

Strategic Advisory Analytics



The MTS US Biotech IPO Monitor

Edition 4: Q3 2018 Update - 2018 Looking to Beat the 2014 High Tide Mark For Biotech IPOs

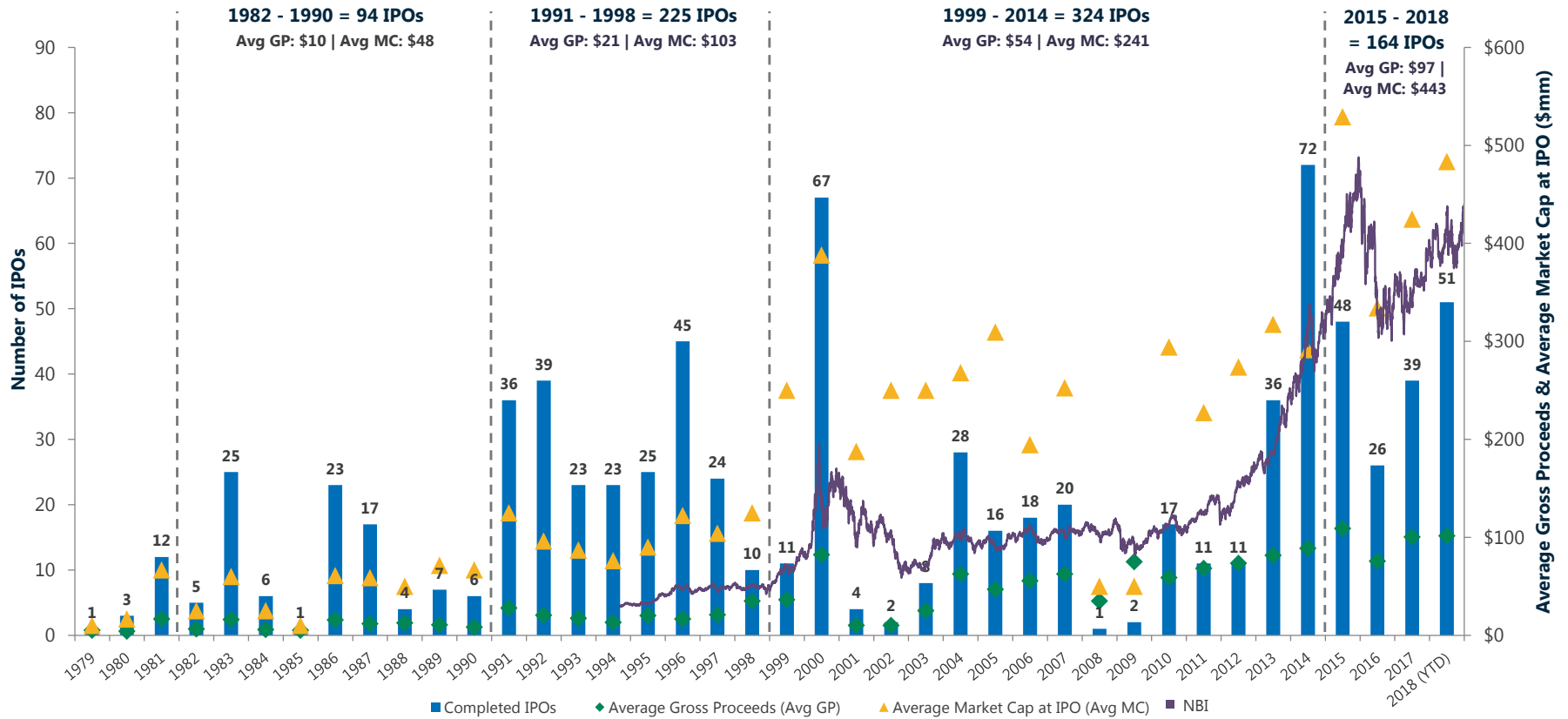
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The 40 Years Of US Biotech IPOs

There Have Been 4 Era's of Biotech IPO Valuations – With Average Gross Proceeds and Market Capitalizations Roughly Doubling In Each Subsequent Period



Special thanks to Stelios “The Godfather” Papadopoulos for the historic data

Executive Summary

The MTS Biotech IPO Monitor - Edition 4: Q3 2018 Update – 2018 Looking to Beat the 2014 High Tide Mark For Biotech IPOs

Key Messages From Detailed Analysis of 2012-Q3:2018 IPOs

1. "Quality" Over Stage of Asset: Pre-Clinical/Phase I IPOs Have Higher Raises and Valuations than Phase II and Phase III Companies – Page 8
2. Gene Therapy Companies Continue to Garner Higher Raises and Valuations than Small Molecule Companies – Page 9
3. 85% of IPOs Are Still Trading As Original Entities; Exits: 9% M&A, 4% Reverse Merger, 2% Bankrupt or Delisted – Page 10
4. Foreign Issuers Have Broad Access to US Capital Markets - Higher Quality Companies Eventually Gravitate to US listings – Page 11
5. ~30% Insider Participation Continues to be an Important Factor for a Successful IPO – Page 12

US Biotech IPO Market Q3:2018

- > **A strong Q3:2018 on number and initial IPO valuations...**
 - Q3:18 was a strong quarter in terms of the number of IPOs, 17 IPOs in Q3:18, which is the same number of IPOs as the 2014 banner year vs. 10 in Q3:17, 6 in Q3:16 and 10 in Q3:15
 - 2018 YTD average raise/post money valuation was stronger than full previous years at \$101/\$483m vs. FY17 \$100m/\$425m, FY16 \$76m/\$334m, FY14 \$89m/\$291m, but lower than the FY15 \$109m/\$529m
- > **...with a scattered performance**
 - 10 out of the 17 Q3:18 IPOs have posted gains at an impressive average of +59%; The 7 underperformers have an average loss of -28%
 - Mean IPO to current performance for class of 2018 YTD +20% vs. class of 2017 +61%, class of 2016 +96%, and class of 2015 +17%

MTS Bespoke IPO Database

- > MTS' "Strategic Advisory Analytics" reports exemplify our value-add strategic advisory services to clients across all healthcare industry sub-sectors
- > Within the "US Biotech IPO Monitor" series, we utilize our proprietary database to generate thought-provoking statistics/observations about the IPO market
- > Our database includes the 823 US Biotech IPOs from the first 1979 US Biotech IPO with micro detailed analysis from 2012

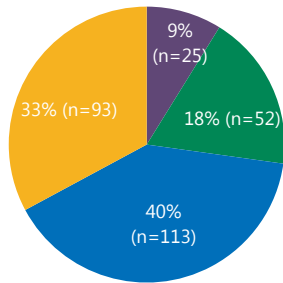
Phase I is the New Phase II – Page 4

- > **Phase I companies now represent the Biotech IPO sweet spot**
 - Phase I companies have become the sweet spot when balancing the amount raised at IPO
- > **Early-Stage stock price performance – Go Big or Go Home**
 - Phase I companies have the strongest average/mean performance of +125%, not far followed by Preclinical companies at an +54%
- > **Early-stage IPO Companies are largely "Platform" Companies with Clinical Triggers less than 1 year out from IPO**
 - The vast majority of early-stage IPO companies are "Platform" vs. "Asset(s)" based
- > **Gene Therapy companies dominate the modality type for Early-Stage companies**
 - Gene Therapy companies, somewhat understandably, have dominated the early-stage company space. 57% of Preclinical and 31% of Phase I companies' lead asset utilized gene therapy

Detailed Analysis of Early-Stage IPOs

2012 – Q3:2018

Exhibit 1: MTS IPO Database (n=283)
Split By Stages [2012 – Q3:2018]



■ Preclinical at IPO
■ Phase I at IPO
■ Phase II at IPO
■ Phase III/Filed/Approved at IPO

Exhibit 2: Average PM Valuations and
Raises [2012 – Q3:2018]

	Implied Value (\$mm)	Amount Raised (\$mm)	Avg Change from IPO to Current Stock Price	Median Change from IPO to Current Stock Price
Early-Stage (27%, n=77)	\$456	\$113	102%	4%
Preclinical (9%, n=25)	468	105	54%	5%
Phase I (18%, n=52)	450	129	125%	(2%)
Mid-Stage				
Phase II (40%, n=113)	344	84	44%	(12%)
Late-Stage				
Phase III/Filed/Approved (33%, n=93)	395	88	67%	12%

Exhibit 3: Early-Stage Assets vs. Total
[2012 – Q3:2018]

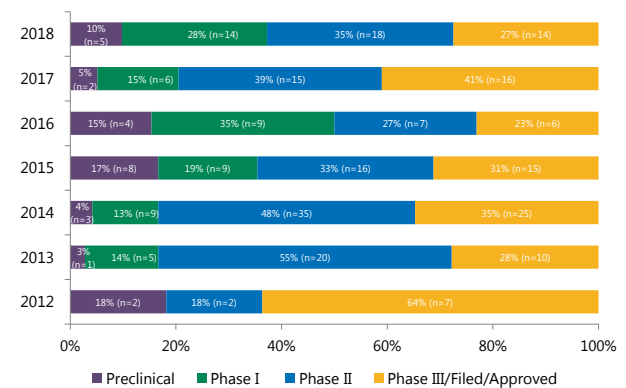


Exhibit 4: Primary Source of Value [2012 – Q3:2018]

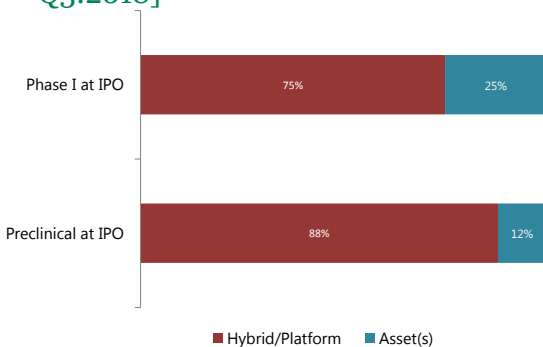


Exhibit 5: Modality [2012 – Q3:2018]

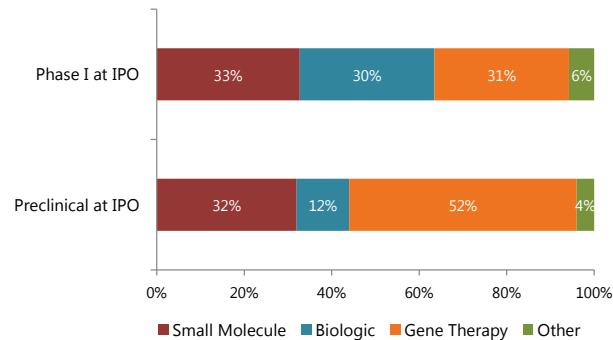
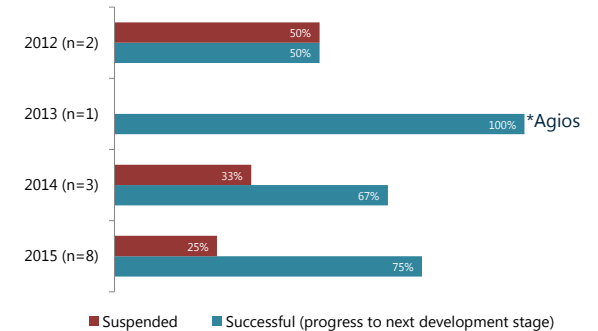


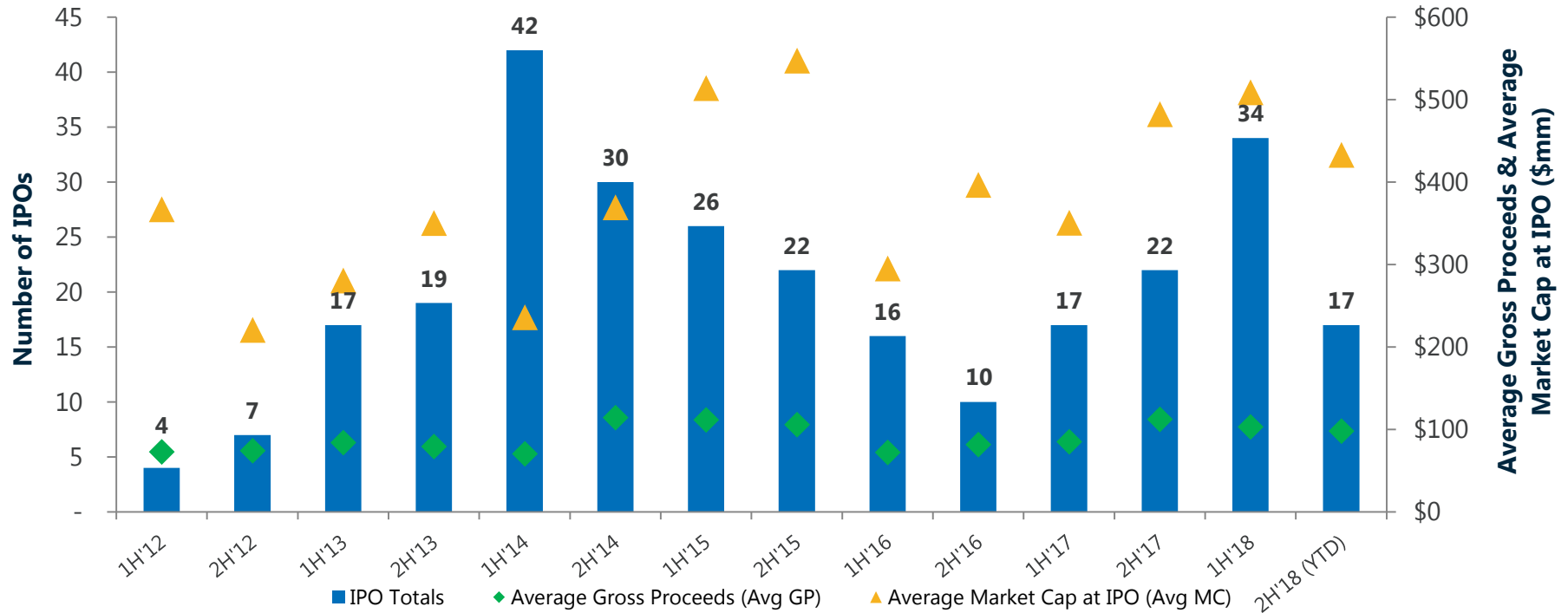
Exhibit 6: Success of Preclinical Assets
[2012 – 2015]



2012 – Q3:2018 IPO Biotech Market Overview

Detailed Analysis Looking at H1:H2 from 2012 to Today

Average Gross Proceeds and Average Market Cap at IPO by Year



	1H'12	2H'12	1H'13	2H'13	1H'14	2H'14	1H'15	2H'15	1H'16	2H'16	1H'17	2H'17	1H'18	2H'18 (YTD)
IPO Totals	4	7	17	19	42	30	26	22	16	10	17	22	34	17
Total Gross Proceeds	\$290	\$517	\$1,429	\$1,504	\$2,957	\$3,426	\$2,901	\$2,326	\$1,150	\$817	\$1,446	\$2,464	\$3,502	\$1,666
Total Market Cap at IPO	1,467	1,544	4,769	6,652	9,902	11,080	13,361	12,034	4,723	3,964	5,958	10,604	17,296	7,367
Average Gross Proceeds	73	74	84	79	70	114	112	106	72	82	85	112	103	98
Average Market Cap at IPO	367	221	281	350	236	369	514	547	295	396	350	482	509	433

Note(s): All \$ in mm.

Source(s): MTS and Dealogic, as of 09/28/2018. Special thanks to "The Godfather" Stelios Papadopoulos for the historic data.

