Making Sense of Preclinical IPOs in Post-Financial Crisis Era: A Temporality Analysis (2008-2020)

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Abstract

This paper looks into processes of making investor sentiment for the biotech IPO market mostly trading preclinical innovations through the lens of temporality. Consistent with an overall positive facade orientation shown in the literature, it argues that evaluations' temporal frame enables and constrains the processes of generating optimism and the ways of establishing causality between facts of past and value of future. Drawing on preclinical IPO evaluations since 2008 to date, this paper finds pre-IPO temporality narrative generally constructed IPO price performance as the effect of the market's transition to the post-financial crisis era, whereas post-IPO one tended to view successful IPOs as the cause of innovation value of future. When generating optimism for failed IPOs, evaluators blended in counter-facts surrounding institutional investors' contrasting decision to de-legitimate the market's action. This paper shows dynamic of making investor sentiment and suggests the constructed nature of the market.

Key words: biotech IPOs, investor sentiment, temporality

1. Introduction

On July 18, 2018, the day Cambridge-based biotech startup Rubius Therapeutics smashed the U.S. biotech IPO record in its debut, Allison dangles, a contributor covering "the life sciences, biotech and medical device industries in Massachusetts" for *Boston Business Journal,* credited the IPO's success to the market itself and believed this latest milestone reflected "a renewed appetite for risk among biotech investors": "More than a dozen Massachusetts biotechs have gone public so far this year. They have raised a combined $1.5 billion, the largest amount locally in the last five years (July 18, 2018, BBJ)."

She went on by quoting Brad Loncar, a seasoned biotech investor: "The thing that's so unique about this IPO is not only the record-setting amount, but the fact that the company is still preclinical. They haven't tested their technology in human beings. Four or five years ago, that was almost unheard of." The fact that the current biotech IPO market is trading at record highs for preclinical innovations was echoed by David Lucchnio, an entrepreneur and the startup's founder:

> You almost couldn't imagine an IPO market like we have…I don't believe this is based off of 'irrational exuberance'…I think that investors are seeing science being proven. I think you have investors saying, 'If this continues to play out, I want to be a part of it.' (July 18, 2018, BBJ)

Evaluators like Allison DeAngelis represent a group of financial professionals who play both market forecasters (Cowles 1933) and product critics (Zuckerman 1999) in the

contemporary stock market that is highly mediated (Hirsch 1972) and mediatized (Knorr Cetina and Preda 2007). They produce stock evaluations for and with mass media that are widely read by investors and ordinary people in the financial markets for clues regarding the future trend of stock prices. However, facing a market "almost unheard of" makes their evaluative work much more challenging, if not controversial.

Why do investors, and market actors more general, embrace a biotech IPO market trading preclinical innovations with a higher risk in returns? To use the words of advocates mentioned above, what makes investors "want to be a part of the game" and believe that revitalization of the market is based off of "rational" exuberance? It turns out that the U.S. biotech IPO market at this moment is in a transition period leaving much room for interpretation, enabling evaluators to create "a corresponding revision of Wall Street sentiment"(Graham 1965: 74) to summon sentiment investors. Resulted from investors' "differing estimates of the returns from investing in risky security" (Miller 1977: 1151), investor sentiment, also called noise trader sentiment (Derrien 2005: 489), is "a belief about future cash flows and investment risks that is not justified by the facts at hand" (Baker and Wurgler 2006: 129). It may lead to investors' short-selling behavior "in the sense of having exuberant expectations regarding future performance" (Ljungqvist et al. 2006: 1667) and/or affect post-IPO price performance with over optimism or excessive pessimism (Cornelli et al. 2006).

The purpose of this paper is to explore evaluators' construction of investor sentiment for the biotech IPO market. It looks into processes of constructing investor sentiment through the lens of temporality, for time is considered a key parameter of valuation formula in the stock

market: “[T]he value of an asset is the sum of the present value and of its expected future cash flows” (Bhagat et al. 2018: 2). Previous studies have operationalized temporality as an object of investigation (e.g., Maines and Hardesty 1987; Starkey 1988), a processual ontology of social phenomenon (e.g., Abbott 2001, 2016), and a methodological issue (Hamann and Suckert 2018). They are generally interested in the social structure of temporality.

This paper understands temporality “not so much as a structure as an action” and puts an emphasis on “the identification of events from the past and the use of a plot that confers context, agency, and a temporal ordering on those events”(Abolafia 2010: 350). More specifically, this paper conceptualizes temporality unfolded in stock evaluations as not only a subtype of market narrative governed by organizational logic and legitimacy (Zuckerman 1999; Beckett 2013; Swedberg 2005a; Abolafia 2010) but also one kind of informational events with symbolic power generating market momentum and emotional trading (Bernard and Thomas 1989, Ikenberry, Lakonishok and Vermaelen 1995, MIchaely, Thaler, and Womack 1995).

