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Security analysts' target prices and takeover premiums ☆

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ABSTRACT

Most existing studies conclude that the accuracy of analysts' target prices is questionable. In forecasting target prices, analysts estimate a future stock price under the constraint of a time frame of usually 12 months. We exclude this source of uncertainty by focusing on valuations in takeover bids. We show that the expected returns by analysts are significantly related to the takeover premiums paid. A 5 percent higher target price is associated with a 1 percent higher takeover bid. The economic significance increases when we control takeover premiums for estimated synergy gains. Our results support the relevance of analysts' price forecasts.

1. Introduction

Target prices reflect security analyst opinions on a potential stock price level within a given time frame. Analysts usually forecast over a 12-month horizon. While target price publications generally have a short-term impact on stock prices (e.g., Brav and Lehavy, 2003; Asquith et al., 2005; Kerl

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and Walter, 2008; Huang et al., 2009; Da and Schaumburg, 2011), their medium to long run accuracy is limited.[1] Bonini et al. (2010) and Bradshaw et al. (2013) showed that 67 percent and 55 percent of the forecasts, respectively, were not met at any point in time, for which reason target prices are sometimes called "*arbitrary and baseless*" (Thomsett, 2010: 350). However, stock returns, and thus target price accuracy, are inherently related to stock market returns which "*analysts cannot forecast*" (Da and Schaumburg, 2011: 67). Anecdotal evidence confirms this statement (Scaggs, 2014).

This calls for the evaluation of target prices against a different benchmark. In this study we use mergers and acquisitions (M&A) to evaluate the relevance of analysts' target prices. In a takeover, the potential acquirer generally offers a price per share for which this party is willing to acquire control over the target company. A takeover bid thereby provides an instant valuation of the target company. Hence, comparing target prices to takeover bids can help us in evaluating the relevance of target prices. We expect a relation for two distinct possible reasons. It can emerge due to either an informational role of target prices (i.e., informational value which is not discounted in stock prices at the time of a takeover bid) or an anchoring function of target prices (i.e., target prices may be considered as a relevant reference price among stock market participants, irrespective of potential information contents). Our results show that the forecasted return and the takeover premium are positively and significantly related, indicating that target prices are a relevant indicator for the takeover value of a company. Depending on the specification of the model, a 5 percent higher forecasted return is roughly associated with a 1 percent higher takeover premium. The results remain strongly significant when we control the takeover bid for anticipated synergy gains, and when we control target prices for the level of systematic risk. We further found that the freshness of target prices plays a major role as more recently issued target prices exhibit a stronger relation to a takeover bid than relatively old target prices. This relates to the finding by Da and Schaumburg (2011) that recently updated target prices are not instantaneously fully discounted in stock prices as they are related to stock returns one month ahead. Nevertheless, stale target prices are related to takeover bids as well. As it is unlikely that the information content of older target prices is not absorbed into stock prices, we view this as an indication that anchoring plays a role. On top of this, we observe that target prices are relevant even though possible synergy benefits are not taken into account in the formation of these prices. This observation tends to favor the anchoring role of target prices in takeover bids.

2. Data and methodology

2.1. Data

We used Thomson Reuters SDC to construct a sample to identify acquired companies and the corresponding takeover bids. Since we were interested in the ultimate valuation of acquired companies, we focused on completed mergers only.[2] In line with the takeover literature, a few restrictions were: (1) both bidder and target must originate from the United States; (2) the deal must be denominated in US dollars; (3) the acquirer was the only bidder; (4) the acquirer bought 100 percent of target shares in the transaction; and (5) the target company was not a penny stock (i.e., the stock price four weeks prior to the announcement must not be less than $1). The resulting dataset was matched with target prices obtained from the Institutional Brokers' Estimates System (I/B/E/S). Target companies should have at least one available price forecast by analysts. As a final step, we verified the data from SDC and I/B/E/S for inconsistencies by using Datastream, and we excluded cases with conflicting price data.[3] Our target price history starts at May 1, 2003 so that all target prices are published after the Global Analyst Research

[1] Brav and Lehavy (2003) and Asquith et al. (2005) documented that average implied returns from target prices equaled 28 percent and 33 percent, respectively. These relatively optimistic predictions might be caused by conflicts of interest. Michaely and Womack (1999) and Agrawal and Chen (2008), for example, illustrated that affiliated analysts are relative more optimistic than nonaffiliated analysts. Investment firms were fined for misconduct under the Global Analyst Research Settlement in 2003. Hence, in our study, we only used target prices published after this date.

