

## Strategic Advisory Analytics



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# The MTS US Biotech IPO Monitor

**2017 Was a Banner Year – How Does This Bode For 2018, The 40<sup>th</sup> Birthday For The US Biotech IPO Market?**

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December 7<sup>th</sup>, 2017

# Executive Summary

The MTS US Biotech IPO Monitor - 2017 Was a Stellar Biotech IPO Year – How Does This Bode For 2018?

## Key Messages From Detailed Analysis of 2012-2017 IPOs

1. “Quality” Over Stage of Asset: Pre-Clinical/PIIPOs Have Higher Raises and Valuations than PIII Companies
2. Gene Therapy Companies Garner ~50% Higher Raises and Valuations Than Small Molecule Companies
3. 88% of IPOs Are Still Trading As Original Entities; Exits: 7% M&A, 3% Reverse Merger, 2% Bankrupt or Delisted
4. Foreign Issuers Increased Access to US Capital Markets; in 2017, 26% of Total Post Money Valuation was from foreign issuers
5. ~30% Insider Participation is an Important Factor of a Successful IPO

## US Biotech IPO Market in 2017

- > **2017 was the 39<sup>th</sup> year of US Biotech IPOs and was a Top 4 year on a Number of Matrices**
  - For the historians amongst us, the first was BioResponse in October 1979, followed by Enzo in June 1980, and Genentech in October 1980
- > **In our view “Indirect Generalist Fund Flows” principally drive biotech IPO windows...**
  - ... concomitant to a window specific Biotech theme, e.g. 1999-2000 = Tech Bubble Original Inflows, 2013-2015 = Large Cap Biotech 1.0 Moving to Biotech 2.0
- > **General market performance/indices hitting all time highs drove the 2017 IPO window**
  - ...with the concomitant specific Biotech theme being Gene Therapy and Immunology advances

## 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 US IPO market
- > Our database includes the 785 US Biotech IPOs from the first 1979 US Biotech IPO with micro detailed analysis from 2012

## The Top Accolades for 2017 US IPO Market

- > **2<sup>nd</sup> Best Year for Average Gross Proceeds**
  - \$102mm for 2017 vs. \$62mm on average since 2000 (only eclipsed by 2015)
- > **3<sup>rd</sup> Best Year for Average Post Money Market Cap at IPO**
  - \$378mm for 2017 vs. \$266mm on average since 2000 (only eclipsed by 2000, 2015)
- > **4<sup>th</sup> Best year for Total Post Money Market Cap and Total Gross Proceeds**
  - Total post money market cap: \$14B for 2017 vs. \$8B and total gross proceeds \$3.9B for 2017 vs. \$1.9B average since 2000 (only eclipsed by 2000, 2014, 2015)

# The MTS Outlook For The 2018 US Biotech Market

Looking Into The Crystal Ball

Private US and foreign issuers can request a presentation of our views, sensitivities, headwinds and tails winds for the 2018 Biotech IPO market by contacting:

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**Mark Epstein**  
[epstein@mtspartners.com](mailto:epstein@mtspartners.com)

or any partner at MTS  
[schalmo@mtspartners.com](mailto:schalmo@mtspartners.com)

## Senior Life Sciences Team

### Ravi Mehrotra – Partner



- > Has nearly two decades of healthcare equity research experience prior to joining MTS
- > 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

### 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

### Sooin Kwon – Partner



- > Has worked on over \$20 billion in equity and M&A deal volume
- > Director, BofA Healthcare Equity Capital Markets
- > Prior to BofA, Equity Research at Merlin Biomed Asset Management and UBS
- > Worked in Consulting: market research and forecasting

### 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 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

### 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

# MTS' Strategic Advisory Analytics Reports

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MTS Securities, LLC., an affiliate of MTS Health Partners, L.P., ("MTS") offers investment banking services to the healthcare industry. Our professionals distinguish themselves by providing experienced, attentive and independent counsel, and expertise in the context of long-term relationships. Our "Strategic Advisory Analytics" reports exemplify our value add strategic advisory services to clients across all healthcare industry sub-sectors. The reports are also distributed to institutional investors, providing a differentiated macro-perspective on key themes and therapeutic areas within Biopharma.

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## Industry Thought Reports

### **Drug pricing**

[Principled Drug Pricing Centered on Innovation and Choice: Part 1](#)

[Will Drug Pricing Still be as Big of an Issue Going Forward with the New US Administration?](#)

[Unprincipled Price Rises: Where is the Value in the Unbearable Symptom?](#)

[The Frictional Cost Break-up in Drug Pricing: It's not Me, It's You](#)

[Orphan Drug Pricing – Unlikely to be Left Alone in the Current Pricing Debate](#)

[#complex drug pricing in 140 characters or less](#)

### **Gene Therapy: Near-term Revolution or Continued Evolution?**

[Part 1: Global Proprietary Data](#)

[Part 2: The Gene Therapy Ecosystem](#)

## Industry Dynamic Comments

### **IPO Monitor**

## Therapeutic Area Thought Reports

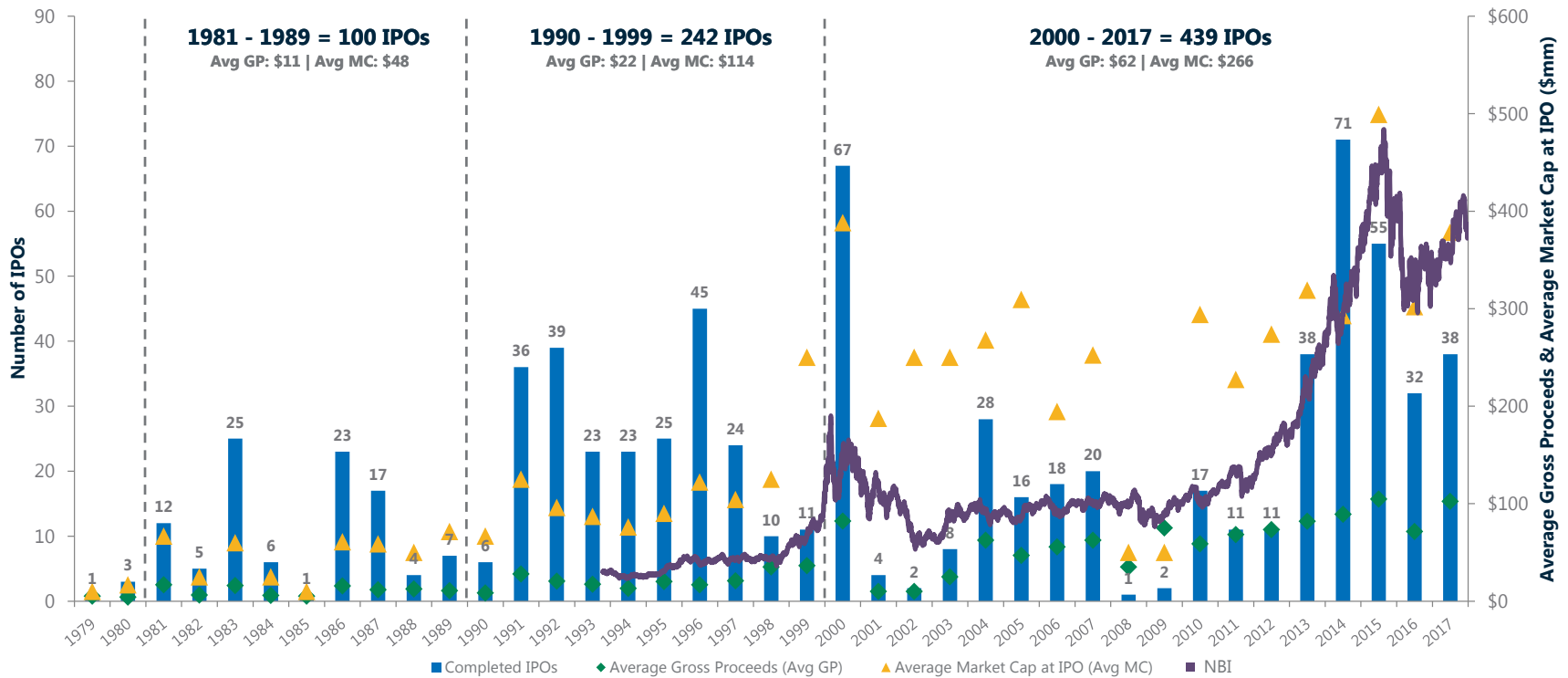
### **Dermatology – anticipated Q1:2018**

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To be added to the mailing list for Strategic Advisory Analytics reports please email Ryan Cinalli at [cinalli@mtspartners.com](mailto:cinalli@mtspartners.com)

# The 39 Years Of US Biotech IPOs

Strong Fund Flows Underlie Strong IPO Years



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

Source(s): MTS, Dealogic, as of 12/05/2017 and Stelios “The Godfather” Papadopoulos

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# 1. Executive Summary

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

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

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## Key Observations from Lead Asset Analysis by Stage

- > A detailed analysis of the 245 IPOs from 2012-2017 when considering the stage of the lead asset (broken down into three buckets; early-stage – preclinical/Phase I; mid-stage - Phase II assets; late-stage - Phase III/filed/marketd) 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
- > In 2017 companies mid- and late-stage assets garnered the highest average raise since 2012 and the second highest valuation (only below to banner 2015 year), whereas early stage assets in general garnered lesser amounts versus average of previous years (with the relatively low number of “platform Gene Therapy” companies in 2017 being a notable driver of this observation – see key message 2 for more details)
- > Data summarized from pages 19, 60, 61

	<b>Early-Stage (24%)</b>	<b>Mid-Stage (38%)</b>	<b>Late-Stage (37%)</b>
Avg Raise (2012 - 2017)	\$91	\$94	\$87
Avg PM (2012 - 2017)	370	346	359
	<b>Early-Stage (18%)</b>	<b>Mid-Stage (37%)</b>	<b>Late-Stage (45%)</b>
Avg Raise (2017)	\$82	\$111	\$104
Avg PM (2017)	235	350	461

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## 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



# Key Message 2: Gene Therapy = Highest Raises & Valuations

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

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## Key Observations from Lead Asset Analysis by Modality

- > A detailed analysis of the IPO market from 2012-2017, 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
- > While GT companies have garnered highest raises and valuations in the last six years, interestingly in 2017, companies with this modality comprised of only 11% of all IPOs, second lowest after 2012, with their average post money valuations lower than small molecules and biologics
- > Data summarized from pages 20, 62, 63

	<b>Small Molecule (51%)</b>	<b>Biologic (22%)</b>	<b>Gene Therapy (16%)</b>	<b>Other (11%)</b>
Avg Raise (2012 - 2017)	\$83	\$93	\$122	\$76
Avg PM (2012 - 2017)	294	435	464	330

	<b>Small Molecule (58%)</b>	<b>Biologic (21%)</b>	<b>Gene Therapy (11%)</b>	<b>Other (11%)</b>
Avg Raise (2017)	\$101	\$133	\$93	\$54
Avg PM (2017)	396	466	282	200

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## In 2017 Modality and Stage Matters

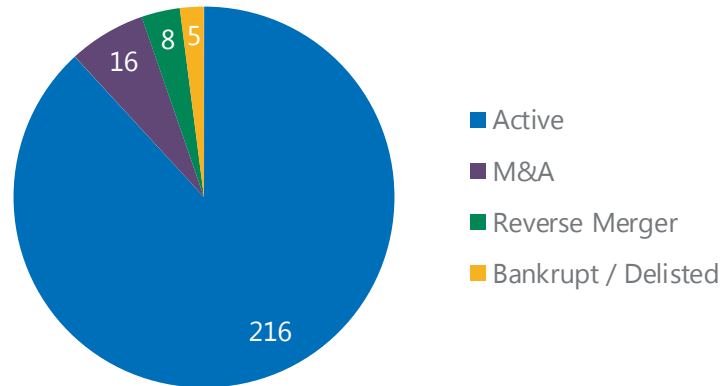
In contrast to previous years, 2017 GT companies were seen as the laggards of the group. This could possibly be attributed to the fact that GT Companies IPOing in 2017 were less “fundamental broad platforms” and more companies with late-stage assets.

# Key Message 3: 88% 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 245 companies that IPO'd from 2012-2017, 16 companies exited via M&A at an average 354% premium to IPO pricing
  - In 2017, the average premium was 423%, only second to 2015's outstanding year when average premium was 520%
  - Over the last 6 years the average time to exit was 2 years
- > From the same cohort, 8 companies reported negative data and reverse merged at an average of a 75% discount to IPO pricing
  - 2017 was “The Reverse Merger Year” - 6 of the 8 reverse mergers 2012-2017 occurred in 2017
  - The majority of private companies that were the effective acquirers in these reverse mergers were considering a traditional IPO
- > Of 245 companies, there were 5 that filed for bankruptcy or delisted
- > Data summarized from pages 21, 22



## IPO Exits via M&A and Reverse Mergers – Somewhat surprising results

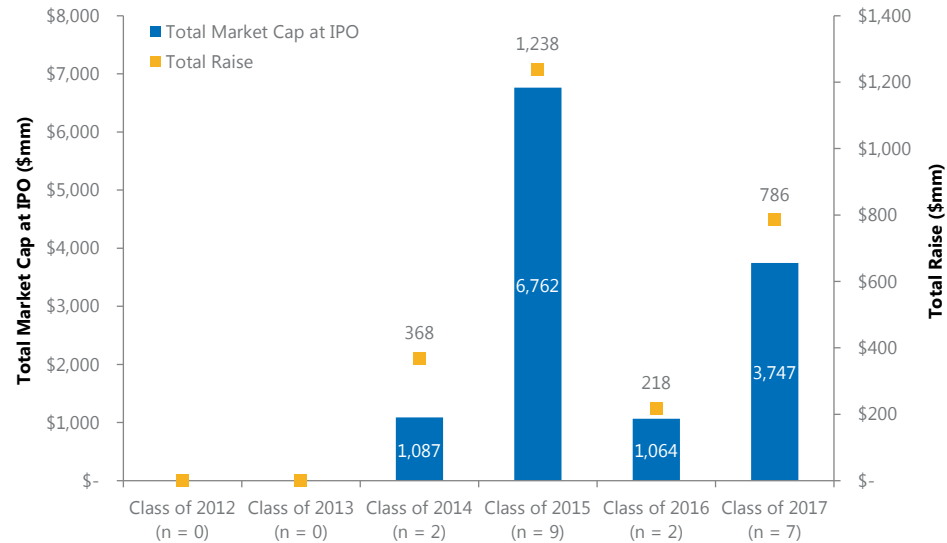
Of the 245 US Biotech IPOs over the last 6 years, 16 (6.5%) were acquired, 8 (3.3%) had lead asset failures and exited via a reverse merger, and 5 (2.0%) filed for bankruptcy.

