , or \overline{SUV} .

In Model 2, controlling for the known determinants of CAR, we find that the coefficient of disagreement factor, regardless of its proxy, is negative and significant at the 1% level though its magnitude declines slightly from Model 1. For instance, the coefficient of \overline{RESD} is -0.063. To gauge the economic impact of \overline{RESD} , we estimate the change in CAR when we increase \overline{RESD} by one standard deviation (from the mean of \overline{RESD}). Given that the standard deviation of \overline{RESD} is 0.176, one standard deviation increase in \overline{RESD} roughly corresponds to a decrease of 1.11% of CAR. In other words, the difference of one standard deviation in \overline{RESD} is translated to the difference of 1.45% in CAR.

For the information asymmetry proxy (\overline{CSSPRD}), inconsistent with the information hypothesis, we do not find evidence for a positive association between CAR and \overline{CSSPRD} in Table 3. As suggested by the results of the bivariate analysis of the information asymmetry in which we find a significant deterioration in the information asymmetry of the sample after the completion of a spinoff, there is no connection between the levels of information asymmetry *ex ante* and CARs. Under the information hypothesis as we discussed previously, firms with higher levels of information asymmetry is expected to earn higher abnormal returns because investors would rationally anticipate greater reductions in information asymmetry, hence higher valuations for these firms. This evidence

suggests further that there might be no empirical ground for the notion that it is undervalued firms with severe information problem that engage in a corporate spinoff.

Furthermore, inconsistent with the prior literature whether or not a firm spins off related or unrelated subsidiary is not significantly related to CAR. This result provides a support for the outlier analysis, though not reported here. That is, a significantly positive coefficient of *Focus* reported in Table 2 for the full sample (before trimming the outliers) seem to reflect the fact that extremely positive (negative) abnormal returns tend to be observed for focus-increasing (non-focus-increasing) firms.

In Model 3, we add disagreement shock (*Shock*) to Model 2. *Shock* is the magnitude of a change in the degree of disagreement from a normal level in the pre-event period (i.e., disagreement factor) to the event level in the announcement period. A surge in the level of disagreement caused by differential interpretation about the information content of a spinoff announcement among investors, which is Hypothesis 1 in Kim (2017A) is empirically verified in that paper. Based on Miller (1977)'s model in which disagreement induces a downward-sloping demand curve, we interpret a change in the level of disagreement as a change in the slope of the demand curve of a firm. In Kim (2017A) we also hypothesize a positive correlation between disagreement shock and abnormal return in the announcement period (Hypothesis 2). It implies that a firm with a greater change in the slope (or disagreement shock) should earn a higher abnormal return or a larger wealth gain. On Model 3 in Table 4, we find that in all measure of *Shock* except \overline{SUV} , all the coefficients of *Shock* are positive and significant at the 1% level.

Above all, the results in Table 3 and 4 renders a further support for the implication of Hypothesis 3 of Kim (2017A), which states that "the ex-ante level of DO is negatively correlated with the disagreement shock in the event period." The importance of the implication is that the ex-ante level of DO of a firm or disagreement factor—a firm's attribute defined by non-rational behavior of investor disagreement about

Table 4. Disagreement Shock and Announcement Abnormal Returns

	\overline{RESD}	$\overline{Detrend}$	\overline{RESD}	\overline{SUV}
	Model 3	Model 3	Model 3	Model 3
Constant	0.052 (0.236)	0.056 (0.210)	0.052 (0.242)	0.051 (0.273)
Dis.Factor	-0.058 (0.006)	-0.038 (0.053)	-0.050 (0.016)	-0.030 (0.035)
Shock	0.021 (0.003)	0.020 (0.003)	0.021 (0.003)	0.006 (0.257)
\overline{CSSPRD}	0.006 (0.392)	0.008 (0.231)	0.007 (0.344)	0.002 (0.765)
Focus	0.005 (0.465)	0.006 (0.419)	0.005 (0.531)	0.009 (0.248)
Relative size	0.004 (0.265)	0.005 (0.149)	0.004 (0.248)	0.009 (0.023)
Size	0.000 (0.994)	0.001 (0.772)	0.000 (0.934)	0.000 (0.906)
Obs	183	183	183	183
R^2	0.196 (0.000)	0.194 (0.000)	0.195 (0.000)	0.120 (0.001)

