Assignment 2 - Build on theory: Unraveling theory

Rebecca Koprik

Research on Corporate Transparency

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Motivation

Do firms voluntarily disclose private information (e.g., about earnings, production, future demand, etc.)?

▶ Yes – why?

To avoid adverse selection!

▶ Market power leads to information asymmetry – one party has more information than the other
▶ Market parties can exploit each other – e.g. a firm that doesn't disclose results has better information about the company value than other agents
▶ However, people with capital are usually not willing to give money for something unknown
▶ Keeping information private would make the firm get less capital as investors will discount their beliefs on the company because they are unsure of the value
▶ Firms are better off if they disclose – higher capital gives them the incentive to do so

The model - Unraveling with certain information endowment

▶ Set of i firms with a value x defined as

$$x_i = y_i + \epsilon \tag{1}$$

▶ Where y_i represents the information the firm has and ϵ has expectation $E[\epsilon] = 0$
▶ Disclosing y_i is costless
▶ Disclosures are always truthful
▶ Investors have rational expectations: based on the information they receive, they will price the firm

$$P(y) = E[x|y] = y \tag{2}$$

   ▶ They price the firm at y upon disclosure and at y_hat upon nondisclosure
   ▶ The distribution of y is common knowledge

[1].->Based on Gassen (2021), Grossman (1981) and Milgrom (1981)

Graphically - Unraveling with certain information endowment

- 10 firms uniformly distributed, no one discloses
- Market prices the firms based on the expectation over the distribution of y

   ▶ $P = E[y] = (1 + 2 + ... + 10)/10 = 5.5$

- Underpriced firms have a strong incentive to disclose information, they will announce disclosure and disclose information
- The market will adjust their price accordingly upwards, since every disclosure is trustworthy (45' line)
- Market will adjust the firms that didn't disclose according to the expectation of y again

   ▶ 1-5 uniform
   ▶ $P = E[y] = (1 + 2 + ... + 5)/5 = 3$
   ▶ Price goes down from 5.5 to 3

- Firms that are undervalued at P = 3 will again disclose
- Market will adjust the price of the non-disclosing firms

   ▶ 1-2 uniform
   ▶ $P = E[y] = (1 + 2)/2 = 1.5$
   ▶ Price goes down from 3 to 1.5

- Firms that are undervalued at P = 1.5 will again disclose
- Market will again adjust the price of the non-disclosing firms
- This mechanism will go on until every firm discloses
- Last firm would be indifferent, but per assumption, when indifferent, firms disclose

The assumptions - Unraveling with certain information endowment

- A very strong assumption of our model is perfect information
  - What happens when the manager doesn't have the information?
  - Would unraveling still occur?

Is it even realistic to think that a manager wouldn't have the information on the company?

Graphically - Unraveling with uncertain information endowment

- 10 firms uniformly distributed, no one discloses
- Market prices the firms based on the expectation over the distribution of y

  ▶ $P = E[y] = (1 + 2 + ... + 10)/10 = 5.5$

- Underpriced firms have a strong incentive to disclose information, they will announce disclosure and disclose information
- The market will adjust their price accordingly upwards, since every disclosure is trustworthy (45' line)
- Market will adjust the firms that didn't disclose according to the expectation of y again

  ▶ As the market only observes red/blue, it will take any non-disclosure act as red, regardless of the reason

  ▶ All red and green points will be adjusted downwards
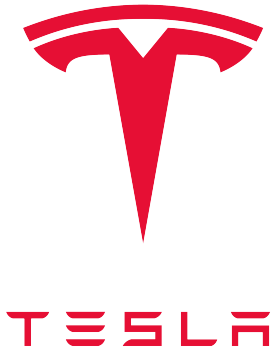
  ▶ $P = E[y] = (1 + 2 + 3 + 4 + 10)/5 = 4$

- Firms that are undervalued at P = 4 will again disclose
- Market will adjust the price of the non-disclosing firms - This mechanism will continue until all the firms that had incentive/possibility to disclose did so

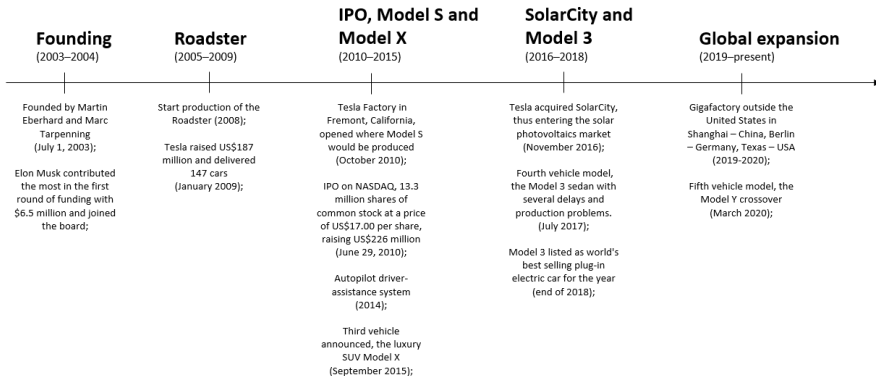# The assumptions - Unraveling with uncertain information endowment

