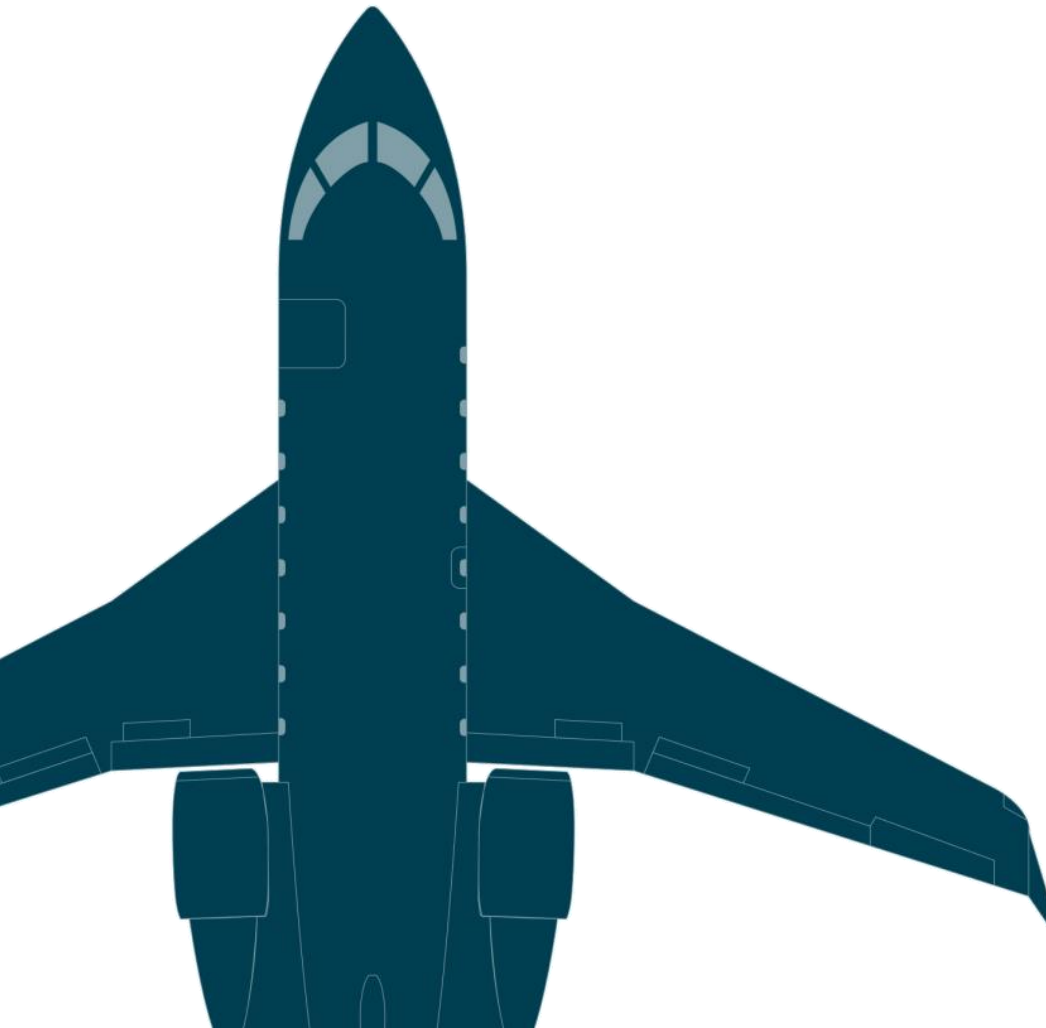




Charon Special
Situations Group

UNITED TECHNOLOGIES & ROCKWELL COLLINS

8 OCTOBER 2018



United Technologies
& Rockwell Collins
Risk Arbitrage Analysis

Considering the amount of media coverage, we found ourselves wondering when might be the most opportune time to invest in the United Technologies and Rockwell Collins merger process. To that end, we backtested different strategies to identify times and catalysts that might have been a good indicator of when to deploy capital. We came to the following conclusions:

- **The Rockwell Collins takeover is safely overpriced and largely as expected.** United Technologies' acquisition is a reflection of inflecting trends in the airplane supply chain. With calls for consolidation, supplier acquisitions, and forays into services from OEMs, the deal represents an expected response against pricing and competitive pressures. **Because the two companies need and want the transaction to go through, the consideration terms equally favor both sides; this makes the story incredibly straightforward as shareholders, management, and other parties are seemingly aligned.**
- **Though the greatest cash returns occurred at the beginning of merger process by buying UTX long, the highest annualized returns come from arbitraging toward the merger end.** Our arbitrage model indicates potential gains of around \$49-50 (for every UTX share shorted and fractional COL bought) when initiating the position after August 2018. Most profitable long positions in either companies for the most part are announcement based day trades. **We recommend the risk arbitrage and still see opportunity as we near the transaction close.**
- **The only real risk involved in the arbitrage at this point is Chinese exposure.** Merger spread tightened up until the start of 2018; widening began with the trade war and reversed with EU approval. When cross referencing these time frames with the implied merger probability, it appears that the market-wide sell-off was an anomaly and announcement-based catalysts are the only factors impacting spread. **We believe the possibility of a Chinese strike-back unlikely but possible in this macroeconomic environment.**