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1. Executive Summary

Key Message 1: “Quality” Wins Over Stage of Asset

Big Idea/Pre-Clinical/PI Companies Have HIGHER Raises and Valuations Than PII/PIII Companies

Key Observations from Lead Asset Analysis by Stage

- > A detailed analysis of the 283 IPOs from 2012-Q3:2018 when considering the stage of the lead asset (broken down into three buckets; early-stage – preclinical/Phase I; mid-stage - Phase II; late-stage - Phase III/filed/marketed) demonstrated that, broadly speaking, the ability to raise capital and concomitant valuation remains dependent on the quality of the company rather than the stage of the lead asset
- > Interestingly, Phase I companies have become the sweet spot when balancing the amount raised at IPO (#1 spot at an average/mean \$129mm), valuation (average/mean of \$450mm, with Preclinical companies holding the #1 spot at very slightly higher valuation of an average/mean \$468mm), number/proportion of companies (a reasonable 18% over the 7 year period) and post-IPO stock performance (#1 at an average/mean +125%)
- > Data summarized from pages 19, 24, 71, 72

	Early-Stage (27%)	Mid-Stage (40%)	Late-Stage (33%)
Avg Raise (2012 - Q3:18)	\$113	\$84	\$88
Avg PM (2012 - Q3:18)	456	344	395
	Early-Stage (21%)	Mid-Stage (38%)	Late-Stage (41%)
Avg Raise (2017)	\$99	\$96	\$105
Avg PM (2017)	459	348	479
	Early-Stage (37%)	Mid-Stage (35%)	Late-Stage (27%)
Avg Raise (Q3:18)	\$115	\$98	\$87
Avg PM (Q3:18)	535	417	499

Two Key Interlinked Dynamics:

1. Quality of the company acts as an investor filter relative to the development stage of the company: “hot” early-stage companies can get out at high valuations relative to “standard” late-stage companies – the classical “risk/reward” play
2. The healthcare specialist investor base for each bucket of stage of lead asset company is notably different – but rapidly changing (new gen “Crossover”)

Key Message 2: Gene Therapy = Highest Raises & Valuations

Gene Therapy Companies Garner ~50% Higher Raises and Valuations Than Small Molecule Companies

Key Observations from Lead Asset Analysis by Modality

- > A detailed analysis of the IPO market from 2012-Q3:2018, when considering the modality of lead asset [broken down into four buckets; small molecule, biologic, Gene Therapy (GT) or other], demonstrated that GT modality commands highest raises and concomitant valuations
- > In H1:2018, there were 8 GT companies: Unum Therapeutics, Homology Medicines, Solid Biosciences, MeiraGTx, AVROBIO, Translate Bio, Magenta Therapeutics and Autolus Therapeutics
- > In Q3:2018, Rubius Therapeutics, a Gene Therapy company focusing on red blood cell therapy IPOed with a \$1.8bn valuation, making it the 2nd highest IPO of 2018 YTD (MorphoSys was the highest at \$3.3bn)
- > Data summarized from pages 20, 73, 74

	Small Molecule (49%)	Biologic (29%)	Gene Therapy (17%)	Other (5%)
Avg Raise (2012 - Q3:18)	\$85	\$91	\$124	\$83
Avg PM (2012 - Q3:18)	315	457	498	391
	Small Molecule (51%)	Biologic (31%)	Gene Therapy (10%)	Other (8%)
Avg Raise (2017)	\$104	\$106	\$93	\$63
Avg PM (2017)	451	471	282	253
	Small Molecule (43%)	Biologic (31%)	Gene Therapy (18%)	Other (8%)
Avg Raise (Q3:18)	\$95	\$101	\$136	\$57
Avg PM (Q3:18)	377	593	651	256

A Focus on GT Remains

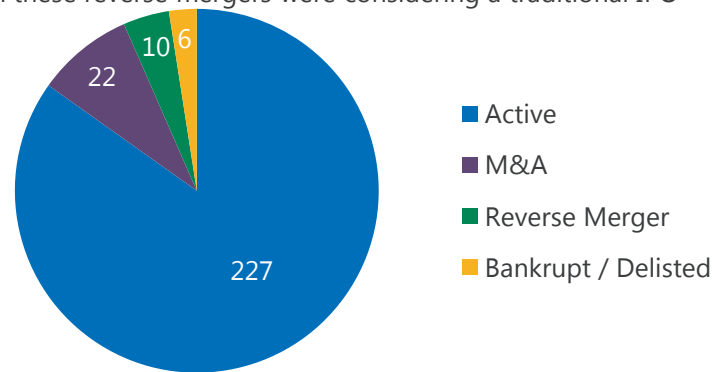
As noted above, the GT sector IPO window remains open with relatively robust valuation despite companies the regulatory clinical noise. This somewhat reflects the M&A within the GT space over the last 9 months

Key Message 3: 85% IPOs Still Trading As Original Entities

A Relatively Small Proportion of IPOs Exit Via M&A or “Completely Fail”

Key Observations from Different Types of Exits

- > Of 283 companies that IPO'd from 2012 – Q3:2018, 22 companies exited via M&A at an average 349% premium to IPO pricing
 - Surprisingly, there was no M&A activity in Q3:2018
 - H1:18 saw a very strong M&A dataflow with 5 deals, less than the number in the whole of 2017 and 2 more than in 2016
 - In H1:18, the average premium was 362%, only second to 2015's outstanding year when average premium was 520%
 - In H1:18, the average time to exit was 1.4 years vs. 2.0 years for all companies in 2012-2016
- > From the same 283 companies, 10 companies reported negative data and reverse merged at an average of a 73% discount to IPO pricing
 - 2017 was “The Reverse Merger Year” from 2012 – Q3:2018, 6 of the 10 reverse mergers occurred in 2017, 2 occurred in H1:2018
 - The majority of private companies that were the effective acquirers in these reverse mergers were considering a traditional IPO
- > Of 283 companies, there were 6 that filed for bankruptcy or delisted
- > Data summarized from pages 21, 22



IPO Exits via M&A and Reverse Mergers – Somewhat Surprising Results

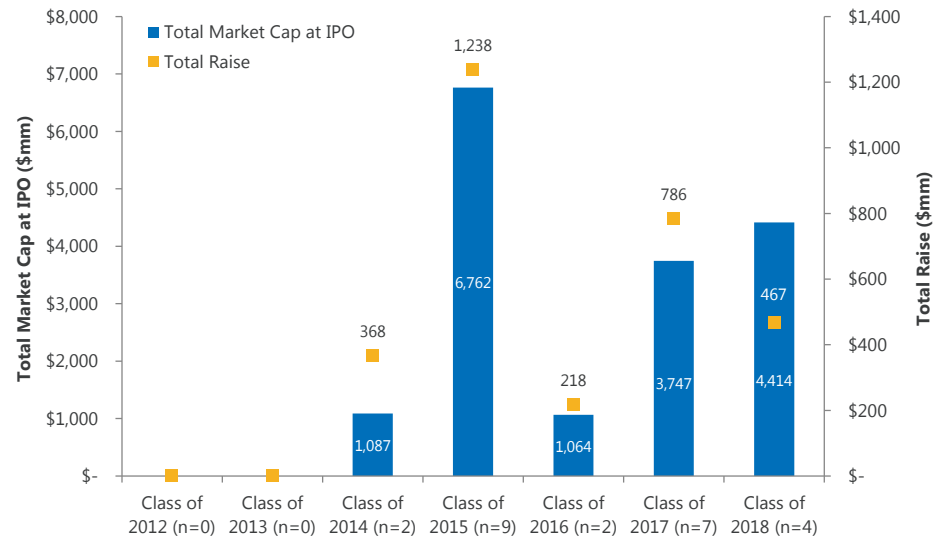
Of the 283 US Biotech IPOs over the last 7 years, 22 (8.3%) were acquired, 10 (3.8%) had lead asset failures and exited via a reverse merger, and 6 (2.3%) filed for bankruptcy.

Key Message 4: Foreign Issuers Have Broad Access to US

Generally Higher Quality/Successful EU Companies Eventfully Gravitare to US listings

Key Observations from ADR Offerings

- > Over the last 7 years, 2015 and 2017 were exceptional years for foreign issuers IPOing in the US based on matrices such as total amount raised and post money valuation
- > In 2015, there were 9 foreign companies that IPO'd, raising ~22% of the total amount raised and representing ~25% of total post money valuation for that year, whereas in 2017 there were 7 foreign companies that IPO'd, raising ~20% of total IPO proceeds and representing ~22% of total post money valuation for the year
- > In H2:2018 (YTD) there were 4 foreign company raising ~13% of total IPO raise, and representing ~25% of total post money valuation for the year to date



Foreign Companies Benefit from US Capital Markets

US capital markets offer the largest pool of sophisticated investors that are supportive of novel biotech technologies.

Key Message 5: Insider Participation, A Notable Component

High Insider Participation Continues to Drive Successful IPO Numbers in Q3:2018

Key Observations from Analysis of Insider Participation

- > Over the last 7 years, average insider participation in the US biotech ranged from 23% - 66%
- > 2016 was a banner year with an average insider participation of 39.9%
- > 2018 (YTD) saw the maximum insider participation of 66% for Entasis Therapeutics
- > Q3:2018 numbers regarding the amount of insider participation demonstrate that the trend is continuing from previous years

	2012	2013	2014	2015	2016	2017	2018 (YTD)	Total
Average Insider Participation	35.8%	29.2%	26.9%	22.1%	39.9%	32.0%	35.8%	30.3%

Meaningful Insider Participation in Q3:2018 Continues to be a Driver in Successful IPOs

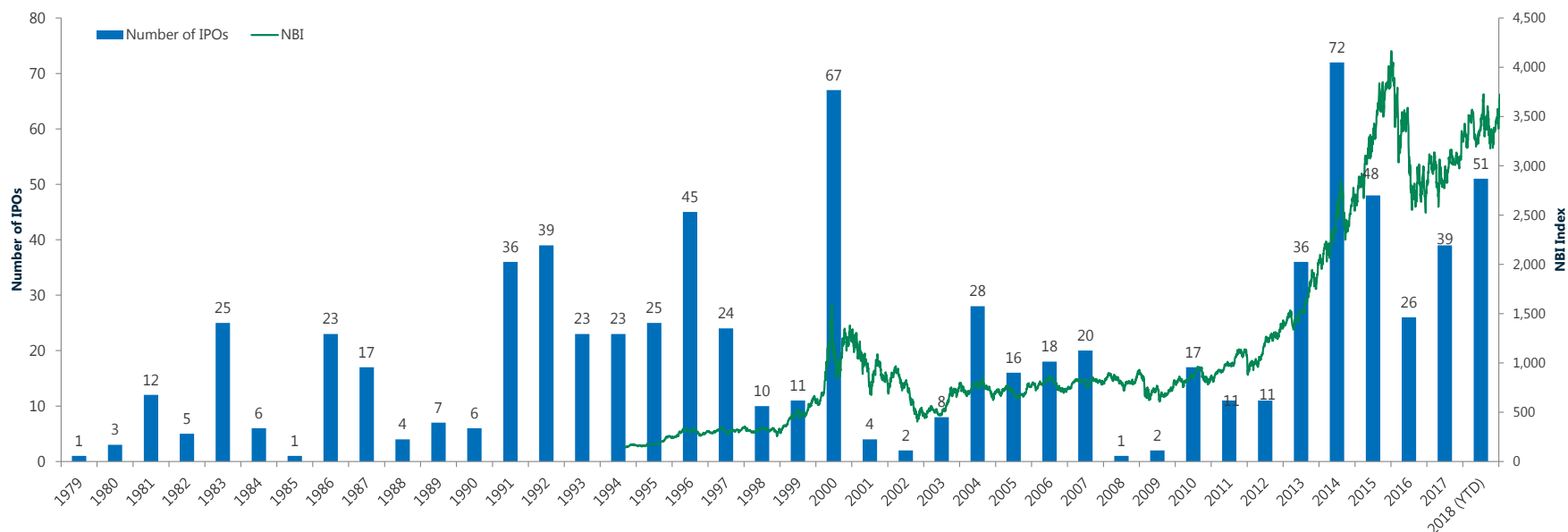


2. Historical Biotech IPO Market Overview

1979-2018 IPO Biotech Market

Valuation and Raises Summary

IPO Totals by Year vs. NASDAQ Biotech Index



Historical IPO Raises and Valuation

	2010	2011	2012	2013	2014	2015	2016	2017	2018 (YTD)
Avg. Raise	\$80	\$75	\$73	\$81	\$89	\$109	\$76	\$100	\$101
Avg. Post Money Valuation	308	237	274	317	291	529	334	425	483
Total Raised	1,448	980	808	2,933	6,384	5,227	1,967	3,911	5,169
Total Post Money Valuation	5,538	3,075	3,011	11,421	20,983	25,396	8,688	16,563	24,656

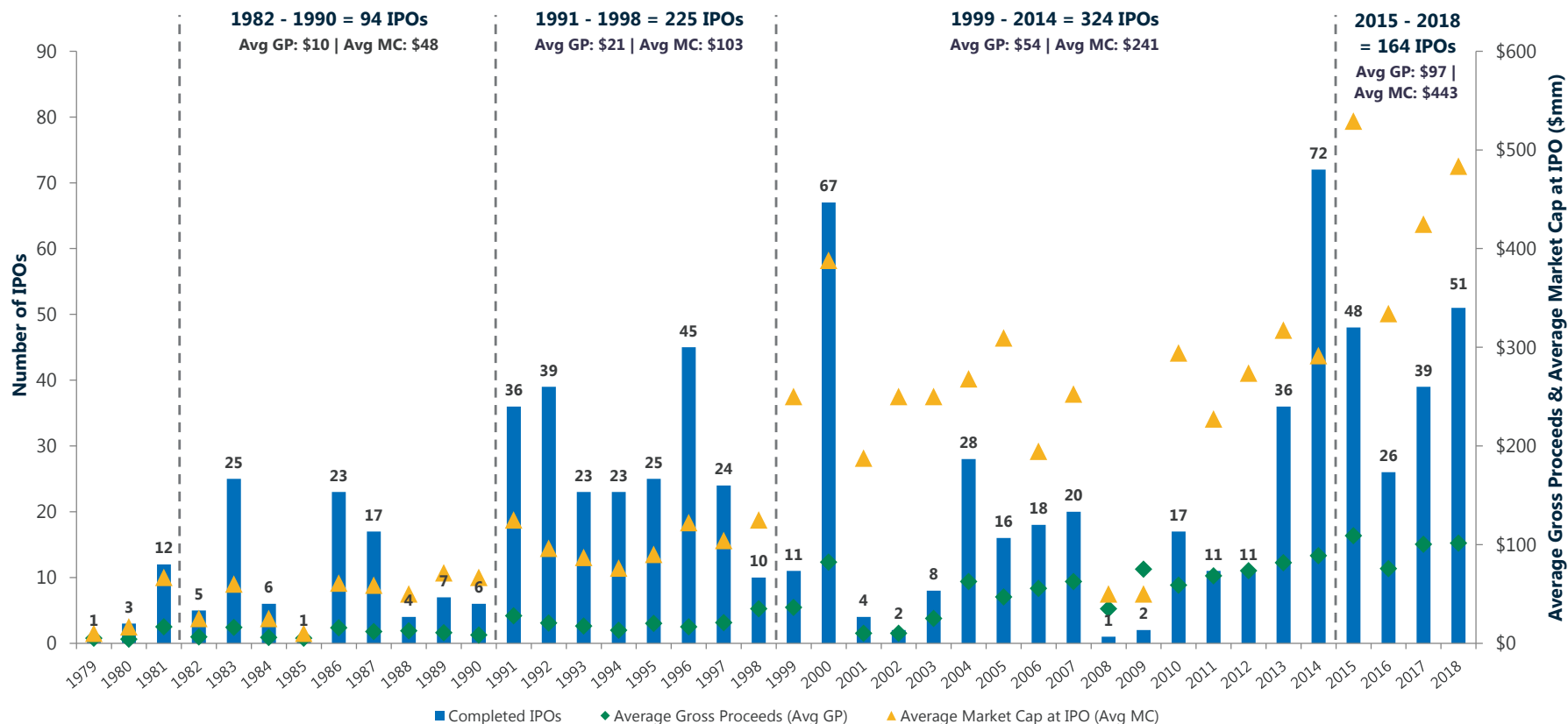
Note(s): All \$ in mm.

Source(s): MTS and Dealogic, as of 09/28/2018. Special thanks to "The Godfather" Stelios Papadopoulos for the historic data.

1979-2018 IPO Biotech Market Overview

The Three Generations Of US Biotech IPOs By Average Gross Proceeds and Market Cap

Average Gross Proceeds and Average Market Cap at IPO by Year

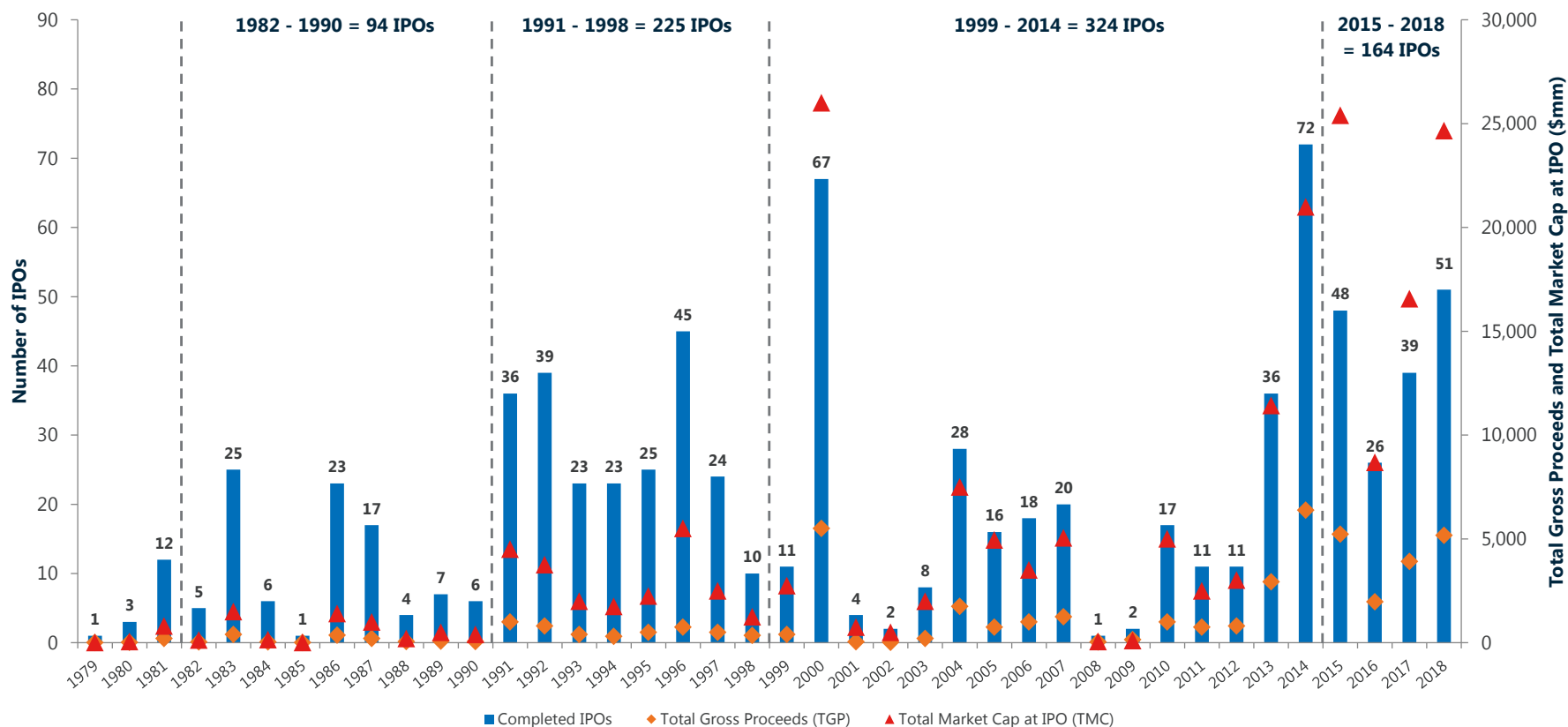


Source(s): MTS and Dealogic, as of 09/28/2018. Special thanks to "The Godfather" Stelios Papadopoulos for the historic data.