[2] In unreported tests we included withdrawn merger attempts as well. In those tests we employed the initial price offered rather than the final price. Results remained highly significant.

[3] The results in this paper do not change qualitatively when we include observations with conflicting price data across SDC and Datastream.

Settlement. Given the validity of target prices for 12 months, our M&A sample began at May 1, 2004. Our main sample includes announced mergers – and published target prices – up to and including 2010, resulting in a sample of 592 mergers.

Table 1 depicts summary statistics for the sample. Panel A shows the distribution of target prices among companies. On average 5.0 target prices per company were published, with a standard deviation of 4.3. The median number of target prices was 4.0. The minimum number of target prices for a company was 1 while the maximum was 28. Panel B illustrates the annual distribution of cases. The years 2007, 2008 and 2009 showed a decrease in the total number of takeovers, most likely due to the global financial crisis. Panel C shows the industry subdivision according to the Standard Industrial Classification. A large portion of the mergers took place in the manufacturing industry as well as among finance, insurance and real estate companies.

2.2. Variables and methodology

As independent variable we computed the final takeover premium (*FTP*). Taking into account the findings by Schwert (1996) regarding a price run-up prior to the takeover bid, we calculated this premium by dividing the offered price per share by the closing price of the target shares four weeks prior to the announcement, see Eq. (1). The mean *FTP* was 33.0% with a standard deviation of 30.4%.

$$FTP_i = \frac{\textit{Final takeover bid for company } i}{\textit{Share price of company } i \textit{ four weeks prior to announcement}} - 1 \tag{1}$$

As independent variable we used the target price implied expected return (*TPER*). Analogous to the definition of the *FTP*, we used the share price four weeks prior to the announcement in the denominator. The *TPER* is defined as the average target price at that time divided by the share price of the target company, see Eq. (2):

$$TPER_i = \frac{\textit{Mean target price of company } i \textit{ four weeks prior to announcement}}{\textit{Share price of company } i \textit{ four weeks prior to announcement}} - 1 \tag{2}$$

After calculating the *TPER* for all firms in the sample, we follow Brav and Lehavy (2003) in winsorizing this variable at the 1% and the 99% level.[4] The mean *TPER* amounted 25.3% with a standard deviation of 34.6%. This number is in line with Brav and Lehavy (2003) who reported for their sample an average *TPER* of 28%.

In addition, we added several control variables which are known to be related to the takeover premium. We added the natural logarithm of the size of the target company, and dummy variables indicating whether the deal was an all-cash offer, was a tender offer, was a hostile offer, involved a publicly listed bidder, or involved companies from the same industry. Finally, we added year-dummies to control for the fact that takeover premiums vary over time. Table 2 depicts the correlation matrix between our variables. The positive association between *FTP* and *TPER* stands out. Negative correlations were found between *LnSize* on the one hand and *FTP* and *TPER* on the other hand. Brav et al. (2005) also made note of the negative association between firm size and forecasted returns.