Looking at historic mega deals and merging in the industrial space, the market climate is highly conducive of the UTX / COL takeover. We believe there are parallels to conglomerates such as DowDuPont and Nestle which are required to divest businesses post-transaction and face activist-impelled corporate actions. The merger is most likely to be accretive due to tax reform and repatriation benefits – which could indicate a good long-term investment regardless of trading.

Figure 1: Transaction Details

Deal Highlights

Acquirer:	United Technologies Corporation (United Tech, NYSE: UTX)
Target:	Rockwell Collins Inc (Rockwell, NYSE: COL)
UTX Advisors:	Morgan Stanley (advisor), Wachtell Lipton Rosen & Katz (legal), Cleary Gottlieb Steen & Hamilton (legal)
COL Advisors:	J.P. Morgan Securities (advisor), Citigroup Global Markets (advisor), Skadden Arps Slate Meagher & Flom (legal)
Structure:	\$93.33 cash and \$46.67 stock subject to a two-way equity collar
Financing:	\$6.5B unsecured bridge loan facility; combination of new debt and cash on UTX balance sheet
Bank Group:	Morgan Stanley (administrative agent) / Bank of America Merrill Lynch (JLA, bookrunner) / HSBC (JLA, bookrunner)
Other Notes:	UTX is expected to assume \$7.3B of COL outstanding debt

Aerospace & Defense (A&D)		
Ticker (in MM except per share and ratios)	UTX (US:NYSE)	COL (US:NYSE)
Price (10/05/2018)	\$139.06	\$140.27
52-Week Range:	\$115.40-144.15	\$130.01-142.61
Shares Outstanding:	800.1	164.4
Market Cap:	111,261.0	23,056.0
Forward Dividend / Yield:	\$2.80 / 2.01%	\$1.32 / 0.94%
LT Debt:	\$27,246.0	\$6,317.0
LT Debt / Total Cap:	44.97%	48.17%
ROE:	16.95%	16.20%
Last Reporting Date:	7/27/2018	7/27/2018
P/E (TTM)	21.91x	23.11x
EPS (TTM)	6.35x	6.07x
EV / EBITDA (TTM)	10.94x	15.08x
Leverage (TTM)	2.34x	3.22x
Coverage (TTM)	12.50x	7.52x



The Rockwell Collins takeover is a stock and cash merger subject to a two-way fixed price collar. Each Rockwell Collins shareholder will receive per share \$93.33 cash and \$46.67 of UTX shares subject to a two-way 7.5% collar based on 8/22/17 trading price of \$115.69.

If United Technologies exceeds \$124.37, then the conversion rate will be 0.37525 of the prior UTX 20-day share price average. If UTX draws below \$107.01, then the conversion rate will be 0.43613 of the prior UTX 20-day share price average. Figure 2 is a diagram that outlines the conversion rate and exchange calculation.

Compared to recent mega-deals in the market, the financing combination seems reasonable since it conservatively ensures that the transaction goes through. Although the traditional long / short positioning was slightly limited by the rise in UTX (given hedge fund interest, required COL divestitures, and mutually beneficial exchange structure), the premium safely allows for an arbitrage as shown in the following slides.