1979-2018 IPO Biotech Market Overview

The Three Generations Of US Biotech IPOs By Total Gross Proceeds and Market Cap

Total Gross Proceeds and Total Market Cap at IPO by Year



Source(s): MTS and Dealogic, as of 09/28/2018. Special thanks to "The Godfather" Stelios Papadopoulos for the historic data.

Annual Stock Price Performance

Selected Benchmark Indices / Equities

	2010	2011	2012	2013	2014	2015	2016	2017	2018
NASDAQ	16.9%	(1.8%)	15.9%	38.3%	13.4%	5.7%	7.5%	28.2%	16.6%
Healthcare Indices									
NASDAQ Biotechnology Index	15.0%	11.8%	31.9%	65.6%	34.1%	11.4%	(21.7%)	21.1%	14.3%
NYSE Arca Biotechnology Index	37.7%	(15.9%)	41.7%	50.6%	47.6%	10.9%	(19.4%)	37.3%	27.4%
ProShares Ultra NASDAQ Biotechnology ETF	-	15.6%	66.8%	159.6%	66.8%	13.9%	(44.2%)	40.5%	24.2%
S&P Pharmaceuticals Select Industry Index	21.4%	11.6%	10.1%	59.5%	28.7%	1.1%	(23.7%)	11.3%	11.5%
Bellwether Stocks⁽¹⁾									
Mean	3.1%	27.4%	41.3%	86.4%	30.4%	2.5%	(11.5%)	9.3%	7.2%

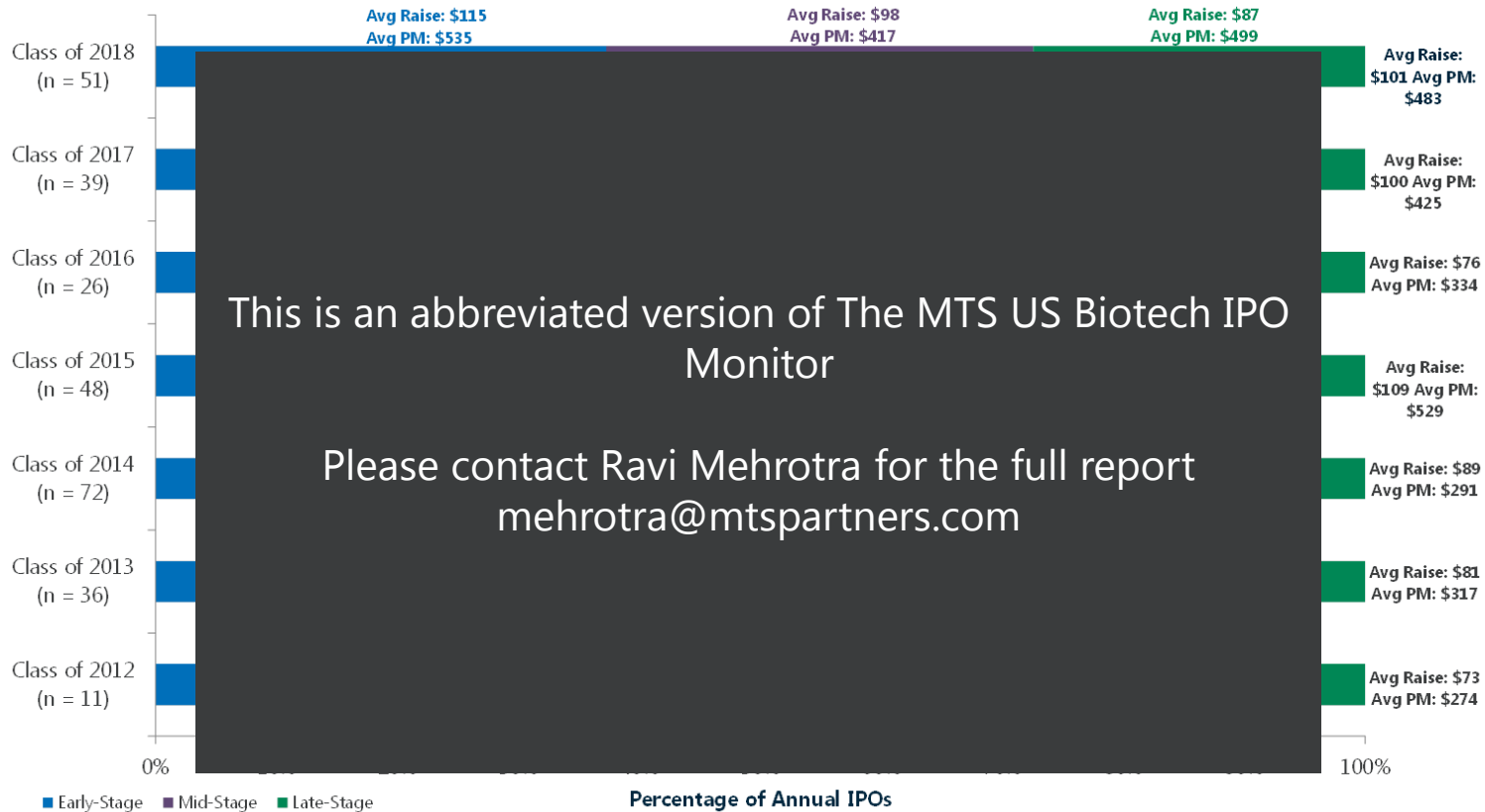
(1) Bellwether stocks comprise of AMGN, BIIB, CELG and GILD
Source(s): MTS and FactSet Research Systems, as of 09/28/2018.



3. 2012-Q3:18 Detailed US IPO Biotech Analysis

Valuation Dynamics Split by Lead Asset Phase at IPO

Classes of 2012 – Q3:2018

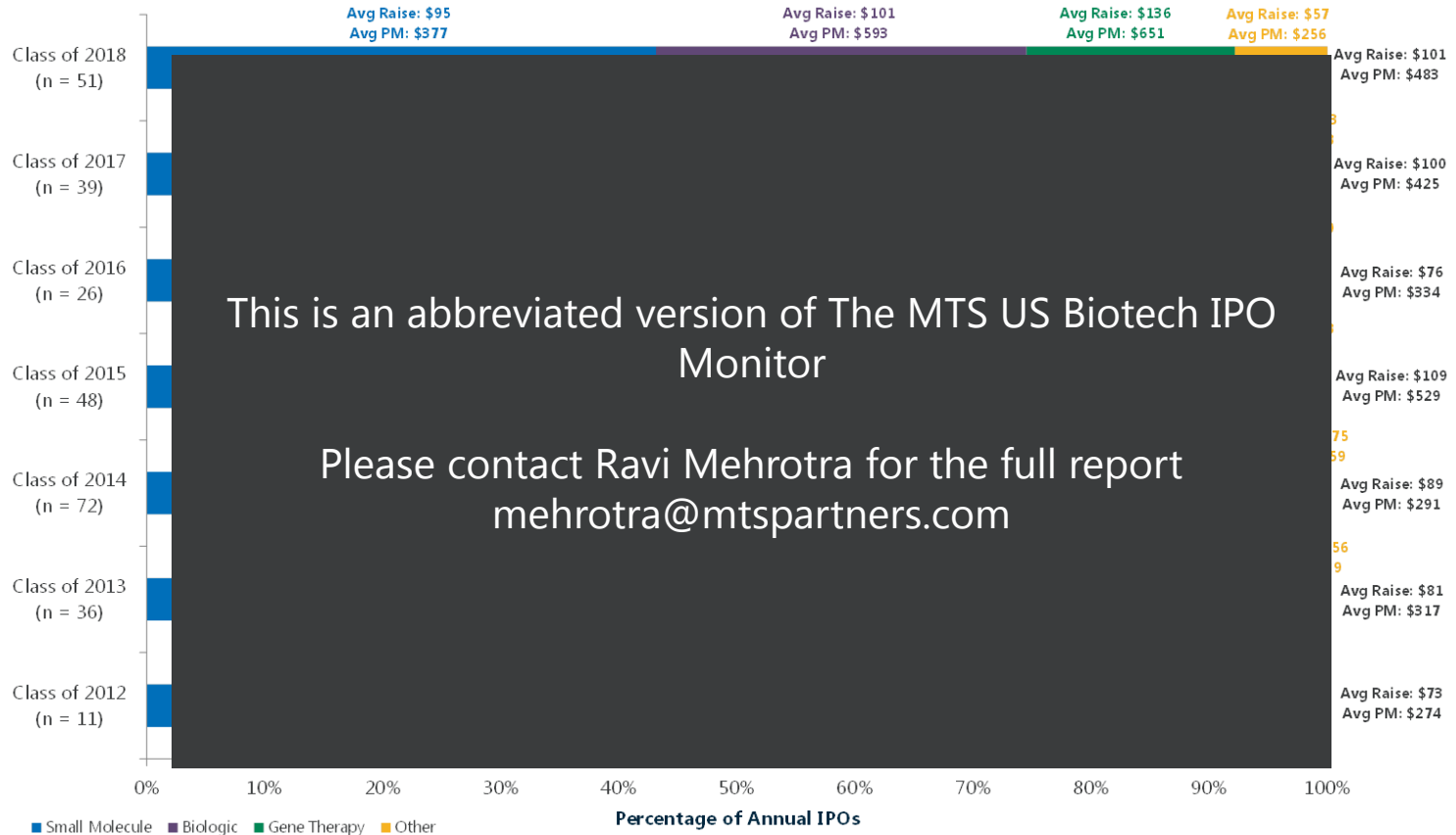


	Early-Stage (27%)	Mid-Stage (40%)	Late-Stage (33%)
Avg Raise (2012 - Q3:18 YTD)	\$113	\$84	\$88
Avg PM (2012 - Q3:18 YTD)	456	344	395

Note(s): All \$ in mm; Early-Stage = Preclinical and Phase I assets; Mid-Stage = Phase II assets; Late-Stage = Phase III assets and onwards. PM refers to post-money valuations.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Valuation Dynamics Split by Modality

Classes of 2012 – Q3:2018



	Small Molecule (49%)	Biologic (29%)	Gene Therapy (17%)	Other (5%)
Avg Raise (2012 - Q3:18 YTD)	\$85	\$91	\$124	\$83
Avg PM (2012 - Q3:18 YTD)	315	457	498	391

Note(s): All \$ in mm; Other is comprised of steroids, vaccines and non-traditional biotech products.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Valuation Dynamics of IPO Exits via M&A

Classes of 2012 – YTD 2018 IPO Exits

	U.S. IPO Pricing Date	Exit Date	Time to Exit (Years)	Acquiror	Premium (Discount) to IPO Pricing
M&A	Please contact Ravi Mehrotra for the full report mehrotra@mtspartners.com				

(1) Traded on the NASDAQ as ADRs.

(2) Excluded from average, since stock was trading far below IPO price when acquired. For reference, the acquisition represented a 400% premium over unaffected stock price at the time.

Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Total: 22

Average: 365%

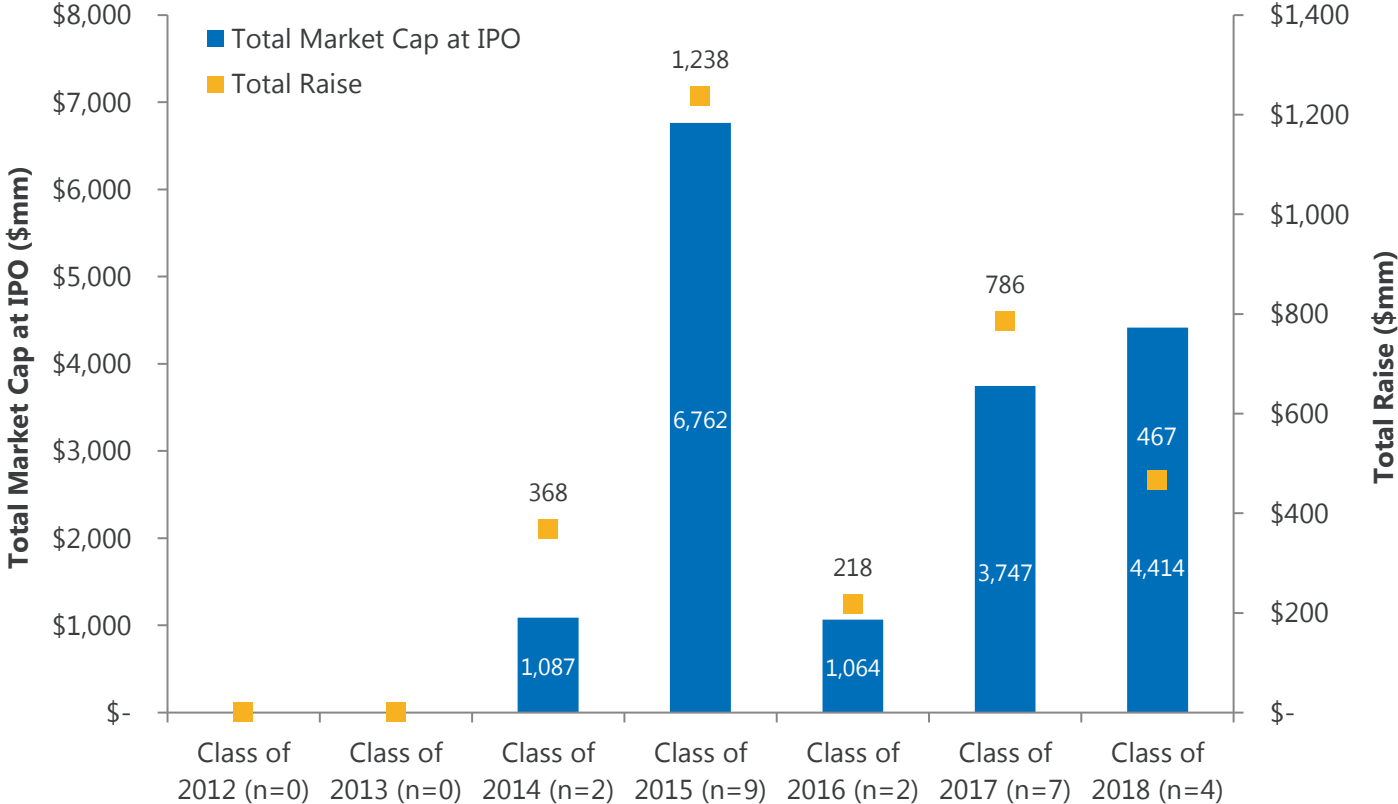
Valuation Dynamics of IPO Exits via Reverse Mergers & Bankruptcies

Classes of 2012 – YTD 2018 IPO Exits

	U.S. IPO Pricing Date	Exit Date	Time to Exit (Years)	Acquiror	Premium (Discount) to IPO Pricing
Reverse Merger	<p>Please contact Ravi Mehrotra for the full report mehrotra@mtspartners.com</p>				
				Total: 10	Average: (73%)
Bankruptcy	<p>Please contact Ravi Mehrotra for the full report mehrotra@mtspartners.com</p>				
				Total: 6	

Valuation Dynamics of ADR Offerings

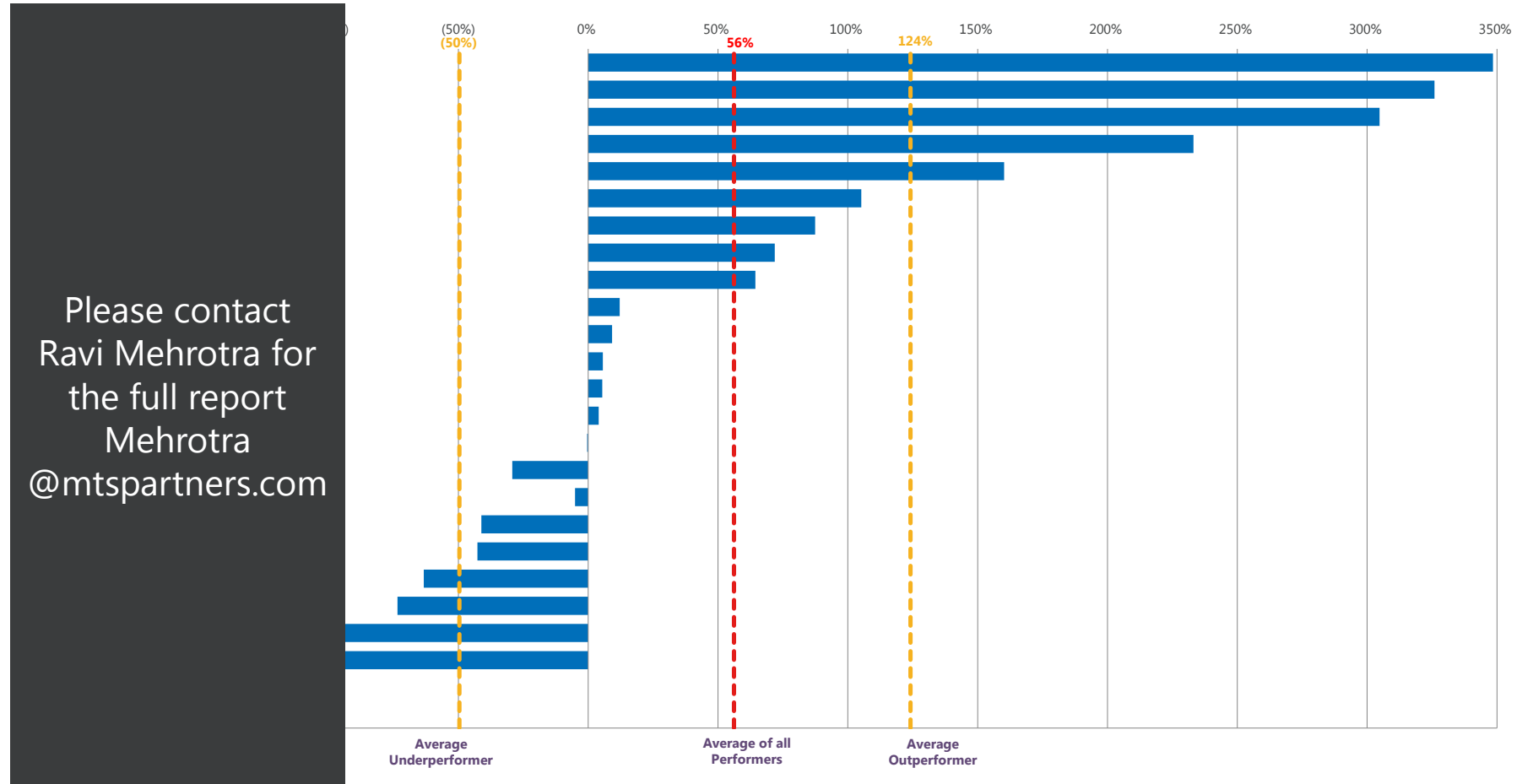
Total Market Cap at IPO and Total Raise of ADR Offerings



Source(s): MTS and Dealogic, as of 09/28/2018.