My analysis relies on stock evaluations about biotech IPOs circulated in both print and online media at the initial phase of the post-financial crisis era beginning from 2017 (682 in total). To provide evidence for the making of investor sentiment, I pursue a text analysis in historical and comparative perspective that can better unveil similarities and dissimilarities in temporality narrative between pre-IPO processes and post-IPO ones.

The data shows evaluators generally interpreted unchangeable facts and unobservable future in a positive light and changed their interpretation of IPO price performance at different time points in order to generate an optimistic sentiment. When constructing pre-IPO temporality

narrative, they tended to employ the hot market factor to yield positive information framing IPO price performance as an effect of the market's transition to the post-financial crisis era. During post-IPO processes, attempts to making an optimistic sentiment were instead consistently couched in the intangible assets factor translating IPO price performance into a strong cause of preclinical innovation value in the future. Even evaluations about failed IPOs showed a strong tendency toward optimism. Evaluators remained optimistic in response to the market's "wrong" move. They would braid in a layer of counter-reality surrounding institutional investors' contradictory decision to de-legitimate the market's action and reaction. That the intangible assets factor did not become a main sentiment generator until post-IPO processes indicates that preclinical innovation value is viewed both endogenous and exogenous during the construction of temporality narrative.

This paper argues that stock evaluations' temporal frame enables and constrains processes of constructing facts and values as cause and effect. In the process of assembling the causal parts of temporality, narrative operates not only as a mirror illuminating institutional tendencies to reduce agency cost of making an un-tradable decision (Gomper 1995), but also as a filter for understanding social worlds (Goffman 1974; Weick 1995). This filter helps evaluators arrive at a tradable decision by focusing facts around a coherent investor-centered reality. Thus, it has become less possible to select contradictory facts and negative information. As a result, it is more difficult to capture the whole picture of risks and uncertainty occurring at the invention phase of a so-called medical innovation pathway (Garber et al. 2014).

This paper also finds some evidence of social construction of the market (Granovetter 1992, 2002) via temporality narrative construction, particularly associated with failed IPOs, consistent to a number of studies' findings (Zukin and DiMaggio 1990; Zelizer 1978, 1983, 1985, 1994, 2005; Abolafia 1998). At the heart of this approach is the role of interpretation in affecting the market's action and reaction. Zuckerman and others (Tuckerman 1999; Beckert 2013; Swedberg 2005) have shown that interpretation may work as a filter that privileges and legitimates certain market action and reaction but not others. For market regulators such as policy-makers at Federal Reserve, their application of appropriateness logic enables them to construct narrative that makes sense for its operating model (Abolafia 2010). Their use of macroeconomic theory as interpretive framework, could instead constrain their capability to "see" facts resulting into the 2008 financial crisis (Fligstein, Brundage, and Schultz 2017).

This paper makes three contributions by looking into social processes of constructing temporality narrative for biotech IPOs in the stock market. First, the findings add empirical evidence for positive asymmetry (Cerulo 2006) by showing how positive facade is built up with the making of an optimistic sentiment. Differently put, this paper represents a case study applying a bottom-up approach to investor sentiment, an approach "using biases in individual investor psychology, such as overconfidence, representativeness, and conservatism, to explain how individual investors underreact or overreact to past returns or fundamentals" (Baker and Wurgler 2006: 129).

Second, while it is premature to deliver on these promises, this paper is part of a first attempt at evidencing the encoding model of information asymmetry, defined by Ackerlof (1970)

as an asymmetry in available information between sellers and buyers with an assumption that the former has more knowledge about the quality of a product than the latter (p. 489). In general, the decoding model focuses on determinants of evaluators' interpretative ability (Podolny 2001; Stark, David & Vedres, Balázs 2006; Hayward and Boeker 1998; Ritter 2003, DeBond and Thaler 1985; Swedberg 2005b).In complementary, This encoding model sheds light to reproduction of information asymmetry via production of asymmetric information. The shift of analytical focus from information-decoding to information-encoding suggests that the association between stock evaluations and IPO price performance is more complicated than previous studies depict.

Last, by delving into the social construction of IPO valuations and innovation value, this paper makes agenda setting efforts of the newly developed sociology of valuation and evaluation (SVE), a research area advantageous "for the understanding of the cultural dimensions or organizational dimensions of all forms of sorting processes and for connecting micro dynamics of exclusion to macro definitions of symbolic community and patterns of boundary work" (Lamont 2012: 5).

2. Stock evaluations as temporality narrative

The enactment of coherent narratives about time is a major part for studying the financial market, for an asset's value of present and future decides its stock price at the moment(Bhagat et al. 2018: 2). Network properties' social time, i.e., "distinctive sequences of network structures," affects how firms employ network ties as resources (Stark and Vedres 2006: 1378). The

temporization of the financial markets is not possible without display of market activities in sequence by the aid of ticker transactions technology and computer-based scopic systems (Knorr Cetina and Preda 2007: 117). In the IPO market, the time gap between offer pricing and stock trading leads to national differences in the estimate of underpricing for market movements (Ljungqvist 2007: 6). Finally, timing, "the optimal point of going public during phases of organizational life cycle of a firm operating in a particular industry" remains an unaddressed question in the IPO literature (Katti and Phani 2016: 49).