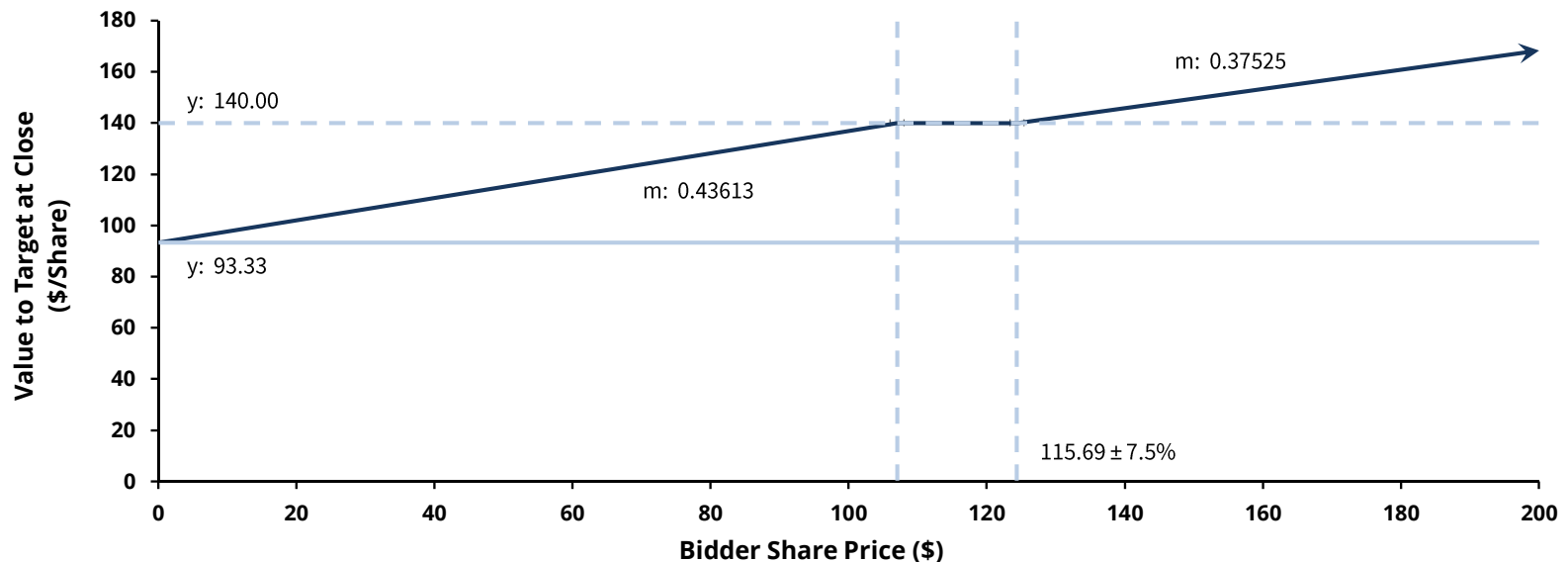
Cash Conversion Features

- The larger cash portion of the deal shields Rockwell Collins' consideration from potential decline in its shares. (Favors target)
- The bidder, United Technologies, is partially and mostly insulated from adverse movements such as target share appreciation or bidder depreciation. (Favors bidder)
- The cash component also limits variance from arbitrage. (Favors target and bidder)

Stock Conversion Features

- The exchange ratio is greater for the lower region (below the collar) which provides consolation for Rockwell Collins should United Technologies stock fall. (Favors target)
- If United Technologies rises beyond the high limit of the equity collar, then less in UTX shares will be exchanged, but the potentially greater upside compensates for the difference. (Favors target and bidder)

Figure 2: Calculation of exchange offering by bidder price



Long COL

1) Pay COL market price in cash	1) Receive COL
2) Exchange COL at merger close	2) Receive \$93.33 and fraction of UTX
- COL market price	+ Cash and stock consideration

Short UTX

1) Borrow and sell UTX <i>(net borrow fees)</i>	1) Receive UTX market price in cash
2) Buy back UTX and cover short after merger close	2) Receive UTX market price in cash
+ UTX old market price	- UTX new market price

See Notes in Footer

Merger Arb

1) Pay COL market price in cash	1) Receive COL
2) Borrow and sell UTX <i>(net borrow fees)</i>	2) Receive UTX market price in cash
3) Exchange COL at merger close	3) Receive \$93.33 and fraction of UTX
4) Cover short using UTX received	
- COL market price	+ \$93.33 per share and UTX old market price

No Action

- Though the trade isn't too complicated, there may have been more efficient investments to be pursued elsewhere. Opportunity cost is always important to consider.
- S&P rose 16.97% during the duration of the tested time period, so selecting strategy or choosing not to may depend on fund's profile and preference for market / merger risk exposure.



The charts below represent the spread (difference between entry and exit price) and annualized return of long positions where the X axis is the exit date between 9/05/17 to 10/05/18 (from left to right) and Y axis represents the position enter date between the same time frame (from top to bottom). Because the annualized heatmap had anomalous returns for short-term (1 to 2 day) trades as shown by the X=Y line, the same heatmap excluding the first month and three months of data are provided respectively. Given Justice Department approval last week, we made the assumption that the merger would close within a week or two of 10/05/18 with Chinese approval.