Note: The *p*-values for the significance of the coefficients are adjusted for heteroskedasticity and shown in parenthesis. The adjusted R^2 and the model *F*-statistic probability in parenthesis are reported in the last row. A coefficient with its *p*-values in bold indicates the significance at the minimum of the 10% level.

the firm’s value can be a key variable affecting a price change due to a material information event of a corporate spinoff announcement. As can be seen these tables, in all estimation models the coefficients of disagreement factor remain negatively significant even after controlling for the known rational factors for the price changes (i.e., wealth gain). F-statistics of all the models are also significant at 1% level, indicating goodness-of-fit of the models to the observed distribution of CAR.

B. Determinants of Disagreement Shock

In Table 3, the relative size of a subsidiary (*Relative size*) is positively and significantly related to CAR in Model 2, consistent with the prior literature. But, when *Shock* is included (Model 3) in Table 4, it is no longer significant except \overline{SUV} . It appears that

the effect of *Relative size* on CAR is captured by *Shock*. Moreover, the coefficient of *Focus* and *Relative size* also monotonically declines from Model 2 to Model 3 in all measures of *Shock*. These results suggest that disagreement shock itself might depend on these factors. Thus, we investigate possible linkages between *Shock* and these variables in this section.

Disagreement shock (*Shock*) is the magnitude of a change in the degree of disagreement, which is triggered by the announcement of a spinoff, from the normal level in the pre-event period to the event level. Then, one obvious question should follow is what are source that make investors interpret the news (i.e., spinoff announcement) differently. We suspect that it is the main information content of a spinoff announcement: relative size (i.e., the portion of assets that a firm split up to its spun-off subsidiary) and focus factor (i.e., the type of a division that the firm spins off) could be sources of disagreement. We also note that investors’ perception regarding the level of information asymmetry about the firm would affect the degree of differential interpretations about the announcement. Therefore, we investigate how *Shock* is related to these variables. More specifically we want to examine the extent to which *Shock* is capturing the information in these determinants for announcement abnormal returns. We regress *Shock* on disagreement factor and the control variables: \overline{CSSPRD} , *Focus*, *Relative size*, and *Size*.

$$Shock_i = \beta_0 + \beta_1 * DisFactor_i + \beta_2 * IA_i + \beta_3 * Focus_i + \beta_4 * RelativeSize_i + \beta_5 * Size_i + e_i$$

We present the results of regressions in Table 5. First, regressing *Shock* on a constant and disagreement factor: Model 1, we find that all the proxies for disagreement factor are negatively related to *Shock* at the 1% level of significance, confirming the result of Kim (2017A) which postulates that firms characterized by lower disagreement factor prior to spinoff announcements are expected to incur larger disagreement shock than firms with higher disagreement factor. We argue that this relationship occurs due to limited attention of investors. Because cognitively overloaded investors pay

attention to only a subset of information most of time, a firm that is not frequently covered by the media would have a low value of disagreement factor. In other words, it is less susceptible to heterogeneous interpretations by investors. However, when a corporate spinoff is announced (i.e., a material news), which is very likely to receive a wide media coverage, the firm becomes susceptible to a high degree of differential interpretation among investors relative to its disagreement factor (i.e. the normal level of disagreement).

Overall, disagreement shock, confirming our conjecture, is significantly related to the sources of disagreement (i.e., information content of spinoff announcement: IA, Focus, and Relative size). First, regarding IA, it is negatively related to *Shock*. It implies that firms with a lower level of information asymmetry seem to be more exposed to a higher level of disagreement triggered by spinoff announcements. An alternative interpretation would be that trading activity is much more intensive for lower IA firms than higher. Thus, investors' perception about a firm's

information asymmetry problem appears to reduce or perhaps, inhibit differential interpretation among investors about the announcement, and consequently abates trading activity in the market in the announcement period.