Through the lens of temporality, however, the question is less about the optimal point but about how that optimal point, as a social phenomenon, is constructed and embedded in temporal structures (Bourdieu 1995; Abbott 2001, 2016). Temporal order of that optimal point matters, too, as "the differentiation of the social order brings with it a differentiation of the temporal order (Luhmann, 1978). With an assumption that it is impossible to conceptualize present if it isn't inserted to discourse **(**Benveniste 2014**)**, a line of research studying social construction of time has emerged showing varieties in empirical topics about temporality (Bergmann 1992). It has offered plenty of evidence showing social actors' perception and organization of time (Maines and Hardesty 1987; Starkey 1988). Temporality narrative itself has become a methodological challenge, too (Hamann and Suckert 2018).

Previous studies, however, tend to focus social construction of present. Few efforts are made to examine the other two time points, past and future, and analyze how they are connected and narrated. One exception is Beckert (2013), who coined the concept of fictionality to tackle market uncertainty. His framework expands previous studies of temporality with attempts to

theorize the connection between present and future ("reality in the future cannot be known in the present"(p.225)). More importantly, it sheds light to causality of temporality:

> Empirical studies need to investigate how in concrete settings expectations regarding future developments and understandings of *causal relationships* emerge, stabilize, and change. They must investigate the strategic use of expectations as well as the motivating force standing behind them and the anchoring of expectations in cultural frames and institutional structures. (Beckert 2013: 236-237, emphasis added)

Shifting the analytical focus from temporality to temporal causality is putting it on market actors' action of interpretation. It is through interpretation that market actors decide what is tradable because market valuation is "necessarily an interpretative exercise" (Zuckerman 1999: 1431). Valuation and evaluation in the stock market is no exception. To use the words of Swedberg (2005a): "[T]he cognitive limits on information processing along with the inherent unpredictability of the economic future make stock evaluations an interpretation project" (p. 293). In general, the evaluation-as-interpretation literature complements the evaluation-as-information research. Initiated by Ackerlof (1970)'s pathbreaking article, "The Market for "Lemons": Quality Uncertainty and the Market Mechanism," the evaluation-as-information literature was generally focuses on determinants of stock evaluators' validity and reliability (Cowles 1933; Stickel 1992; Womack 1996).

Evidence of the impact of interpretation on stock market is scant. Empirical studies have identified a number of determinants of interpretative ability, including cognitive biases (e.g., DeBond and Thaler 1985), network positions (e.g., Podolny 2001; Prato and Stark 2007), and conflicts of interest (e.g., Hayward and Boeker 1998; Swedberg 2005b). A study (Zuckerman 1999) investigating the social consequence of stock evaluators' interpretive frameworks has also found "unclassifiable actors and objects" suffered the social penalty of illegitimacy discount (p. 1399).

In shifting attention from temporality to temporal causality, this paper is to put emphasis not only on "how"(how temporality narrative is constructed) but also on "what" (what temporality narrative is constructed for). From this perspective, temporality narrative is understood "less as a structure but more as an action" (Abolafia 2010). To view temporality narrative as a market action is to analyze how it enables and constrains market actors' way of sense-making: Why and how do narrators identify events from the past and contextualize temporal ordering of those events (Gergen and Gergen 1986; Maines 1993; Mains and Hardest 1987)? Why and how do they express evaluative standards that give meaning to organizational successes or failures (Martin et al. 1983; Pentland 1999; Vaara 2002)?

3. Data and method

The data were collected from stock evaluations about biotech IPOs circulated in both print media and online media between 2017 and 2018 (687 in total). More specifically, this paper focuses on decisionism genre of stock evaluations for its varieties in practice. Among the three genres of

evaluations (journalism, promotionism, decisionism) that I have identified in another paper, the decisionism one is generally governed by the logic of branding that makes its evaluators less concerned about validity, reliability, and loyalty, but more about making sense of investment decisions. In other words, there is a greater chance for them to play and even manipulate facts and values. Therefore, it is expected to see them make contradictory decisions on the same stock.

In general, market actors believed 2017 witnessed the market's transition from the 20028 financial crisis and the beginning of post-financial crisis era. In their own words, it was a year that any IPO's success continued "an early, yet successful trend for biotechs trying to go public in 2017" (January 27, 2017, X). Since the financial crisis, 2017 also represented a turning point at which biotech IPOs started to be less likely to close first trading day at a loss, compared to non-biotech IPOs (Harvard Law School 2017: 4). In comparison, 2018 was celebrated as "the busiest IPO year for the sector," because "investor demand for high-growth companies and the prospect of consolidation with larger peers helped spur IPO activity for biotechnology firms in 2018" (December 21, 2018, R).