Figure 3: Heatmap of COL and UTX Long Positions for Duration of Merger

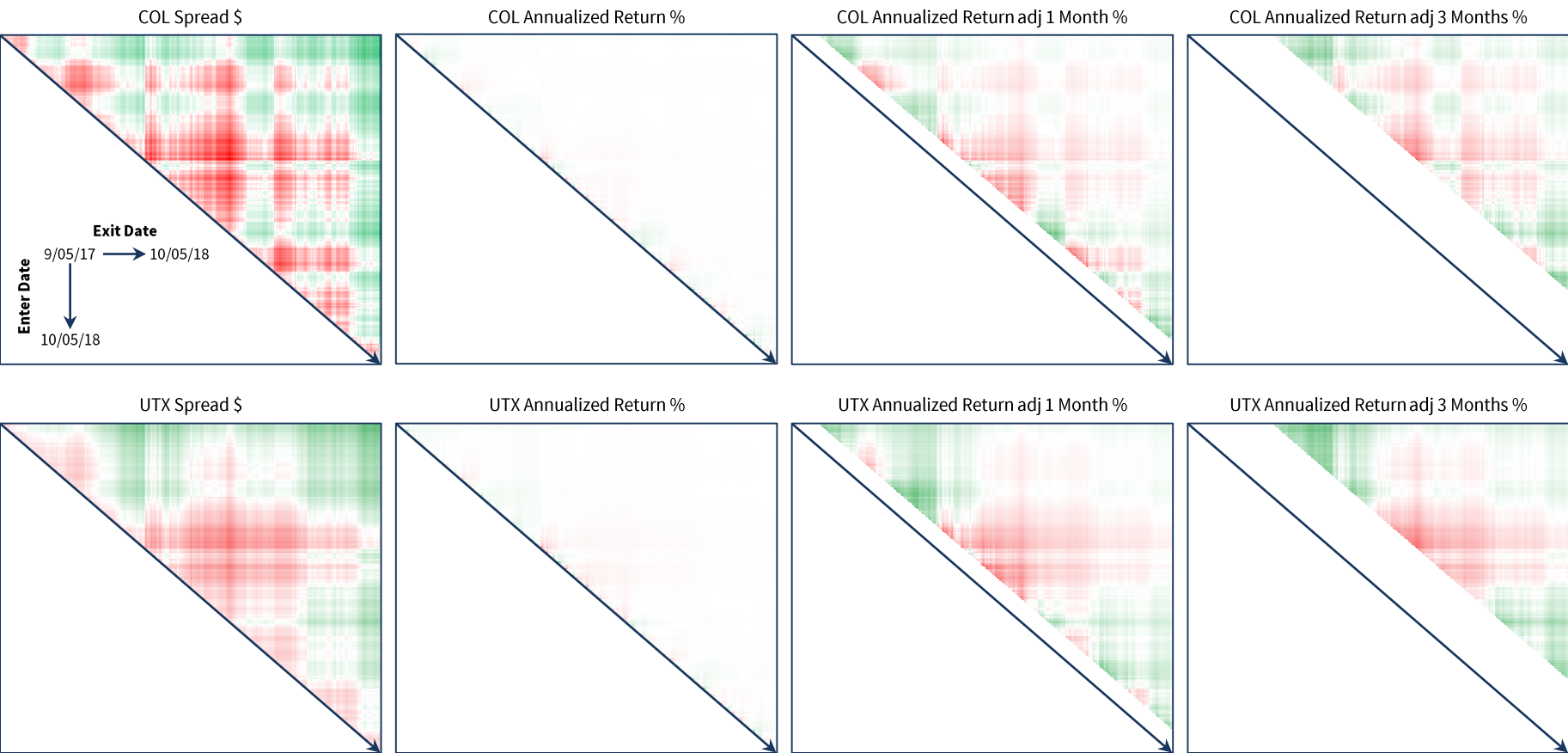


Figure 4 on the right represents the greatest spread and annualized returns of the heatmaps in Figure 3. The largest spreads for both UTX and COL were all centered around the same time frame which is why only one example is provided.

UTX's biggest spread was after the deal announcement as equity research analysts all near unanimously and positively responded over the following two weeks. Annualized returns were more diverse – rallying after selloff, new engine announcement, and new management appointments contributed.