# Key Message 4: Foreign Issuers Increased Access of US Capital

In 2017 ~26% of Total Post Money Valuation Was By Foreign Issuers

## Key Observations from ADR Offerings

- > Over the last 6 years, 2017 was an exceptional year for foreign issuers IPOing in the US by analyzing 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 ~24% of total post money valuation for that year
- > Interestingly, in 2017 there were 7 foreign companies that IPO'd, raising ~20% of total IPO proceeds and representing ~26% of total post money valuation for the year



## 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 Drives Successful IPO Numbers in 2017

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## Key Observations from Analysis of Insider Participation

- > Over the last 6 years, average insider participation in the US biotech ranged from 23% - 40%
- > 2016 was a banner year with an average insider participation of 39.5%
- > Interestingly, 2017 is the 3<sup>rd</sup> highest after 2016 and 2012 by the amount of insider participation

	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017YTD</b>	<b>Total</b>
<b>Average Insider Participation</b>	35.8%	28.9%	26.9%	23.0%	39.5%	32.2%	<b>29.3%</b>

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Insider Participation in 2017 Continues to be a Driver in Successful IPOs



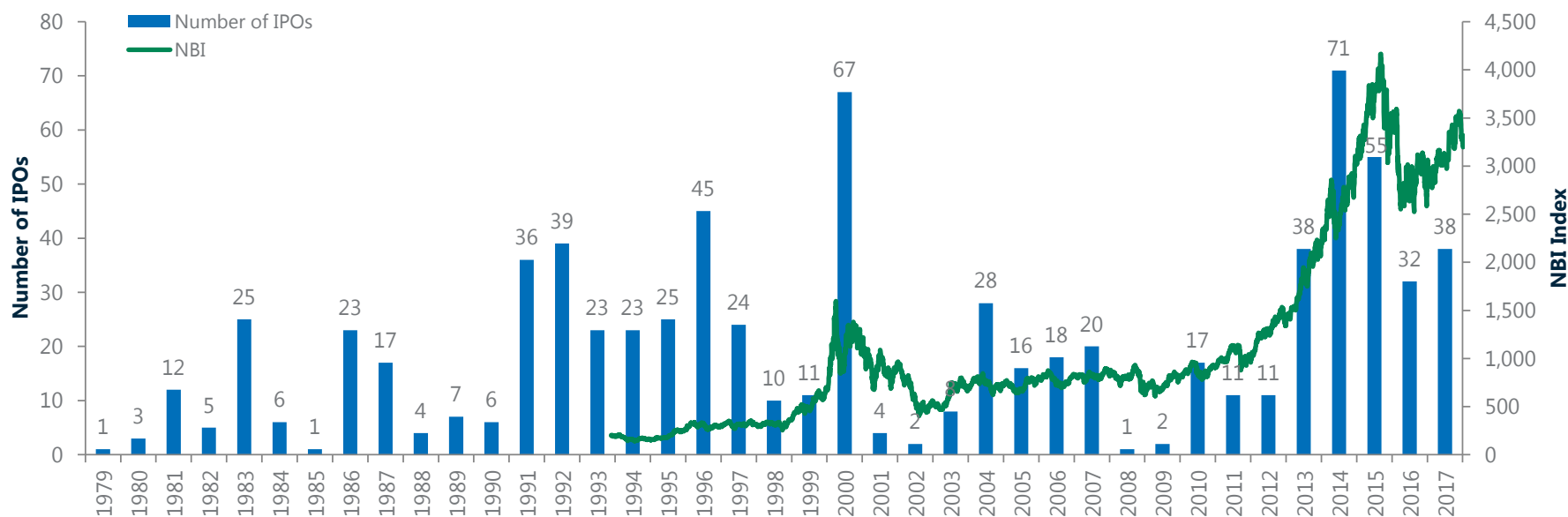
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## 2. Historical Biotech IPO Market Overview

# 1979-2017 IPO Biotech Market Overview

2018 Will Be The 40<sup>th</sup> Year Of Public US Biotech

## IPO Totals by Year vs. NASDAQ Biotech Index



## Historical IPO Raises and Valuation

	2010	2011	2012	2013	2014	2015	2016	2017 YTD
Avg. Raise	\$80	\$75	\$73	\$82	\$89	\$105	\$71	\$102
Avg. Post Money Valuation	308	237	274	319	293	499	302	378
Total Raised	1,448	980	808	3,109	6,328	5,758	2,286	3,887
Total Post Money Valuation	5,538	3,075	3,011	12,119	20,792	27,452	9,667	14,373

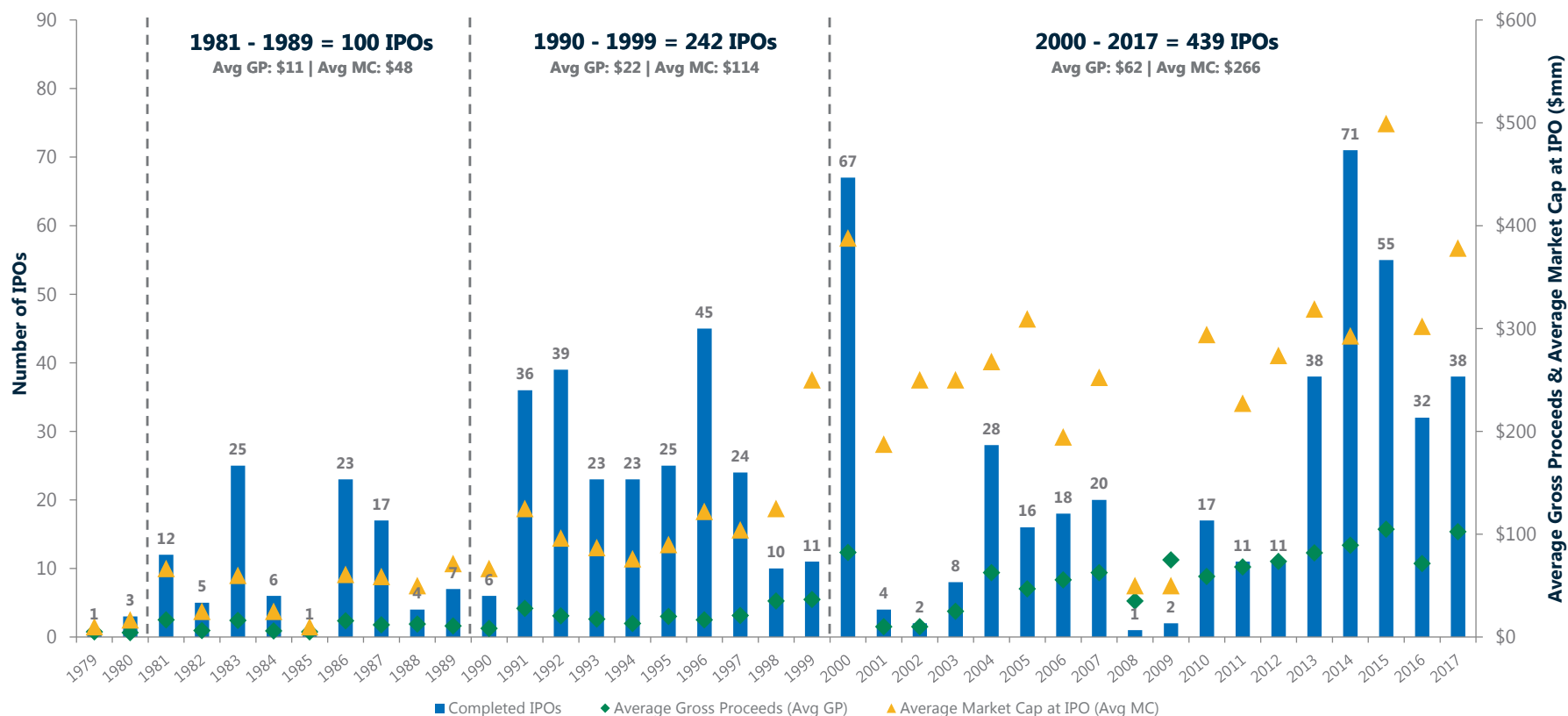
Note(s): All \$ in mm.

Source(s): MTS and Dealogic, as of 12/05/2017. Special thanks for the historic "The Godfather" Stelios Papadopoulos.

# 1979-2017 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

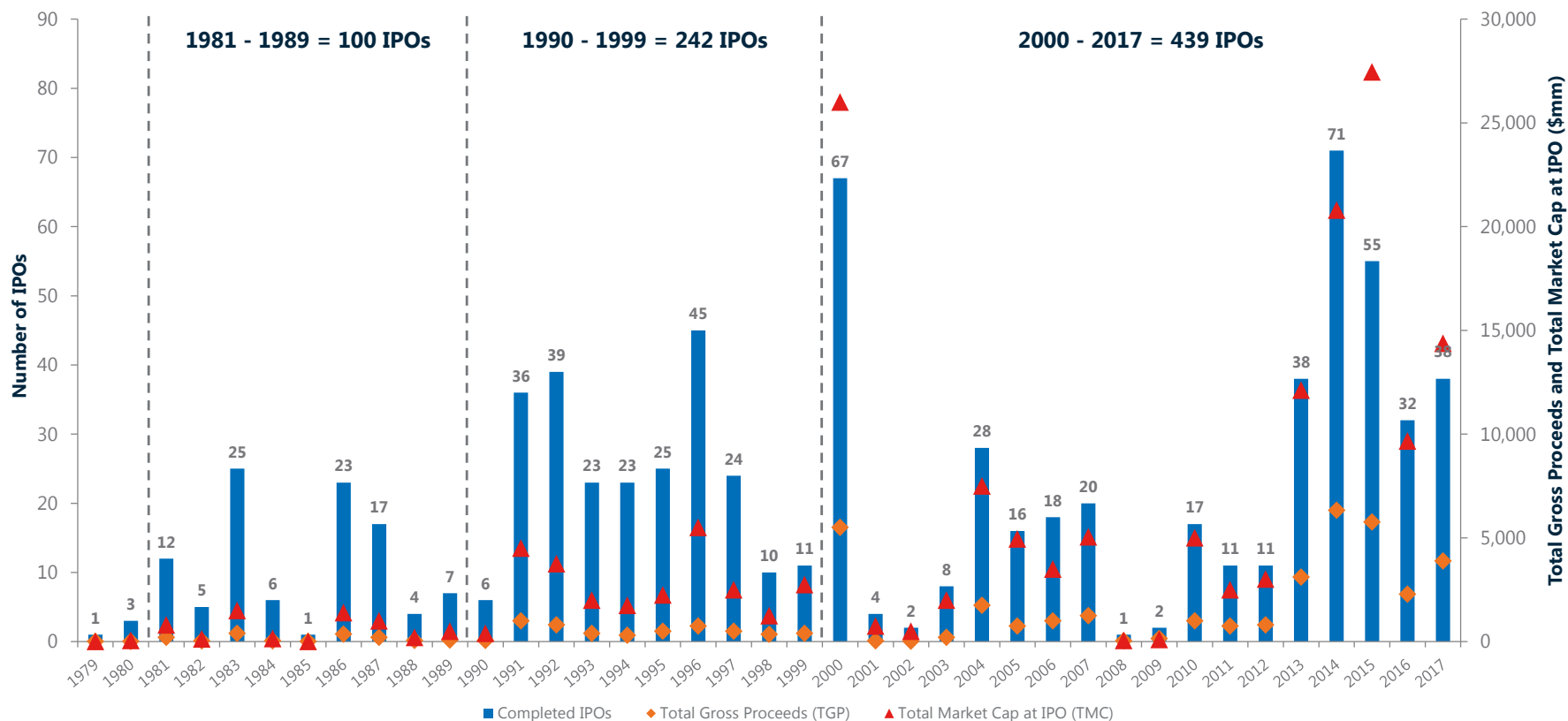


Source(s): MTS and Dealogic, as of 12/05/2017. Special thanks to "The Godfather" Stelios Papadopoulos for the historic data.

# 1979-2017 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 12/05/2017. 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
NASDAQ	16.9%	(1.8%)	15.9%	38.3%	13.4%	5.7%	7.5%	25.7%
<b>Healthcare Indices</b>								
NASDAQ Biotechnology Index	15.0%	11.8%	31.9%	65.6%	34.1%	11.4%	(21.7%)	15.4%
NYSE Arca Biotechnology Index	37.7%	(15.9%)	41.7%	50.6%	47.6%	10.9%	(19.4%)	33.3%
ProShares Ultra NASDAQ Biotechnology ETF	-	15.6%	66.8%	159.6%	66.8%	13.9%	(44.2%)	28.6%
S&P Pharmaceuticals Select Industry Index	21.4%	11.6%	10.1%	59.5%	28.7%	1.1%	(23.7%)	8.1%
<b>Bellwether Stocks<sup>(1)</sup></b>								
Mean	3.1%	27.4%	41.3%	86.4%	30.4%	2.5%	(11.5%)	9.1%

(1) Bellwether stocks comprise of AMGN, BIIB, CELG and GILD  
Source(s): MTS and FactSet Research Systems, as of 12/05/2017.

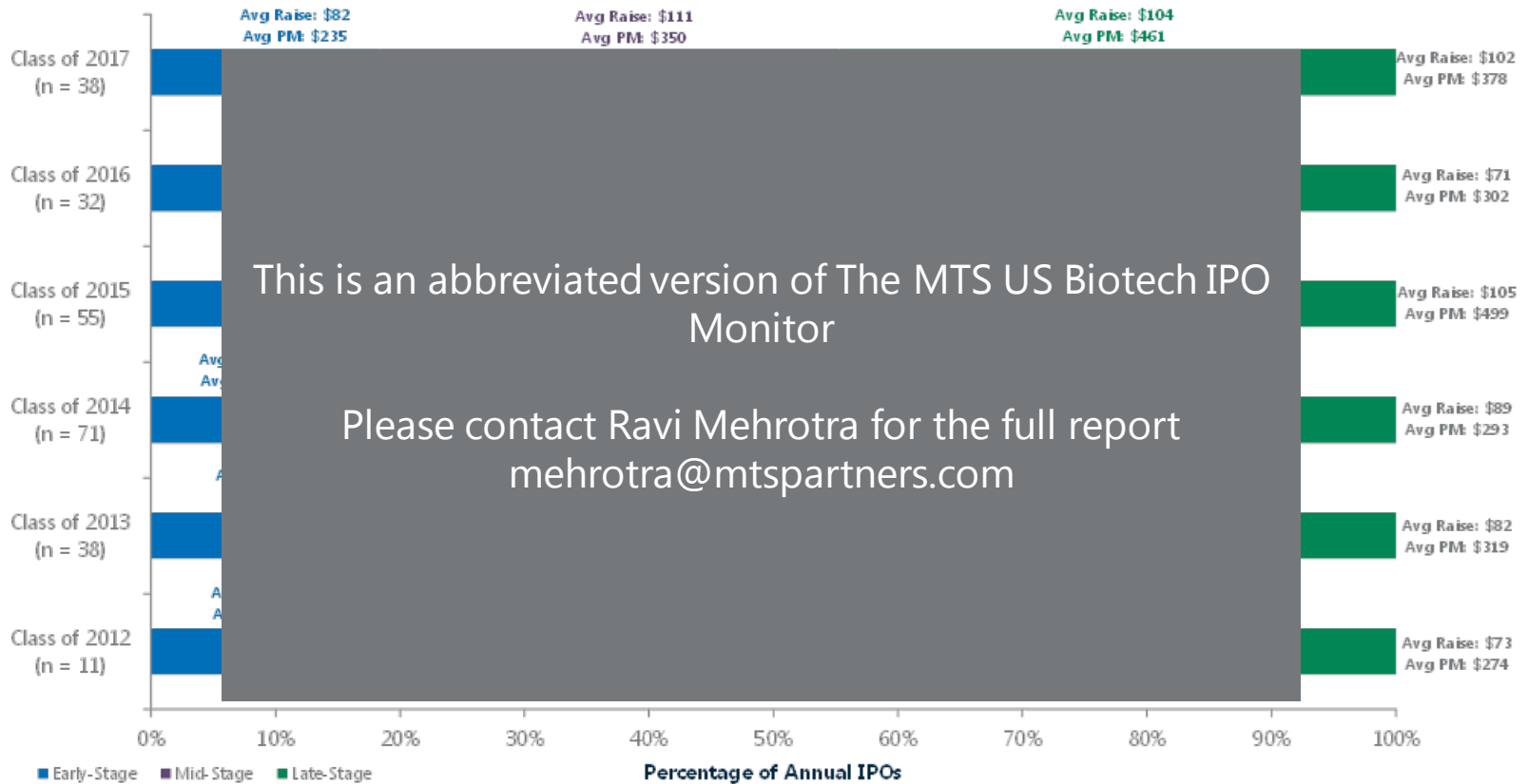


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## 3. 2012-2017 Detailed IPO Analysis

# Valuation Dynamics Split by Lead Asset Phase at IPO

Classes of 2012 – 2017



	<b>Early-Stage (24%)</b>	<b>Mid-Stage (38%)</b>	<b>Late-Stage (37%)</b>
Avg Raise (2012 - 2017)	\$91	\$94	\$87
Avg PM (2012 - 2017)	370	346	359

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 12/05/2017.