Not everyone believed the "hotness" directed toward the market between 2017 and 2018. One of such major concerns was a chain reaction picking up speed when one failed IPO occurred. For example, when Entasis Therapeutics "hit the floor on Nasdaq" in late September of 2018, an evaluator worried less about the stock's "plunging 29%" than about the likelihood of its "causing a few frowns among the rest of the biotechs in the queue for an IPO"(September 27, 2018, EN).

It is worth to note that market actors tend to define successful and failed IPOs in terms of price range, instead of an absolute number. A successful IPO means a stock's price closes at the upper range of its offering price at the end of the first trading day. The description below offers an example: "In a positive sign for the life sciences sector, each of those companies sold shares at prices at or above their expectations, and all four, at least so far, are trading at or above their offering prices"(May 4, 2017, X). Likewise, a failed IPO refers to one closes below their projected range: "Amida Cell, a Phase 3 biotech developing stem cell therapies for hematologic malignancies, raised $50 million by offering an upsized 6.25 million shares at $8, below the range of $13 to $15" (October 26, 2018, RC).

4. The making of an optimistic sentiment for biotech IPOs in a market transition period

Based in the temporal frame, evaluators produced positive asymmetry to filter facts and generate an optimistic sentiment for the biotech IPO market. Overall, I found facts stem from five sets of factors: hot market, intangible assets, FDA decisions, institutional investors, and upper management. These factors summarize the common themes among highly ranked terms in each factor. Further, while the institutional investor and upper management factors deal with only facts that are historically specific, the rest three (market transition, intangible assets, FDA decisions) cover facts occurring both from past and future. Because these factors cover a variety of factual areas and their prevalence varies over time, differences in tradability construction between pre-IPO evaluations and post-IPO ones should thus be represented across such factors.

4.1 Pre-IPO temporality: trading at the moment

During pre-IPO processes, the temporal frame attached the time points of past, present, and future to preclinical innovation value, IPO evaluations, and IPO price performance, respectively. (see Figure1 below). Within this temporal frame, facts were oftentimes selected from the upper management factor covering key individuals at the executive level (founders, CEO, CFO, etc.) who were responsible for making primary decisions: “Among the top owners of the seven-year old firm are Norwegian billionaire investors Stein Erik Hagen and Bjoern Rune Gjelsten as well as two firms founded by Norwegian hospitals”(December 03, 2018, R). In addition to glorious history, their salary package appeared frequently in pre-IPO temporality narrative, too: “CEO Martin Babler — a sales and marketing veteran out of Genentech — picked up a $1.2 million pay package for last year, based on a $374,000 annual salary plus stock options” (August 20, 2018, EN).

[INSERT FIGURE 1 HERE]

However, investor sentiment was grounded in the market transition factor during pre-IPO processes. Although the term market here sometimes indicated geographical market and/or the product market, it mainly referred to facts concerned with the 2008 financial crisis. Consistent with an overall positive facade orientation, the majority of evaluators believed the market has recovered its hotness from the 2008 recent crisis. To them, the transition period between 2017 and 2018 has pulled numerous startups to join the game.

Some evaluators disbelieved the IPO market was hot at this moment, though. For them, the window of hotness already passed and the market was getting cold again. The evaluation below expressed this pessimism:

> Evidence exists to suggest that the biotech IPO market has peaked: the median 'bump' in valuation that companies receive when they move from private to public hands has been in decline since the middle of the year…The market selloff that hit global stock markets in October will have played a role here, but fears are growing that the biotech sector is facing a more prolonged slump. (May 4, 2017, X)

However, my analysis provides evidence for the salience of the market transition factor for generating an optimistic sentiment during pre-IPO processes. Pre-IPO temporality narrative rarely generated optimism from other factors, because they left little room for interpretation of fictionality (Beckert 2013) that enables evaluators to unload their obligation to make sense of their investment decisions.

When multiple factors appeared in one evaluation, the market transition one tended to trump others and became the most significant measure for predicting IPO price performance. For instance, because of "the bullish climate at the moment," an evaluator believed Solid Biosciencesa would succeed in its debut, even though the startup received a negative FDA decision implementing "a partial clinical hold on a pose 1/2 trial" right before its IPO date:

> The [FDA] announcement attracted some heavy flack for the company on Twitter, perturbed that the filing indicates that the FDA informed the company of the hold by letter back in November. The setback wasn't disclosed in Solid's IPO prospectus in December, or indeed in subsequent filings, but still went ahead—*reflecting the bullish climate for biotech stocks at the moment.* (January 26, FB, emphasis added)

Market transition to the post-financial crisis era is the clear subject of pre-IPO temporality narrative that frames IPO price performance as the effect, instead of cause. The reassuring explanatory factor of the market's hotness generally confirms IPO literature that timing matters for IPO price performance. Plenty of studies have shown that firms tend to choose going public when the market is hot, as their IPOs would be more likely to be traded at higher value (Cook et al. 2003; Ljungqvist et al. 2006). This line of research generally treats the hot market issue as one of "three main empirical IPO 'anomalies'"of market efficiency by identifying investors' irrationality as a source of inefficiency (Ljungqvist et al. 2006: 1667). However, my analysis of pre-IPO temporality narrative shows irrationality can be made via construction of investor sentiment; it is an end result of a sense-making process involving rational selection of facts. This finding indicates that market actors like evaluators can both passively wait for the coming of an hot market and actively make one that fitting their judgement.

