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Notice of investment interests

As of the publication date of this report, the Principals and Clients of Devonshire Research Group LLC have a net short position in the stock, put options, bonds, and credit swaps of Tesla Motors, Inc. and stand to realize gains in the event that the price of the stock “TSLA” declines over the long run, or if investment sentiment improves the appeal of an expected decline in any of its securities.

However, Devonshire recognizes that while the technology strategy of the Company reflects a long term bearish outlook for Tesla Motors, Inc.’s security instruments, the short term implication of powerful marketing, including the power of social media tweeting by the CEO and his PR firm, well orchestrated and heavily blogged product launches, and a deep and powerful short term media control and attention span, suggests unpredictable short term volatility.

Principals and Clients of Devonshire Research Group LLC are short term volatility oriented with a long term net short position across multiple security instruments.
On humility:

*It is unwise to be too sure of one’s own wisdom. It is healthy to be reminded that the strongest might weaken and the wisest might err.*

-Ghandi
Executive Summary

- What kind of company is TSLA really? Few companies have ever managed such a broad scope of business models. Its valuation multiples (when they can be calculated) lie well above its direct business model comparables
  - TSLA is attempting more vertical integration than any auto company has recently tried
  - TSLA trades at a higher revenue multiple than any related technology business
  - TSLA’s only comparables in terms of multiple are business models that TSLA is not:
    - Software companies: TSLA has low / negative margins and heavy fixed asset commitment
    - Social media companies: TSLA has no network effects, no platform economics and high scaling costs
    - Biotech or oil explorations companies: TSLA has high marginal costs for every unit it produces

- TSLA has relied heavily on existing technology in designing a successful EV model, and while it may have generated some valuable IP it now controls little of it and has questionable sustainable competitive advantage in technology
  - TSLA’s patents cover battery-related technology and selected components but not battery cells
  - TSLA’s patent holdings are dwarfed by its technology competitors, limiting its freedom to operate in the EV market where its technology position is modest
  - TSLA’s engineering talent is thin relative to competitors and many productive inventors have left
  - TSLA’s valuable inventions can be readily copied by its EV competitors
  - TSLA’s cost position is heavily dependent on its bargaining positions with strategic suppliers who have an incentive to price aggressively for their advanced technologies

- TSLA is not the green company it claims to be, with environmental risks at all stages of the vehicle lifecycle
  - TSLA battery production requires the mining and use of numerous toxic chemicals
  - TSLA EV production has a heavier carbon footprint than traditional vehicles
  - TSLA vehicles consume lots of energy; battery charging shifts CO2 emissions from car engines to power plants
  - Disposal of TSLA batteries at large scale will create a heavy toxic burden
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Tesla wears many hats—does this large scope of functions justify its “disruptive” reputation and corresponding market cap?

<table>
<thead>
<tr>
<th>Business Function</th>
<th>SIC / NAIC Code</th>
<th>Nature of TSLA Involvement</th>
<th>Example Comps</th>
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<tr>
<td>Automotive Manufacturer / Designer</td>
<td>3711 / 336111</td>
<td>Models S and X in production</td>
<td>GM, Ford, Honda, VW</td>
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<tr>
<td>Systems Integrator</td>
<td>7373 / 541512</td>
<td>Assembly plant in Fremont, CA; network of suppliers, retail stores, charging stations</td>
<td>Apple, IBM, Fujitsu</td>
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<td>Software Company</td>
<td>7372 / 511210</td>
<td>Autopilot, over-the-air updates, GUI</td>
<td>Symantec, Microsoft, Oracle</td>
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<td>EV powertrain design &amp; manufacture</td>
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<td>Direct-to-consumer vehicle sales</td>
<td>Sonic, Penske, CarMax</td>
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<td>Powerwall home battery, Gigafactory</td>
<td>A123, Panasonic, LG Chem</td>
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<td>Electric Utility</td>
<td>4931 / 2211</td>
<td>Charging stations, battery swapping</td>
<td>Entergy, Edison, Ameren</td>
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Tesla is currently trading at a 7.0x revenue multiple—far above any comparable except, at the extreme, a high-flying software company.