# Valuation Dynamics Split by Modality

Classes of 2012 – 2017



	Small Molecule (51%)	Biologic (22%)	Gene Therapy (16%)	Other (11%)
Avg Raise (2012 - 2017)	\$83	\$93	\$122	\$76
Avg PM (2012 - 2017)	294	435	464	330

Note(s): All \$ in mm; Other is comprised of steroids, vaccines and non-traditional biotech products.  
Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Valuation Dynamics of IPO Exits via M&A

Classes of 2012 – 2017 IPO Exits

	<b>IPO Pricing Date</b>	<b>Exit Date</b>	<b>Time to Exit (Years)</b>	<b>Acquiror</b>	<b>Premium (Discount) to IPO Pricing</b>
<b>M&amp;A</b>					
Dime					4%)
Biotie					3%
Colu					5%
Vitae					3%
Kite P					8%
ZS Pl					0%
Ausp					1%
Relyp					1%
Rega					2%
Prose					3%
Amb					5%
Rece					7%
Omt					6%
Dura					8%
Kythe					9%
Hype					0%
<b>Total: 16</b>					<b>Average: 354%</b>

Please contact Ravi Mehrotra for the full report  
[mehrotra@mtspartners.com](mailto:mehrotra@mtspartners.com)

(1) 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.  
 (2) Biotie was traded on the NASDAQ as an ADR. The company's local exchange was the Helsinki Stock Exchange (HLSE).  
 Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Valuation Dynamics of IPO Exits via Reverse Mergers & Bankruptcies

Classes of 2012 – 2017 IPO Exits

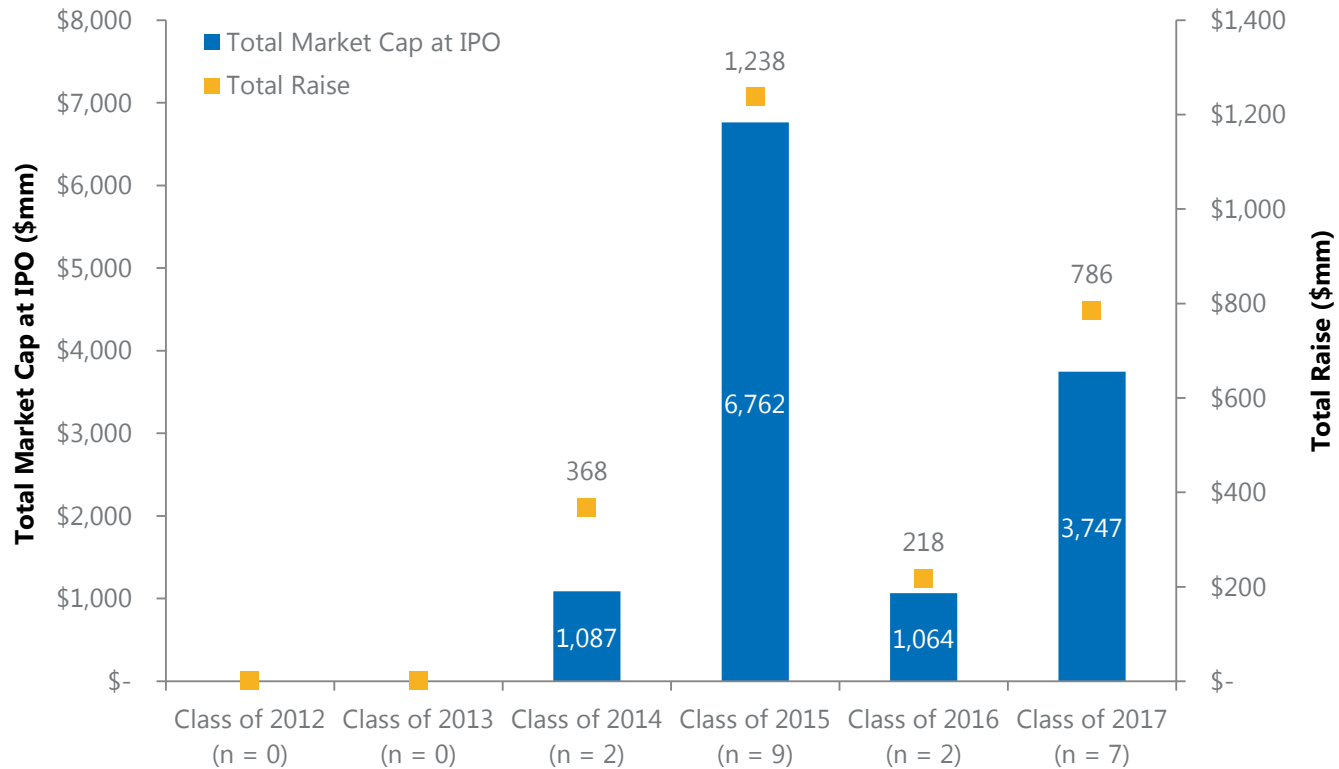
	<b>IPO Pricing Date</b>	<b>Exit Date</b>	<b>Time to Exit (Years)</b>	<b>Acquiror</b>	<b>Premium (Discount) to IPO Pricing</b>
<b>Reverse Merger</b>					
Ni					80%
Ca					77%
To					93%
Ce					53%
Di					87%
Ce					86%
Al					86%
Ce					87%
Please contact Ravi Mehrotra for the full report mehrotra@mtspartners.com					
<b>Total: 8</b>					<b>Average: (75%)</b>

<b>Bankruptcy</b>					
Gl					
Ne					
Te					
BI					
Ka					
Please contact Ravi Mehrotra for the full report mehrotra@mtspartners.com					
<b>Total: 5</b>					

Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Valuation Dynamics of ADR Offerings

## Total Market Cap at IPO and Total Raise of ADR Offerings



Source(s): MTS and Dealogic, as of 12/05/2017.

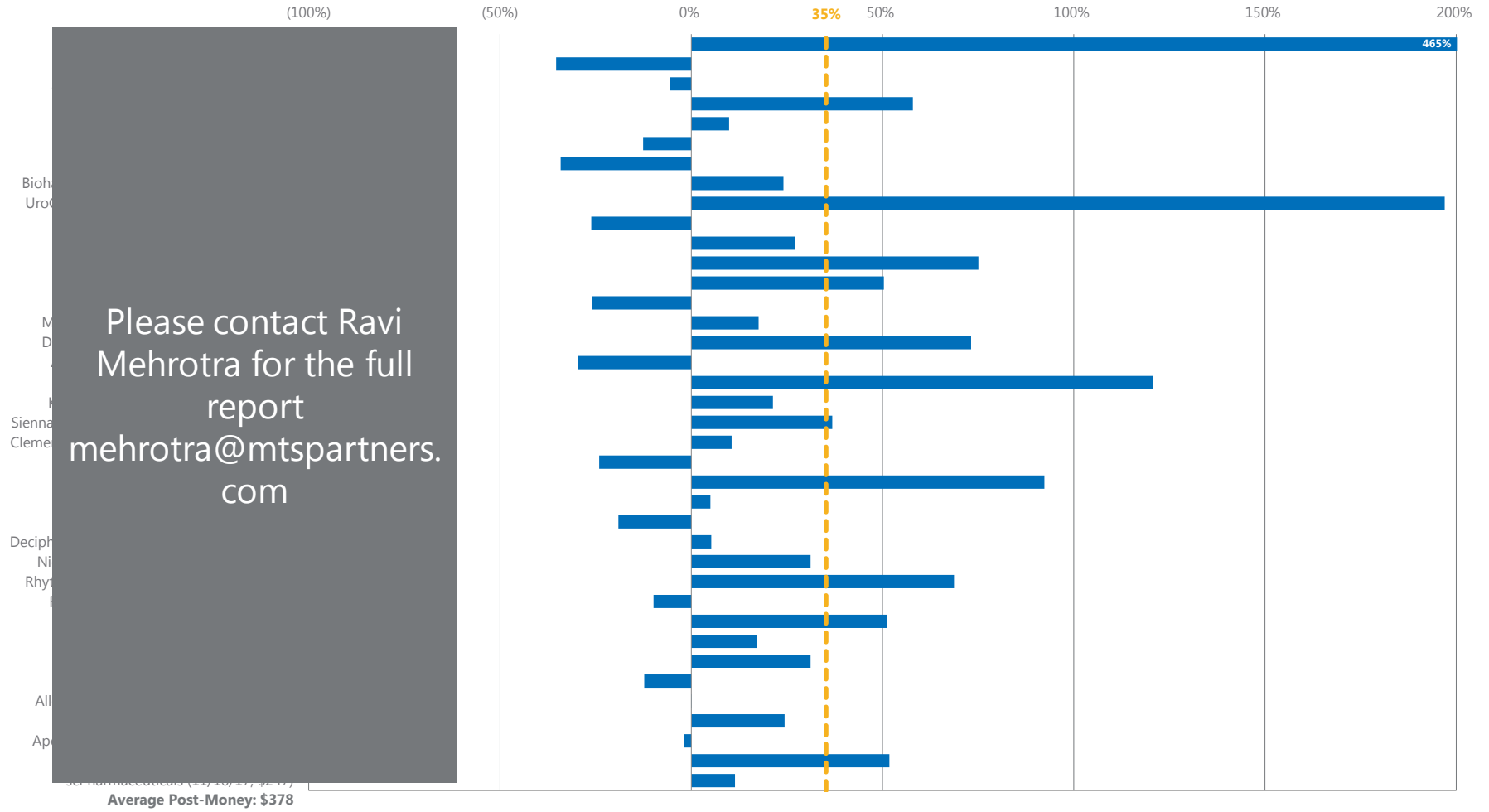


## 4. 2012-2017 Performance Since IPO



# Post-IPO Performance Based on Offer Price to Current Price

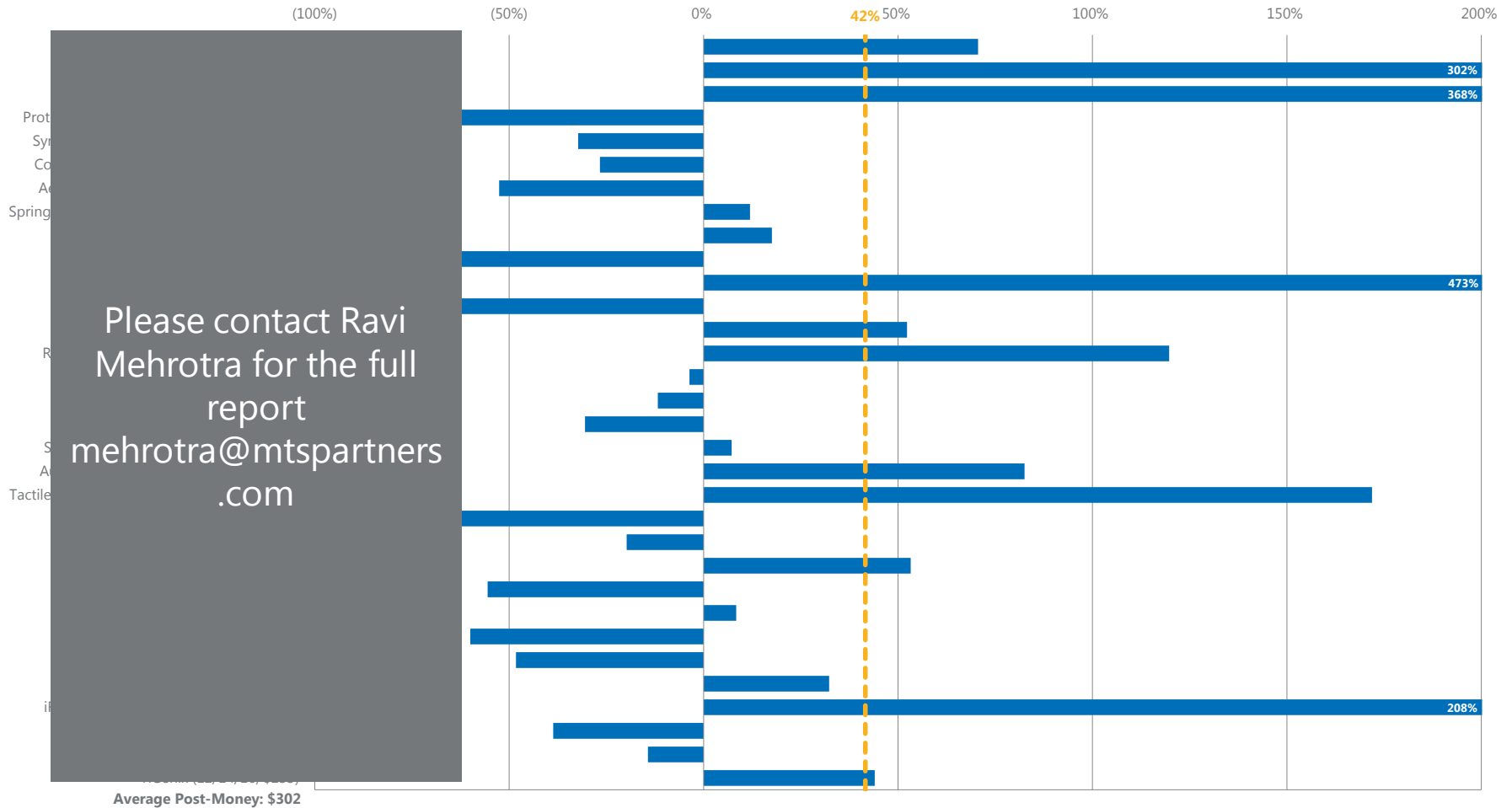
Class of 2017 (n=38) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm.  
 Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Post-IPO Performance Based on Offer Price to Current Price