We estimated the following regression equation:

$$\begin{aligned} TPER_i = {} & \beta_0 + \beta_1(FTP_i) + \beta_2(LnSize_i) + \beta_3(Cash_i) + \beta_4(Tender_i) + \beta_5(Hostile_i) + \beta_6(PublicAcq_i) \\ & + \beta_7(SameSIC_i) + \beta_8(year_i) + \varepsilon_i \end{aligned}$$

In this regression equation, we controlled for possible industry effects by correcting for intra-group correlation (cluster) within the primary SIC-code of the target company. All regressions are run with heteroskedasticity-consistent estimators of variance (also known as 'robust' estimations). Given the significant correlations between independent variables as shown in Table 2, we tested the

[4] Winsorizing is a technique in which the values of outliers are replaced by less extreme values. In this case the lowest (highest) *TPERs* are replaced by the value of the 1st (99th) percentile. Results were similar without the application of this technique. Though relatively uncommon, winsorization at the 5% and 95% level was also considered given the level of the *TPER* at the tails of the distribution. Such a winsorization would increase both the economic and statistical significance of our findings.

Table 1
Descriptive statistics. Panel A shows the distribution of target prices among takeover targets in our sample. Panel B shows the annual distribution of takeovers. Panel C displays the subdivision of acquiring and target companies per industry.

Panel A: Distribution of target prices among companies	
Mean number of outstanding target prices	5.0
Standard deviation	4.3
Median	4
Minimum number of target prices	1
Maximum number of target prices	28

Panel B: Yearly stats

Year	Number
2004	60
2005	101
2006	133
2007	125
2008	59
2009	36
2010	78
Total	592

Panel C: Industry distribution

Industry	Acquirer	Target
Agriculture, Forestry and Fishing	1	1
Mining	19	23
Construction	2	2
Manufacturing	186	200
Transportation, Comm., Electric, Gas and Sanitary service	27	28
Wholesale trade	9	14
Retail trade	14	23
Finance, Insurance and Real estate	228	138
Services	106	163
Total	592	592

Table 2
Correlation matrix. *FTP* and *TPER* are defined in Eqs. (1) and (2), respectively. LnSize is the natural logarithm of the market value of the target four weeks prior to the bid. Cash, Tender, Hostile, PublicAcq, and SameSIC are dummy variables, taking a value of 1 when the deal is fully financed with cash, is a tender offer, is a so-called hostile attempt, involves a public acquirer, or involves two firms with the same SIC code, respectively.

	FTP	*TPER*	LnSize	Cash	Tender	Hostile	PublicAcq
TPER	0.32***						
LnSize	−0.23***	−0.43***					
Cash	0.12***	−0.01	−0.03				
Tender	0.21***	0.06	−0.08*	0.18***			
Hostile	0.01	−0.04	0.04	−0.10**	−0.02		
PublicAcq	0.07	−0.02	0.05	−0.28***	−0.02	0.03	
SameSIC	0.02	0.01	0.02	−0.06	−0.04	0.06	0.19***

* Statistical significance: $p < 0.10$.
** Statistical significance: $p < 0.05$.
*** Statistical significance: $p < 0.01$.

econometric specifications for multicollinearity by using the variance-inflation factor (VIF). None of the main variables exceeded a VIF of 1.30, well below the generally perceived cut-off level of 10. We could therefore conclude that multicollinearity was not an issue of concern in this study.[5]

[5] Another area of concern would be potential endogeneity present in target prices; if security analysts have privileged information about upcoming M&A deals, their price forecasts may not be estimates of the stand-alone value of a target firm, but may include the expectation of a takeover bid. Although Bradley et al. (2007: 10) already noted that *"securities analysts do not do a good job of identifying takeover targets"*, we performed a test for privileged information by comparing the average *TPER* of all public US merger targets involved in a domestic deal over the period May 2004 to December 2010 to the average *TPER* of non-merger targets. Since we were primarily interested in a stand-alone valuation for merger targets, we excluded deal announcements for targets which had been approached by an acquirer before, or which had been rumored (as reported by SDC) to be involved in a deal before, as target prices for these targets might include specific deal-related price components. We did not find a statistically significant difference in the *TPER* during any of the 12 pre-announcement months between targets and non-targets. Hence, we concluded that the *TPERs* for target firms can be interpreted as stand-alone estimates.

Table 3
A cross tabulation of *FTP* and *TPER*. *FTP* and *TPER* are defined in Eqs. (1) and (2), respectively. Both *FTP* and *TPER* have been divided into quartiles where the lowest quartile comprises the 25 percent lowest *FTP*s and *TPER*s, respectively. The numbers displayed are the number of merger targets falling in each of the quartile cross-sections.