Post-IPO Performance Based on Stock Price Change

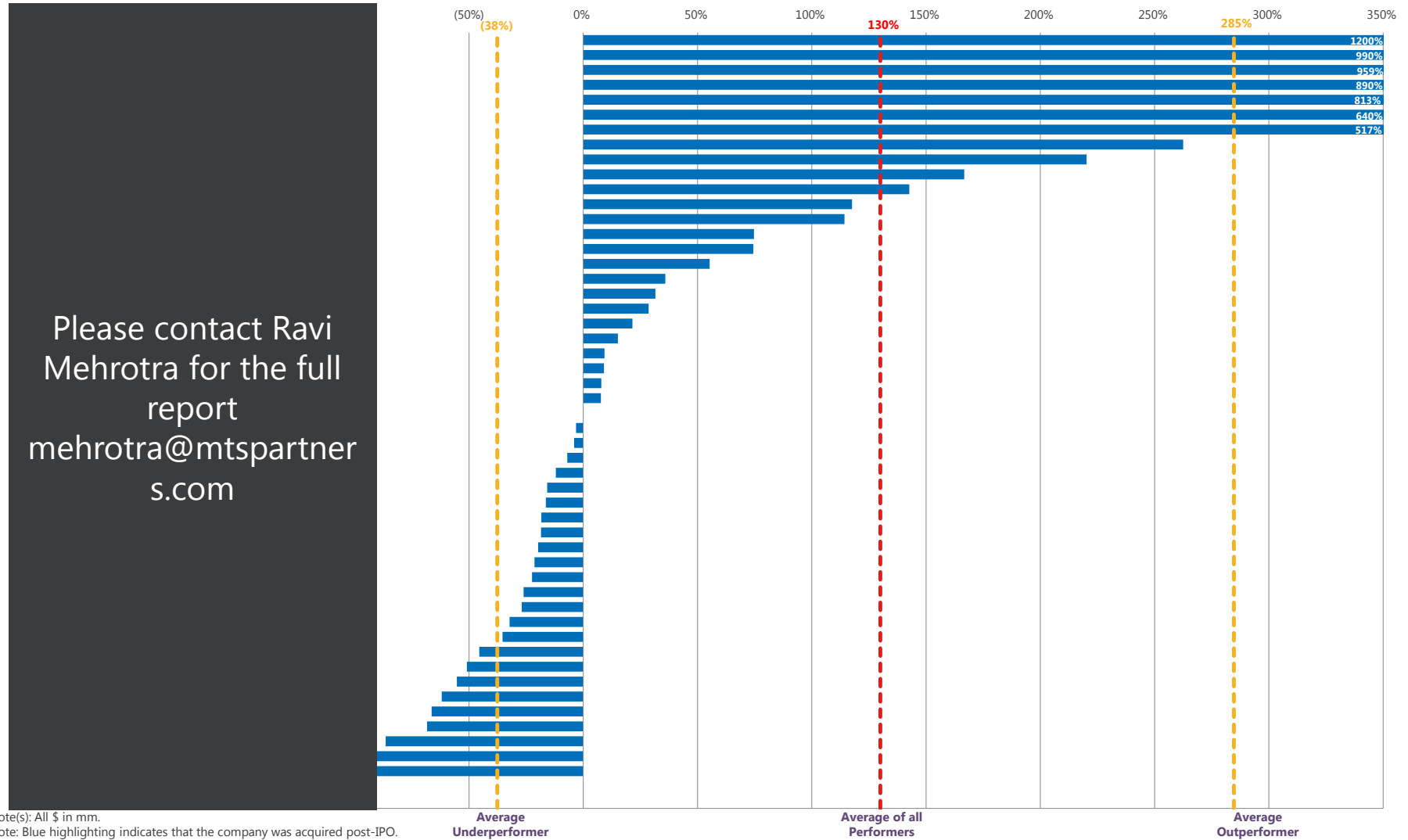
Preclinical Companies (n=25) Sorted by Performance and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm.
Note: Blue highlighting indicates that the company was acquired post-IPO.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Stock Price Change

Phase I Companies (n=52) Sorted by Performance and Showing Post-Money Valuation at IPO Pricing



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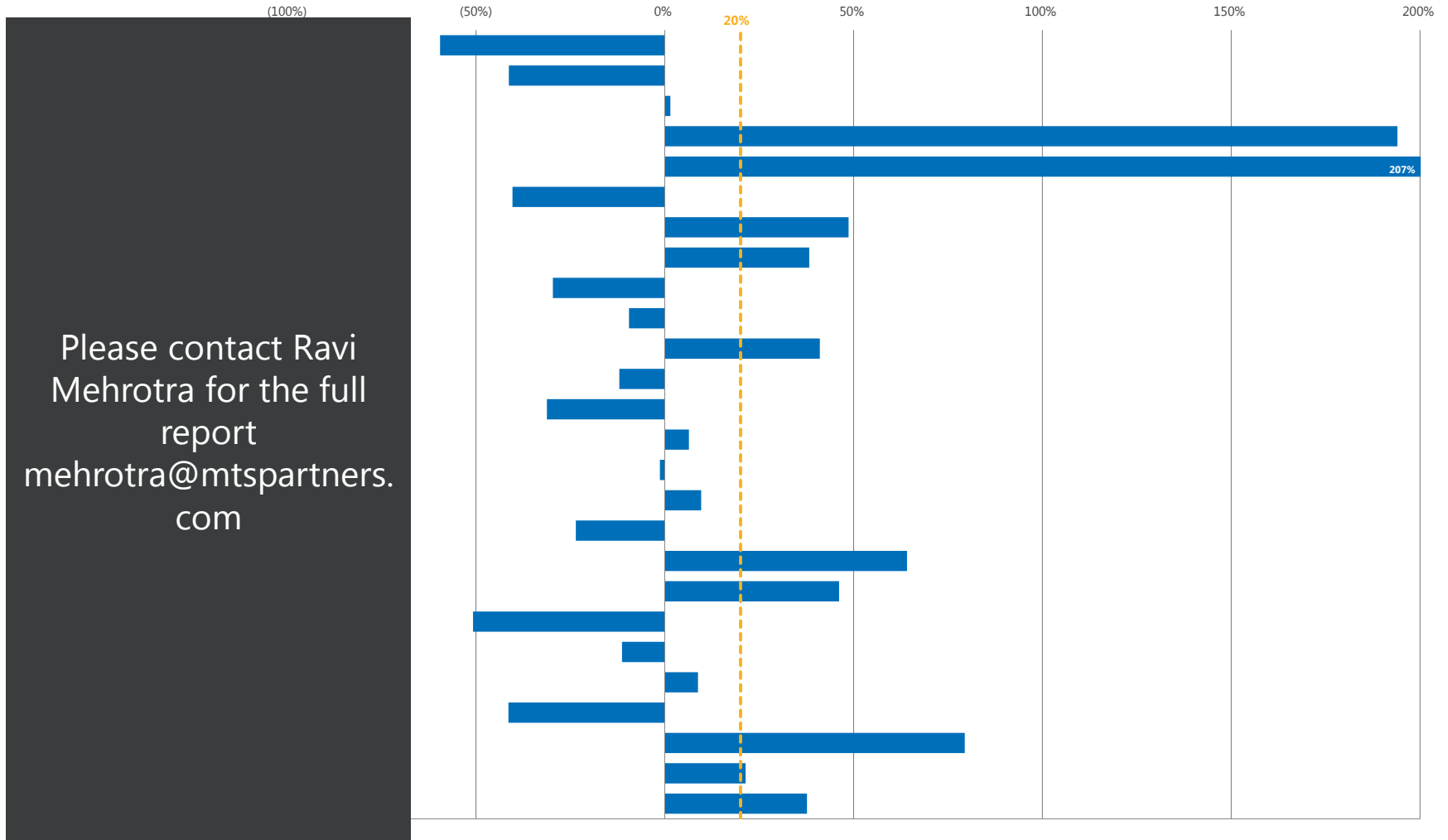
Note(s): All \$ in mm.
 Note: Blue highlighting indicates that the company was acquired post-IPO.
 Note: Purple highlighting indicates that the company went through a reverse merger.
 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.



4. 2012 – YTD 2018 Performance Since IPO

Post-IPO Performance Based on Offer Price to Current Price

Class of 2018 (n=51) Sorted by Date and Showing Post-Money Valuation at IPO Pricing

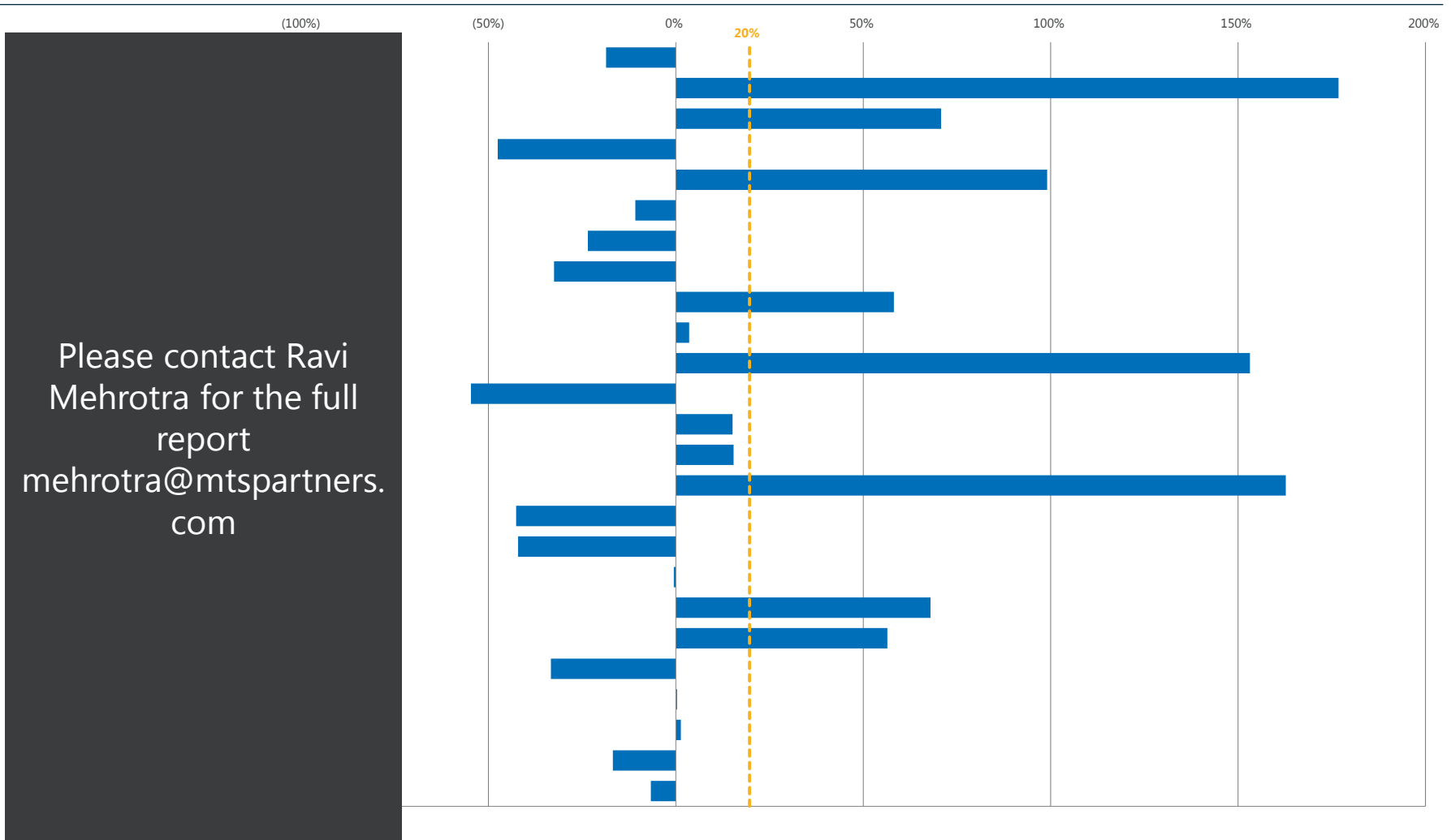


Please contact Ravi Mehrotra for the full report
mehrotra@mtspartners.com

Note(s): All \$ in mm. Blue box indicates acquired companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

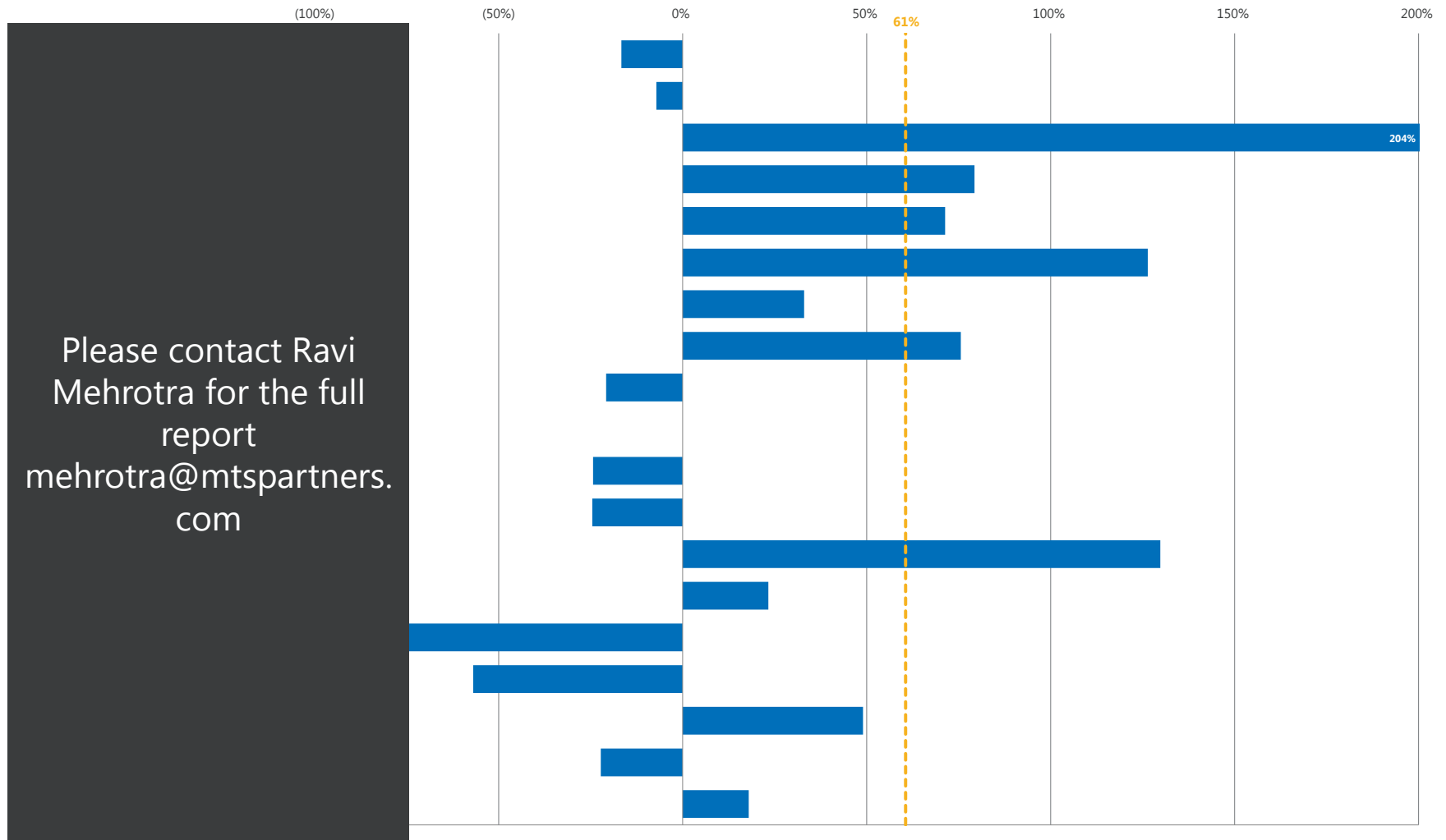
Class of 2018 (n=51) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm. Blue box indicates acquired companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