▶ How can the manager be unaware of crucial information on the firm?
  ▶ Unpredictable cases (e.g., Covid-19)
    ▶ Unexpected shock in future demand that affects all firms
  ▶ Different business models (BM)
    ▶ Firms with traditional BM's know their demand, can compare/estimate based on peers, etc.
    ▶ Innovative BM's that work with new products don't really know their future demand – they are trying something new and won't disclose because than it wouldn't be new anymore
  ▶ Outside factors
    ▶ Substitute/complementary goods can be released at any time by another firm – affecting future demand, e.g

Brief history on Tesla

Founding
(2003–2004)

Founded by Martin
Eberhard and Marc
Tarpenning
(July 1, 2003);

Elon Musk contributed
the most in the first
round of funding with
$6.5 million and joined
the board;

Roadster
(2005–2009)

Start production of the
Roadster (2008);

Tesla raised US$187
million and delivered
147 cars
(January 2009);

**IPO, Model S and
Model X**
(2010–2015)

Tesla Factory in
Fremont, California,
opened where Model S
would be produced
(October 2010);

IPO on NASDAQ, 13.3
million shares of
common stock at a price
of US$17.00 per share,
raising US$226 million
(June 29, 2010);

Autopilot driver-
assistance system
(2014);

Third vehicle
announced, the luxury
SUV Model X
(September 2015);

**SolarCity and
Model 3**
(2016–2018)

Tesla acquired SolarCity,
thus entering the solar
photovoltaics market
(November 2016);

Fourth vehicle model,
the Model 3 sedan with
several delays and
production problems.
(July 2017);

Model 3 listed as world's
best selling plug-in
electric car for the year
(end of 2018);

Global expansion
(2019–present)

Gigafactory outside the
United States in
Shanghai – China, Berlin
– Germany, Texas – USA
(2019-2020);

Fifth vehicle model, the
Model Y crossover
(March 2020);

Tesla timeline. Source: Prepared by the author based on Tesla and Forbes
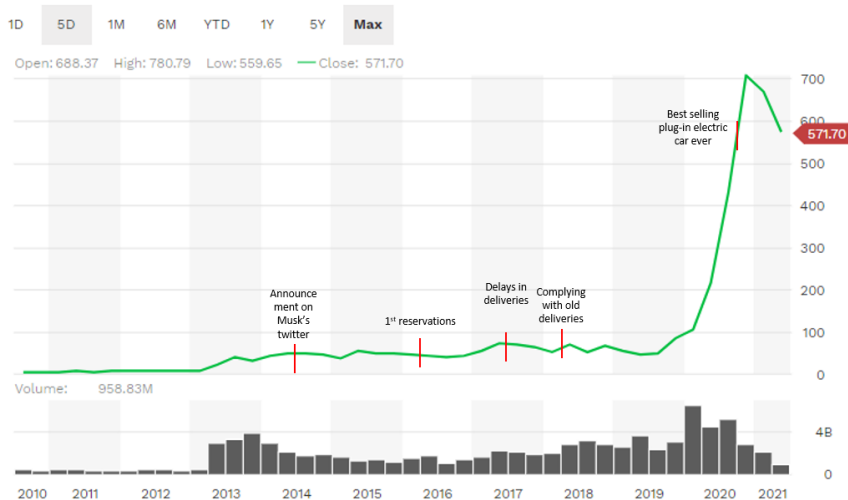
Tesla Model 3

- (2006) First mention of Model 3 as an affordable for all car
- (2007) Model 3 was codenamed Tesla "BlueStar" in the original business plan of 2007
- $(Jul2014)$ Model 3 announced on Musk's Twitter account
- $(Mar2016)$ Costumers able to reserve a Model 3
- $(Jul2017)$ Delays in deliveries – extension until 2018
- $(Nov2020)$ Refreshed with cosmetic and internal changes
- $(Dec2020)$ Global sales since inception totaled about 814,000 units – best selling plug-in electric car ever

[2].->Based on Tesla (2021)