4.2 Post-IPO temporality: trading for the future

The market transition factor continued shaping post-IPO temporality narrative but it worked differently in terms of causal relations. During post-IPO processes, the market transition factor was constructed as a cause to predict performance of the IPO market as a whole. The evaluation below credited the success of an IPO to the market's hotness and, in the mean time, and suggested the success could bring in more successful IPOs:

> Arcus Biosciences provided fresh evidence that the biotech IPO window is open for business — particularly if you have a claim to future immuno-oncology glory….That's another high-range offering, which no doubt will encourage more startups to jump into the IPO game this year, with the money spigot open wide for well connected companies. (March 15, 2018, EN)

The same logic applied to evaluators disbelieving in the market's transition to the post-financial crisis era, i.e., they believed a failed IPO would lead to the coldness of the stock market:

> Companies have been accelerating their IPO preparations, as a stock market sell-off in the last three months wiped out the gains of most shares for the year and raised the prospect of the window for stock market debuts gradually closing. (December 21, 2018, R)

However, the discussion of intangible assets factor rose sharply during post-IPO processes. Similar to the market transition factor, facts stemming from the intangible assets factor can be both historical and fictional, a character expanding more space for evaluators to produce and interpret asymmetric information. However, this factor covered few facts about the outer market, meaning financial crisis rarely mentioned in the post-IPO temporality narrative. Instead, the intangible assets factor rested heavily on preclinical innovations' indicators of progress, such as trial results and innovation pipelines. Although the FDA decisions factor covered preclinical innovations, too, its facts did not appear as frequent. This was expected as the FDA decisions factor captured more concerns about innovations' public regulation.

That the intangible assets factor was the most salient during post-IPO processes revealed a change in the construction of temporal causality. As Figure 2 shows, IPO price performance no longer functioned as an effect/the predicted, but a cause/the predictor in post-IPO narrative. This change anchored the making of post-IPO optimistic sentiment.

[INSERT FIGURE 2 HERE]

How did the intangible assets factor become a source of optimistic belief? My first case came from Allogene Therapeutics, "the largest biotech to go public since 2009"(October 11, 2018, B).

In opening paragraphs, its evaluator predicted the startup's upward valuation after its success in its debut by connecting IPO price performance of past to preclinical innovation value of future:

> Allogene Therapeutics Inc. surged as much as 39 percent above its initial public offering price on its first day of trading in the U.S., after the listing valued the company at more than $2 billion…[It] plans to use the funds to advance so-called off-the-shelf CAR-T therapies that use cells from healthy donors, rather than patients' own, so they don't need to be personalized for each cancer patient. (October 11, 2018, B)

Although the evaluator mentioned the upper management factor ("the company probably gets a "management premium" for CEO David Chang and Chairman Arie Belldegrun's previous experience at Kite Pharma Inc"), optimistic belief in the startup's positive valuation in the future was mainly grounded upon the intangible assets factor's trial results of the past and the future:

> Early data in leukemia therapy makes him "thoroughly convinced that allogeneic approach works…… Allogene sees initiating human trials for its experimental therapies in non-Hodgkin lymphoma and multiple myeloma next year, and advancing its early stage study in leukemia in the second half of 2019.(October 11, 2018, B)

In another case, an evaluator of Guardant, a blood-testing firm selling laboratory developed tests, articulated the connection between IPO price performance and optimistic sentiment toward

preclinical innovations in the most thorough way, again drawing on the intangible assets factor. In addition to producing positive asymmetry with tradable codes (newer, cutting-edge, excite, bigger ambitions, the holy grail, breakthrough, promising, and so on), it followed the steps below to establish the causality and generate optimism:

1) Associating IPO price performance to the startup's value: "The initial public offering of 12.5 million shares priced $19, well above the expected range of between $15 and $17 per share, to raise $237.5 million, and to value the company at $1.59 billion"(October 04, 2018, MW).

2) Associating IPO price performance to preclinical innovations value: "We expect to continue to focus substantial resources on increasing adoption of, and coverage and reimbursement for, our current tests and any future tests we may develop," the prospectus said"(October 04, 2018, MW).