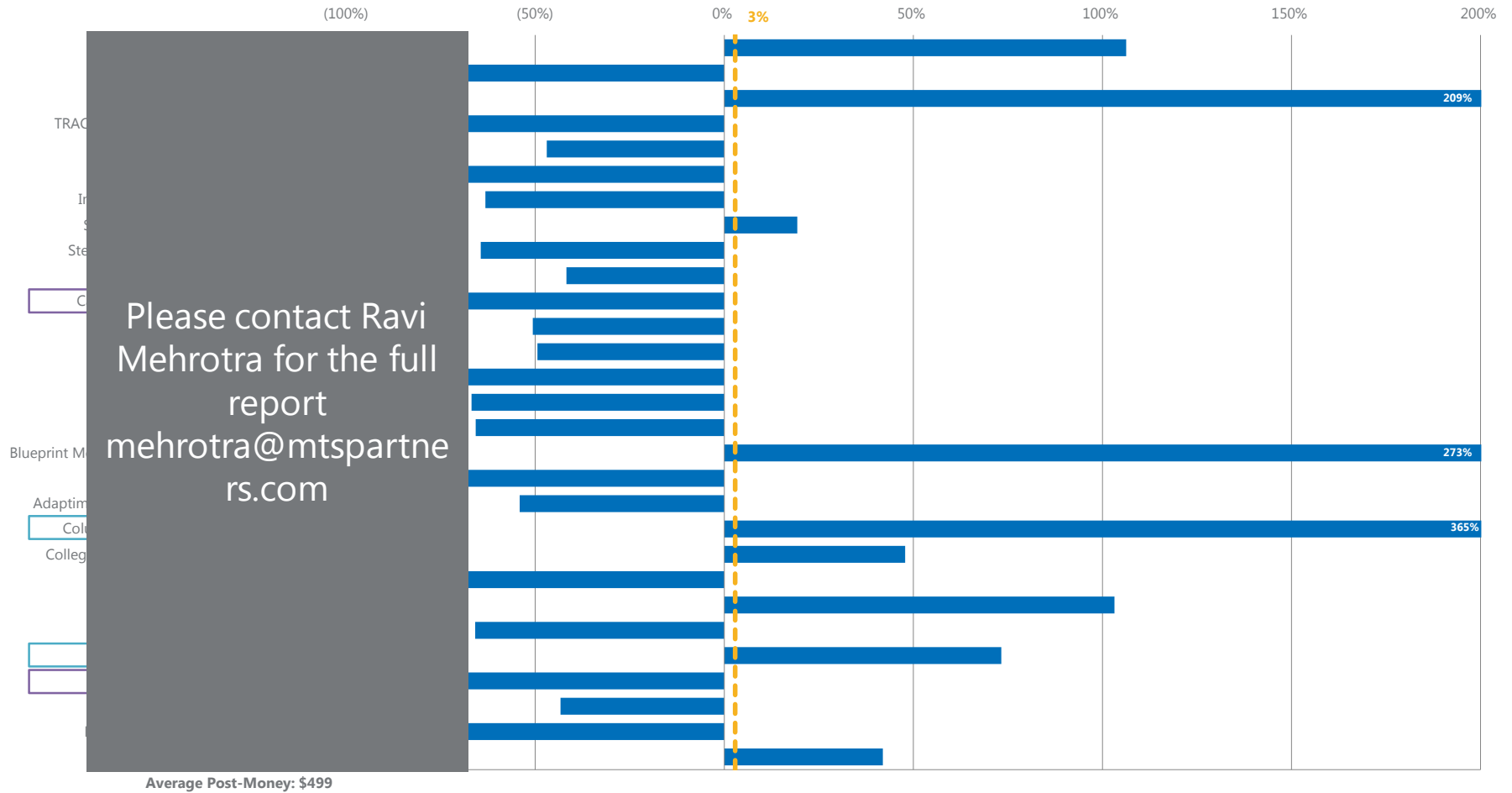
Class of 2016 (n=32) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm.  
 Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Post-IPO Performance Based on Offer Price to Current Price

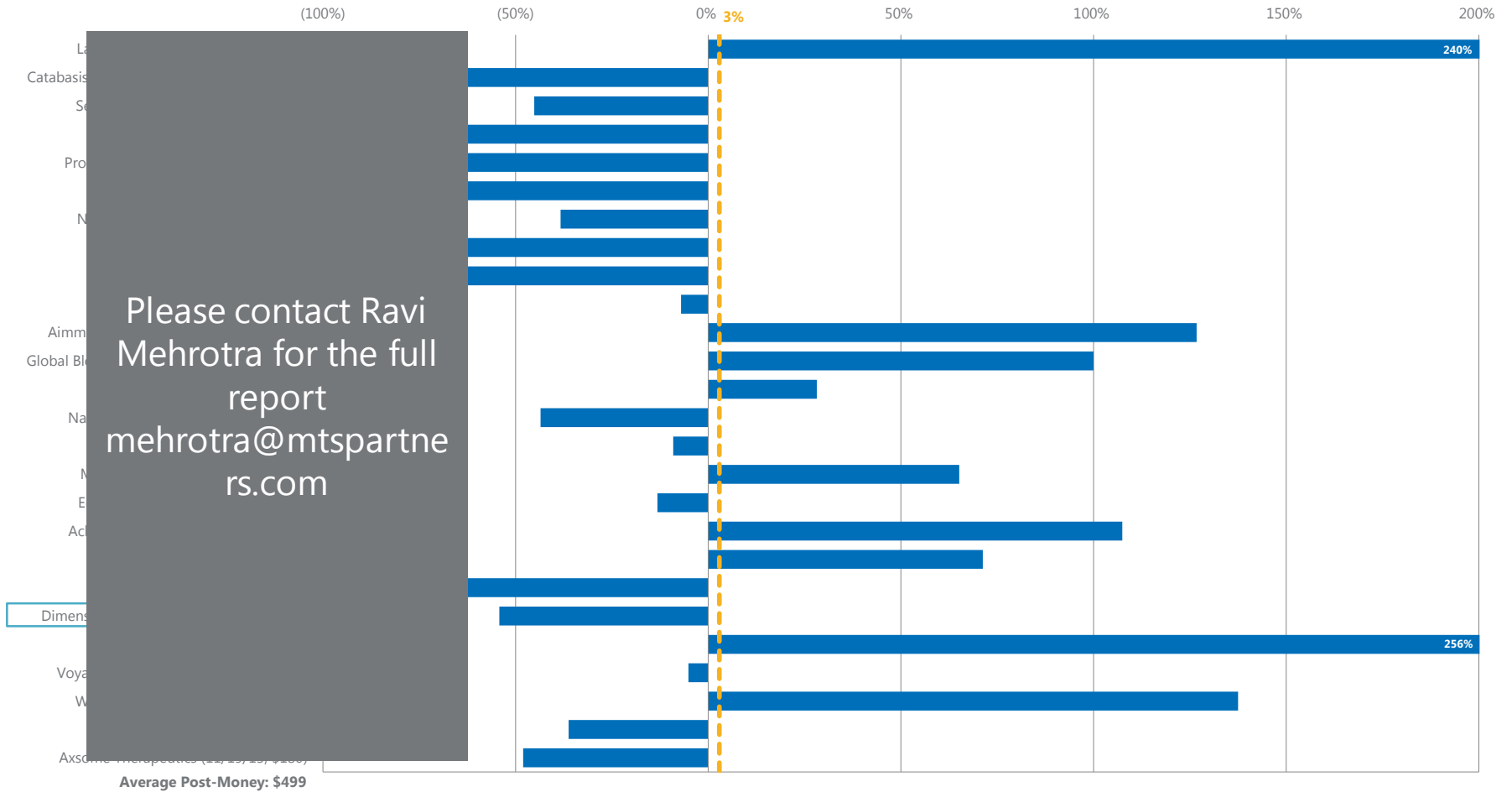
Class of 2015 (n=55) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



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 12/05/2017.

# Post-IPO Performance Based on Offer Price to Current Price

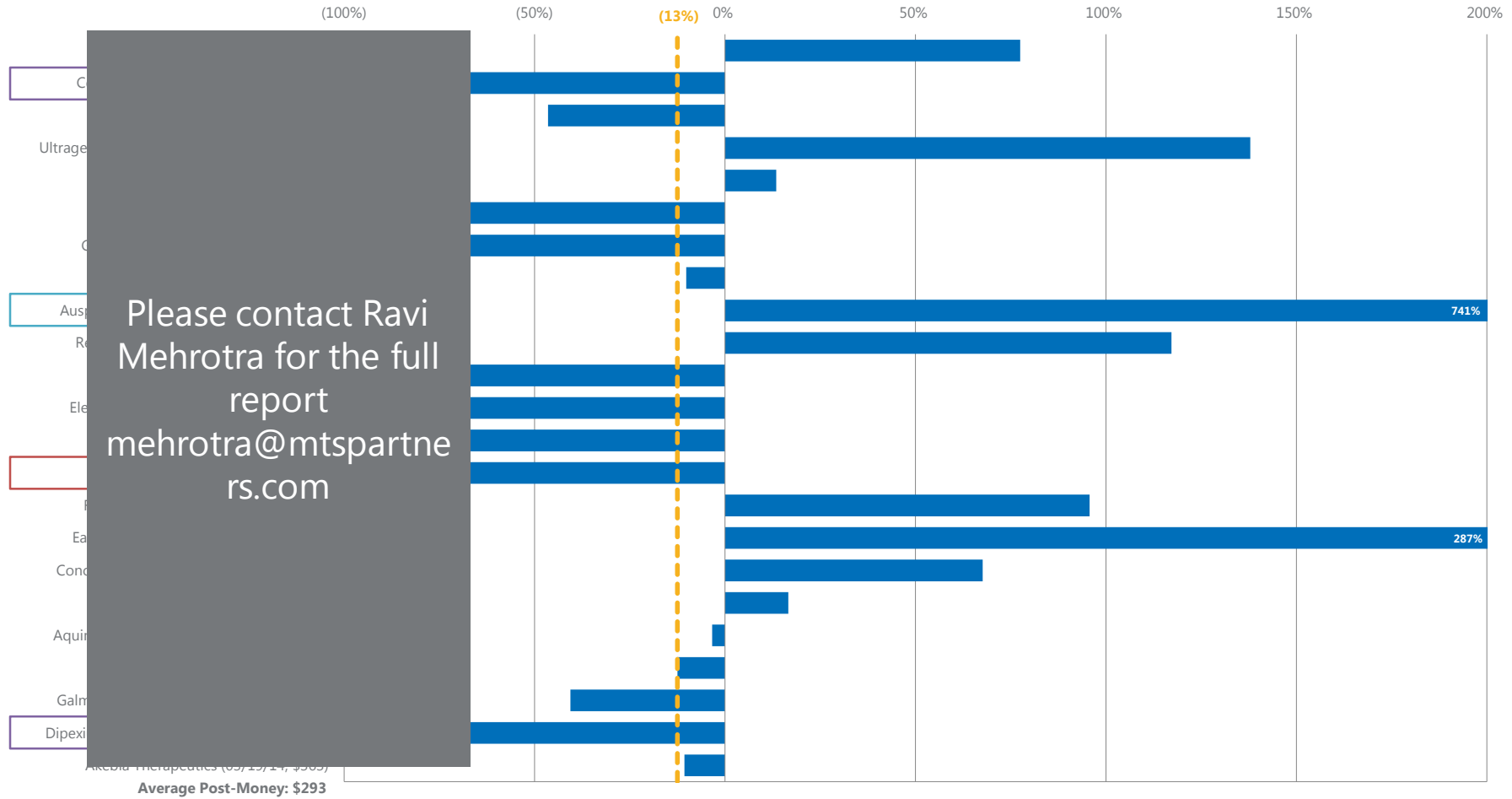
Class of 2015 (n=55) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)



Note(s): All \$ in mm. Blue box indicates acquired companies.  
 Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Post-IPO Performance Based on Offer Price to Current Price

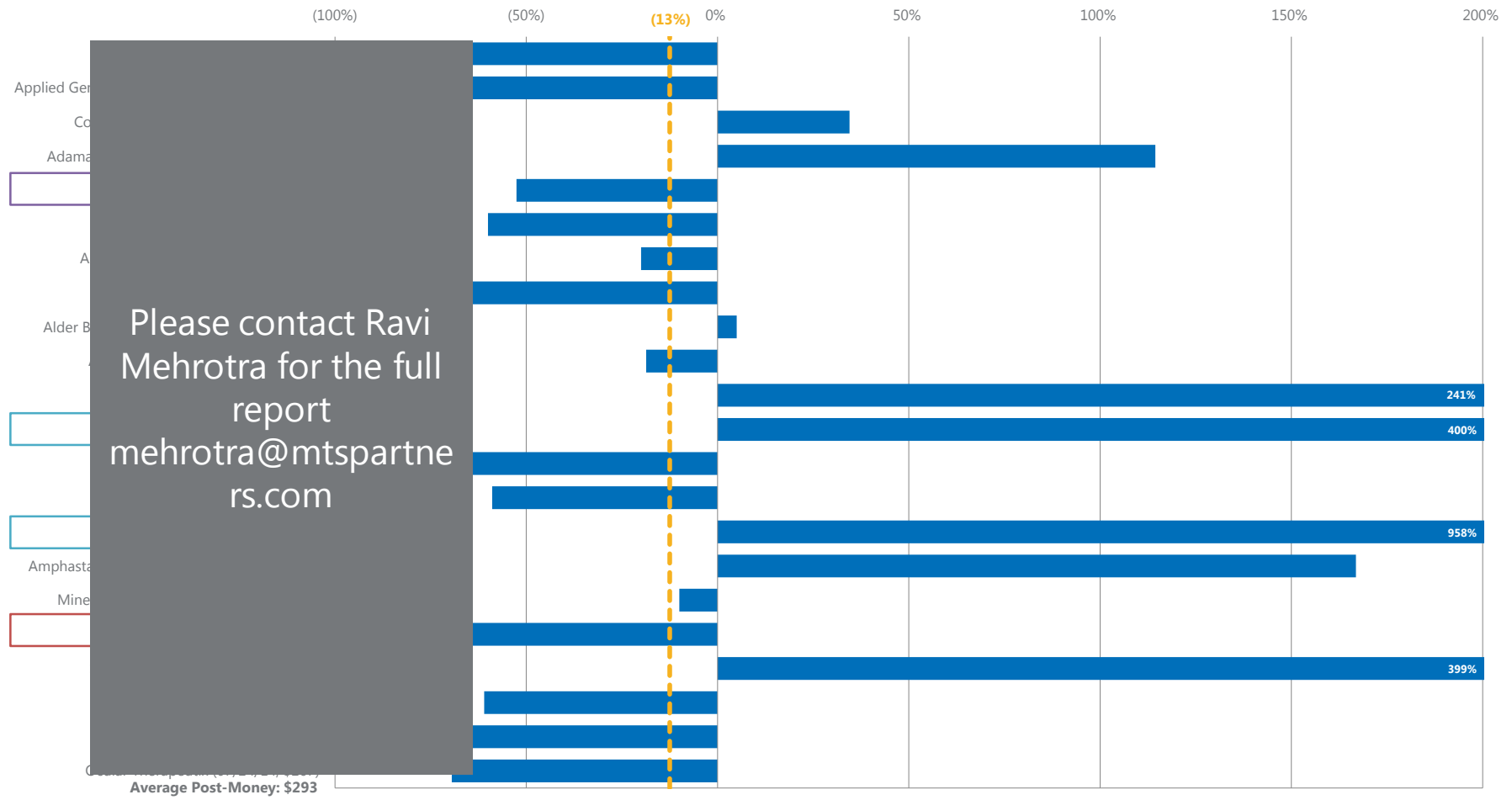
Class of 2014 (n=71) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



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 12/05/2017.