4 quartiles of *TPER*s	4 quartiles of final takeover premiums (*FTP*)				
	Lowest *FTP* (1)	(2)	(3)	Highest *FTP* (4)	Total
Lowest *TPER* (1)	62	48	23	15	148
(2)	38	44	38	28	148
(3)	23	39	50	36	148
Highest *TPER* (4)	25	17	57	69	148
Total	148	148	148	148	592

3. Empirical results

3.1. Main results

Table 3 sheds more light on the relation between takeover premiums and *TPERs*. Both variables were divided into quartiles. The lowest quartile (1) comprised the 25 percent lowest values for each variable; quartile (2) contained the next 25 percent values, etc. The table shows the number of takeovers which are included in each quartile. For example, 62 merger targets in the first *TPER* quartile belonged to the 25 percent companies that received the lowest *FTP* from the acquirer. The overrepresentation of observations in the diagonal from upper-left to bottom-right is a first illustration of the positive association between *FTP* and *TPER*.

Table 4 presents the results of our first regression analysis in which we related takeover premiums to analysts' forecasted returns. With Model 1, we tried to explain the takeover premium by incorporating control variables only. We found that the takeover premium is negatively related to the size of the target company. The coefficients for the dummy variables showed that cash offers, tender offers, hostile offers and offers involving a public bidder increased the premium with 11.3%, 10.4%, 26.4% and 7.7%, respectively. Industry relatedness was not significantly related to the takeover premium. The signs of the statistical significant control variables have all been widely documented in the existing literature.

Table 4
Regression results. See Table 2 for variable definitions. Year-dummies are included (unreported). Clustering takes place around 4-digit SIC codes. The model is estimated using robust standard errors, with clustering at the 4-digit-SIC level.

	Dependent variable: *FTP*	
	Model 1	Model 2
Intercept	0.631***	0.202**
	(4.67)	(2.56)
TPER		0.210***
		(4.87)
LnSize	−0.043***	−0.022**
	(−4.40)	(−2.20)
Cash	0.113***	0.118***
	(3.75)	(3.88)
Tender	0.104**	0.105***
	(2.53)	(2.65)
Hostile	0.264***	0.308***
	(7.27)	(8.81)
PublicAcq	0.077***	0.076***
	(2.73)	(2.91)
SameSIC	0.010	0.007
	(0.35)	(0.26)
Year-dummies	INCL	INCL
Number of observations	592	592
Adjusted R^2	0.15	0.19

t-statistics in parentheses.
* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

Model 2 takes the *TPER* into account as explanatory variable. In this model we regressed the target valuation as assessed by the acquirer on the valuation estimated by analysts (both in terms of a premium on top of the stock price) plus control variables. Model 2 shows that the *TPER* is positively related to the takeover premium. A 5 percent higher *TPER* is roughly associated with a 1 percent higher *FTP*. Although this relation is not 1-to-1, it is not a trivial one. This finding is highly significant at the 1% level. The signs of the control variables were unaltered after the inclusion of *TPER*. The addition of the forecasted return raised the adjusted *R*-squared of the regression from 0.15 to 0.19, indicating an improvement of the explanatory power of the model. A partial *F*-test showed that the improvement is statistically significant.

3.2. Accounting for synergy gains

In our analysis so far, we treated the takeover price as an appropriate stand-alone value of a firm. However, bid premiums can contain a premium for expected synergy gains which can arise through the combination of firms. We therefore constructed two different tests where synergy considerations did not play a large role, so that the *FTP* was likely to be a proxy for the stand-alone target value through the eyes of the acquirer. Firstly, we considered diversifying deals only, in which economies of scale and increases in market power are usually not present to a large extent. To identify diversifying deals, we followed the literature (e.g., Doukas et al., 2002; Graham et al., 2002) by using the SIC classification.[6] We only included deals where the target and the acquiring company did not share the same industry according to the general SIC classification (see also Table 1). By focusing on broad industries, we implicitly also excluded potential synergies arising from acquisitions of suppliers/customers within the same industry. As a result, the total number of observations dropped to 166. Model 1 of Table 5 depicts our results. The relation between the takeover premium and the *TPER* stayed highly significant. The coefficient of *TPER* remained relatively constant at 0.210. The findings did not qualitatively change when we applied the 4-digit SIC code as identifier for diversifying deals instead of the general classification (not reported).