Class of 2017 (n=39) Sorted by Date and Showing Post-Money Valuation at IPO Pricing

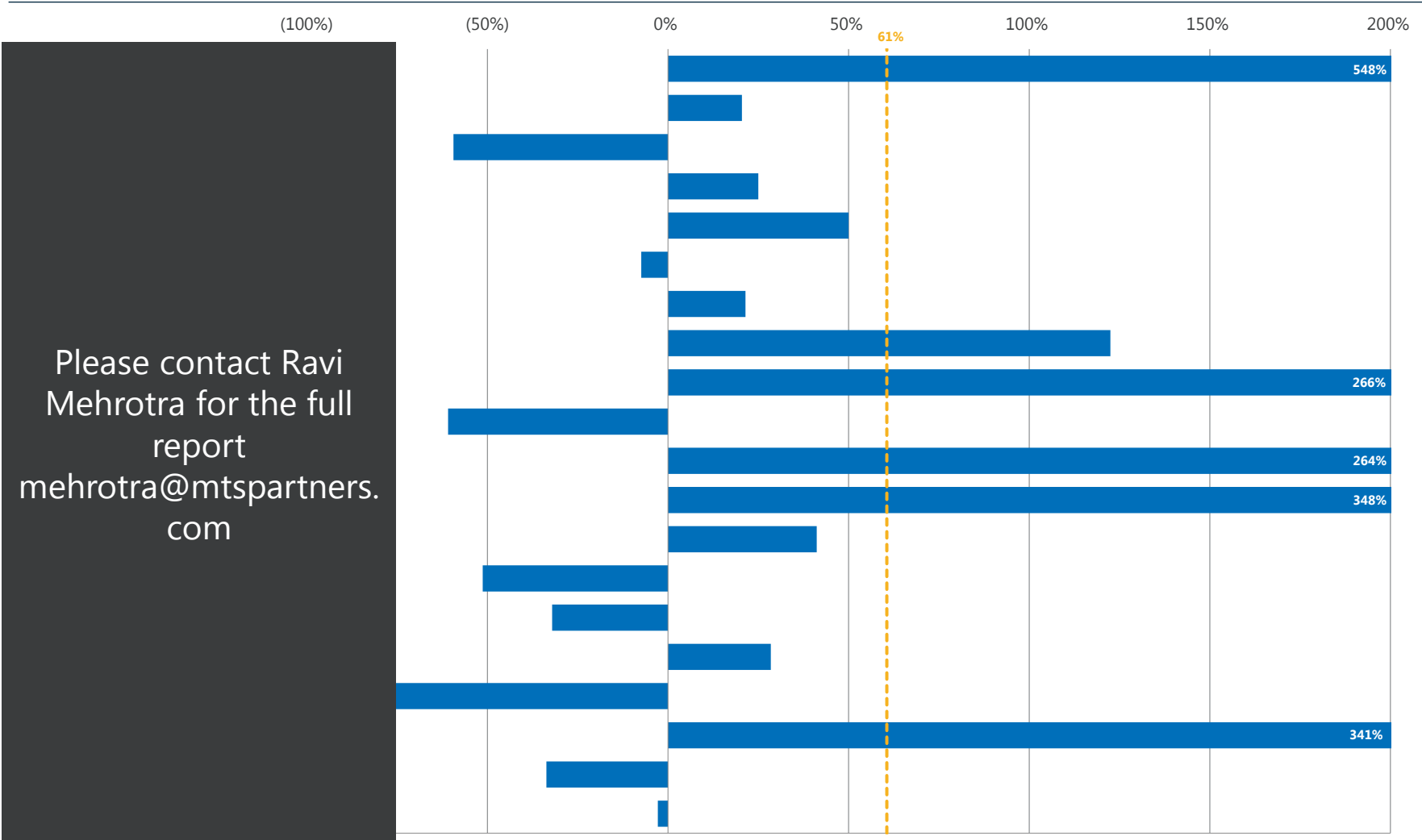


Please contact Ravi Mehrotra for the full report
mehrotra@mtspartners.com

Note(s): All \$ in mm. Blue box indicates acquired companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

Class of 2017 (n=39) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)

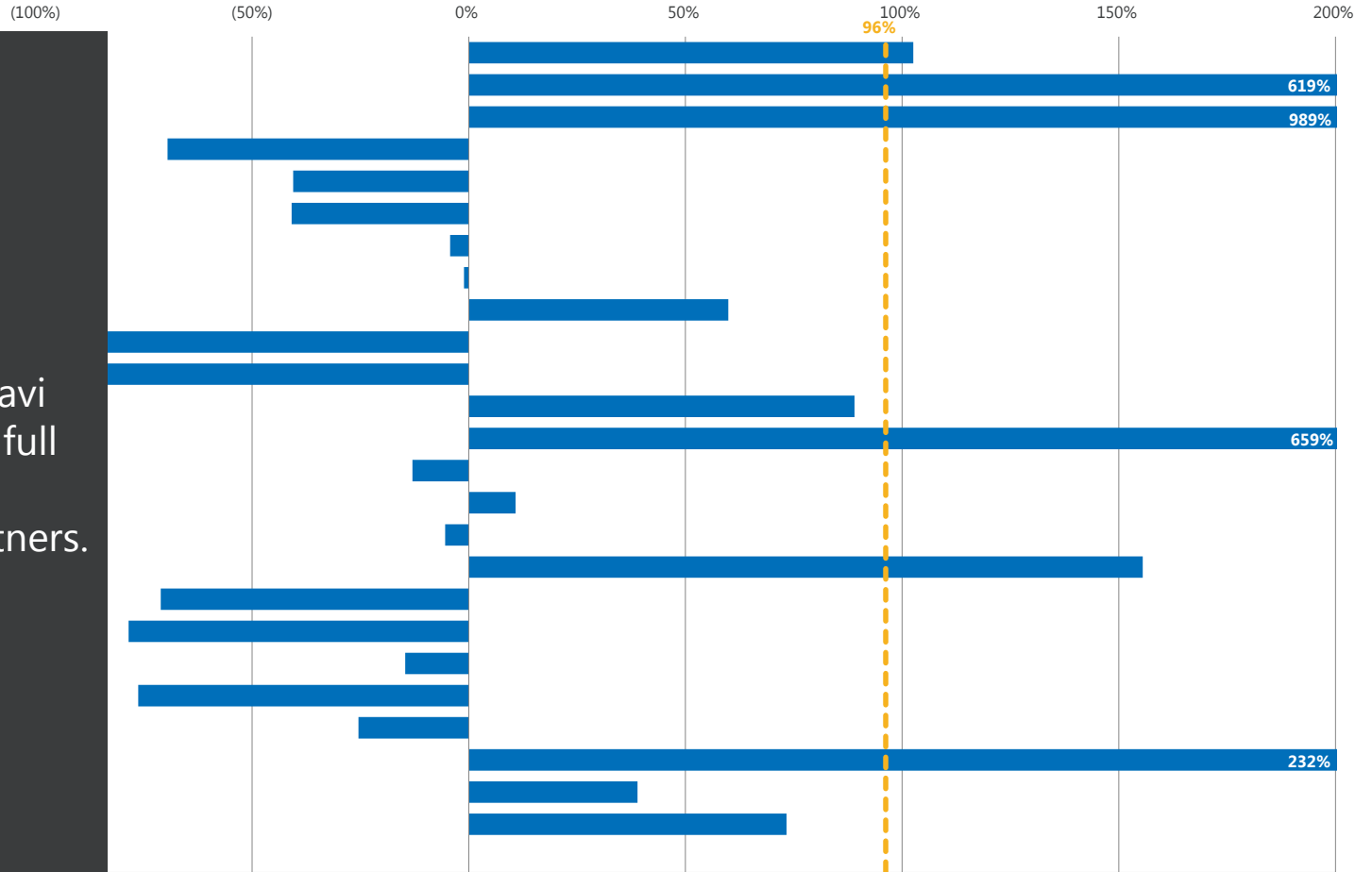


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 mehrotra@mtspartners.com

Note(s): All \$ in mm.
 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

Class of 2016 (n=26) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



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Note(s): All \$ in mm. Blue box indicates acquired companies. Red box indicates bankrupt companies.
 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

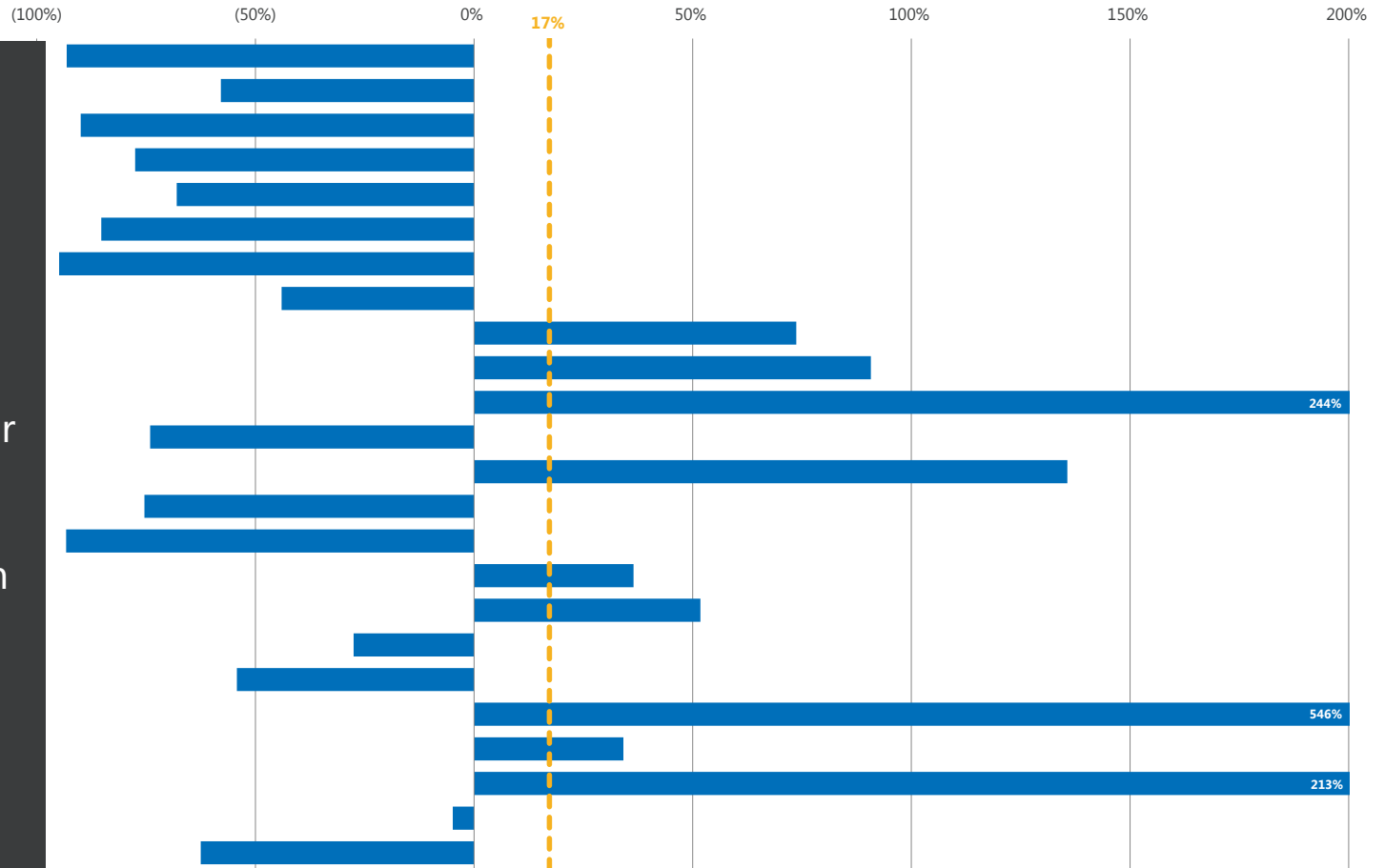
Class of 2015 (n=48) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger.
 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

Class of 2015 (n=48) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)

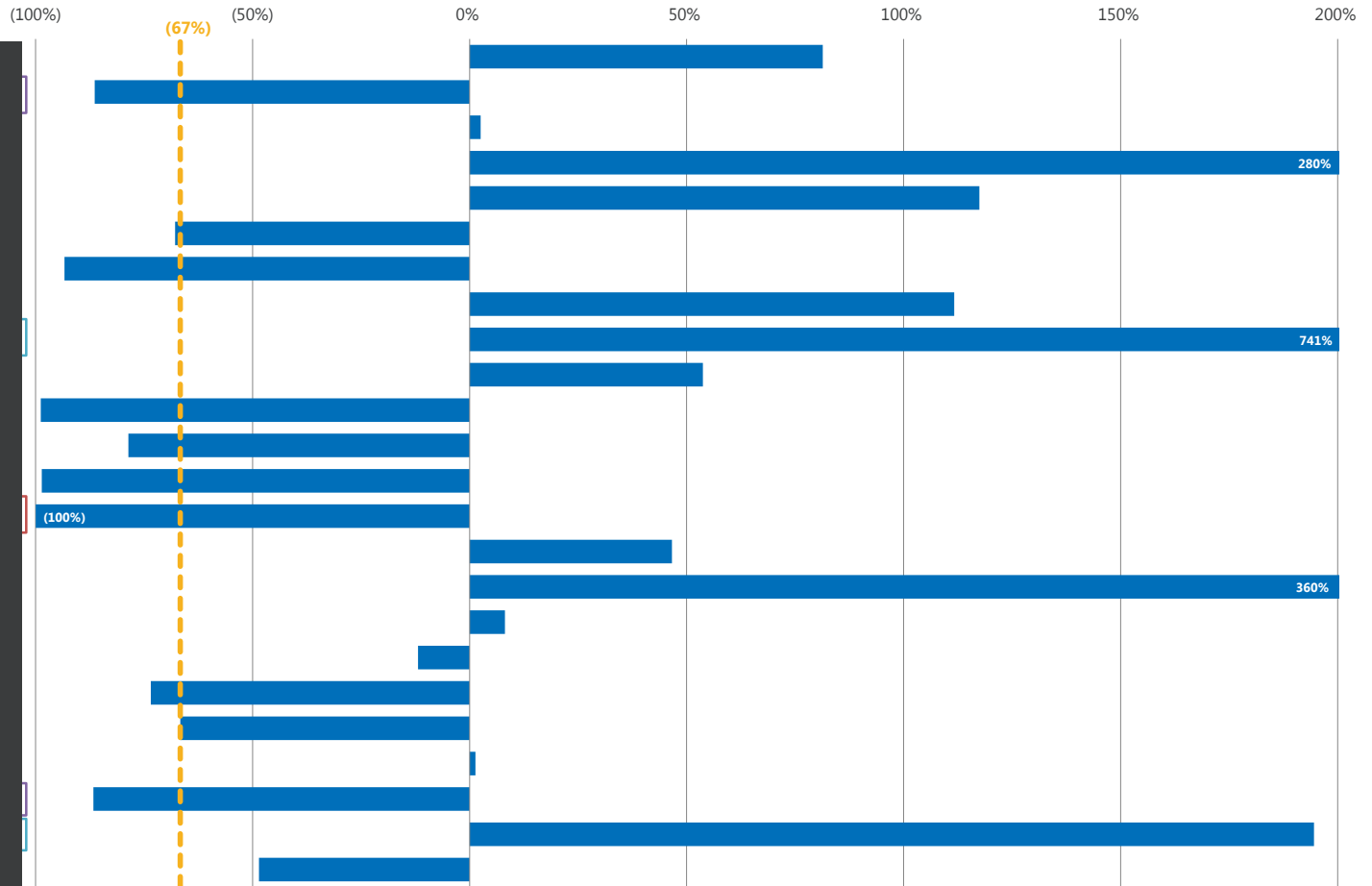


Please contact
Ravi Mehrotra for
the full report
mehrotra@
mtspartners.com

Note(s): All \$ in mm. Blue box indicates acquired companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

Class of 2014 (n=72) Sorted by Date and Showing Post-Money Valuation at IPO Pricing