# Post-IPO Performance Based on Offer Price to Current Price

Class of 2014 (n=71) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)

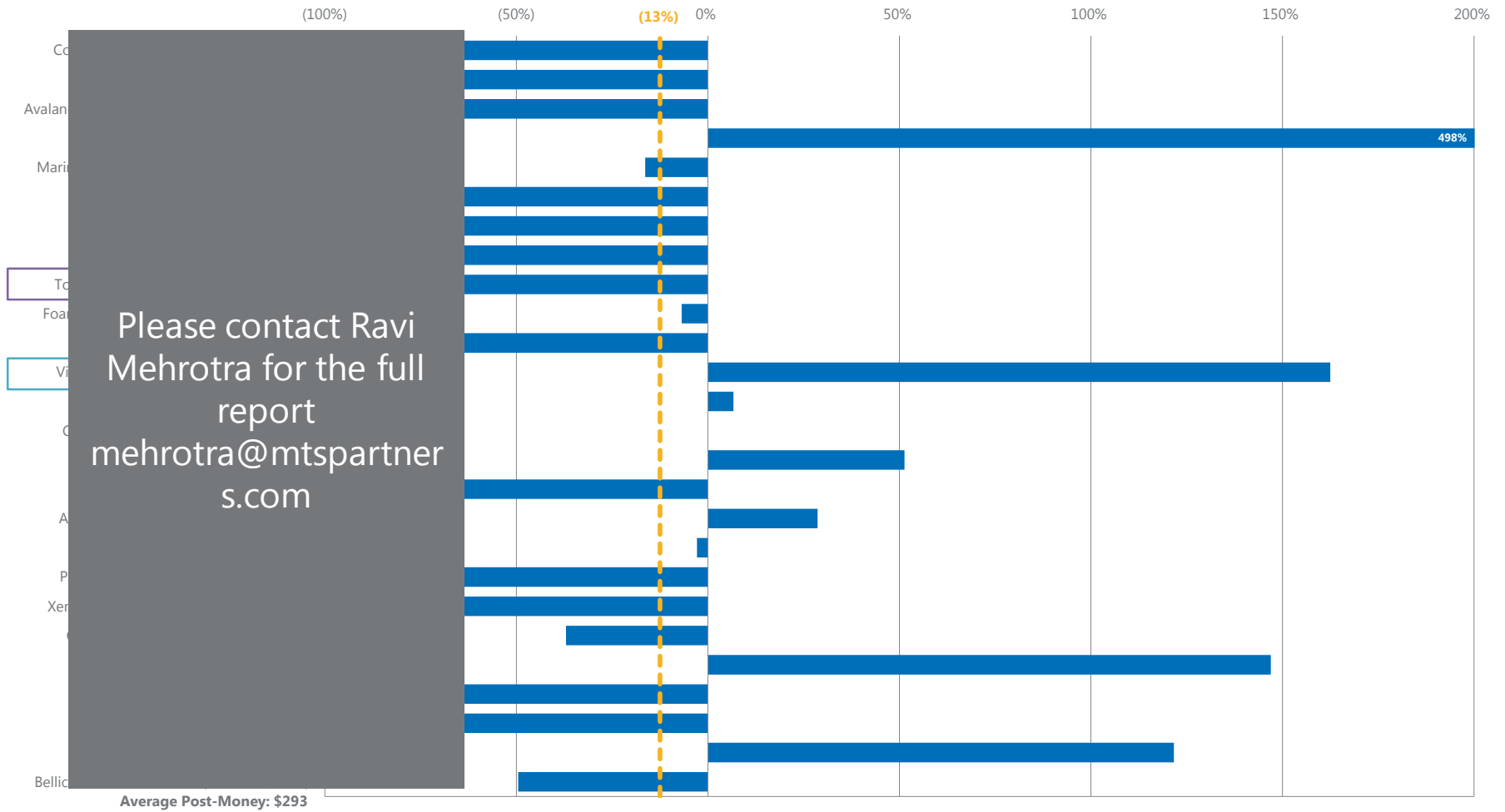


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Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger. Red box indicates bankrupt companies. Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

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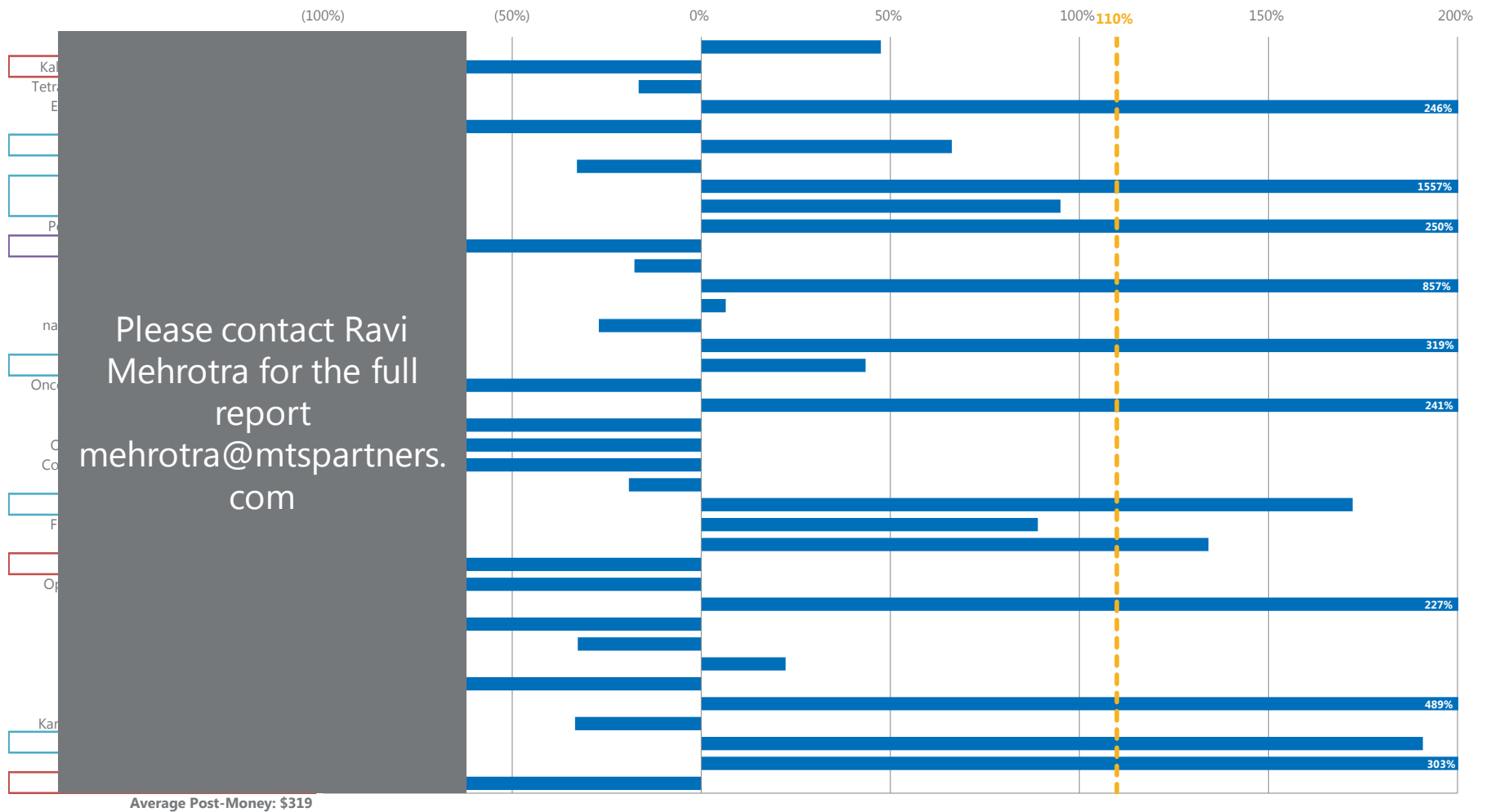
Class of 2014 (n=71) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)



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 12/05/2017.

# Post-IPO Performance Based on Offer Price to Current Price

Class of 2013 (n=38) Sorted by Date and Showing Post-Money Valuation at IPO Pricing

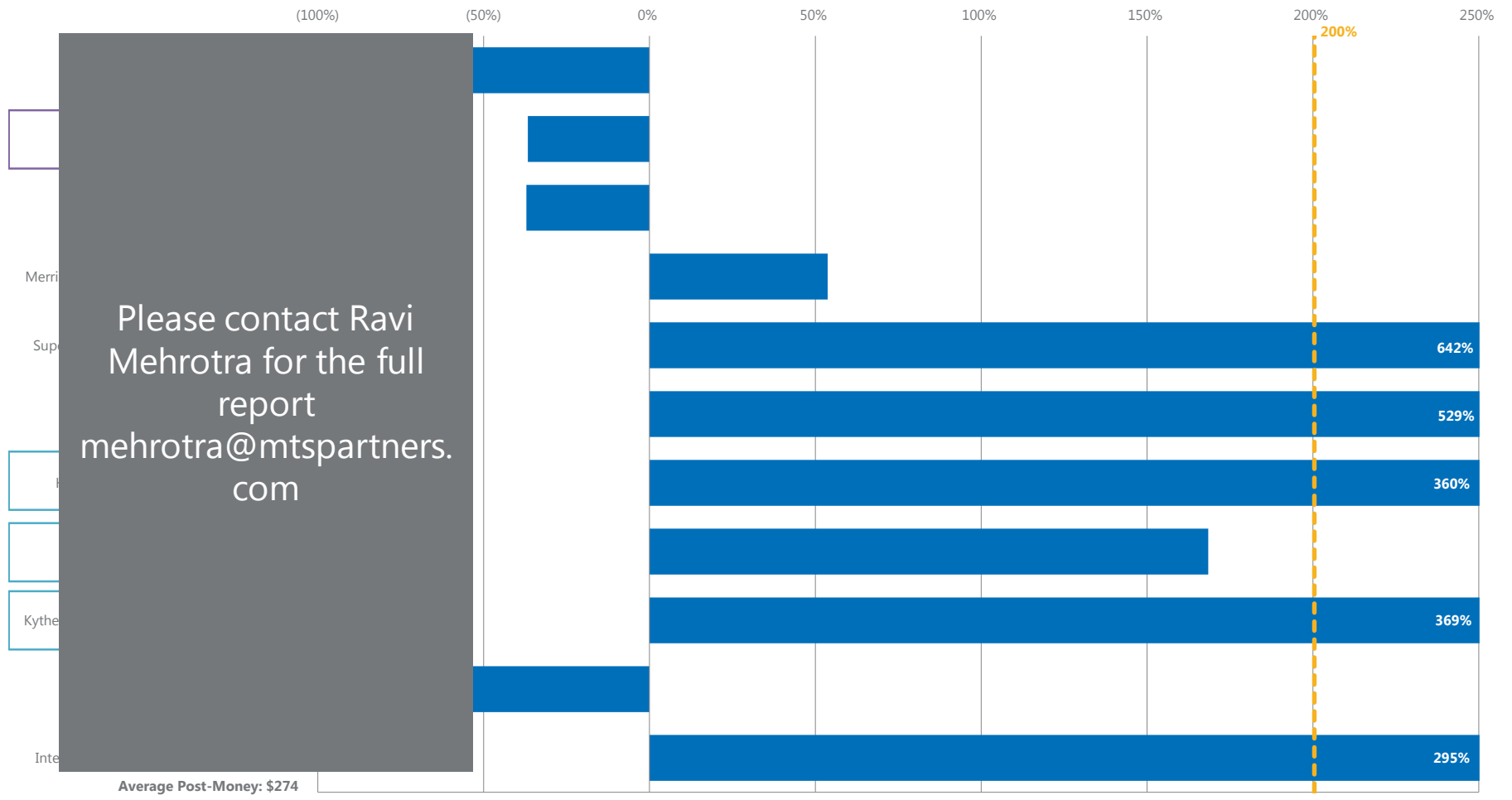


Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger. Red box indicates bankrupt companies. Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.