### Key financials across TSLA comps (EV in billion USD)

<table>
<thead>
<tr>
<th>Name</th>
<th>EV/Rev</th>
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<th>P/E</th>
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</tbody>
</table>

Tesla is not, and will not grow like, a software company—it is an automotive company, and the automotive industry is mature and famously difficult to disrupt.
By valuation multiples, Tesla is comparable to a social media giant—except that it lacks network effects or serious user traction.

**Comps derived from business model fail to support valuation**

<table>
<thead>
<tr>
<th>Social Media Companies</th>
<th>EV/Rev</th>
<th>EV</th>
<th>P/E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yelp</td>
<td>2.2</td>
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<td>Facebook</td>
<td>16.3</td>
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<td><strong>Average</strong></td>
<td>7.5</td>
<td>106</td>
<td>33</td>
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</table>

| Tesla                  | 7.0    | 29 | NM  |

**Valuation-appropriate comp set?**

<table>
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<td>106</td>
<td>33</td>
</tr>
</tbody>
</table>

| Tesla                  | 7.0    | 29 | NM  |

**Social media companies have...**

- Network effects / tipping point economics
- A dominant platform used by an active user base
- A clear path to user base monetization

**Tesla has...**

- Word-of-mouth marketing
- A subreddit with 30k subscribers
- No ability to sell product at a profit
Broadly speaking, Tesla’s multiple places it among industries that rely on speculative future windfalls; true comparables lie far below.
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Tesla’s patents focus on battery peripherals but do not address battery cells, the key performance driver of their products.
Tesla’s limited IP footprint is clearly evident in the broader scope of automotive technologies—they are exposed in many key areas.

* US grants in past 10 years on the topic of motor vehicle or electric vehicle technology
Key players in the broad landscape have a long history of patenting, meaning larger stockpiles of enforceable IP.

### Broad automotive space*: top assignee filing trends

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1. **Sustained leadership with recent ramp-up**
2. **Secondary cohort contributing significant R&D spend**
3. **Recent ramp-up / expansion in scope**
4. **Re-investment following R&D down-cycle**
5. **Transient R&D productivity**
6. **Niche player with short history of innovative activity**

*US grants and applications in the past 20 years on the topic of motor vehicle or electric vehicle technology, collapsed by family*
As a technology owner, Tesla’s patent holdings in key topic areas are dwarfed by its direct competitors in the automotive space.

*INPADOC families filed in past 20 years, worldwide patent search*
Within even the more narrowly specified electric vehicles space, Tesla’s portfolio accounts for a small share of total R&D activity.

Electric vehicle * patent citation network

*Source: Search on electric vehicle keywords returning ~13k INPADOC families filed in past 20 years. Chart shows assignees with 50+ patent families in set.
Tesla’s Model S battery technology builds on pioneering innovation by EV competitors — these patents are still enforceable

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<td>US7679386B2</td>
<td>Interactive battery charger for electric vehicle</td>
<td>Ford</td>
<td>Allan Gale Michael Degner</td>
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<td>US7610978B2</td>
<td>Battery unit mounting structure for electric vehicle</td>
<td>Mitsubishi</td>
<td>Takasaki Seiichi Shimura Nobuyuki</td>
<td>2009</td>
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<td>US7013205B1</td>
<td>System and method for minimizing energy consumption in hybrid vehicles</td>
<td>IBM</td>
<td>James Hafner Anthony Tomlin</td>
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<td>US6841972B2</td>
<td>Method for resetting a state of charge of a battery of a hybrid electric vehicle</td>
<td>Hyundai</td>
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<td>US6868318B1</td>
<td>Method for adjusting battery power limits in a hybrid EV to provide consistent launch</td>
<td>GM</td>
<td>William Cawthorne Gregory Hubbard</td>
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<td>Battery assembly system used for electric vehicle</td>
<td>Toyota</td>
<td>Minamiura Keiichi Nakanishi Toshiaki</td>
<td>2003</td>
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Tesla has proudly Open Sourced and abandoned its Intellectual Property, but other companies have not, and are under no obligation to abandon their rights.
Tesla has orders of magnitude less patent protection than competitors in any of the related industries in which it participates.