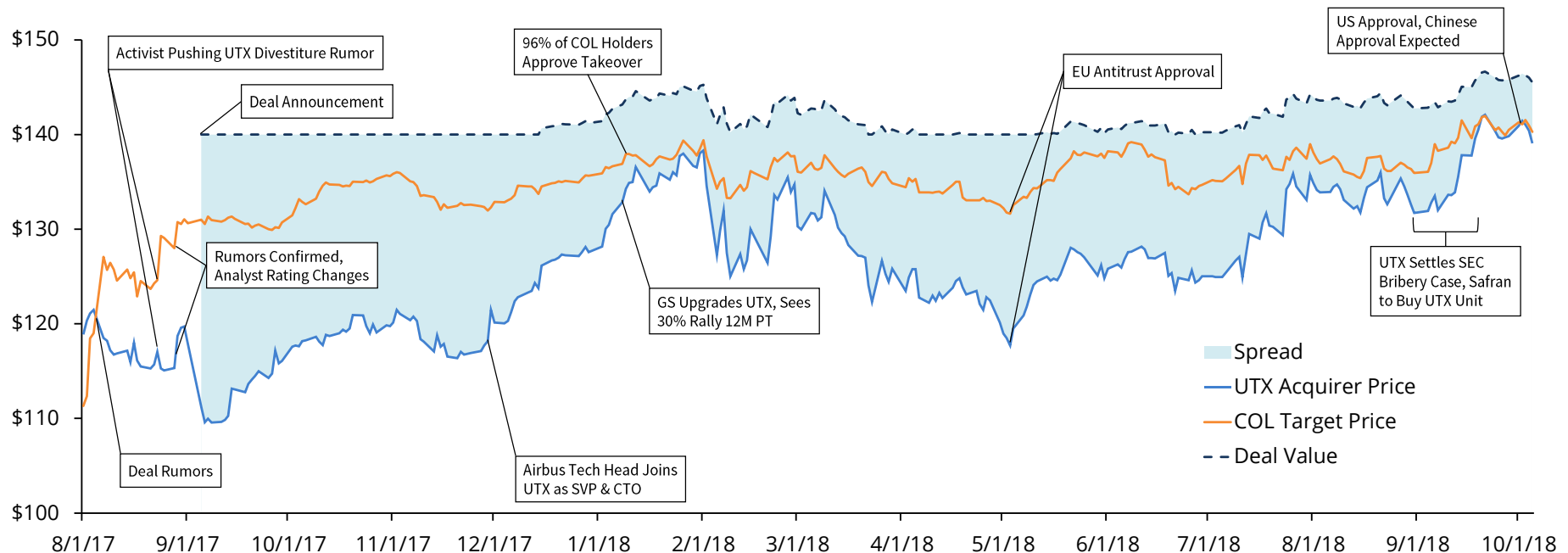
On COL's end, the spread and returns were a little more subdued running for the same periods and presumably for the same reasons as UTX. In this case, this is because as the acquirer United Technologies takes on more of the risk than Rockwell Collins. The spread between the deal value and COL market price stayed consistent throughout the period.

Figure 4: Long Position Illustrative Highlights

UTX	Enter Date	Exit Date	Spread
	9/8/2017	9/21/2018	32.5300
	Enter Date	Exit Date	Ann. Return
UTX	7/23/2018	7/24/2018	13.7401%
	2/21/2018	2/22/2018	12.1987%
	2/20/2018	2/22/2018	10.2752%
	11/29/2017	11/30/2017	10.1629%
	2/14/2018	2/15/2018	9.5067%
	9/13/2017	9/14/2017	9.4659%

COL	Enter Date	Exit Date	Spread
	9/26/2017	10/5/2018	15.6023
	Enter Date	Exit Date	Ann. Return
COL	7/11/2018	7/12/2018	5.8495%
	9/5/2018	9/6/2018	5.4366%
	9/13/2018	9/14/2018	4.7827%
	2/14/2018	2/15/2018	4.6154%
	7/11/2018	7/13/2018	4.1705%
	7/30/2018	7/31/2018	4.1701%

Figure 5: COL and UTX Performance Summary



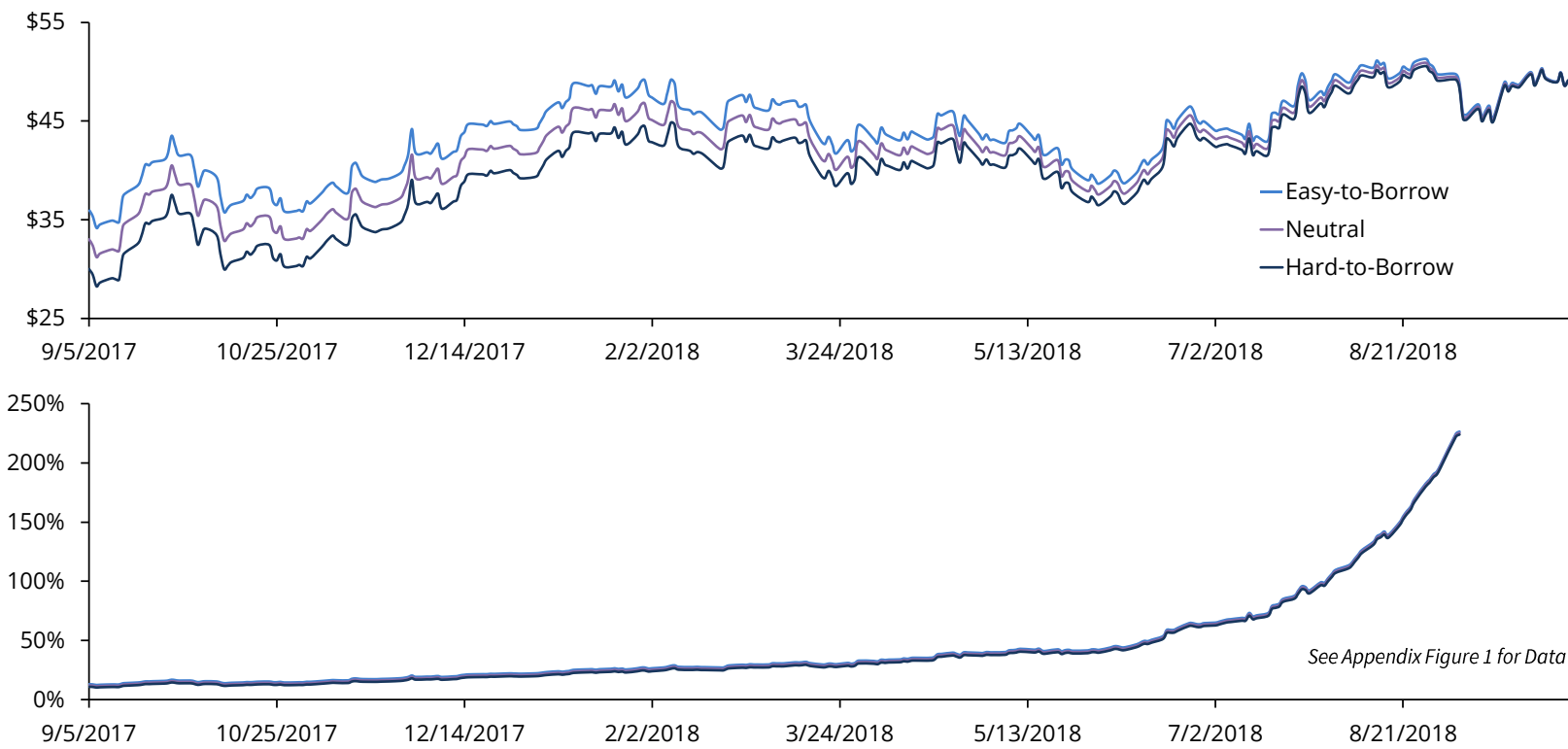
Since the arbitrage requires the deal to close (to cover the UTX short), the only real variable is entry time. This is why the X axis represents the position initiation date between 9/05/17 and 10/05/18 (unlike the long position heatmaps which had both initiation and exit axes).