In the next test, we defined diversifying deals in an alternative fashion. We focused on acquisitions by so-called "holdings and other investment offices" (i.e., companies with 67 as the first two digits according to the SIC classification) which acquired target companies active in a different sector. Diversifying financial investors are more likely to acquire companies due to perceived undervaluation than due to identified synergies. Model 2 of Table 5 shows our results. 93 deals qualified for this test. The coefficient of *TPER* stayed at 0.211 and remained highly significant in this specification.

In addition to the relatively indirect way of controlling for synergy gains, we also composed a restricted sample consisting of deals for which we could collect projected synergy estimates. We limited our synergy estimates to deals where both target and bidder were publicly listed. We computed the estimated synergy gains analogously to Houston et al. (2001) and Bernile (2004). We used internet search engines to identify press releases, conference call transcripts, and investor presentations held around the announcement of the takeover to find synergy estimations.[7] Our final restricted sample comprised 94 mergers.[8] Due to the selection criteria, the average target company's market value is $3.8 bln versus $1.7 bln in the main sample. As most of the value of the synergies is being appropriated by target shareholders (Sudarsanam and Sorwar, 2010), we defined the so-called stand-alone final takeover premium as the takeover premium as defined in Eq. (1) minus the present value of the synergy forecasts per share, divided by the share price, see Eq. (3).

$$\textit{Stand-alone } FTP_i = FTP_i - \frac{PV(\textit{Synergy forecasts})_i / \textit{Number of shares}_i}{\textit{Share price of company i four weeks before announcement}} \tag{3}$$

In this restricted sample, the average bid premium and the average *TPER* were 28.0% and 15.4%, respectively. Especially the *TPER* is lower than in the main sample, which can be attributed to the larger firm size in this restricted sample (e.g., Brav et al., 2005). The average present value of the synergy estimate per share equaled 35.6% of the stock price, resulting in the projected synergies per share exceeding the bid premium by on average 7.6%.

For this set of mergers, Models 3 and 4 of Table 5 show the regression outcomes. Model 3 considers the relation between the takeover premium (for now ignoring any synergy estimates) and the *TPER*. The coefficient of *TPER* is also highly significant in this restricted sample, and its effect size is twice as large as in our previous estimations. This could be explained by the relatively high number of large companies in this subsample. For these firms, the average *TPER* is lower than in our main sample, while this difference is less pronounced for *FTP*. Model 4 introduces the relation between the stand-alone takeover premium and the *TPER*. From Model 3 to Model 4, the *TPER* remained significant and its coefficient increased from 0.400 to 0.554, indicating a stronger relation between target price and takeover premium once the takeover premium is adjusted for estimated synergy gains.

[6] We acknowledge that, for example, financial synergies can also be attained through acquisitions of non-related companies. In a follow-up test in this paragraph, we deal more rigorously with synergies by assessing synergy estimates by the management.

[7] Management forecasts can be overly optimistic (Houston et al., 2001). Accordingly, Bernile (2004) found that the market discounts insiders' estimates of synergy gains; nevertheless, synergy estimates are significantly and positively related to target abnormal returns, acquirer abnormal returns and combined abnormal returns, indicating that management estimates can be used as indication for the actual synergy gains. Integration costs are often ignored in projected synergy gains (Houston et al., 2001). We specifically searched for mentions of integration costs, but we could find documents stating these costs for 21 companies only. Empirical analyses on these 21 cases confirmed all findings, but we did not report any results, given the extremely small sample size.