# Post-IPO Performance Based on Offer Price to Current Price

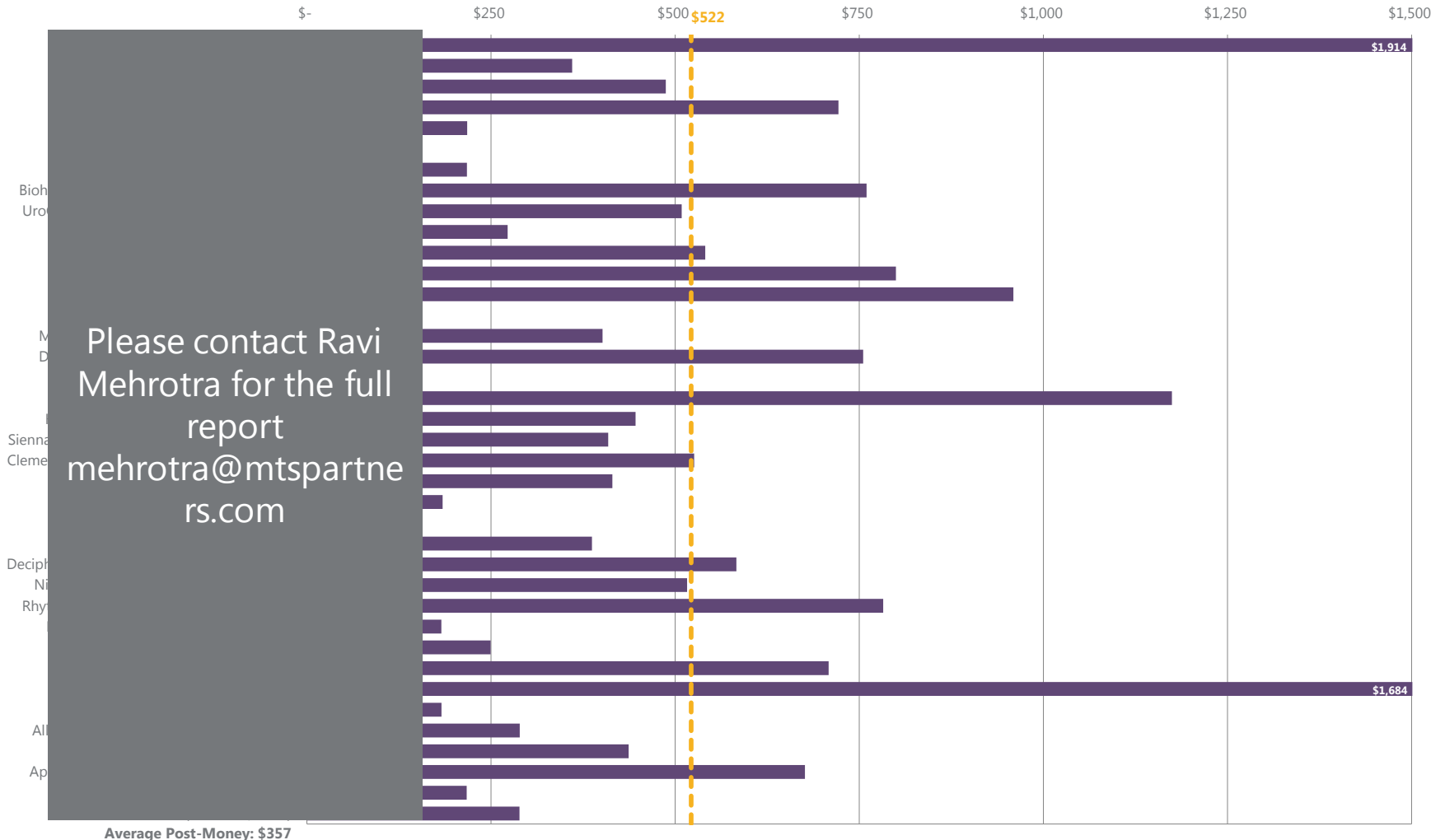
Class of 2012 (n=11) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm. Blue box indicates acquired companies.  
Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Current Market Capitalization

Class of 2017 (n=38) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



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

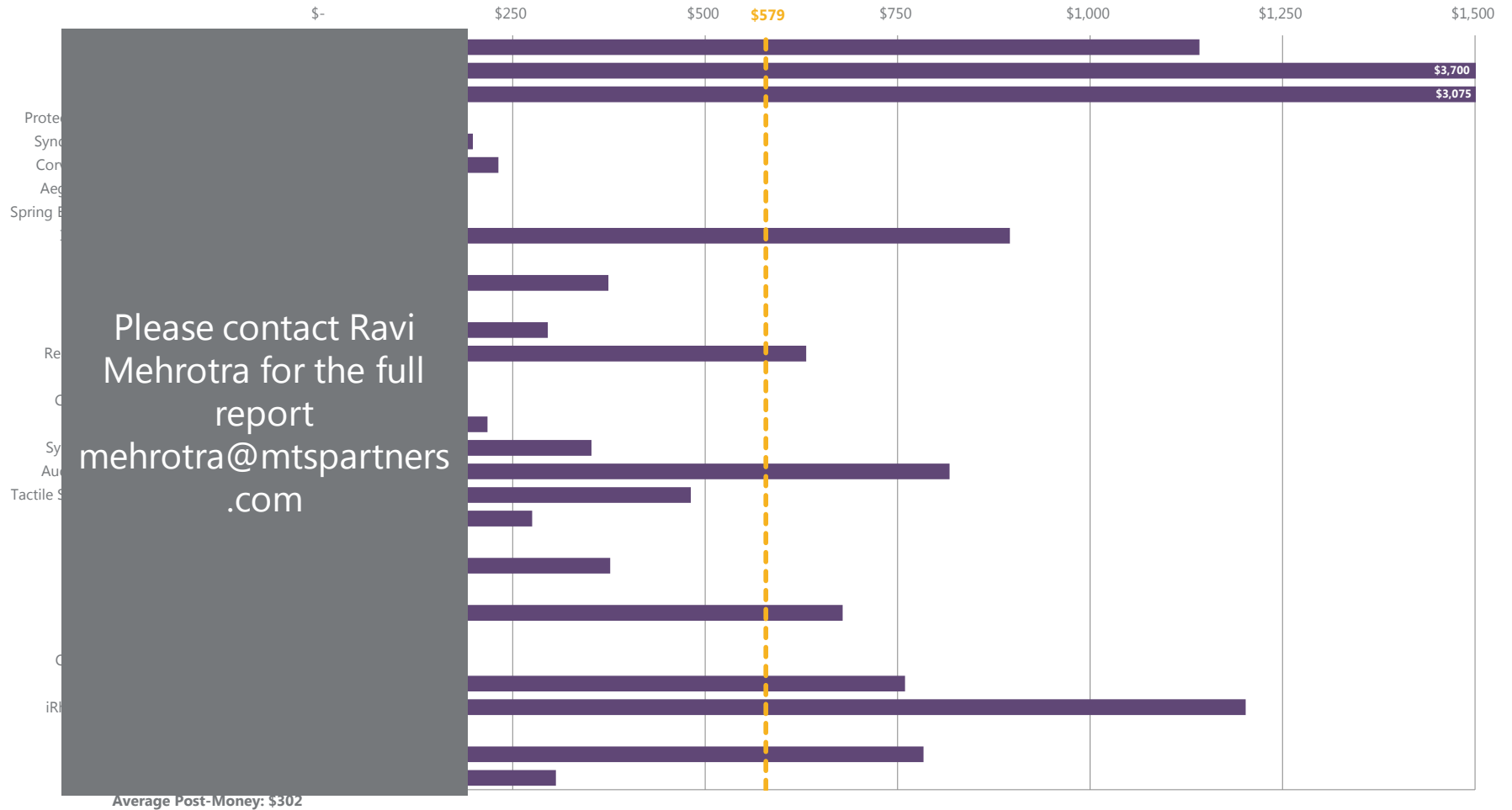
Average Post-Money: \$357

Note(s): All \$ in mm.

Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Current Market Capitalization

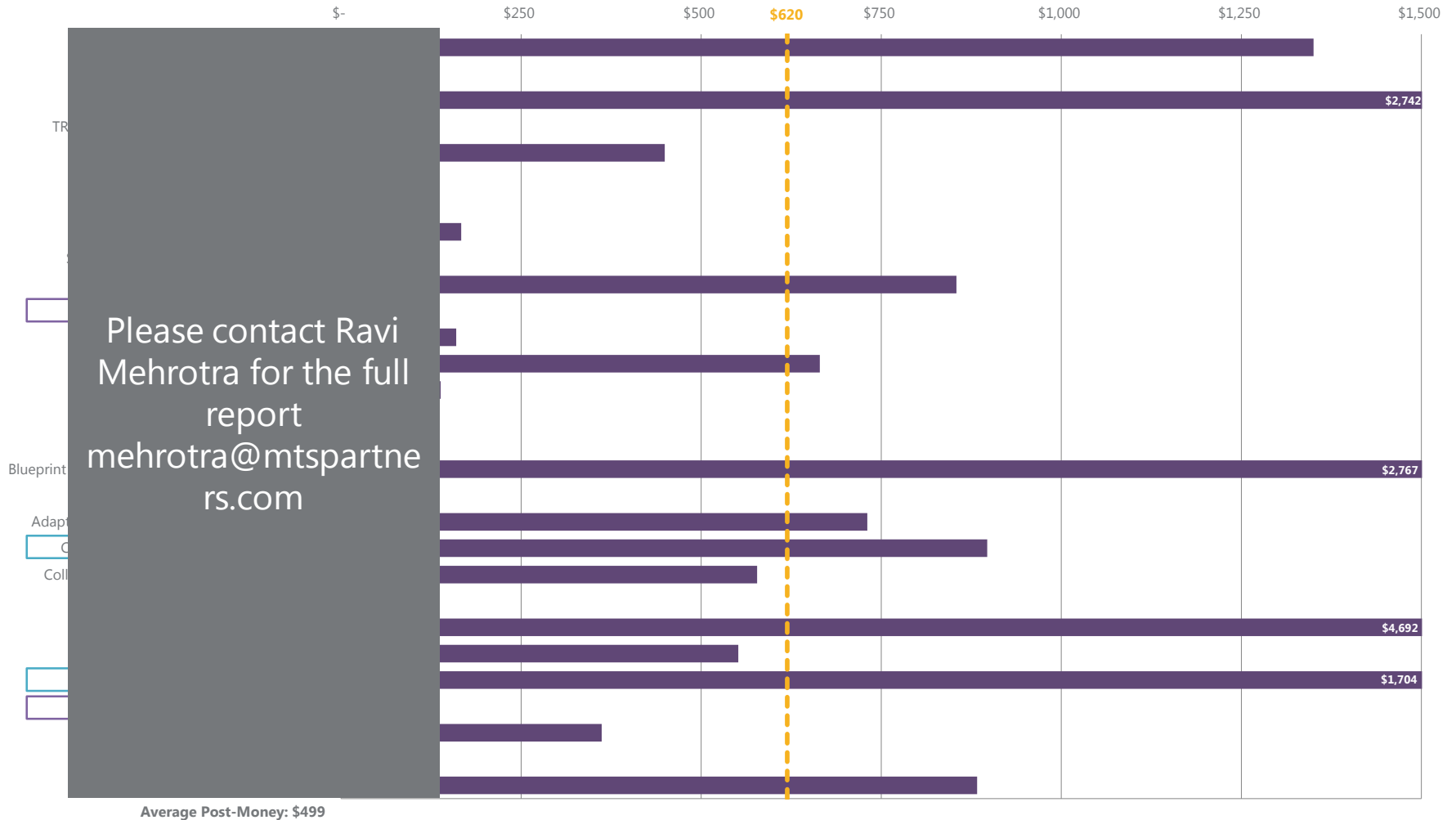
Class of 2016 (n=32) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



Note(s): All \$ in mm.  
Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Current Market Capitalization

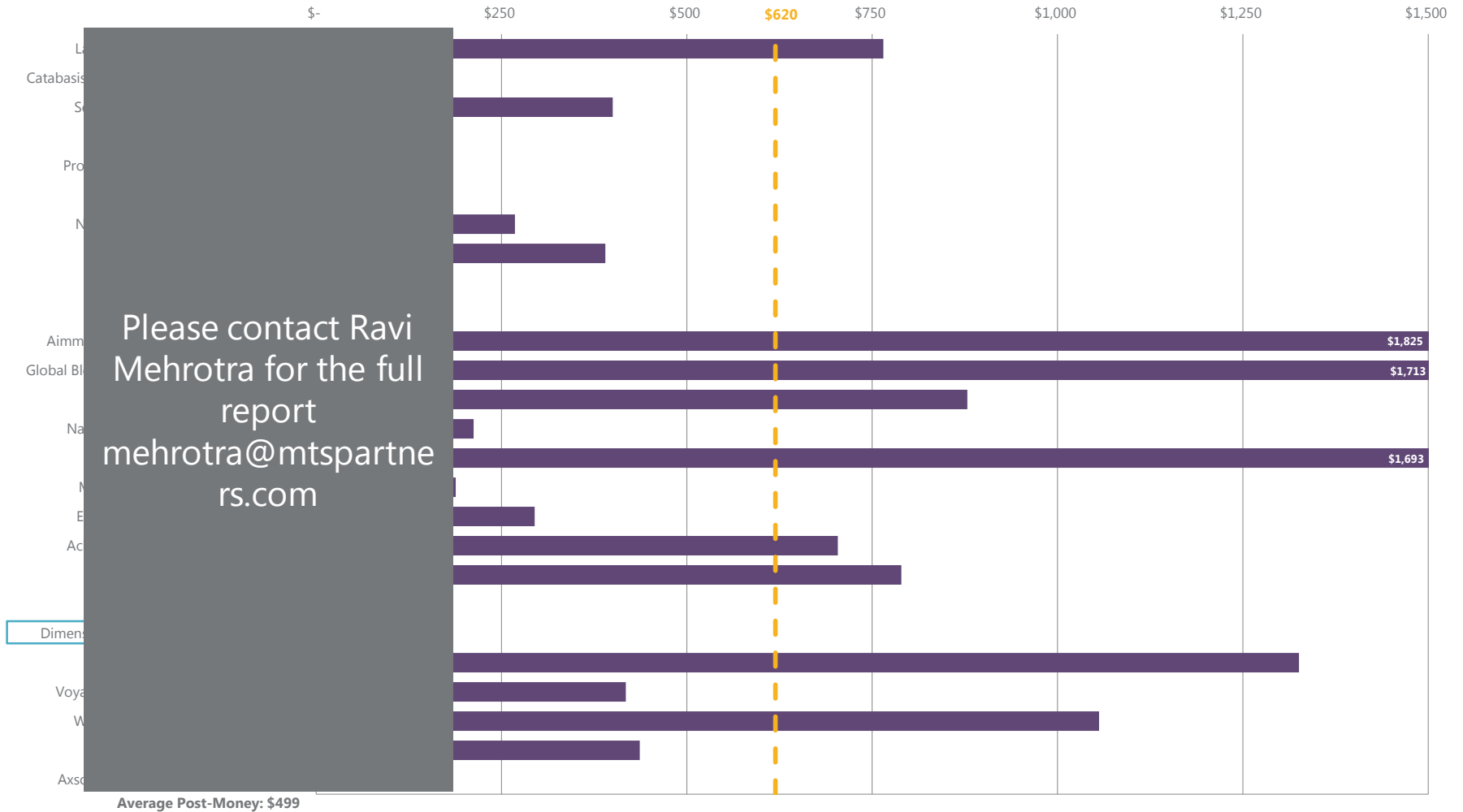
Class of 2015 (n=55) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



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 12/05/2017.