3) Generating optimism from the intangible assets factor's index of progress:

a) data of past: "Guardant, notably, said it has invested "heavily" in clinical studies, including 80 peer-reviewed publications for its flagship Guardant360 test."(October 04, 2018, MW)

b) data of future: "With more data…the better we are at decoding signals in the blood"; "The information that Guardant collects through its existing tests is also supposed to inform development of next-generation tests, like its Lunar-1 test for cancer recurrence and its Lunar-2 test for early cancer detection. Lunar-2 is geared toward individuals who don't have symptoms but do have a higher risk of cancer due to genetics, smoking, health conditions and other factors."(October 04, 2018, MW)

c) FDA decisions: “Guardant360 got a “breakthrough device” designation from the FDA early this year, which could allow for faster regulatory review, and the company said it plans to file for approval through the FDA’s medical device pathway in the first half of next year. Guardant said it may pursue approval for other tests too.”; “Guardant gets a higher average price for biopharmaceutical sample testing, by contrast, the prospectus noted, adding that if its tests are approved by the FDA, wider health insurance coverage would likely follow.”(October 04, 2018, MW)

4.3 Generating optimism for failed IPOs

This section discusses how evaluators generate optimism from failed IPOs. The analysis shows that even startups failed in their debut, evaluators could still produce positive asymmetry toward the risk involved with, again, the temporal frame. Evaluators readily considered the failure of a biotech startup’s IPO on its first trading day when producing positive asymmetry, but minimized, or even made no mention of, its implication for the startup’s long-term valuation. That IPO price performance hardly recurred as a primary focus in these evaluations indicates a relative lack of concern about the past. This scenario is particularly strong evidence for the presence of positive facade. If evaluators ignored or rationalized risk attached to preclinical innovations even in the face of unsuccessful IPOs, they likely did so on routine basis.

The hotness of the market did remain a theme of post-IPO narrative on failed IPOs throughout 2017 and 2018. This was shown by an evaluator’s comments on Ovid’s failure in achieving its targeted price on the first trading day: “Although this biotech IPO fails, the market is still hot. Thus, all biotech IPOs are generally tradable”(May 4, 2017, X). Shifting to the

intangible assets factor, the evaluator continued viewed the IPO price performance as a key source of optimism, because the progress of the startup's preclinical innovation, and hence its value in the future, seen in the best scenario, was secured and made-believe at the present: "With the IPO cash, Ovid will run a Phase 2 study in adults with Angelman, with data expected in 2018, and an early-stage trial in kids with either Angelman or Fragile X syndrome, with data to come later this year" (May 4, 2017, X).

Another example came from Unum Therapeutics, a Cambridge-based startup advertising its technology as a way to "maximize tumor-killing activity and minimize toxicity", following its failure of IPO (March 29, 2018, FB). Facing an unsuccessful IPO, the evaluator remained associating IPO price performance to preclinical innovation value ("That could be seen as an underwhelming result for a biotech in the red-hot oncology cell therapy field, but it means Unum has come through a wobble caused by patient deaths and raised enough money to execute the next stage of its R&D strategy). To construct its post-IPO tradability, the evaluator projected optimism from fictional facts about the startup's trial results of the future:

> Unum expects its freshly inflated cash pile to see it through to the completion of both rituximab NHL combination trials. At that point, the data will paint a clearer picture of whether Unum has dealt with the safety problems and potentially positioning it to raise a follow-on financing that supports its longer-term plans. (March 29,2018, FB)

In addition to the intangible assets factor, positive FDA decisions of past were underlined as the legal legitimate to tone down the failure: “The FDA put the trial on a clinical hold at one point but lifted the restrictions shortly before Unum filed to go public” (March 29,2018, FB).

But the most powerful way for generating optimism toward failed iPOs was to braid in another layer of counter-reality to de-legitimate the market’s action. This was evidenced by post-IPO evaluations about Visterra, a startup received a setback from its failed IPO that left it “without an anticipated source of funding for its two most advanced assets”(March 30, 2017, FB). Although the evaluator admitted “the bruising IPO experience” had led the startup to “a long way from showing it can perform as hoped,” hope was attempted to pull back by, as expected, the intangible assets factor (“the drug causes direct killing of the bacteria. So this is a one-two punch”) and the FDA decisions factor (“FDA placed a partial clinical hold on a phase 2a trial of the asset one year ago……The agency lifted the hold in September, setting Visterra up to start speeding forward again, funding permitting” (March 30, 2017, FB).

The evaluator finally gave the market’s decision a knockdown by highlighting institutional investors’ contrasting decision: “We have a very strong syndicate of investors, plus many of our products have attracted a lot of attention from the Big Pharma and Big Biotech companies. We're very confident that we will be able to fund the company to success” (March 30, 2017, FB). Here, investors referred to institutional investors, a factor barely appeared in post-IPO narrative about successful IPOs. In the case discussed here, facts surrounding financial support from institutional investors such as venture capitalists and charity foundations were selected and described in detail:

> Visterra made contact with CARB-X last summer when the latter put out a request for proposals… [T]hat led to more than 160 expressions of interest. Subsequent screening by CARB-X whittled down this list and resulted in Visterra walking away with $7.2 million.
>
> CARB-X has awarded Visterra a $7.2 million contract to support preclinical development of VIS705… The contract tees up Visterra to advance the asset up to an IND filing.
>
> Visterra has leaned on some big-name backers to support its progress to date. Merck Research Labs Venture Fund co-led a $30 million Series B in 2014. And backers including the Bill & Melinda Gates Foundation, Flagship Ventures and Lux Capital chipped in to a similarly sized A round.