[8] Please refer Supplementary data for a detailed computation of synergy gains.

Table 5
Regression results – Alternative specifications. See Table 2 for an explanation of the variables. In addition, Stand-alone *FTP* and Adjusted *TPER* are defined in Eqs. (3) and (4), respectively. Control variables and year-dummies have been included (unreported). Clustering takes place around 4-digit SIC codes. The model is estimated using robust standard errors, with clustering at the 4-digit-SIC level.

	Dependent variable					
	FTP Model 1	*FTP* Model 2	*FTP* Model 3	Stand-alone *FTP* Model 4	*FTP* Model 5	Stand-alone *FTP* Model 6
Intercept	−0.178	−0.082	0.150	−0.896***	0.411***	−0.83***
	(−1.11)	(−0.65)	(1.20)	(−5.07)	(2.87)	(−4.78)
TPER	0.210***	0.211***	0.400***	0.554***		
	(3.12)	(3.51)	(2.78)	(2.88)		
Adjusted *TPER*					0.204***	0.508**
					(4.72)	(2.64)
Control variables	INCL	INCL	INCL	INCL	INCL	INCL
Year-dummies	INCL	INCL	INCL	INCL	INCL	INCL
Number of observations	166	93	94	94	579	94
Adjusted R^2	0.21	0.22	0.25	0.23	0.19	0.21

t-statistics in parentheses.
* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

3.3. Accounting for systematic risk

Although several studies (Demirakos et al., 2004; Imam et al., 2008) showed that analysts base their opinions – at least partly – on intrinsic value calculations, others found that the *TPER* is significantly related to the systematic risk of the respective stock (Brav et al., 2005). These considerations suggest that the *TPER* should be adjusted for this risk factor in order to find the firm-specific value potential of a firm. We therefore first calculated the expected return for stock *i* (k_i) based on the single-factor Capital Asset Pricing Model.[9] The adjusted *TPER* for firm *i* could then be computed by subtracting the required rate of return from the forecasted return, see Eq. (4).

$$Adjusted\ TPER_i = TPER_i - k_i \tag{4}$$

Model 5 of Table 5 shows the relation between the takeover premium and the *Adjusted TPER* for the main sample, while the results for the restricted sample are shown in Model 6. The relation remained highly significant in both models. The coefficient in Model 5 (0.204) is similar to the reported findings in Model 2 of Table 4. Model 6's coefficient of the *Adjusted TPER* amounts 0.508 and is in line with Model 4's coefficient for *TPER*.

3.4. Alternative specifications

We performed a range of additional tests (unreported in tables for expository reasons). We first checked whether our findings were driven by influential outliers. We replaced the average *TPER* by the median *TPER*. Relative to our original models, the economic and statistical significance of the coefficients of interest are of a similar magnitude. As a second test, we dealt with outliers differently. We censored the *TPER* so that the maximum forecasted return was 100%. We further excluded deals where the takeover premium was lower than 0%. This procedure increased the significance of the relation between *TPER* and *FTP*; the coefficient of *TPER* rose to 0.309 in the main sample and to 0.611 in the restricted sample, respectively. Both the increased coefficient and the increased significance are signs that the relation between an analyst's forecasted return and the takeover premium is particularly strong for a sample with censored outliers.

4. Freshness of target prices

Da and Schaumburg (2011) reported that recent target price adjustments are positively related to future one-month abnormal returns. This indicates that more recently published target prices may be more relevant than relatively "old" target prices. We test this proposition by computing, for each target price, the time in weeks from the day of the publication until the reference day for an acquisition. We subsequently averaged this number for all outstanding target prices per merger target. The

[9] Please refer Supplementary data for a detailed computation of the required rate of return.

Table 6
Does freshness matter? See Table 2 for an explanation of the variables. In addition, Recent and Recent∗*TPER* are both defined in Section 4. Control variables and year-dummies have been included (unreported). Clustering takes place around 4-digit SIC codes. The model is estimated using robust standard errors, with clustering at the 4-digit-SIC level.