# Current Market Capitalization

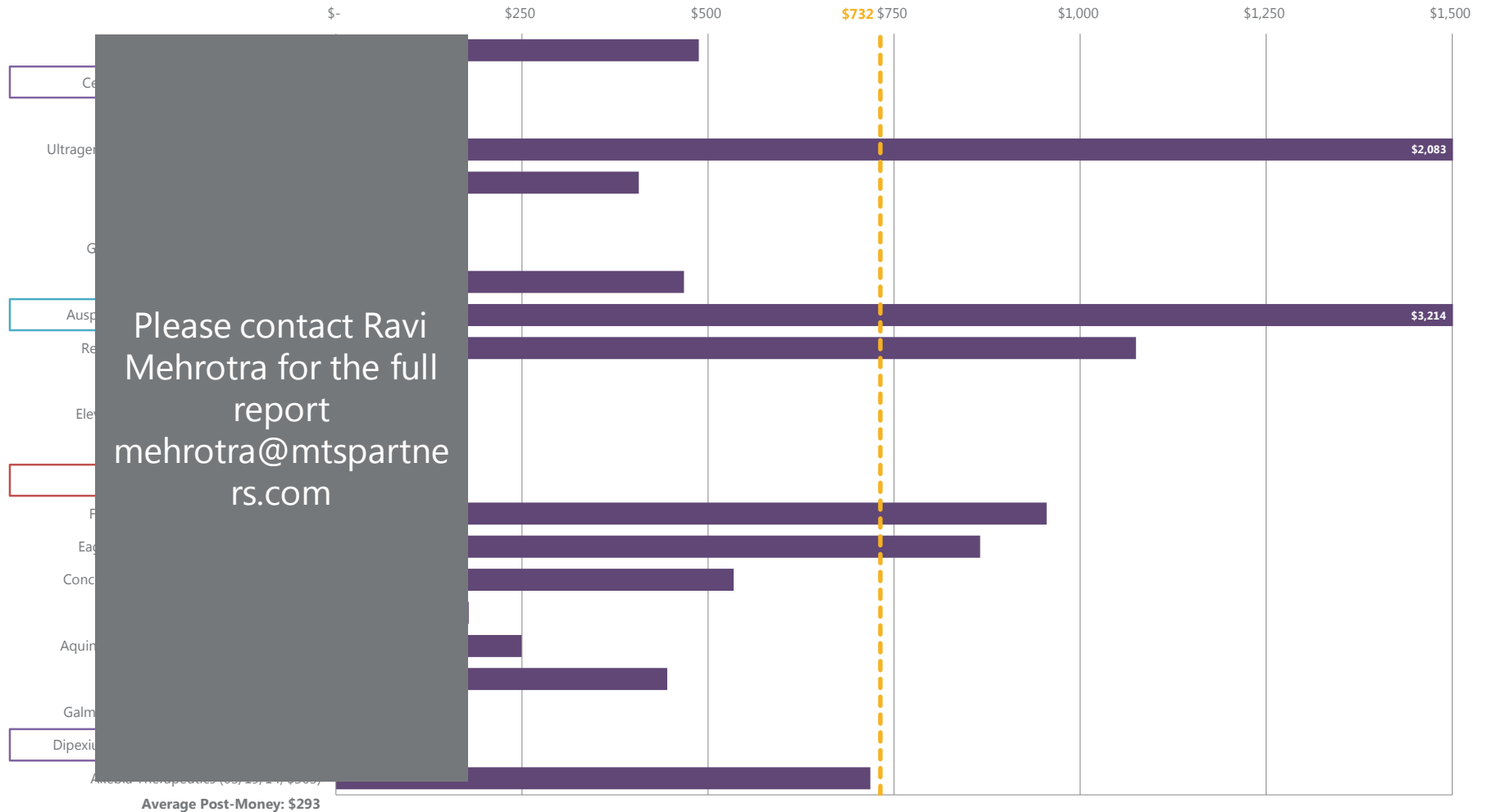
Class of 2015 (n=55) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)



Note(s): All \$ in mm. Blue box indicates acquired companies.  
Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# Current Market Capitalization

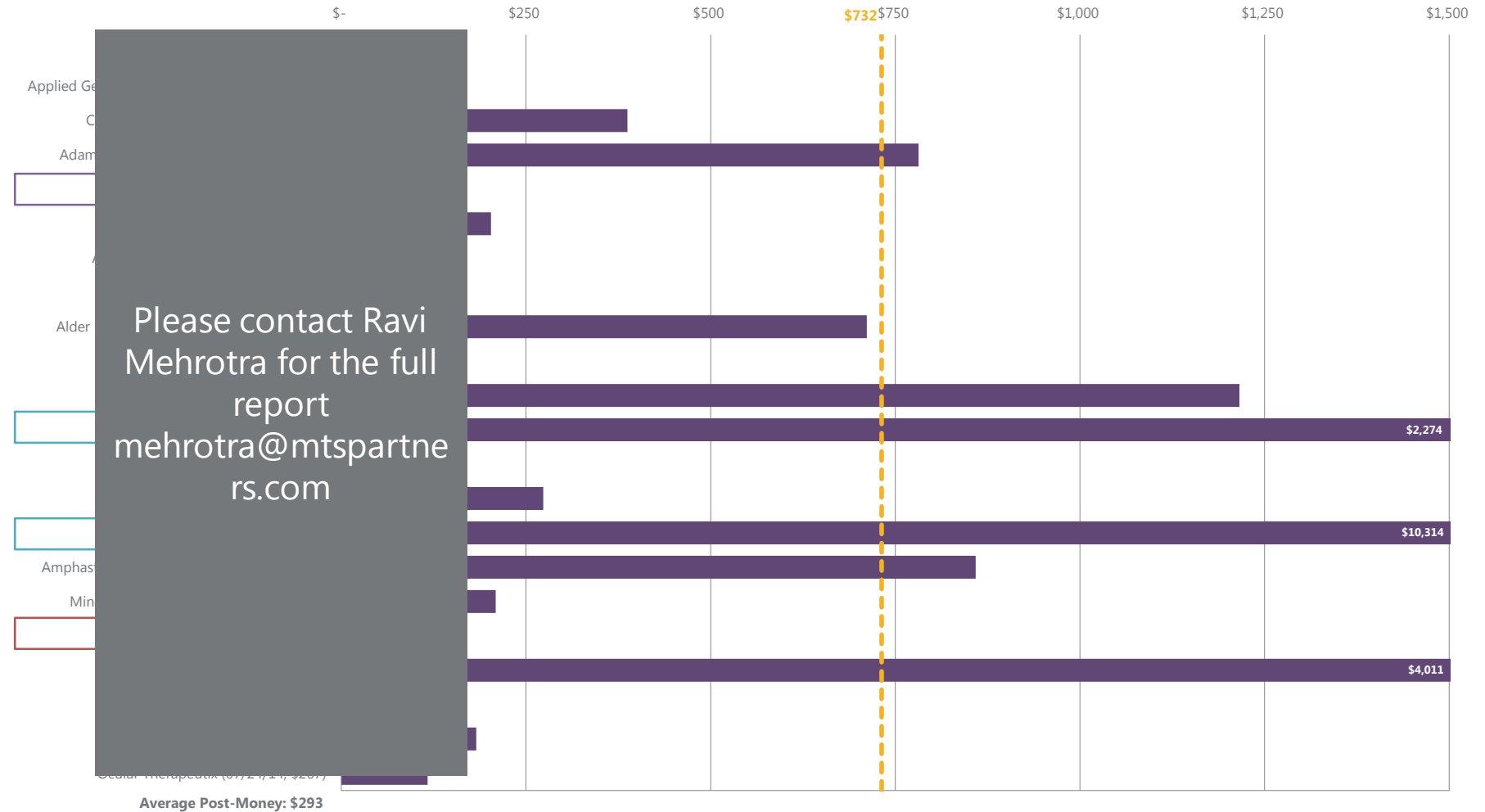
Class of 2014 (n=71) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



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 12/05/2017.

# Current Market Capitalization

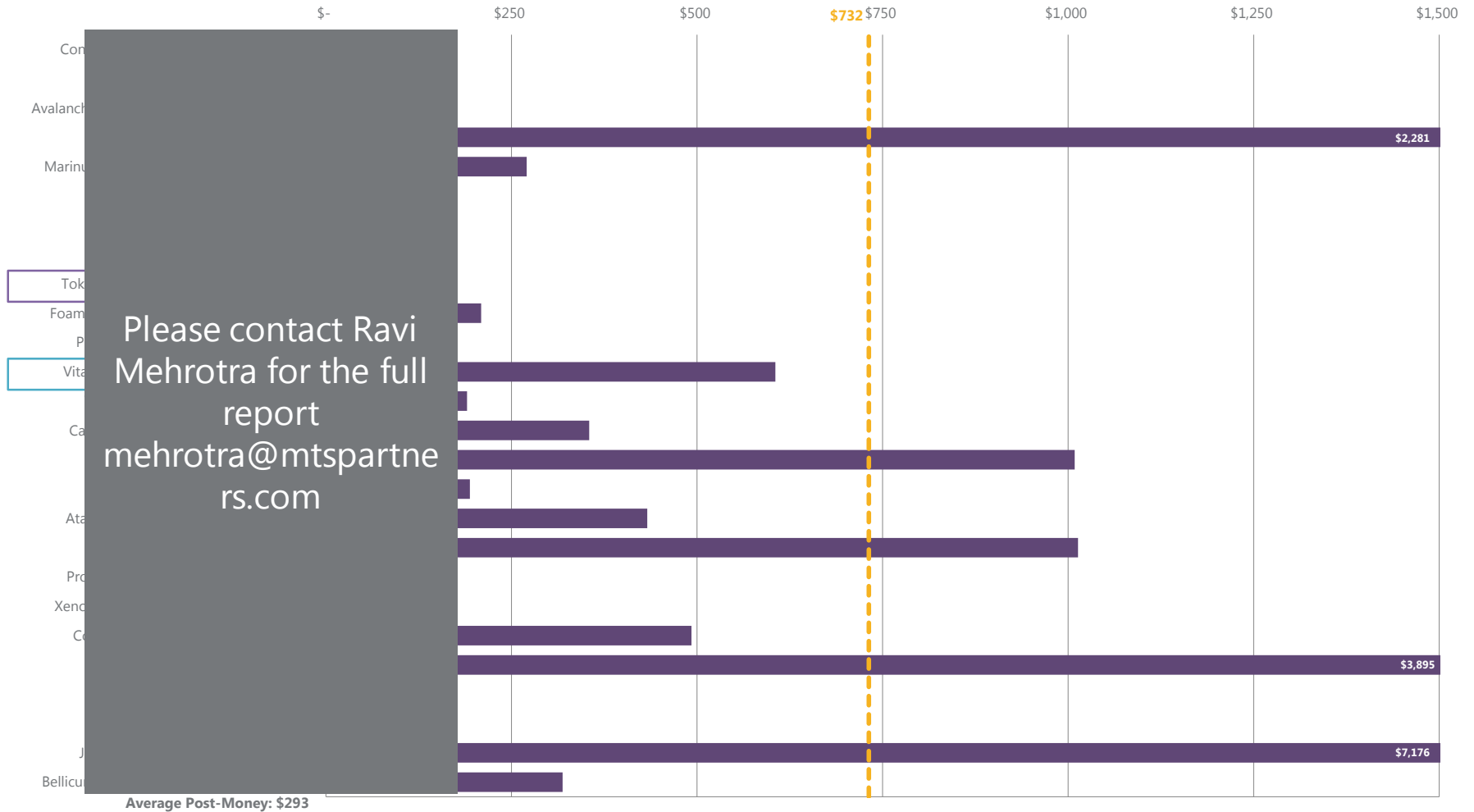
Class of 2014 (n=71) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)



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 12/05/2017.

# Current Market Capitalization

Class of 2014 (n=71) Sorted by Date and Showing Post-Money Valuation at IPO Pricing (cont'd)

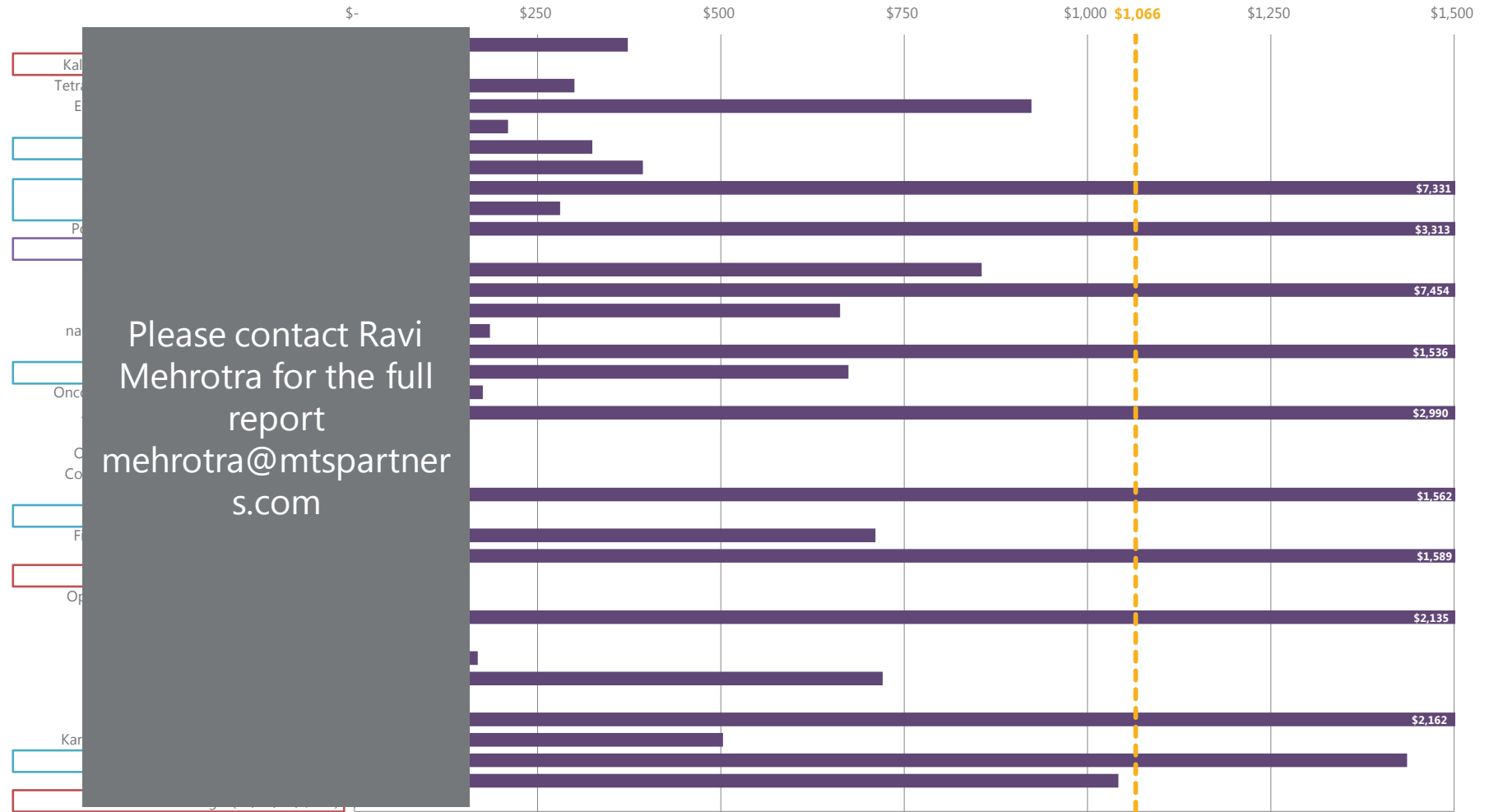


Note(s): All \$ in mm. Blue box indicates acquired companies. Purple box indicates companies that were acquired through a reverse merger.  
 Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.