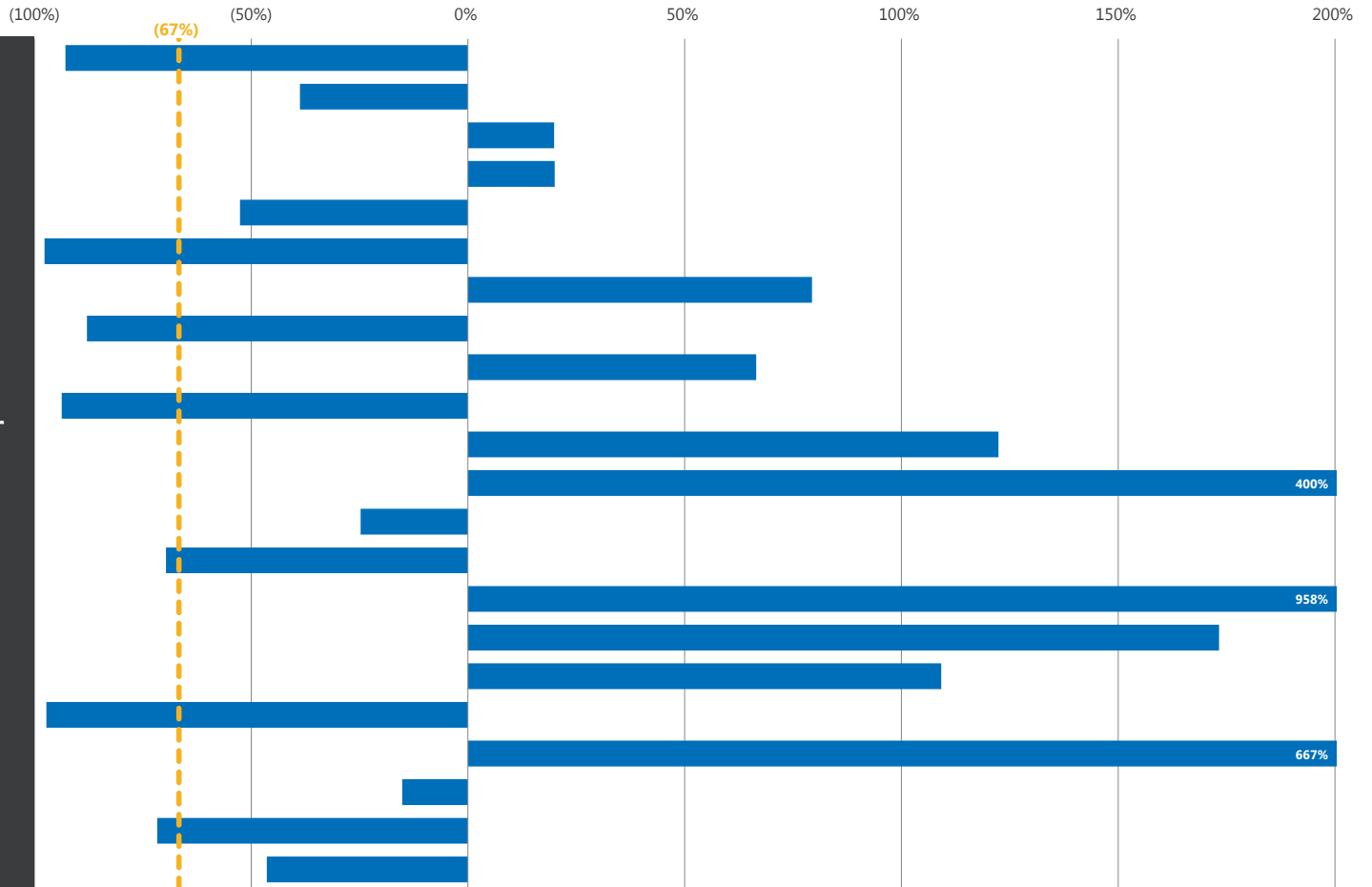


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Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger. Red box indicates bankrupt companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

Class of 2014 (n=72) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)

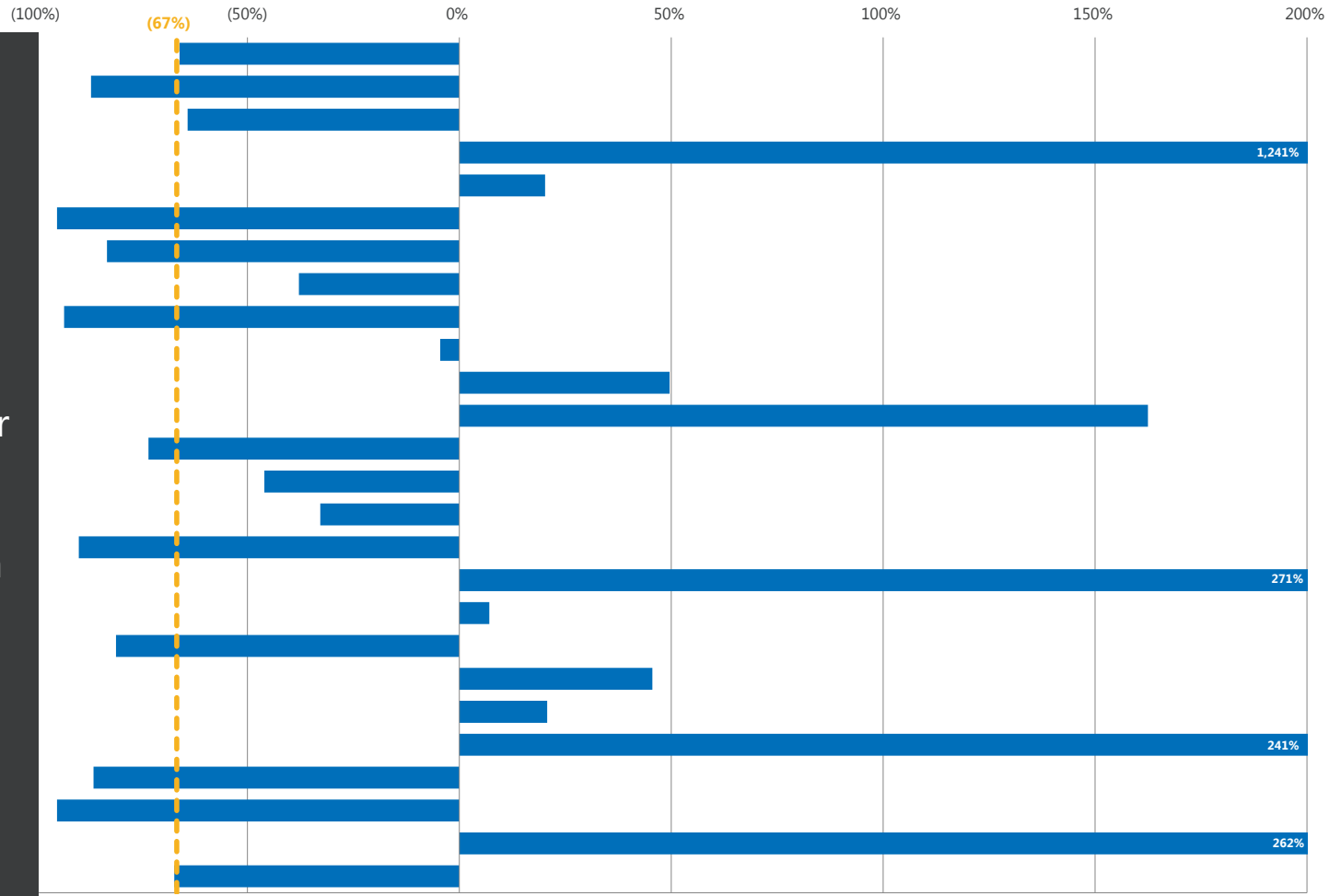


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Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger. Red box indicates bankrupt companies. Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

Class of 2014 (n=72) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)

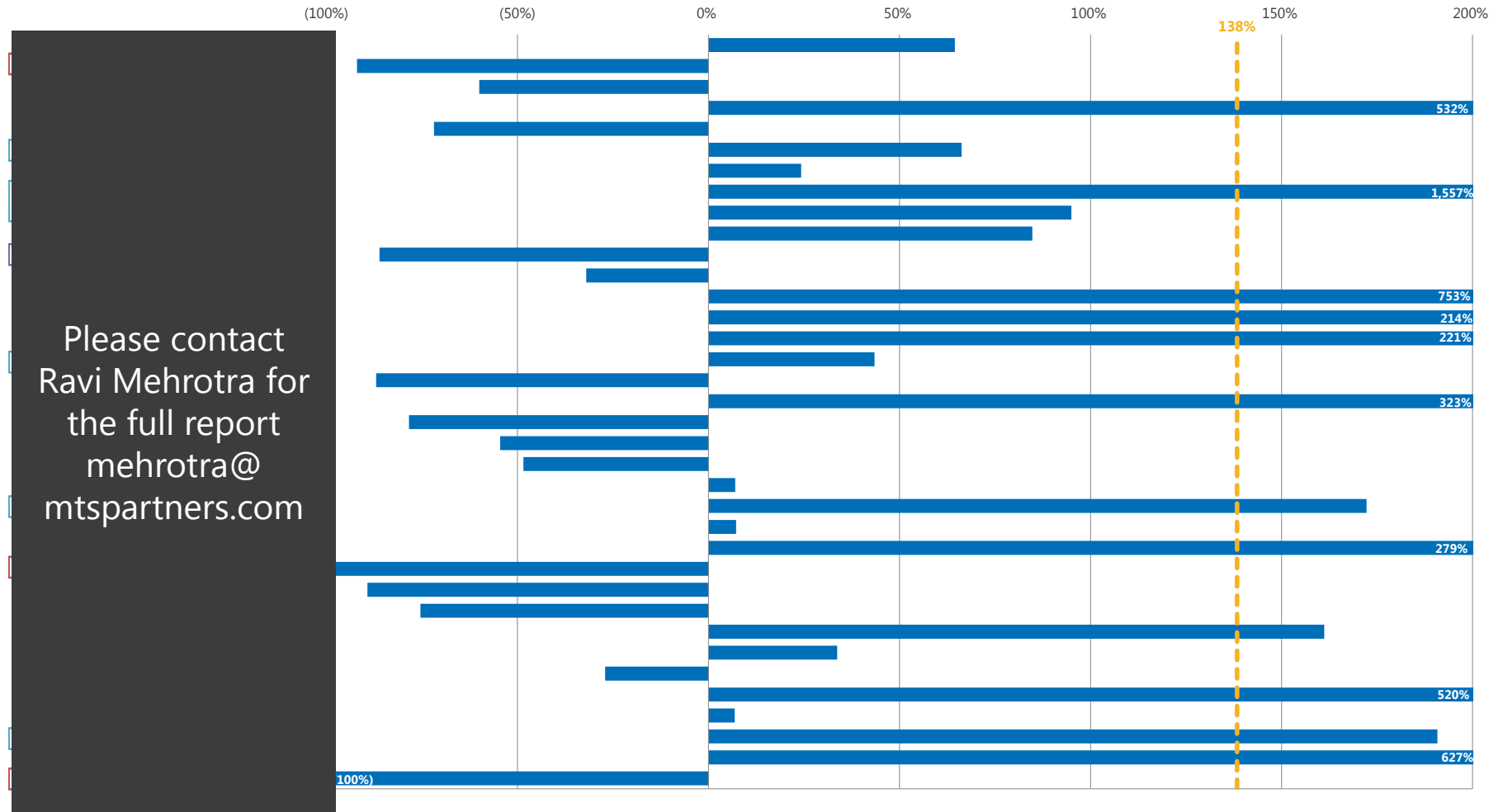


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Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

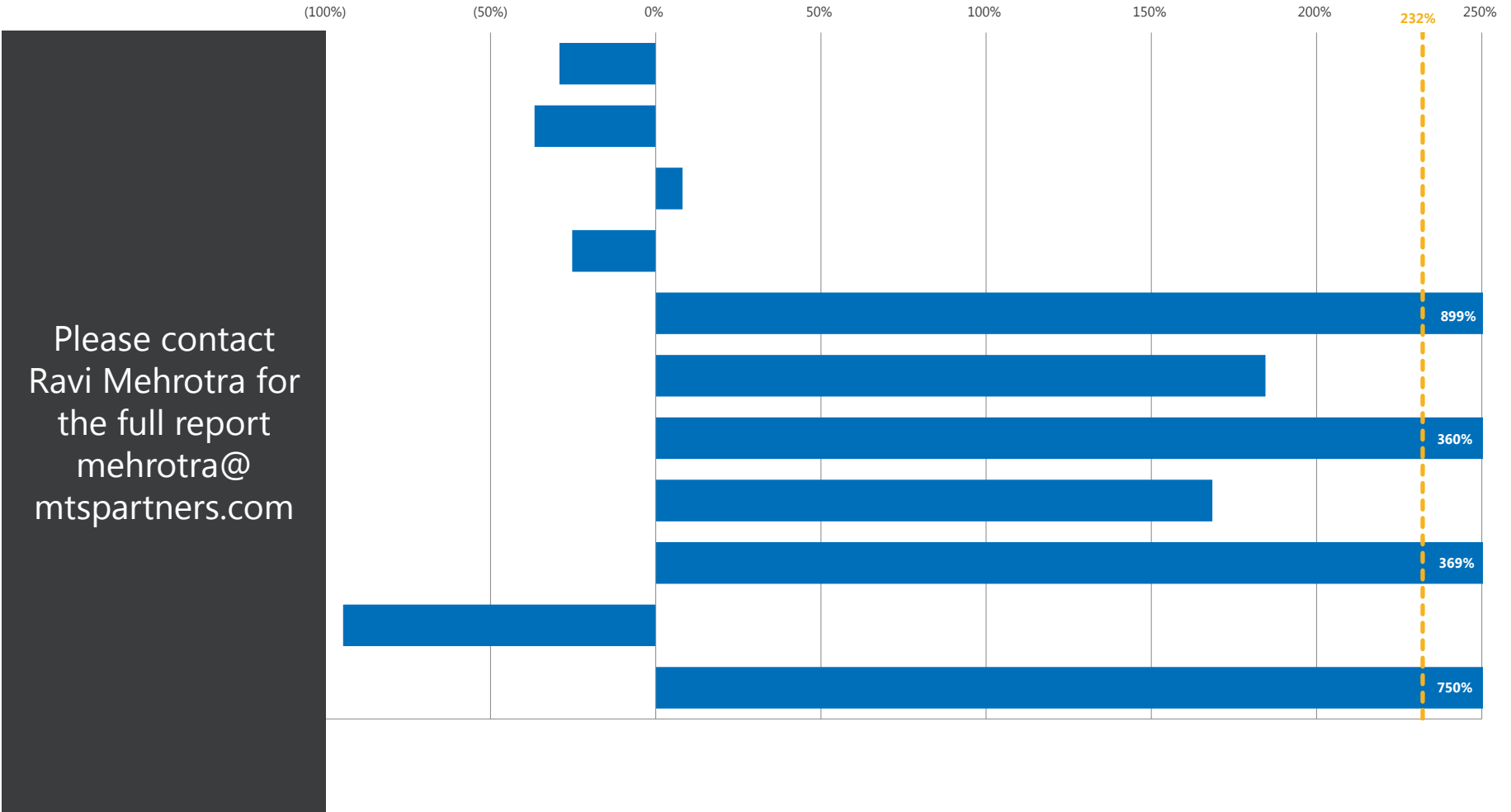
Class of 2013 (n=36) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger. Red box indicates bankrupt companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Post-IPO Performance Based on Offer Price to Current Price

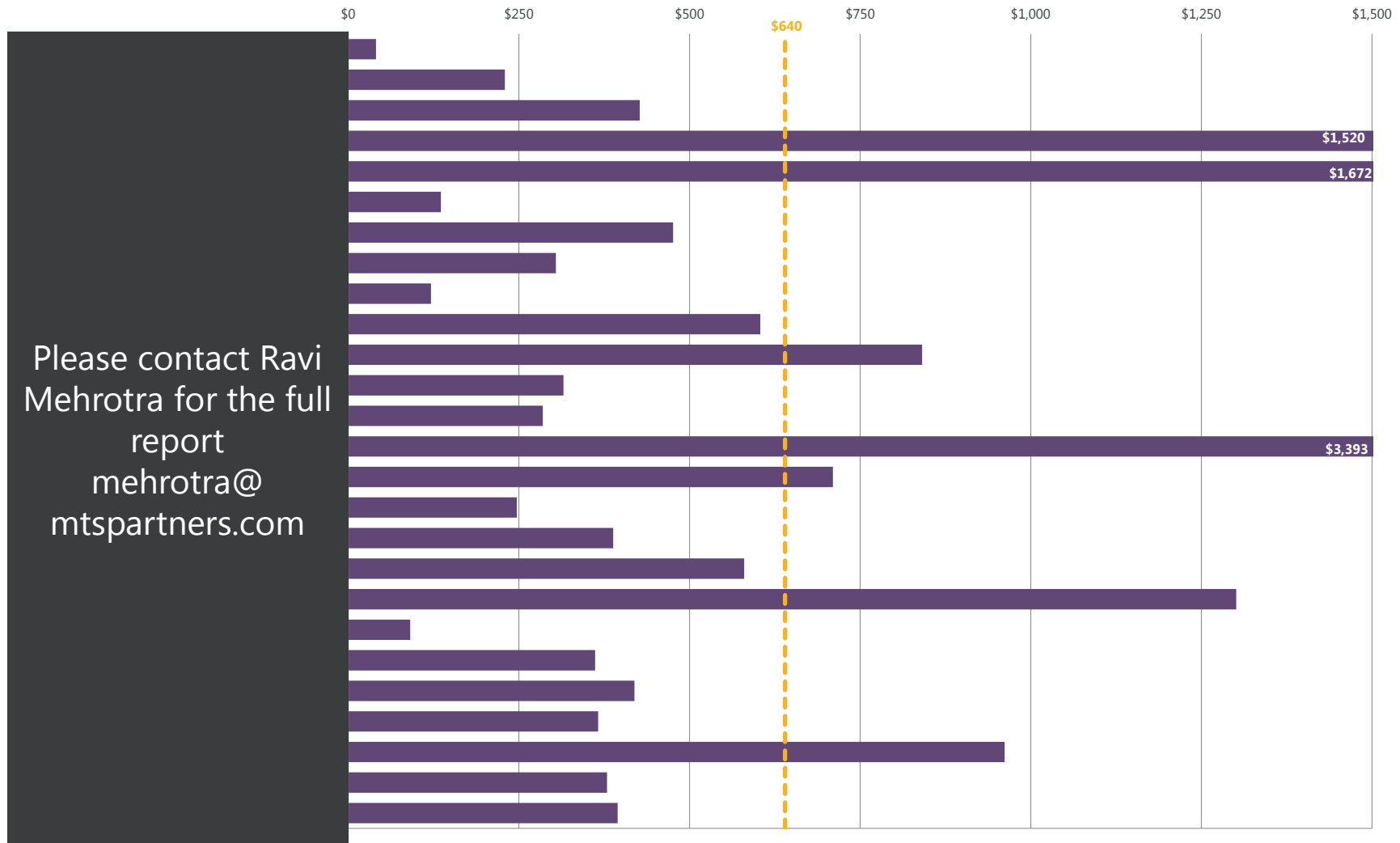
Class of 2012 (n=11) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm. Blue box indicates acquired companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