	Dependent variable				
	FTP Model 1 (Quartile 1)	*FTP* Model 2 (Quartile 1)	*FTP* Model 3 (Quartile 1)	*FTP* Model 4 (Quartile 1)	*FTP* Model 5
Intercept	0.155	0.482	0.400**	0.385**	0.325**
	(1.28)	(1.31)	(2.13)	(2.58)	(2.18)
TPER	0.100*	0.241*	0.273*	0.425**	−0.048
	(1.70)	(1.95)	(1.71)	(2.43)	(−0.50)
Recent					0.002
					(1.56)
Recent ∗ *TPER*					0.008**
					(2.36)
Control variables	INCL	INCL	INCL	INCL	INCL
Year-dummies	INCL	INCL	INCL	INCL	INCL
Number of observations	148	148	149	147	592
Adjusted R^2	0.09	0.22	0.29	0.20	0.21

t-statistics in parentheses.
* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

mean value across all mergers in the sample equaled 13.8 (indicating that four weeks prior to the bid, the average target price was 13.8 weeks old), the minimum was 0.3 weeks and the maximum was 49.7 weeks. For reasons of interpretation, we deducted this number from 52 (the maximum number of weeks a target price is valid) to get a variable named *Recent*. The higher this number, the more recent the average target price was. Table 6 presents the results from our tests. As a first test, we estimated different regressions for each quartile based on the variable *Recent*. The coefficient of *TPER* increased with each quartile. Stale *TPERs* came with a coefficient (see Model 1 of Table 6) of 0.100. In the second and third quartile, *TPER* had a coefficient of 0.241 and 0.273; see Models 2 and 3, respectively. The fourth quartile showed a coefficient of 0.425, see Model 4. A test on the difference in regression coefficients for *TPER* in quartile 1 and quartile 4 revealed that this difference is statistically significant ($p < 0.10$, unreported). This implies that more recently published expected returns are stronger related to takeover premiums than old target prices. For the purpose of a second test, we computed an interaction effect *Recent* ∗ *TPER* which, when significant, illustrates that more recent *TPERs* are more informative. Model 5 displays our findings. The interaction variable is positive and significant; indicating that recent target prices are stronger related to takeover premiums than relatively outdated target prices. We conclude that while the average level of *TPERs* is generally related to the takeover premium, more recent target prices exhibit a stronger relation.

5. Conclusion and discussion

Employing a dataset of target prices and takeover bids in the US, we examined the relevance of target prices using a new perspective. The target price implied expected return (*TPER*) was positively related to takeover premiums of acquisitions. As takeover premiums could be influenced by potential synergy gains as estimated by the acquirer, we constructed several subsamples in which we controlled for synergy gains. The relation between the variables of interest remained intact. Various additional checks were performed, which showed that the results were robust to many different specifications.

The relation between the takeover premium and the *TPER* is stronger for more recently updated target prices. Relatively stale target prices are, however, as well related to the takeover price, although to a lesser extent. An explanation for the higher relevance of recent target prices could be that the

information content of target prices is not fully discounted in the stock price at the time of a bid. This would be in line with Da and Schaumburg (2011) who found that recently published target prices are informative with respect to short-term future returns. Alternatively, target prices could be functioning as an important anchor among market participants toward which acquirers may bias their takeover bid (see Baker et al. (2012) for a discussion of recent stock price highs as anchor in takeover pricing), irrespective of the information content of a target price. Especially the observation that old target prices are related to takeover bids fits into this explanation, but it may also explain the finding that recent target prices are more relevant in case market participants consider more recent information as a more important anchor. The observation that takeover bids are related to target prices even though the latter is independent from synergy estimations present in M&A considerations further indicates that target prices may serve as an anchor in takeover bids.

Our findings contribute to our understanding of the relevance of target prices. We show that target prices are significantly related to takeover premiums. This relation is particularly strong for recently published target prices. As this relation could be driven by both an informational role and an anchoring role of target prices, future research could be aimed at the disentanglement of these effects.

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.frl.2015.01.002.

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