The merger spread represents the hard cash value left at merger close and it assumes three different scenarios based on broker fees: Easy-to-Borrow (ETB) rate assumes 2.5%; Neutral 5.0%; Hard-to-Borrow (HTB) 7.5%. We imagine that because of the catalyst-driven nature of the investments that shorting UTX would charge HTB fees.

The spread is also based on shorting one share of UTX and buying long fractional shares of COL for the sake of convenience. The exchange rate used was the 10/05/18 deal consideration.

The three spread scenarios merge as the dates get closer to present as the fees diminish, and the annualized returns extend far beyond the scope of the chart which is why the graph is cut off at September 2018. Simple returns tend toward ~18% – refer to Appendix Figure 1 to see a table for associated values.

Figure 6: Line Chart of Merger Spread and Annualized Returns



While market implied risk can be roughly inferred from the merger spread, we thought it might be helpful to provide a calculation.

We used two different formulas provided on the right – the academic approach and Bloomberg’s internally used one. The only distinguishing factor between the two is whether the deal value is static or variable (initial deal value is used or if the exchange consideration changes). In Bloomberg’s case, they used the \$140 constant value which minimizes the change in the denominator.

For the most part until September 2018, the two seem to correlate; however afterwards, the divergence seems to imply that the Bloomberg calculation is a better proxy since the rise in probability corresponds to merger spread tightening.