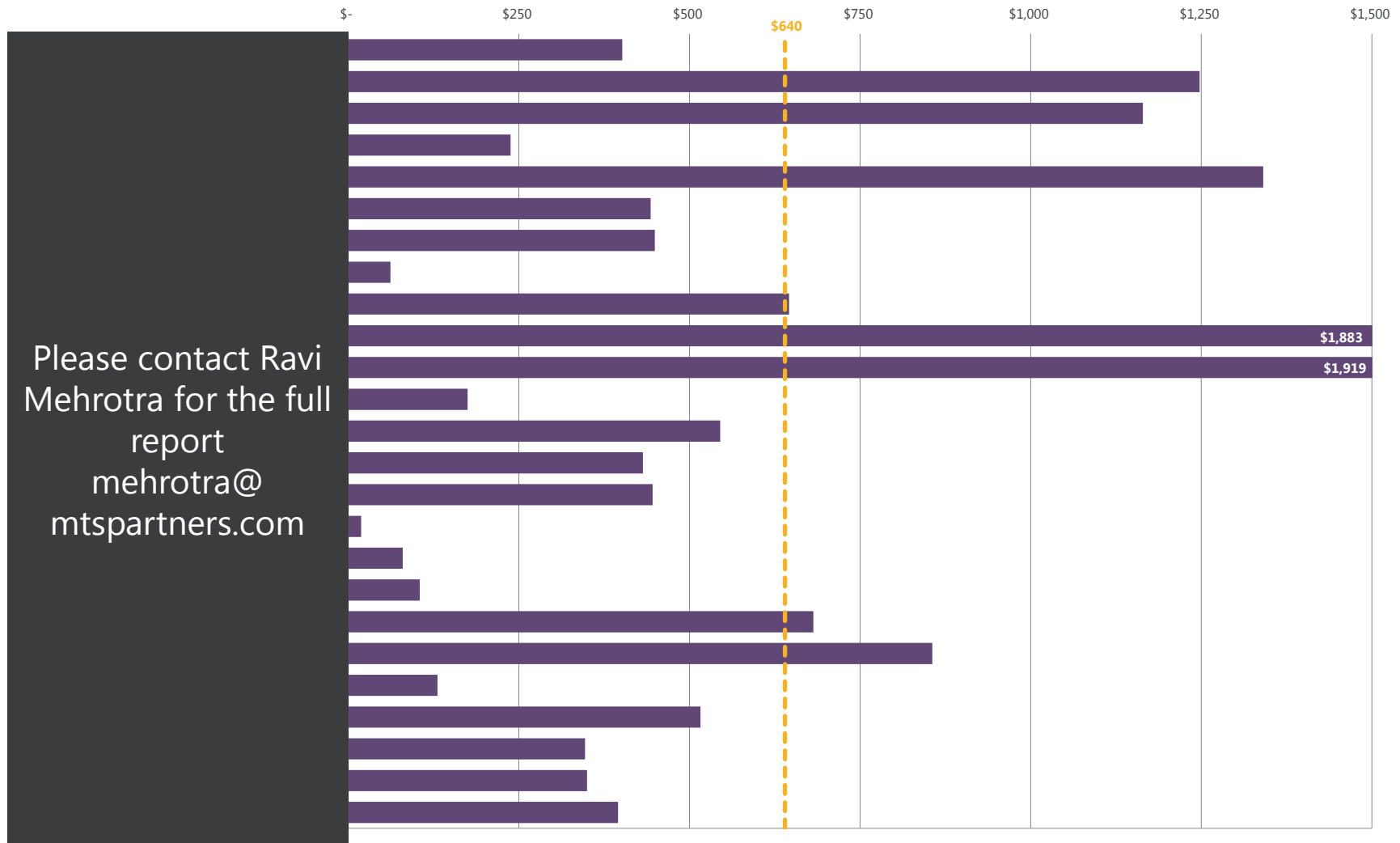
Class of 2018 (n=51) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm. Blue box indicates acquired companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

Class of 2018 (n=51) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm. Blue box indicates acquired companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

Class of 2017 (n=39) Sorted by Date and Showing Post-Money Valuation at IPO Pricing

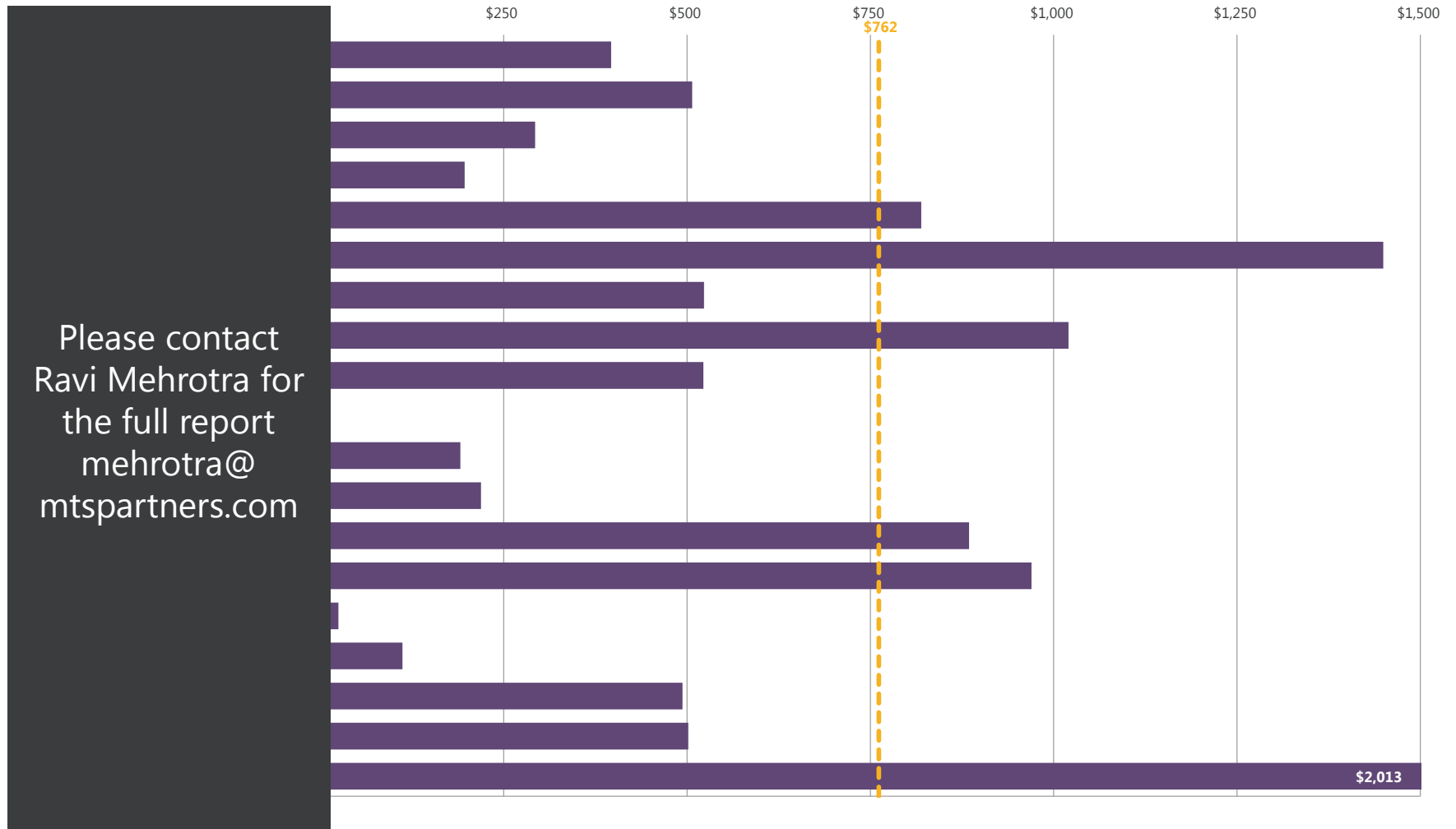


Note(s): All \$ in mm.

Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

Class of 2017 (n=39) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)



Note(s): All \$ in mm. Blue box indicates acquired companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

Class of 2016 (n=26) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



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 mehrotra@mtspartners.com

Note(s): All \$ in mm. Blue box indicates acquired companies. Red box indicates bankrupt companies.
 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

Class of 2015 (n=48) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

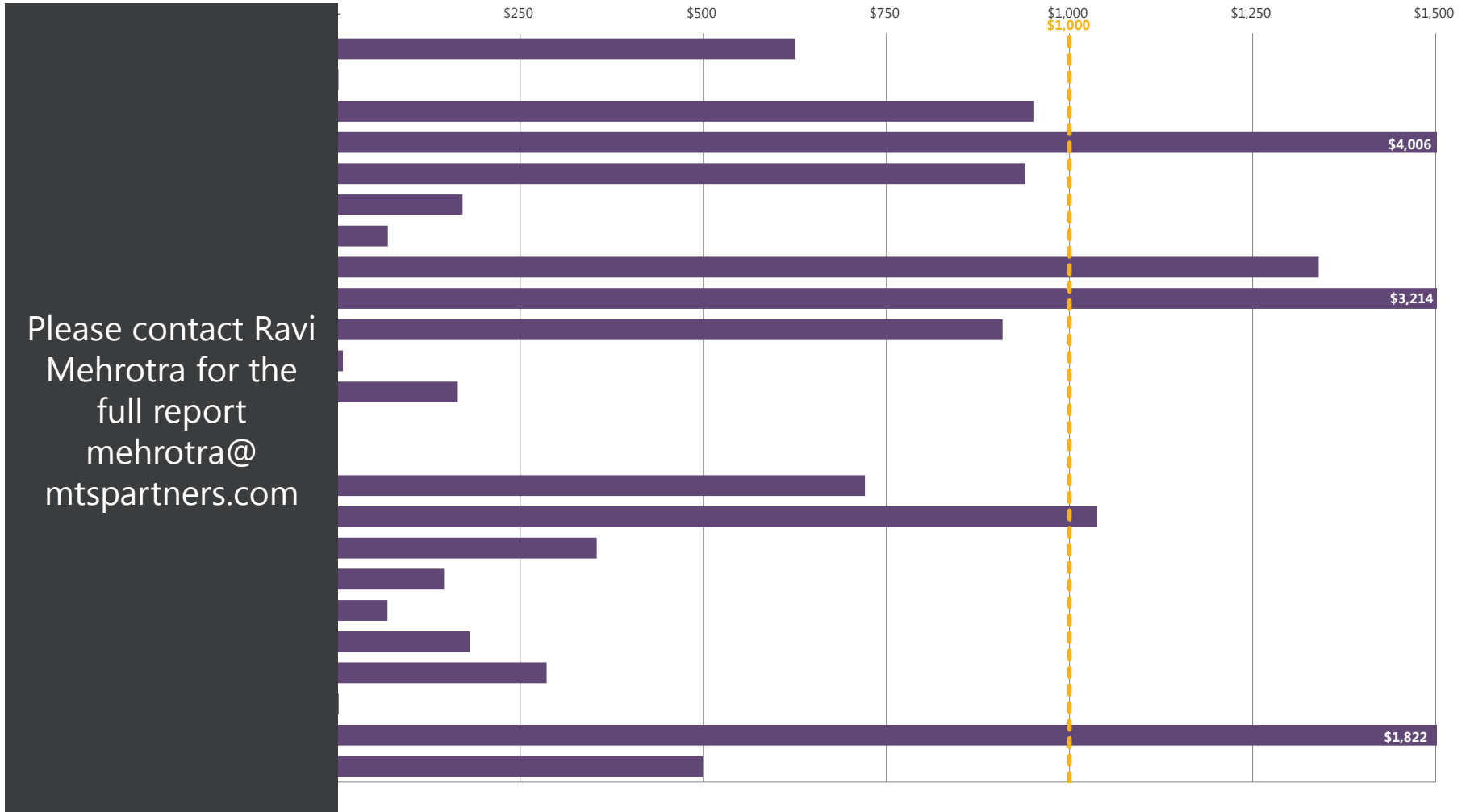
Class of 2015 (n=48) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)



Note(s): All \$ in mm. Blue box indicates acquired companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

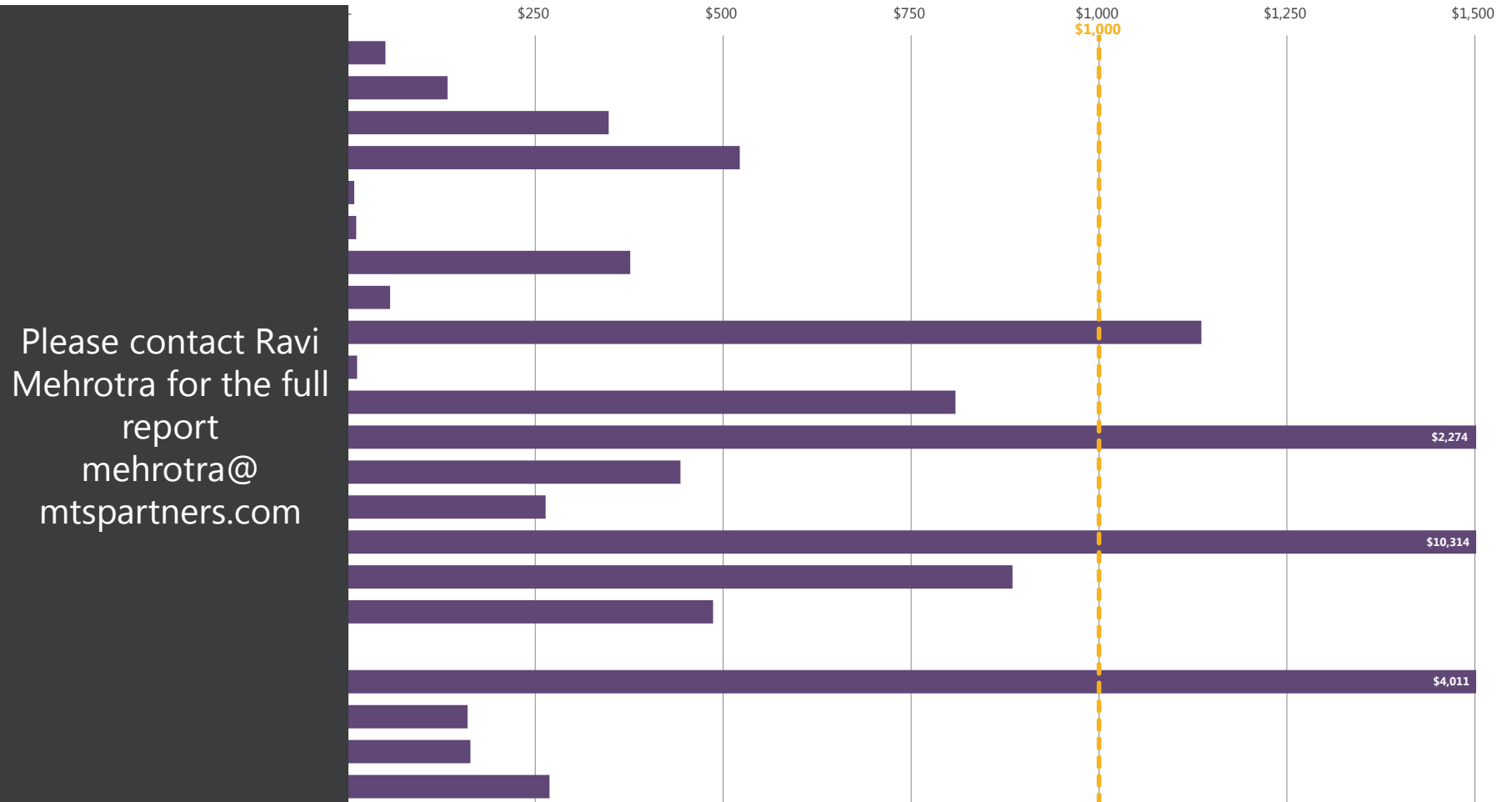
Class of 2014 (n=72) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger. Red box indicates bankrupt companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