Second, a firm's decision to split an unrelated subsidiary from its main business (Focus) has a significantly positive effect on Shock. The coefficient of Focus is positive for all measures of Shock and significant. A firm engaging in focus-increasing spinoff incurs a greater level of disagreement about the firm's prospect after the spinoff than one engaging in non-focus-increasing spinoff. Finally, the size of a firm's assets to be spun off (Relative size) is also an important piece of information from which investors derive differential interpretation. Notice that in all measures of Shock, its coefficient is significant at the 1% level.

Table 5. Determinants of Announcement Abnormal Returns

	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Constant	0.586 (0.000)	-0.148 (0.775)	0.619 (0.000)	-0.373 (0.494)	0.596 (0.000)	-0.261 (0.612)	0.655 (0.000)	-1.348 (0.052)
Dis.Factor	-0.781 (0.008)	-0.263 (0.352)	-1.125 (0.000)	-0.708 (0.008)	-0.889 (0.002)	-0.390 (0.153)	-0.979 (0.001)	-0.792 (0.005)
<i>CSSPRD</i>		-0.173 (0.048)		-0.262 (0.005)		-0.214 (0.013)		-0.029 (0.799)
Focus		0.202 (0.049)		0.199 (0.064)		0.212 (0.037)		0.136 (0.317)
Relative size		0.250 (0.000)		0.223 (0.000)		0.243 (0.000)		0.256 (0.000)
Size		0.011 (0.706)		-0.007 (0.822)		0.003 (0.907)		0.154 (0.000)
Obs		183		183		183		183
R^2	0.038 (0.008)	0.214 (0.000)	0.085 (0.000)	0.239 (0.000)	0.051 (0.002)	0.233 (0.000)	0.063 (0.001)	0.190 (0.000)

Note: The p -values for the significance of the coefficients are adjusted for heteroskedasticity and shown in parenthesis. The adjusted R^2 and the model F -statistic probability in parenthesis are reported in the last row. A coefficient with its p -values in bold indicates the significance at the minimum of the 10% level

IV. Conclusion

In this paper, we empirically examine the significance of disagreement factor, a non-rational factor defined by investor behavior, as the determinant for the cross-sectional variation of abnormal returns days surrounding the announcement of a corporate spinoff. Our investigation is an extension of Kim (2017A) that we undertake a stringent empirical test of the effect of investor disagreement on stock price change.

Our study is mainly based on an analytical framework of application Banerjee and Kremer (2010)'s dynamic DO model Miller (1977)'s static DO (Differences of Opinion) model which allow us to investigate the effects of investor's differential interpretations of a material information event of corporate spinoff news. Investors' differential interpretation of corporate spinoff divestures is not a readily observable variable. However, guided by theoretical and empirical literature on DO, we use, from our previous paper, the estimated value of the mean level of disagreement (i.e., disagreement factor) and abnormal level of disagreement surrounding a spinoff announcement as the principal variables. The disagreement factor of a firm is defined as the level of disagreement among investors about its value in a normal trading day prior to a spinoff announcement. Therefore, it is reasonably considered as a firm-specific characteristic defined by investors, who have heterogeneous beliefs and interpret information differently, thus a non-rational factor that moves the stock price of the firm.

It is well documented in the literature that corporate spinoffs tend to increase firm value, often being referred to as wealth gain. These rational factors for wealth gain have shown to be sources of information asymmetry *ex ante*, change in industrial focus (focus factor), and the ratio of the size of a spin-off to that of its parent (relative size), all of which have received strong empirical support in the prior studies. However, our review of the literature reveals that there is conflicting evidence for the effect of information asymmetry and that a majority of empirical papers that studied focus factor are concentrated on spinoff announcements occurred in the U.S. before year 1992. Thus, we reexamine the

validity of the information (asymmetry) hypothesis and the role of focus factor because our sample data is larger in size and cover a longer study period compared to the prior literature that examine these variables.