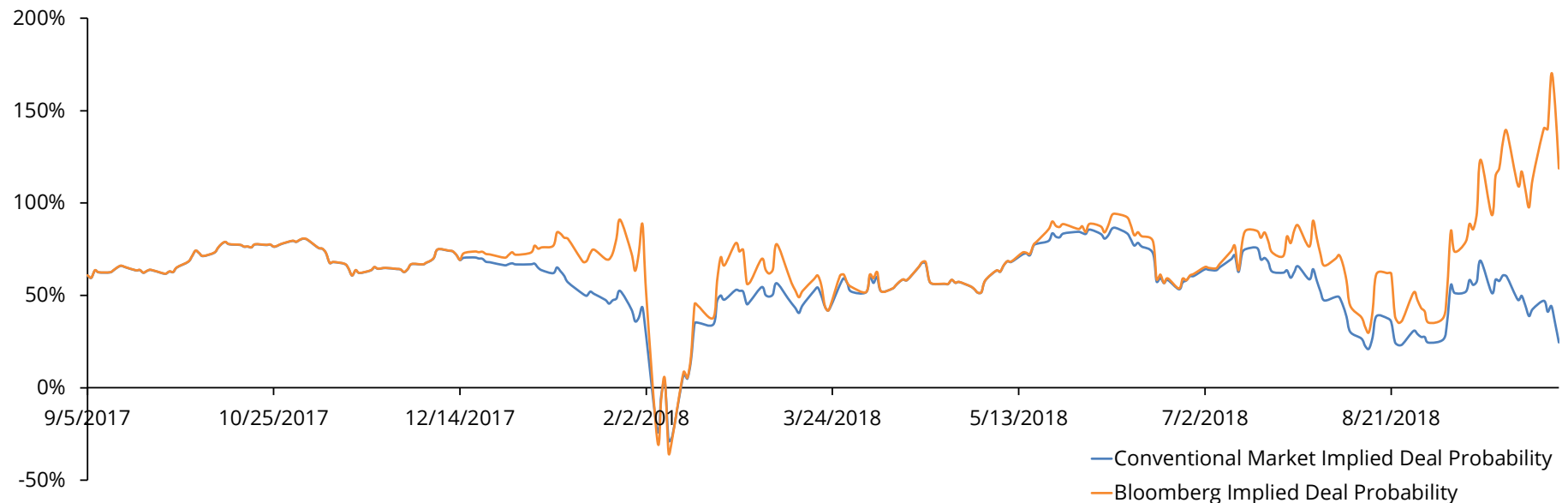
Market Implied Deal Probability

$$= \frac{\text{Target Price} - 20 \text{ Day Buyer Average}}{\text{Deal Value} - 20 \text{ Day Buyer Average}}$$

Bloomberg Calculated Deal Probability

$$= \frac{\text{Target Price} - 20 \text{ Day Buyer Average}}{\text{Static Initial Deal Value} - 20 \text{ Day Buyer Average}}$$

Figure 7: Market-Implied Probability and Bloomberg Calculation



Appendix



Appendix Figure 1: Arbitrage Illustrative Highlights Segmented by Borrow Fees (8/20/2018 – 10/05/2018)

Date	ETB			Spread	Neutral			Spread	HTB		
	Spread	% Return	Annual. Return		Spread	% Return	Annual. Return		Spread	% Return	Annual. Return
08/20/18	49.8195	18.8890%	149.8801%		49.3937	18.7276%	148.5991%		48.9679	18.5661%	147.3181%
08/21/18	50.4937	19.1321%	155.1826%		50.0745	18.9733%	153.8946%		49.6554	18.8145%	152.6065%
08/22/18	50.2817	19.2347%	159.5609%		49.8801	19.0811%	158.2867%		49.4786	18.9275%	157.0124%
08/23/18	50.1900	19.2378%	163.2973%		49.7994	19.0881%	162.0265%		49.4088	18.9383%	160.7557%
08/24/18	50.9561	19.5329%	169.7498%		50.5725	19.3858%	168.4718%		50.1889	19.2387%	167.1938%
08/27/18	51.2918	19.5352%	182.8299%		50.9303	19.3975%	181.5410%		50.5687	19.2598%	180.2522%
08/28/18	50.7883	19.3689%	186.0434%		50.4382	19.2354%	184.7611%		50.0881	19.1019%	183.4787%
08/29/18	50.4946	19.2992%	190.3843%		50.1560	19.1698%	189.1075%		49.8174	19.0404%	187.8308%
08/30/18	49.7829	19.0495%	193.1412%		49.4560	18.9244%	191.8728%		49.1291	18.7993%	190.6044%
08/31/18	49.7090	19.0800%	198.9774%		49.3933	18.9588%	197.7136%		49.0776	18.8377%	196.4499%
09/04/18	49.7530	19.0829%	224.6855%		49.4730	18.9755%	223.4208%		49.1929	18.8680%	222.1560%
09/05/18	48.8964	18.6297%	226.6613%		48.6235	18.5257%	225.3965%		48.3507	18.4218%	224.1318%
09/06/18	45.7346	17.1693%	216.0967%		45.4694	17.0698%	214.8436%		45.2042	16.9702%	213.5905%
09/07/18	45.6548	17.2311%	224.6195%		45.4016	17.1355%	223.3739%		45.1484	17.0400%	222.1284%
09/10/18	46.6867	17.5786%	256.6475%		46.4578	17.4924%	255.3895%		46.2290	17.4063%	254.1314%
09/11/18	45.4103	17.0182%	258.8181%		45.1906	16.9359%	257.5663%		44.9710	16.8536%	256.3145%
09/12/18	46.0439	17.2780%	274.1942%		45.8330	17.1988%	272.9381%		45.6221	17.1197%	271.6821%
09/13/18	46.5308	17.3857%	288.4442%		46.3266	17.3094%	287.1784%		46.1224	17.2331%	285.9125%
09/14/18	45.3099	16.7105%	290.4449%		45.1117	16.6374%	289.1744%		44.9135	16.5643%	287.9038%
09/17/18	48.9202	18.2863%	370.8052%		48.7503	18.2228%	369.5178%		48.5805	18.1593%	368.2305%
09/18/18	48.3137	17.8968%	384.2545%		48.1512	17.8366%	382.9619%		47.9887	17.7764%	381.6693%
09/19/18	48.8398	18.0647%	412.1018%		48.6859	18.0078%	410.8026%		48.5319	17.9508%	409.5035%
09/20/18	48.7417	17.9318%	436.3411%		48.5959	17.8782%	435.0364%		48.4502	17.8246%	433.7318%
09/21/18	48.7129	17.9036%	466.7714%		48.5766	17.8535%	465.4659%		48.4404	17.8034%	464.1604%
09/24/18	49.9545	18.5612%	615.8958%		49.8488	18.5220%	614.5922%		49.7431	18.4827%	613.2885%
09/25/18	48.7789	18.0871%	660.1776%		48.6832	18.0516%	658.8825%		48.5875	18.0161%	657.5874%
09/26/18	49.4625	18.3968%	746.0913%		49.3765	18.3648%	744.7936%		49.2905	18.3328%	743.4960%
09/27/18	50.3394	18.7751%	856.6138%		50.2629	18.7466%	855.3114%		50.1863	18.7180%	854.0090%
09/28/18	49.4058	18.3534%	956.9995%		49.3387	18.3285%	955.7011%		49.2717	18.3036%	954.4027%
10/01/18	49.0111	18.1037%	1651.9625%		48.9725	18.0894%	1650.6611%		48.9339	18.0752%	1649.3598%
10/02/18	49.9339	18.4707%	2247.2702%		49.9048	18.4600%	2245.9621%		49.8758	18.4492%	2244.6541%
10/03/18	48.6130	17.9224%	3270.8372%		48.5937	17.9153%	3269.5375%		48.5744	17.9082%	3268.2377%
10/04/18	49.1425	18.1947%	6641.0784%		49.1329	18.1912%	6639.7790%		49.1233	18.1876%	6638.4795%