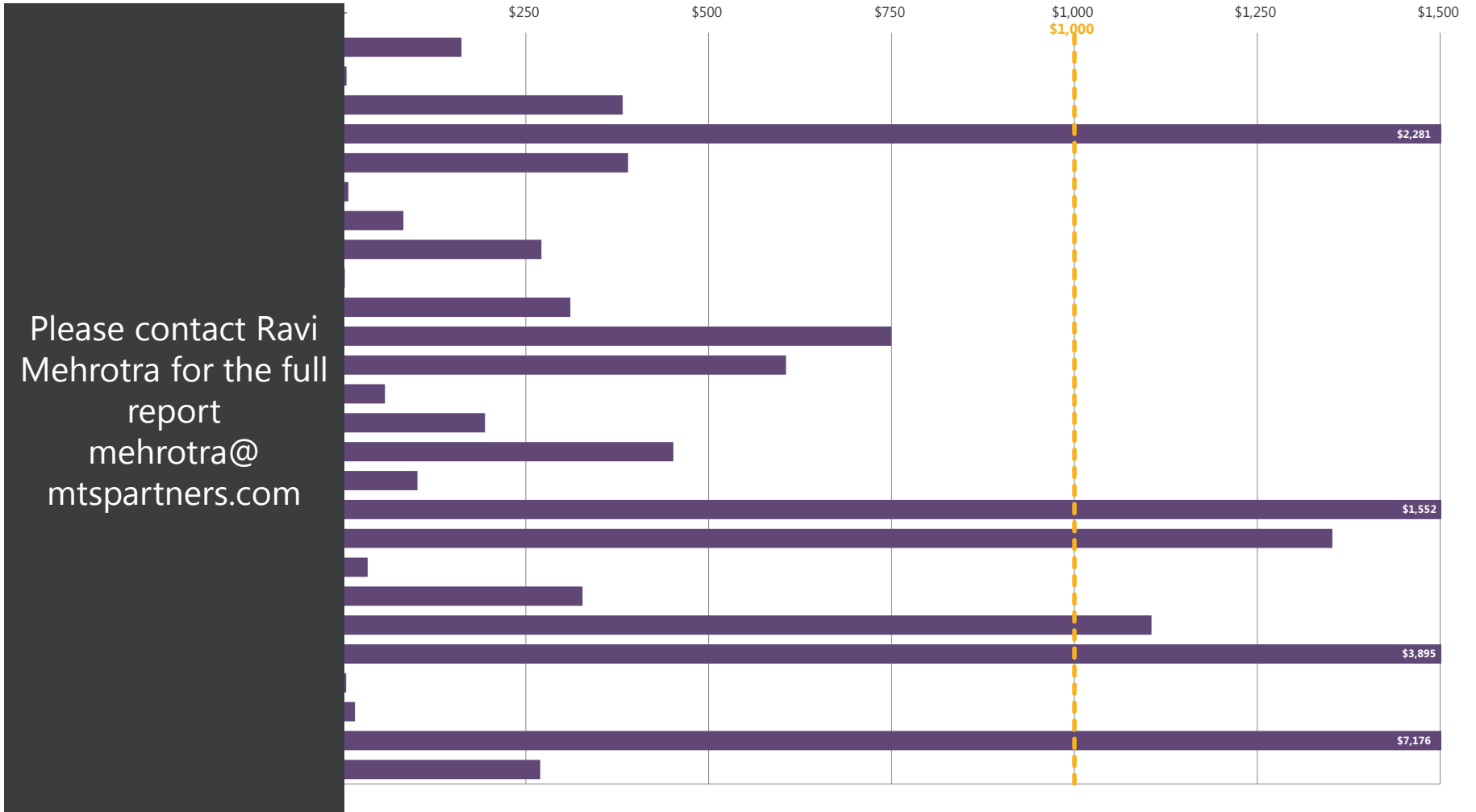
Class of 2014 (n=72) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)



Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger. Red box indicates bankrupt companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

Class of 2014 (n=72) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)



Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

Class of 2013 (n=36) Sorted by Date and Showing Post-Money Valuation at IPO Pricing

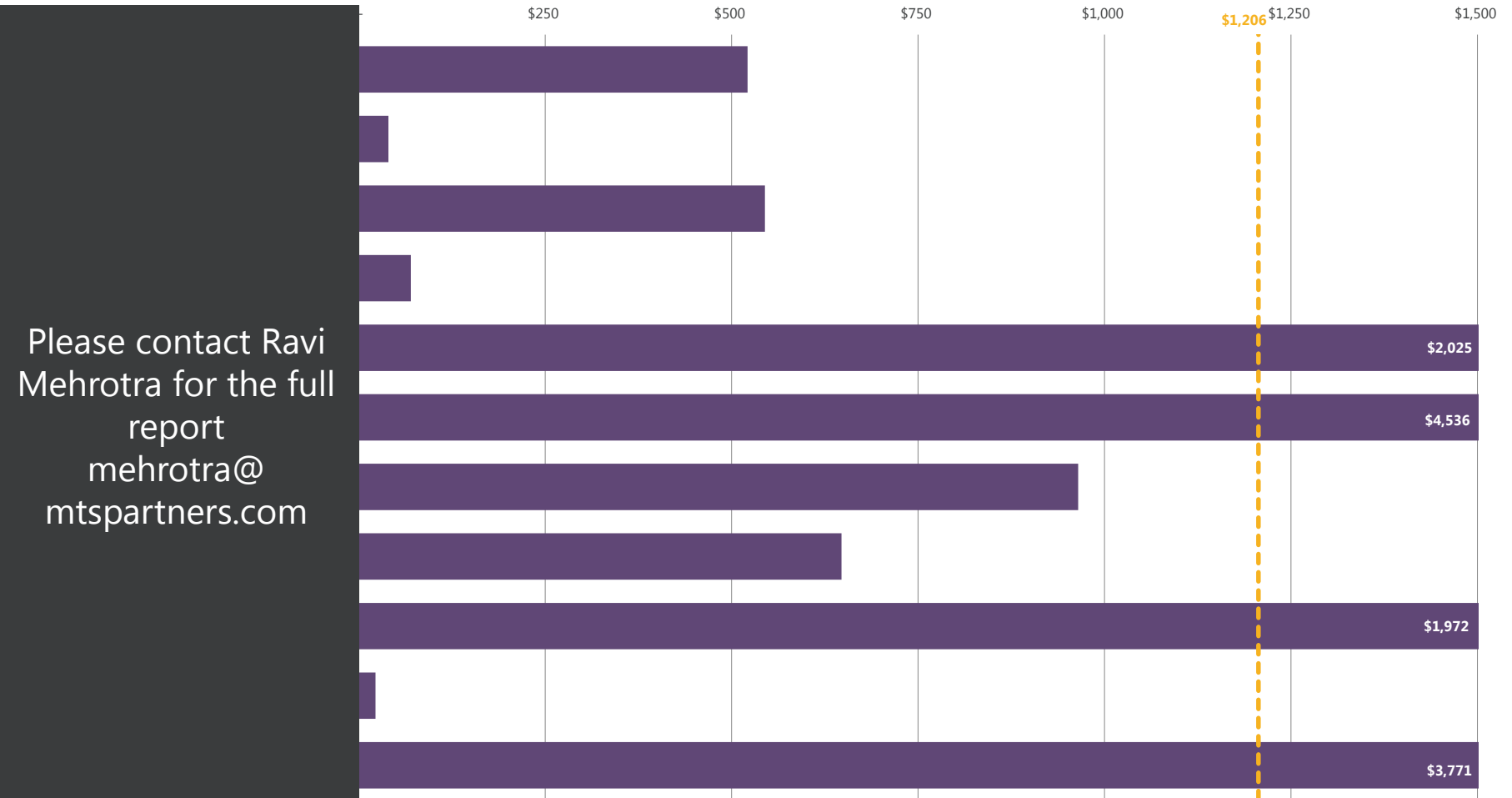


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Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger. Red box indicates bankrupt companies.
 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Current Market Capitalization

Class of 2012 (n=11) Sorted by Date and Showing Post-Money Valuation



Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.



5. 2012-Q3:18 Detailed US IPO Biotech Database

IPO Summary

YTD 2018 (n=51)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Offer Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price

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mehrotra@mtspartners.com

Note(s): Blue shading indicates acquired companies. Orange shading indicates ADR offerings.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

YTD 2018 (n=51) (cont'd)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Offer Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price

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 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

2017 (n=39)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance			
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Offer Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days
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Note(s): Blue shading indicates acquired companies. Orange shading indicates ADR offerings.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

2017 (n=39) (cont'd)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance			
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Offer Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days
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Note(s): Orange shading indicates ADR offerings.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

2016 (n=26)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price

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Note(s): Blue shading indicates acquired companies. Orange shading indicates ADR offerings. Red shading indicates bankrupt companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

2015 (n=48)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price
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Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

2015 (n=48) (cont'd)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Offer Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price
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Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

2014 (n=72)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price
[Redacted Content]																

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Orange shading indicates ADR offerings.

Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

2014 (n=72) (cont'd)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price
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IPO Summary

2014 (n=72) (cont'd)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Offer Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price
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Note(s): Purple shading indicates companies that were acquired through a reverse merger.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

2013 (n=36)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance			
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Offer Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days
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IPO Summary

2013 (n=36) (cont'd)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price
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Note(s): Red shading indicates bankrupt companies.
Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

IPO Summary

2012 (n=11)

Pricing Date	Company	Stage at IPO	Therapeutic Area	Modality	Initial		Actual					Post IPO Performance				
					Offer Size (\$mm)	Filing Range (\$)	Offer Price	Premium (Disc.)	Offer Size (\$mm)	Cash Raised to IPO	% IPO Raise to Prior Cash	Implied Valuation (\$mm)	Insider Participation	1 Day	30 Days	Current Price
[Redacted Content]																

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Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.



6. Introduction to MTS

MTS Health Partners Overview

Investment Banking

- > **Privately owned, independent firm, founded in 1999**
- > **Aligned strategic and financial advisory services to healthcare companies of all sizes, from global corporations to venture-backed businesses**
- > **Extensive experience across a broad range of client and transaction types**
 - Public and private; for-profit and not-for-profit
 - Mergers and acquisitions, restructurings, private placements, IPOs, structured debt financings and general strategic advice
- > **Partners averaging 20 years of healthcare experience**
- > **Offices in New York, San Francisco and Tokyo**

Life Sciences

- > Pharmaceuticals
- > Specialty Pharma
- > Generics
- > Biotechnology
- > Orphan / Rare Disease
- > Medical Devices / Diagnostics

Healthcare Services

- > Managed Care
- > Hospitals/Outsourced Services
- > PBMs & Pharmacy Services
- > Dialysis
- > Post-Acute Facilities (SNF, IRF, LTACH)
- > Home Healthcare/Hospice
- > Healthcare Technology
- > Clinical Laboratories
- > Healthcare Distribution/Supply
- > Pharma Services

Advantages of a Partnership with MTS Advisory Team

Bulge Bracket Capabilities with a Boutique Approach

Distinguished by experienced, attentive and independent counsel in the context of long-term relationships

Aligned

- > Economics – compensation model that transcends annual Wall Street bonus cycle
- > Culture – private equity mentality allows for **investor-focused perspective**
- > “Success” – defined through **achievement of client goals** rather than mere transaction execution

Independent

- > **Stability** of franchise and execution in turbulent banking environment
- > **Unencumbered by balance sheet conflicts** or commoditized financing solutions
- > Advisory team **solely focused on meeting client objectives** without impact from other parts of the organization

Attentive

- > **Boutique environment** – ensures personal commitment and focus
- > **Team of over 40 professionals**, larger than many bulge-bracket healthcare teams
- > **Staffed, resourced similarly to bulge-bracket banks**

Long-Term Partnership

- > **Long-term relationships** rather than short-term transactions
- > Translates to **unbiased and objective** evaluation and advice

Experienced

- > **Senior personnel** – decades of healthcare-focused banking experience
- > **Extensive** strategic, operational, financial and capital markets expertise
- > **Creative solutions** rather than the “standard” banker playbook

Healthcare-Focused

- > Unparalleled network provides **broadest reach** of any healthcare advisor
- > **In-depth knowledge** of healthcare industry, trends, transactions, decision-makers and their personalities

Large Firm Scale with Boutique Focus

Senior Life Sciences Team

Mark Epstein Managing Partner

Completed over 100 private financings for clients raising over \$5 billion in private capital

Managing Director / Co-Head Bank of America Private Equity Placements

Prior to BofA, VP and co-head of Direct Private Equity Placements at Merrill Lynch

Andrew Weisenfeld Managing Partner

Has worked on approximately \$50 billion in M&A deal volume across a range of advisory transactions

Managing Director/ Co-Head of BofA Life Sciences Investment Banking

Prior to BofA, Managing Director and Head of Healthcare M&A at JPMorgan

Peter Collum Partner

Has worked on over \$20 billion in M&A deal volume

Director, Bank of America Healthcare Investment Banking from 2003-2009

Prior to BofA, Technical Development Engineer at Hoffmann-La Roche

Andrew Fineberg Partner

Prior to MTS, Andrew led the Financing Group at Torrey Partners, LLC, a boutique investment bank

Prior to Torrey Partners, Andrew worked at Cowen and Company, a global investment bank as Vice President in the Private Placement Group

Kazuki Kusaka Partner

Prior to joining MTS, Mr. Kusaka led the healthcare practice for Lazard in Japan for 10 years

Prior to Lazard, Mr. Kusaka was a Managing Director and the head of Asia Healthcare Group at Lehman Brothers from 2000 to 2007

Soojin Kwon Partner

Has worked on over \$14 billion in equity and M&A deal volume

Director, BofA Healthcare Equity Capital Markets

Prior to BofA, Equity Research Analyst at Merlin Biomed Asset Management and UBS, respectively

David Low Partner

Previously, a partner in Lazard's Life Sciences Group, which he joined in 2002

Long career in advising on M&A and equity financing strategies for life sciences companies globally

Worked at Lehman Brothers from 1987-1996 and JPMorgan from 1996 through July 2002

Ravi Mehrotra Partner

Has nearly two decades of healthcare equity research experience

Previously, at Credit Suisse for 11 years and most recently held the title Global Head of Biotechnology Equity Research

Worked at Cowen 1999-2004 as European head of Biotechnology and Deutsche bank 1997-1999

Entire MTS Team Solely Focused on the Global Healthcare Industry

13 Partners/Senior Advisors

9 Directors / Vice Presidents

28 Associates / Analysts



Appendix

Valuation of Performance Split by Lead Asset Phase at IPO

Classes of 2015 – Q3:2018

	# of Companies	(%)	Avg Raise	Avg Raise to Prior Cash (%)	Cumulative IPO Valuation	(%)	Avg Valuation / Company @ IPO	Performance Since IPO
Class of 2018								
Early-Stage								
Mid-Stage								
Late-Stage								
Total								
Class of 2017								
Early-Stage								
Mid-Stage								
Late-Stage								
Total								
Class of 2016								
Early-Stage								
Mid-Stage								
Late-Stage								
Total								
Class of 2015								
Early-Stage								
Mid-Stage								
Late-Stage								
Total								

Please contact Ravi Mehrotra for the full report
 mehrotra@mtspartners.com

Note(s): All \$ in mm; Early-Stage = Preclinical and Phase I assets; Mid-Stage = Phase II assets; Late-Stage = Phase III assets and onwards. PM refers to post-money valuations. Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Valuation of Performance Split by Lead Asset Phase at IPO

Classes of 2012 – 2014

	# of Companies	(%)	Avg Raise	Avg Raise to Prior Cash (%)	Cumulative IPO Valuation	(%)	Avg Valuation / Company @ IPO	Performance Since IPO
Class of 2014								
Early-Stage								
Mid-Stage								
Late-Stage								
Total								
Class of 2013								
Early-Stage								
Mid-Stage								
Late-Stage								
Total								
Class of 2012								
Early-Stage								
Mid-Stage								
Late-Stage								
Total								

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Note(s): All \$ in mm; Early-Stage = Preclinical and Phase I assets; Mid-Stage = Phase II assets; Late-Stage = Phase III assets and onwards. PM refers to post-money valuations.
 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Valuation of Performance Split by Modality

Classes of 2015 – Q3:2018

	# of Companies	(%)	Avg Raise	Avg Raise to Prior Cash (%)	Cumulative IPO Valuation	(%)	Avg Valuation / Company @ IPO	Performance Since IPO
Class of 2018								
Small Molecule								
Biologic								
Gene Therapy								
Other								
Total								
Class of 2017								
Small Molecule								
Biologic								
Gene Therapy								
Other								
Total								
Class of 2016								
Small Molecule								
Biologic								
Gene Therapy								
Other								
Total								
Class of 2015								
Small Molecule								
Biologic								
Gene Therapy								
Other								
Total								

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Note(s): All \$ in mm; Other comprises of steroids, vaccines and non-traditional biotech products.
 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.

Valuation of Performance Split by Modality

Classes of 2012 – 2014

	# of Companies	(%)	Avg Raise	Avg Raise to Prior Cash (%)	Cumulative IPO Valuation	(%)	Avg Valuation / Company @ IPO	Performance Since IPO
Class of 2014								
Small Molecule								
Biologic								
Gene Therapy								
Other								
Total								
Class of 2013								
Small Molecule								
Biologic								
Gene Therapy								
Other								
Total								
Class of 2012								
Small Molecule								
Biologic								
Gene Therapy								
Other								
Total								

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Note: All \$ in mm; Other comprises of steroids, vaccines and non-traditional biotech products.
 Source(s): MTS, Dealogic and CapitalIQ, as of 09/28/2018.



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MTS

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