Using a sample of spinoffs that were undertaken and completed by the U.S. publicly-traded firms from 1964 to 2005, we find that information asymmetry problem, regardless of a proxy for information asymmetry used, is aggravated after the completion of a spinoff. This is inconsistent with the information hypothesis, which states that information asymmetry should be improved following spinoff. Under this hypothesis, the undervaluation of a firm due to information asymmetry between outside investors and managers is the motivation for spinoff to gain a fair valuation by reducing information asymmetry. Moreover, the deterioration in information asymmetry is much larger for and limited to the sample firms engaged in focus-increasing spinoff. This result invalidates the information hypothesis further because the focus-increasing samples should achieve a greater improvement in information asymmetry according to the hypothesis.

Regarding the effect of focus factor, we show that the focus-increasing firms earn significantly positively larger abnormal returns than the non-focus increasing firms only in our first study period from 1964 to 1991. This confirms the result of the extant literature that covered a similar time period. However, in our second study period from 1992 to 2005 there is no statistically significant difference in the abnormal returns between these two focus groups, and both groups, on average, earn significantly positive abnormal returns.

In pooling regression of the sample, we find that disagreement factor explains a significant portion of the cross-sectional variation in announcement abnormal returns after controlling for the other known determinants. This finding renders a further support for the result of Kim (2017A) that disagreement factors, a non-rational factor defined by investor behavior, has a systemic impact on price changes induced by spinoff announcements. However, information asymmetry and focus factor are shown to have no material influence on the price changes. Thus our result supports neither the information asymmetry nor the industrial-focus hypotheses from

the prior literature on the wealth gain.

Furthermore, including disagreement shock in regression analyses, we find that while disagreement factor remains significant, disagreement shock (i.e., a magnitude of change in investor disagreement from a normal to an abnormal level) also is significantly positively correlated to the abnormal returns. However, all the other determinants (i.e., focus factor and information asymmetry) including relative size become insignificant. This result suggests that the variations in these determinants are captured by disagreement shock. This implication is reasonable because the information content of these variables, which is known at the time of a spinoff announcement, is potentially a source for investor disagreement. Thus, relating these determinants with disagreement shock, we find that disagreement shock is smaller if a firm has higher level of information asymmetry *ex ante*, but the shock is larger if the firm implements a focus-increasing spinoff, and splits up a larger portion of its assets to its subsidiary. Given that our proxies for disagreement shock in effect represent abnormal trading activity resulting from disagreement triggered by a spinoff announcement, investors refrain from trading based on their own interpretation for firms that they perceive to have high information asymmetry.

To sum, the prior literature has examined sources for wealth gains generated from spinoff announcements (i.e., motives for spinoffs) based on the assumption that managers make decisions rationally to maximize the shareholder value, and thus rational investors react positively to spinoff decisions. However, these motives—value creation through a spinoff by reducing information asymmetry, by focusing on core business, or by splitting up a large portion of assets to a spun-off—at best have limited power to explain wealth gains. But, our key result suggests that understanding behavioral characteristics of investors proves to be critical for understanding the effects of their systematic irrationality to the announcement of a spinoff on price changes.

But, our paper is not without limitations. First, even though we attempted to collect a sample for a long period of time, the study period ends in 2005. We admit that our data is rather old. Second, our sample firms

are confined to the U.S. Thus, out-of-sample tests for our findings can be performed with a more comprehensive dataset.

For future research, it would be interesting to examine whether managers engage in a spinoff to create value or more correctly overpricing by catering to investors who hold the most optimistic views on either a parent or its subsidiary. The presence of disagreement among investors implies that the sum of the parent' and the subsidiary's value as separate entities can be greater than the current value of the combined firm. If rational managers are aware this, they will exploit such less-than-rational investor behavior to increase the firm's value. A research on this topic would show that not only does investor disagreement have a temporal impact (triggered by the announcement of a spinoff) on contemporaneous overpricing, but also might affect long-term values of the parent and the subsidiary following the spinoff.