Established biotech firms sometimes became a place where evaluators gathered fuel of positivity from. This was revealed by the gratitude expressed by a startup's founder toward two world famous drug companies: "The thing we like about Merck KGaA and Celgene is they brought to us a real deep understanding of the tumor microenvironment and targets that they were particularly excited about" (August 10, 2017, FB).

The final case came from Beyond Spring, a drug maker whose valuation "bounced from $100 million to $75 million, then to just $12 million"(September 03, 2017, FB) between its announcement of going public and its failure on the first trading day. Likewise, to discredit the market's decision, the evaluator projected the startup's bright future based on its intangible

assets' index of progress("a large pipeline of cancer drugs in development" that comprised "three preclinical agents in the works internally") and trial results of past and future ("as many as six new agents annually for the next five years"; "BeyondSpring is cranking out new clinical trials at a rapid-fire pace.") Finally, the startup's cooperation with several venture capitalists and an established Pharma successfully surpassed pessimism projected by its failed IPO, indicating the market's disbelief in the startup's preclinical innovation value:

> Apart from its three late-stage programs for plinabulin, the company has advanced the product into multiple planned phase 1/2 programs to test it out in combination with Bristol-Myers' I-O med Opdivo.
>
> Given its sinking interest, the company tacked on a new bullet point to the offering that saw the group of investors buying up $50 million worth of shares at the IPO price in a separate deal.

To sum up, evaluators' sense-making of failed IPOs was directly informed by the framework of temporal causality. The facts and values by which an optimistic sentiment was generated, however, were different from those that shaped evaluators' interpretation of successful IPOs (discussed earlier). Although evaluators were much more committed to establishing a causal relationship between IPO price performance and preclinical innovation value during post-IPO processes, the separation of the market's decision and institutional investors' decision enabled evaluators to unload the obligation of legitimating their evaluations. In this way, evaluations of failed IPOs and the optimism projected by their positive asymmetry were to strengthen, instead

of weakening, the causality between IPO price performance and preclinical innovation value, between unchangeable facts and fictional facts, between past and future.

5. Conclusion

The findings show that evaluators of biotech IPOs succeeded in building up positive facade in a market transition period to the post-financial crisis era because of their interpretative ability of changing what IPO price performance means in a temporal frame provided by temporality narrative. Temporal causality helps evaluators make sense of their investment decisions because it comprises indicators of what happened in the past is expected to cause the unobservable outcomes.

While evaluators viewed IPO price performance as an effect of the hot market factor during pre-IPO processes, they re-narrated the performance as a cause of preclinical innovation value with the intangible assets factor in their post-IPO evaluations. Moreover, when attempting to make an optimistic sentiment from failed IPOs, evaluators didn't debunk the temporal frame and/or disregard the unchangeable fact of failure. Instead, within the same frame, they blended in counter-reality surrounding institutional investors' contradictory decision to invoke optimism and de-legitimate the market's action and reaction.

This paper's focus on processes of narrative construction, instead of narrative product, suggests its emphasis on why and how a (un)tradable decision is commonly made, rather than what decision is made. The collective act of narrative construction is an effort to embed stock evaluations in the ongoing interpretation of institutionalized evaluators. Put it differently, in complementary with a "top down" approach demonstrating that "investor sentiment has larger

effects on securities whose valuations are highly subjective and difficult to arbitrage" (Baker and Wurgler 2006), this paper offers empirical evidence for a bottom-up approach focusing on the "why" and "how" over-optimism or over pessimism is generated (Baker and Wurgler 2006; Cornelli et al. 2006).

In shifting attention away from narrative product to processes, this paper is putting it on narrators. It uncovers the triple roles stock evaluators play at different time points of constructing temporality narrative (see table 1 below). As market forecasters (Cowles 1933; Womack 1996) and product critics (Zuckerman 1999), evaluators predict the market's move based on their evaluative work of innovations' values and stock prices.

[INSERT TABLE 1 HERE]

But it is not the forecasting and/or critique ability of evaluators with which would I be concerned. Rather, my interest is in their interpretative capability as market makers. Zuckerman and others (Tuckerman 1999; Beckert 2013; Swedberg 2005a) have shown the role of interpretation in legitimating certain market action and reaction. For market regulators such as policy-makers at Federal Reserve, their application of appropriateness logic enables them to construct narrative that makes sense for its operating model (Abolafia 2010). Their use of macroeconomic theory as an interpretive framework, on the other hand, constrains their capability to "see" facts related to the 2008 financial crisis (Fligstein, Brundage, and Schultz 2017). For stock evaluators as market makers, they are not simply predicting where the market is

heading, but actively participating in making the direction of a market. One strategy, as discussed above, is making sense of a contradictory decision against the market's based on different criteria of valuation.