*INPADOC families filed in past 20 years, worldwide patent search
Tesla’s small inventor group highlights their lack of R&D depth in an industry with vast inventive resources.

**Inventor Co-Occurrence Networks**

*Tesla: 114 inventors with >2 patents*

*Ford: 3245 inventors with >2 patents*

Beyond the overwhelming difference in scale, Tesla’s small core inventor team is a source of fragility—R&D quality relies on the consistent output of a small talent base.
The core inventor team is fragile: of the 16 inventors with 5+ co-authored patents, 10 have since left Tesla for other opportunities.
Why patents matter: battery and automotive technology is complicated, and keeping up requires every advantage possible.
Tesla’s technology would risk being copied even if it owned all the patents assigned to it...but it has actually given its IP away

All Our Patent Are Belong To You

Elon Musk, CEO • June 12, 2014

Tesla Motors was created to accelerate the advent of sustainable transport. If we clear a path to the creation of compelling electric vehicles, but then lay intellectual property landmines behind us to inhibit others, we are acting in a manner contrary to that goal. **Tesla will not initiate patent lawsuits against anyone who, in good faith, wants to use our technology.**

Patents have no value beyond the ability to enforce them; unless this is a PR platitude with no real-world meaning, then TSLA has discarded a key source of competitive advantage

Technology leadership is not defined by patents, which history has repeatedly shown to be small protection indeed against a determined competitor, but rather by the ability of a company to attract and motivate the world’s most talented engineers. We believe that applying the open source philosophy to our patents will strengthen rather than diminish Tesla’s position in this regard.

Translation: “please do not sue us, established auto manufacturers of the world!” Engineers do build technology leadership, but IP (and the threat of mutually assured destruction) maintains it
Tesla imports large volumes of strategic components in a supply network that is volatile and poorly understood.
### Top Tesla suppliers, containers per year

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### Drastic supply shifts October '15

- **Abrupt supply ramp-ups**
- **Abrupt supply discontinuations**

**December effect**

- 24

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**Note:** The table above lists the top Tesla suppliers based on the number of containers per year. The drastic supply shifts for October '15 are indicated with colored boxes. The "December effect" is highlighted with a note at the bottom.
Tesla is increasingly dependent on battery and motor imports

The "smoking gun": as deployment of diverse motor parts increases, the probability of patent infringement increases.
Tesla’s cost position is driven by negotiations with suppliers (e.g. Panasonic and Fukuta) with incentives to charge high prices for advanced technologies.

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**Basic industrial commodity** ➔ **Valuable semi-commodity** ➔ **Critical technology chokepoint**

Tesla does not own its IP, and worse, it doesn’t own the technology within its motors. As soon as Tesla becomes profitable its margins will be drained by its vendor network.
Executive Summary

- What kind of company is TSLA really? Few companies have ever managed such a broad scope of business models. Its valuation multiples (when they can be calculated) lie well above its direct business model comparables
  - TSLA is attempting more vertical integration than any auto company has recently tried
  - TSLA trades at a higher revenue multiple than any related technology business
  - TSLA’s only comparables in terms of multiple are business models that TSLA is not:
    - Software companies: TSLA has low / negative margins and heavy fixed asset commitment
    - Social media companies: TSLA has no network effects, no platform economics and high scaling costs
    - Biotech or oil explorations companies: TSLA has high marginal costs for every unit it produces