# Current Market Capitalization

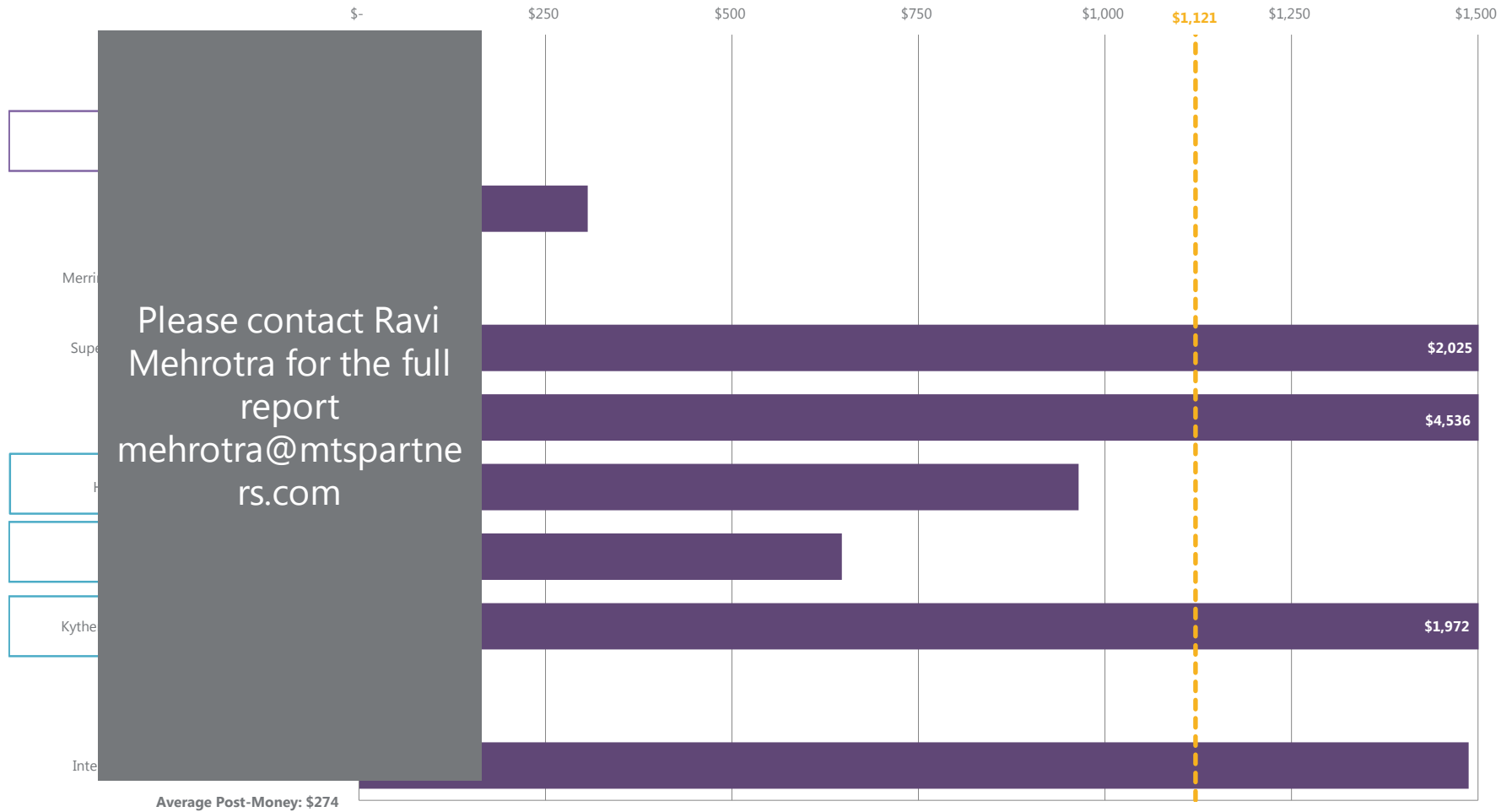
Class of 2013 (n=38) Sorted by Date and Showing Post-Money Valuation at IPO Pricing



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 12/05/2017.

# 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 12/05/2017.



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## 5. 2012-2017 Detailed IPO Database

# IPO Summary

2017 (n=38)

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	Market Cap (\$mm)	Return Since IPO	
11/16/1																			11%
11/15/1																			52%
11/08/1																			(2%)
11/07/1																			24%
11/01/1																			0%
11/01/1																			(12%)
10/24/1																			31%
10/12/1																			17%
10/11/1																			51%
10/11/1																			(10%)
10/04/1																			69%
09/27/1																			31%
09/27/1																			5%
09/27/1																			(19%)
09/19/1																			5%
09/19/1																			92%
08/08/1																			(24%)
08/01/1																			11%
07/26/1																			37%
07/19/1																			21%
07/13/1																			121%
06/28/1																			(30%)
06/28/1																			73%
06/27/1																			18%
06/26/1																			(26%)
06/13/1																			50%
05/17/1																			75%
05/16/1																			27%
05/04/1																			(26%)
05/03/1																			197%
05/03/1																			24%
04/27/1																			(34%)
04/26/1																			(13%)

Please contact Ravi Mehrotra for the full report  
[mehrotra@mtspartners.com](mailto:mehrotra@mtspartners.com)

Note(s): Orange shade indicates ADR offerings.

Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# IPO Summary

2017 (n=38) (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	Market Cap (\$mm)	Return Since IPO
04/12/17																		10%
03/08/17																		58%
01/26/17																		(6%)
01/25/17																		(35%)
01/25/17																		465%
																		<b>35%</b>
																		<b>17%</b>

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Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# IPO Summary

2016 (n=32)

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	Market Cap (\$mm)	Return Since IPO
12/14/16																		44%
10/27/16																		(14%)
10/26/16																		(39%)
10/19/16																		208%
10/19/16																		32%
10/05/16																		(48%)
09/28/16																		(60%)
09/23/16																		8%
09/21/16																		(56%)
08/11/16																		53%
08/05/16																		(20%)
07/27/16																		(71%)
07/27/16																		172%
07/20/16																		83%
06/30/16																		7%
06/22/16																		(31%)
06/02/16																		(12%)
06/02/16																		(4%)
05/26/16																		120%
05/19/16																		52%
05/18/16																		(78%)
05/17/16																		473%
05/12/16																		(79%)
05/06/16																		18%
05/06/16																		12%
04/07/16																		(53%)
03/23/16																		(27%)
03/02/16																		(32%)
02/11/16																		(69%)
02/10/16																		368%
02/03/16																		302%
02/03/16																		71%
<b>Median</b>					\$64	NA	\$12	(12%)	\$59	\$71	94%	\$235	40%	1%	3%	\$12.39	\$285	42%

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Note(s): Orange shade indicates ADR offerings.  
 Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# IPO Summary

2015 (n=55)

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	Market Cap (\$mm)	Return Since IPO
11/19/1																		(48%)
11/13/1																		(36%)
11/11/1																		138%
11/11/1																		(5%)
10/29/1																		256%
10/22/1																		(54%)
10/15/1																		(75%)
10/08/1																		71%
10/07/1																		107%
10/01/1																		(13%)
10/01/1																		65%
10/01/1																		(9%)
09/17/1																		(44%)
09/17/1																		28%
08/12/1																		100%
08/06/1																		127%
08/05/1																		(7%)
07/30/1																		(74%)
07/28/1																		(80%)
07/23/1																		(38%)
07/16/1																		(88%)
07/15/1																		(89%)
06/30/1																		(83%)
06/26/1																		(45%)
06/25/1																		(86%)
06/24/1																		240%
06/24/1																		42%
06/24/1																		(94%)
06/18/1																		(43%)
06/17/1																		(80%)
06/11/1																		73%
06/10/1																		(66%)
05/13/1																		103%

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(1) Biotie was traded on the NASDAQ as an ADR. The company's local exchange was the Helsinki Stock Exchange (HLSE).

Note(s): Blue shading indicates acquired companies. Purple shading indicates companies that were acquired through a reverse merger. Orange shade indicates ADR offerings.

Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# IPO Summary

2015 (n=55) (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	Market Cap (\$mm)	Return Since IPO
05/07/1																		(73%)
05/07/1																		48%
05/06/1																		365%
05/05/1																		(54%)
05/05/1																		(96%)
04/30/1																		273%
04/28/1																		(66%)
04/16/1																		(67%)
04/15/1																		(79%)
04/15/1																		(49%)
04/15/1																		(51%)
04/09/1																		(77%)
03/24/1																		(42%)
03/20/1																		(64%)
03/04/1																		19%
02/18/1																		(63%)
02/13/1																		(80%)
02/12/1																		(47%)
01/30/1																		(70%)
01/30/1																		209%
01/28/1																		(76%)
01/27/1																		106%
																		3% (45%)

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Note(s): Blue shading indicates acquired companies. Purple shading indicates companies that were acquired through a reverse merger. Orange shade indicates ADR offerings. Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.



# IPO Summary

2014 (n=71)

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	Market Cap (\$mm)	Return Since IPO
12/19/1																		(50%)
12/19/1																		122%
12/02/1																		(82%)
11/19/1																		(90%)
11/14/1																		147%
11/05/1																		(37%)
11/04/1																		(73%)
10/22/1																		(81%)
10/21/1																		(3%)
10/16/1																		29%
10/14/1																		(80%)
10/03/1																		51%
10/02/1																		0%
09/30/1																		7%
09/18/1																		163%
09/18/1																		(76%)
09/17/1																		(7%)
09/16/1																		(93%)
09/11/1																		(73%)
08/12/1																		(68%)
08/05/1																		(93%)
07/31/1																		(16%)
07/31/1																		498%
07/30/1																		(82%)
07/30/1																		(81%)
07/28/1																		(85%)
07/24/1																		(69%)
07/24/1																		(68%)
07/23/1																		(61%)
07/17/1																		399%
06/30/1																		(96%)
06/30/1																		(10%)
06/24/1																		167%

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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.

Orange shade indicates ADR offerings.

Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# IPO Summary

2014 (n=71) (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	Market Cap (\$mm)	Return Since IPO
06/20/14																		958%
06/18/14																		(59%)
06/18/14																		(76%)
06/17/14																		400%
06/05/14																		241%
05/22/14																		(19%)
05/08/14																		5%
05/02/14																		(79%)
05/01/14																		(20%)
04/16/14																		(60%)
04/10/14																		(53%)
04/09/14																		114%
04/02/14																		35%
03/26/14																		(68%)
03/20/14																		(90%)
03/19/14																		(11%)
03/12/14																		(87%)
03/12/14																		(41%)
03/11/14																		(13%)
03/06/14																		(3%)
03/06/14																		17%
02/12/14																		68%
02/11/14																		287%
02/11/14																		96%
02/10/14																		(100%)
02/06/14																		(98%)
02/05/14																		(93%)
02/05/14																		(90%)
02/05/14																		117%
02/04/14																		741%
02/04/14																		(10%)
02/04/14																		(91%)
01/31/14																		(79%)

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Note(s): Blue shading indicates acquired companies. Purple shading indicates companies that were acquired through a reverse merger. Red shading indicates bankrupt companies.  
 Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# IPO Summary

2014 (n=71) (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	Market Cap (\$mm)	Return Since IPO	
01/31/14																			13%
01/31/14																			138%
01/30/14																			(46%)
01/30/14																			(86%)
01/09/14																			78%
																			29% (37%)

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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 12/05/2017.

# IPO Summary

2013 (n=38)

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	Market Cap (\$mm)	Return Since IPO
12/11/13																		(99%)
12/02/13																		303%
11/14/13																		191%
11/06/13																		(33%)
10/27/13																		489%
10/16/13																		(67%)
10/10/13																		22%
09/30/13																		(33%)
09/24/13																		(79%)
09/24/13																		227%
09/24/13																		(86%)
09/19/13																		(99%)
09/18/13																		134%
09/17/13																		89%
08/21/13																		172%
08/07/13																		(19%)
07/24/13																		(63%)
07/24/13																		(90%)
07/23/13																		(96%)
07/23/13																		241%
07/17/13																		(73%)
06/27/13																		43%
06/25/13																		319%
06/25/13																		(27%)
06/19/13																		6%
06/18/13																		857%
05/30/13																		(18%)
05/21/13																		(86%)
05/21/13																		250%
05/15/13																		95%
05/08/13																		1557%
05/02/13																		(33%)
04/11/13																		66%

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[mehrotra@mtspartners.com](mailto:mehrotra@mtspartners.com)

Note(s): 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 12/05/2017.

# IPO Summary

2013 (n=38) (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	Market Cap (\$mm)	Return Since IPO	
04/10/13																			(68%)
03/20/13																			246%
03/19/13																			(17%)
01/31/13																			(95%)
01/30/13																			48%
																			<b>110% (5%)</b>

Please contact Ravi Mehrotra for the full report  
[mehrotra@mtspartners.com](mailto:mehrotra@mtspartners.com)

Note(s): Red shading indicates bankrupt companies.  
 Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.

# 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	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	Market Cap (\$mm)	Return Since IPO
10/11/12																		321%
10/11/12																		(77%)
10/10/12																		369%
10/04/12																		168%
07/25/12																		360%
07/25/12																		518%
07/18/12																		690%
06/27/12																		72%
04/30/12																		(30%)
03/28/12																		(37%)
01/27/12																		(64%)
																		<b>208%</b>
																		<b>168%</b>

Please contact Ravi Mehrotra for the full report  
[mehrotra@mtspartners.com](mailto:mehrotra@mtspartners.com)

Note(s): Blue shading indicates acquired companies. Purple shading indicates companies that were acquired through a reverse merger.  
 Source(s): MTS, Dealogic and CapitalIQ, as of 12/05/2017.



## 6. Introduction to MTS

# MTS Health Partners Overview

---

## Investment Banking

- > **Privately owned, independent firm, founded in 2000**
- > **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, São Paulo and Tokyo**

## Life Sciences

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

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## 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

### **Soojin Kwon** Partner

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

Director, BofA Healthcare Equity Capital Markets

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

Worked in Consulting: market research and forecasting

### **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

12 Partners/Senior Advisors

9 Directors / Vice Presidents

29 Associates / Analysts



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# Appendix

# Valuation of Performance Split by Lead Asset Phase at IPO

Classes of 2014 – 2017

	# of Companies	(%)	Avg Raise	Avg Raise to Prior Cash (%)	Cumulative IPO Valuation	(%)	Avg Valuation / Company @ IPO	Performance Since IPO
<b>Class of 2017</b>								
Early-Stage								
Mid-Stage								
Late-Stage								
<b>Total</b>								
<b>Class of 2016</b>								
Early-Stage								
Mid-Stage								
Late-Stage								
<b>Total</b>								
<b>Class of 2015</b>								
Early-Stage								
Mid-Stage								
Late-Stage								
<b>Total</b>								
<b>Class of 2014</b>								
Early-Stage								
Mid-Stage								
Late-Stage								
<b>Total</b>								

Please contact Ravi Mehrotra for the full report  
[mehrotra@mtspartners.com](mailto: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 12/05/2017.

# Valuation of Performance Split by Lead Asset Phase at IPO

Classes of 2012 – 2013

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

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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 12/05/2017.

# Valuation of Performance Split by Modality

Classes of 2015 – 2017

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

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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 12/05/2017.

# 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
<b>Class of 2014</b>								
Small Molecule								
Biologic								
Gene Therapy								
Other								
<b>Total</b>								
<b>Class of 2013</b>								
Small Molecule								
Biologic								
Gene Therapy								
Other								
<b>Total</b>								
<b>Class of 2012</b>								
Small Molecule								
Biologic								
Gene Therapy								
Other								
<b>Total</b>								

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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 12/05/2017.



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