Evaluators' role as market makers further points to the constructed nature of the market, an idea that was elaborated by economic sociologist Granovetter (1992, 2002) and evidenced by plenty of studies looking into economic phenomena with cultural perspective (Zukin and DiMaggio 1990; Zelizer 1978, 1983, 1985, 1994; Abolafia 1984, 1998). This approach sees market narrative as an instrument, 'the preferred sense-making currency ... among internal and external stakeholders' (Boje 1991: 106); a device for making sense of ambiguous organizational situations (Abolafia 2010; Weick 1995; Brown 2003, 2005); and collective efforts to legitimate an institutional logic of action (March and Olsen 1989; Suchman 1995).

Grounded upon this line of research, this paper's findings raise a question about how to bridge economic sociology and cultural sociology to better theorize a cultural economy of the financial markets. In the case of the stock market, a point of departure is to understand what investment means in terms of value-judgement from the perspective of market actors themselves. That is, to figure out "what their definition of the situation is" (Granovetter and Swedberg 2011: xix).

This approach brings forth a dimension of tradability, which I define as a social construct and an end result of meaning-making processes in which trading boundary as value-based judgment is changeable and crossable. To stock evaluators, the boundary between tradable and un-tradable biotech IPOs is blurred, changing, and changeable, as are those among individual investors and institutional investors. Investment decisions are definitely rational choices.

However, the fact that reality turned out to be far more complex is also undeniable, raising the question of the degree to which narratives are dynamic, evolving, and legitimate.

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Figure 1: Pre-IPO construction of temporal causality

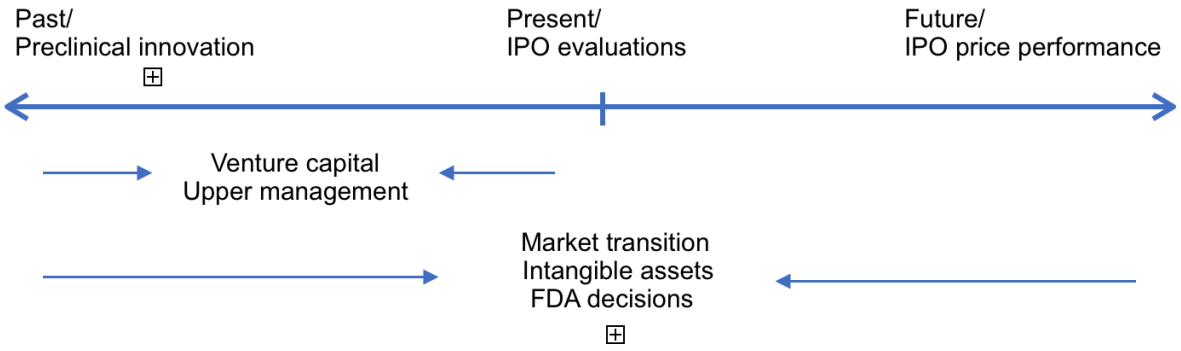

Figure 2: Post-IPO construction of temporal causality

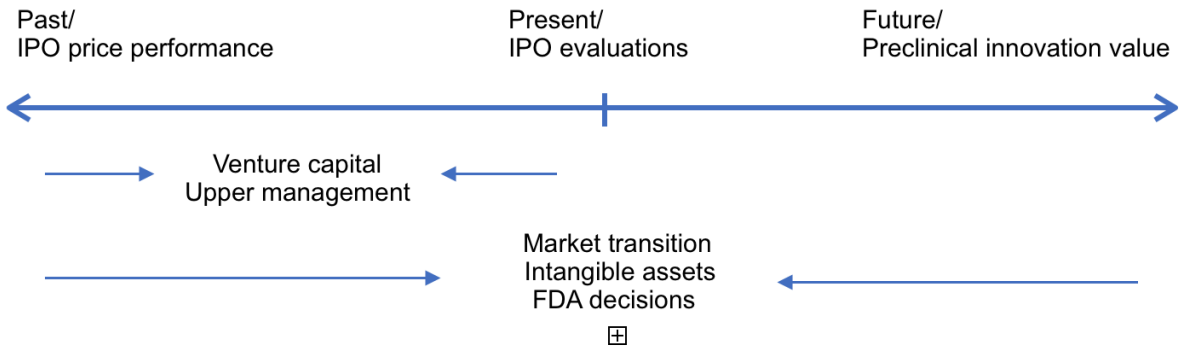

Table 1: Comparison of pre-IPO temporality and post-IPO temporality

	Pre-IPO Construction	**Post-IPO Construction**
Temporality Theme	Trading at the moment	Trading for the future
Perception of IPO Price Performance	The market's reaction to a transition from the 2008 financial crisis	The market's action on biotech startups' preclinical innovation value
Generators of Optimism	Market transition factor	Intangible assets factor
Roles of Evaluators	Market forecasters, product critics	Market forecasters, product critics, market makers