Notes: ETB (Easy-to-Borrow) rate is assumes 2.5%; Neutral 5.0%; HTB (Hard-to-Borrow) 7.5%. Spread is based on shorting one share of UTX and buying long fractional shares of COL.

Sources: CSSG Estimates, Yahoo Finance

Date	News	
08/04/2017	Reuters	United Technologies in Bid to Acquire Rockwell Collins
08/23/2017	New York Post	Activist Shareholder Prods United Technologies
08/24/2017	Vertical Research Partners	Opinion: Don't Dismiss UTC's Potential Acquisition of Rockwell
08/29/2017	WSJ	United Technologies Nears Deal to Buy Rockwell Collins for More Than \$20 Billion
09/01/2017	Bezinga	United Technologies for Rockwell Collins: Deal or No Deal?
09/04/2017	Rockwell Collins	United Technologies to Acquire Rockwell Collins for \$30 Billion
09/04/2017	United Technologies	United Technologies to Acquire Rockwell Collins for \$30 Billion
09/07/2017	Cleary Gottlieb	United Technologies Acquires Rockwell Collins for \$30 Billion
11/30/2017	Reuters	Airbus Technology Head Eremenko Leaves to Join Rival UTC
01/08/2018	CNBC	Goldman Sachs Upgrades United Technologies, Sees 30% Rally This Year
01/11/2018	Business Wire	Rockwell Collins' Shareowners Vote Overwhelmingly in Favor of Acquisition by UTC
05/04/2018	CNBC	UTC Gets European Go-Ahead for \$23 Billion Purchase of Rockwell Collins
05/04/2018	Reuters	UTC Gains EU Antitrust Approval to Buy Rockwell Collins
09/06/2018	Bloomberg	Rockwell Collins Said Near Clearance from China on United Tech Merger
09/12/2018	WSJ	United Technologies to Pay \$13.9 Million to Settle SEC Bribery Case
09/18/2018	Triad Business Journal	As \$30B Acquisition by United Technologies Nears, Rockwell Collins Will Divest of Business Unit
10/01/2018	CNBC	US Approves United Tech Purchase of Rockwell Collins
10/07/2018	NYT	China Wants to Strike Back on Trade. Big U.S. Deals Could Suffer.
Title	Source	
Challenger 650	Bombardier	https://businessaircraft.bombardier.com/en/aircraft/challenger-650
The M&A Collar Handbook	Booz Allen Hamilton	Link not available
Rockwell Collins Inc.	SEC EDGAR	https://www.sec.gov/cgi-bin/browse-edgar?CIK=col&owner=exclude&action=getcompany
United Technologies Corp.	SEC EDGAR	https://www.sec.gov/cgi-bin/browse-edgar?CIK=utx&owner=exclude&action=getcompany
Rockwell Collins Inc.	WSJ	https://quotes.wsj.com/COL
United Technologies Corp.	WSJ	https://quotes.wsj.com/UTX
Rockwell Collins Inc.	Yahoo Finance	https://finance.yahoo.com/quote/COL
United Technologies Corp.	Yahoo Finance	https://finance.yahoo.com/quote/UTX

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