References

- Admati, A. R., & Pfleiderer, P. (1988). Selling and trading on information in financial markets. *American Economic Review*, 78(2), 96-103.
- Banerjee, S., & Kremer, I. (2010). Disagreement and learning: Dynamic patterns of trade. *Journal of Finance*, 65(4), 1269-1302.
- Berger, P., & Ofek, E. (1995). Diversification's effect on firm value. *Journal of Financial Economics*, 37(1), 39-66.
- Corwin, S. A., & Schultz, P. (2012). A simple way to estimate bid-ask spreads from daily high and low prices. *Journal of Finance*, 67(2), 719-760.
- Daley, L., Mehrotra, V., & Sivakumar, R. (1997). Corporate focus and value creation: Evidence from spinoffs. *Journal of Financial Economics*, 45(2), 257-281.
- Desai, H., & Jain, P. J. (1999). Firm performance and focus: Long-run stock market performance following spinoffs. *Journal of Financial Economics*, 54(1), 75-101.
- Foster, F., & Viswanathan, S. (1990). A theory of interday variations in volume, variance and trading costs in securities markets. *Review of Financial Studies*, 3(4), 593-624.
- Galai, D., & Masulis, R. W. (1976). The option pricing model and the risk factor of stock. *Journal of Financial Economics*, 3(1-2), 53-82.

- Grossman, S. J., & Stiglitz, J. E. (1980). On the impossibility of informationally efficient markets. *American Economic Review*, 70(3), 393-408.
- Hite, G., & Owers, J. (1983). Security price reactions around corporate spin-off announcements. *Journal of Financial Economics*, 12(4), 409-436.
- Huson, M. R., & MacKinnon, G. (2003). Corporate spinoffs and information asymmetry between investors. *Journal of Corporate Finance*, 9(4), 481-503.
- John, K., & Ofek, E. (1995). Assets sales and increase in focus. *Journal of Financial Economics*, 37(1), 105-126.
- Kim, D. W. (2017A). Differences of opinion and stock price reaction in the case of corporate spin-off announcements. *Global Business & Finance Review*, 22(2), 65-82.
- Kim, D. W. (2017B). Does trading volume contain information about investor disagreement? *Journal of Convergence Information Technology*, 12(1), 26-37.
- Kim, O., & Verrecchia, R. E. (1994). Market liquidity and volume around earnings announcements. *Journal of Accounting and Economics*, 17(1-2), 41-67.
- Krishnaswami, S., & Subramanian, V. (1999). Information asymmetry, valuation and the corporate spin-off decision. *Journal of Financial Economics*, 53(1), 73-112.
- Kyle, A. S. (1985). Continuous auctions and insider trading. *Econometrica*, 53(6), 1315-1335.
- Lo, A. W., & Wang, J. (2000). Trading volume: Definitions, data analysis, and implications of portfolio theory. *Review of Financial Studies*, 13(2), 257-300.
- Martin, J. D., & Sayrak, A. (2003). Corporate diversification and shareholder value. *Journal of Corporate Finance*, 9(1), 37-57.
- Maxwell, W. F., & Rao, R. P. (2003). Do spin-offs expropriate wealth from bondholders? *Journal of Finance*, 58(5), 2087-2108.
- Miles, J., & Rosenfeld, J. (1983). The effect of voluntary spin-off announcements on shareholder wealth. *Journal of Finance*, 38(5), 1597-1606.
- Miller, E. (1977). Risk, uncertainty, and divergence of opinion. *Journal of Finance*, 32(4), 1151-1168.
- Schipper, K., & Smith, A. (1983). Effects of recontracting on shareholder wealth: The case of voluntary spin-offs. *Journal of Financial Economics*, 12(4), 437-467.
- Tkac, P. (1996). A trading volume benchmark: Theory and evidence. *Journal of Financial and Quantitative Analysis*, 34(1), 89-114.
- Veld, C., & Veld-Merkoulova, Y. V. (2004). Do spin-offs really create value? The European case. *Journal of Banking and Finance*, 28, 1111-1135.
- Veld, C., & Veld-Merkoulova, Y. V. (2008). An empirical analysis of the stockholder-bondholder conflict in corporate spin-offs. *Financial Management*, 37(1), 103-124.
- Wang, J. (1994). A model of competitive stock trading volume. *Journal of Political Economy*, 102(1), 127-168.