Tesla Model Y

- ▶ (2013) Trademark filed
- ▶ (2015) Possible design as a Model 3-based Model Y with falcon-wing doors
- ▶ ($Jun 2017$) Model Y's silhouette presented at the annual general meeting
- ▶ ($Jun 2018$) New silhouette revealed by CEO Musk
- ▶ ($Mar 2019$) Debut of Model Y at Tesla's design studio in Hawthorne, CA
- ▶ ($Nov 2019$) Announcement that Model Y would be assembled in Berlin's Gigafactory
- ▶ ($Jan 2020$) Announcement that delivery of Model Y should begin in Q1 2020
- ▶ ($Mar 2020$) First deliveries
- ▶ ($Aug 2020$) Design and manufacturing still improving – world's largest unibody casting machine, switching to casting the rear body in a single piece
- ▶ ($Jan 2021$) Improvement of optional 7-seat, third-row seating configuration

Timeline - Models vs Stock price

Timeline Model 3 vs. Stock price.
Source: Prepared by the author based on Forbes and Tesla (as of 05/14/2021)

Timeline - Models vs Stock price
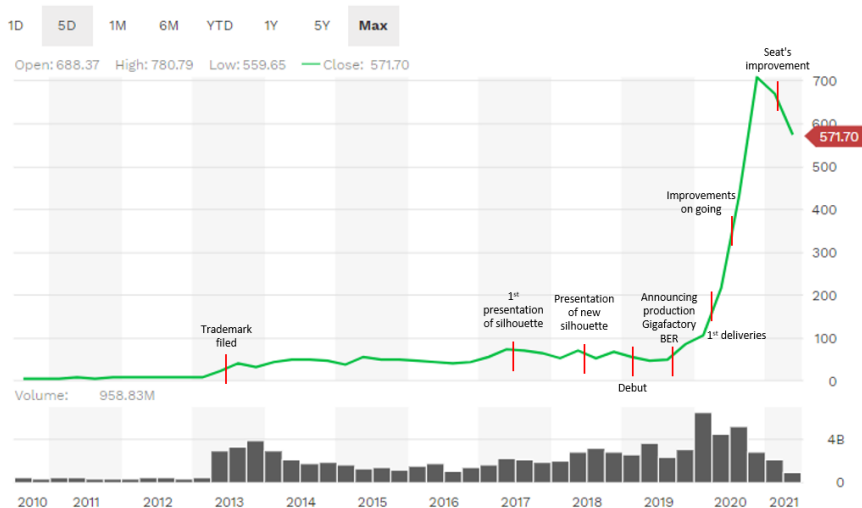
Timeline Model Y vs. Stock price.
Source: Prepared by the author based on Forbes and Tesla (as of 05/14/2021)

Innovation is...new!

- ▶ With all those announcements and media attention, why hasn't Tesla's stock price gone up before 2020?
    - ▶ Model 3 has been around since 2016!
- ▶ How could the future the demand (or financial forecast) be unknown?
- ▶ It is hard to forecast the impact of innovation!
- ▶ Firms themselves can't know the impact and financial forecast when developing new technologies
    - ▶ How do you put a price on something that was never done before?
    - ▶ This information is unknown by the manager...
    - ▶ ...and also by everyone else!
- ▶ In this case, the new technology is proving itself profitable after several years when mass production is starting

Innovation is…new!

Why Tesla Stock Looks Set To Rally Further

Trefis Team Contributor
Great Speculations Contributor Group ⊙
Markets

Tesla stock (NASDAQ: TSLA) rallied by almost 17% over the last week, driven by a broader recovery in technology stocks and a bullish outlook from multiple brokerages. Moreover, the company also raised prices on select models including its entry-level Model 3 Standard Range Plus ($500 price increase) and its top-end Model S Plaid Plus ($10k increase), likely signaling that it is more confident about demand going forward. So will Tesla stock continue its upward trajectory over the coming weeks and months, or is a correction looking more likely?

GOTHENBURG, SWEDEN – 2019/09/14: An American automotive and energy company that specialises in ... [+] SOPA IMAGES/LIGHTROCKET VIA GETTY IMAGES

Source: Forbes

- ▶ Once information is known and the market/innovation is already around for some time, it is then possible to quantify and forecast its impacts
- ▶ Unraveling will occur normally
    - ▶ Signaling increased future demand by raising price
    - ▶ Market will price Tesla accordingly – increase in the stock price

In the Musk wave…

▶ Another example, yet extreme, would be SpaceX.
▶ Ready for a SpaceX IPO?
  ▶ Company denied any intent to do so, but let's assume it would.
  ▶ Morgan Stanley's Adam Jonas VERY PRECISE valuation is…

"For this report, we built a hypothetical DCF range for SpaceX, valuing the company somewhere between ~$5 bn and $120 bn+, with a Base Case of ~$50 bn."

SpaceX valuation.
Source: Financial Times

In the Musk wave…

▶ Part of this depends on whether SpaceX actually does reinvent itself into a satellite-internet company, as Morgan Stanley predicts. (The $5bn figure is their ballparkvaluation if it doesn't.)

▶ Mars missions don't appear to factor into their model.

WHAT'S THE VALUE OF LANDING ON MARS?

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