- TSLA has relied heavily on existing technology in designing a successful EV model, and while it may have generated some valuable IP it now controls little of it and has questionable sustainable competitive advantage in technology
  - TSLA’s patents cover battery-related technology and selected components but not battery cells
  - TSLA’s patent holdings are dwarfed by its technology competitors, limiting its freedom to operate in the EV market where its technology position is modest
  - TSLA’s engineering talent is thin relative to competitors and many productive inventors have left
  - TSLA’s valuable inventions can be readily copied by its EV competitors
  - TSLA’s cost position is heavily dependent on its bargaining positions with strategic suppliers who have an incentive to price aggressively for their advanced technologies

- TSLA is not the green company it claims to be, with environmental risks at all stages of the vehicle lifecycle
  - TSLA battery production requires the mining and use of numerous toxic chemicals
  - TSLA EV production has a heavier carbon footprint than traditional vehicles
  - TSLA vehicles consume lots of energy; battery charging shifts CO2 emissions from car engines to power plants
  - Disposal of TSLA batteries at large scale will create a heavy toxic burden
Finally, all-electric vehicles are not as sustainable as they may seem; this is a serious brand risk and an unknown legal exposure.

"Tesla Motors was created to accelerate the advent of sustainable transport."

Battery Sourcing

“Graphite...is mined and processed in China where graphite pollution has fouled air and water, damaged crops and raised health concerns...Tesla’s factory alone could double demand for graphite in batteries.” – Bloomberg

Battery Charging

“When a wire is connected to an electric vehicle at one end and a coal-fired power plant at the other end, the environmental consequences are worse than driving a normal gasoline-powered car...all-electric vehicles cause 86% more deaths from air pollution than do cars powered by regular gasoline.“ – Carnegie Inst. for Sci.

Battery Disposal

“The recovery rate of lithium ion batteries, even in first world countries, is in the single digit percent range. Most batteries end up in landfill.” – Tech Metals Insider

“Initial production of the vehicle and the batteries together make up something like 40 percent of the total carbon footprint of an EV—nearly double that of an equivalent gasoline-powered vehicle.” – EC

“The extraction of lithium has significant environmental and social impacts, especially due to water pollution and depletion.” – EC

“A carbon emissions surcharge [was] slapped on...the Model S [in Singapore]...an equivalent CO2 emission of 222g/km. The emissions were calculated using a "grid emissions factor" [for] emissions created by energy use...when its battery converts electricity into power” – CNBC

“The environmental impacts include resource depletion, global warming, and ecological toxicity—primarily resulting from the production, processing, and use of cobalt and nickel metal compounds, which can cause adverse respiratory, pulmonary, and neurological effects in those exposed.” – ABT Associates
Pounds of toxic cobalt and unstable lithium are present in each Tesla EV, and present a serious safety (as well as moral) hazard.

**Cobalt**
- Immediately dangerous to life and health at 20 mg / m³ (microgram / L)
- A Tesla EV contains 18 pounds of cobalt distributed throughout the battery cells
- **This toxic concentration of a dangerous heavy metal is core to Tesla vehicle performance**

**Lithium**
- Lithium in damaged battery cells is known to lead to spontaneous and violent explosions
- The Model S stores 30 pounds of lithium in cells with reduced individual safety features
- **What happens when aging Tesla batteries get compacted and punctured in landfills?**

From US20150111082A1: Cell Module Assemblies

Just as switching from tobacco cigarettes to e-cigarettes is still bad for your health, switching from gas automobiles to electric vehicles is still bad for the environment.
On market price adjustments:

There’s a man goin’ round takin’ names.
An’ he decides who to free and who to blame.
Everybody won’t be treated all the same.
There’ll be a golden ladder reaching down.
When the man comes around.

-Johnny Cash
Thank you

For more information, please contact Devonshire Research Group, LLC on Bloomberg: SURFHACKER