Patent Eligibility and Investment

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IP on the Wane: Examining the Impacts as IP Rights Are Reduced
George Mason University, Antonin Scalia Law School
Center for Intellectual Property x Innovation Policy
Arlington, Virginia, September 23, 2022
I conducted a survey of venture capitalists and private equity investors in an effort to answer the following question:

- Did the Supreme Court’s most recent patent eligibility cases change the behavior of venture capital and private equity investment firms, and if so how?
Response Rate

- 422 of 3,304 investment firms participated (12.78% response rate)
- 474 of 14,641 investors participated (3.24% response rate)
  - 460 online
  - 14 telephonic

- Going forward all of my data will be presented on an investor (rather than firm) basis unless otherwise indicated
Demographics

- Knowledge of at Least One of 4 Supreme Court Cases
  - Type .......................................................... Percent
  - Eligibility Expertise/Knowledgeable 38%
  - Non-Expertise/Unknowledgeable 62%

- Investment Stage of Respondents’ Firms
  - Stage .......................................................... Percent
  - Early Stage 59%
  - Seed Stage 45%
  - Middle Stage 27%
  - Growth Stage 22%
  - Expansion Stage 15%
  - Late Stage 1%
Demographics

- **Investment Industry of Respondents’ Firms**
  - Industry | Percent  
  - Software and the Internet | 70%  
  - Medical Devices | 63%  
  - Computer Electronics/Hardware | 61%  
  - Biotechnology | 55%  
  - Pharmaceutical | 54%  
  - Communications | 53%  
  - Energy | 49%  
  - Semiconductors | 48%  
  - Transportation | 47%  
  - Construction | 42%
First Principal Finding: Importance

- Patent eligibility is an important consideration for investors.

- Patent Eligibility is An Important Consideration in Firm Decisions Whether to Invest in Companies Developing Technology
  - Response Percent
    - Strongly agree 43%
    - Somewhat agree 31%
    - Neither agree nor disagree 13%
    - Somewhat disagree 9%
    - Strongly disagree 5%
First Principal Finding: Importance

- Patent Eligibility Importance By Industry – Percent Strongly or Somewhat Agreeing Patent Eligibility is an Important Consideration in Firm Decisions Whether to Invest in Companies Developing Technology

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Devices</td>
<td>81%</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>79%</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>79%</td>
</tr>
<tr>
<td>Energy</td>
<td>78%</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>76%</td>
</tr>
<tr>
<td>Construction</td>
<td>76%</td>
</tr>
<tr>
<td>Computer Electronics/Hardware</td>
<td>75%</td>
</tr>
<tr>
<td>Transportation</td>
<td>75%</td>
</tr>
<tr>
<td>Communications</td>
<td>74%</td>
</tr>
<tr>
<td>Software and the Internet</td>
<td>72%</td>
</tr>
</tbody>
</table>
First Principal Finding: Importance

- Statistically significant difference between responses based on knowledge of at least one of the Supreme Court’s eligibility cases
  - Type                      Mean (1-5 Scale)
    - Eligibility Knowledgeable 4.18
    - Unknowledgeable           3.93
First Principal Finding: Importance

- But patent eligibility not the most important factor in investment decisionmaking

<table>
<thead>
<tr>
<th>Factor</th>
<th>Mean (1-9 Scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of People</td>
<td>7.77</td>
</tr>
<tr>
<td>Quality of Technology</td>
<td>7.55</td>
</tr>
<tr>
<td>Size of Potential Market</td>
<td>7.24</td>
</tr>
<tr>
<td>Avail. of U.S. Patents</td>
<td>5.31</td>
</tr>
<tr>
<td>First Mover Advantage</td>
<td>4.94</td>
</tr>
<tr>
<td>Avail. of Foreign Patents</td>
<td>3.72</td>
</tr>
<tr>
<td>Avail. of Trade Secrets</td>
<td>3.31</td>
</tr>
<tr>
<td>Avail. of Copyrights</td>
<td>3.13</td>
</tr>
<tr>
<td>Other</td>
<td>2.03</td>
</tr>
</tbody>
</table>
The second principal finding is that reduced patent eligibility correlates with particular investment behaviors in particular industries.

- Investors on average report that each industry would see reduced investment if patents were eliminated or less available.

- But investors reported that the elimination of patents or the reduction in patent eligibility would have more devastating impact on the pharmaceutical, biotechnology, and medical device industries.

- This is shown by calculating a weighted average of responses to a question on point, giving the response “significantly increase investments” five points on down to one point for “significantly decrease investments.”
Second Principal Finding: Behaviors

- On average, investors report that decreased availability of patents would cause each industry to see reduced investment.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Mean (1-5 Scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>2.78</td>
</tr>
<tr>
<td>Transportation</td>
<td>2.62</td>
</tr>
<tr>
<td>Software and the Internet</td>
<td>2.59</td>
</tr>
<tr>
<td>Communications</td>
<td>2.54</td>
</tr>
<tr>
<td>Energy</td>
<td>2.47</td>
</tr>
<tr>
<td>Computer/Electronic Hardware</td>
<td>2.26</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>2.09</td>
</tr>
<tr>
<td>Medical Devices</td>
<td>1.83</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>1.78</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>1.70</td>
</tr>
</tbody>
</table>
Second Principal Finding: Behaviors

- Impact of Decreased Availability of Patents on Investment Decisions: Responses

<table>
<thead>
<tr>
<th>Industry</th>
<th>Strongly Increase</th>
<th>Somewhat Increase</th>
<th>No Impact</th>
<th>Somewhat Decrease</th>
<th>Strongly Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>1%</td>
<td>3%</td>
<td>71%</td>
<td>21%</td>
<td>3%</td>
</tr>
<tr>
<td>Transportation</td>
<td>2%</td>
<td>5%</td>
<td>54%</td>
<td>32%</td>
<td>7%</td>
</tr>
<tr>
<td>Soft. &amp; Internet</td>
<td>1%</td>
<td>6%</td>
<td>53%</td>
<td>30%</td>
<td>9%</td>
</tr>
<tr>
<td>Communications</td>
<td>1%</td>
<td>5%</td>
<td>52%</td>
<td>31%</td>
<td>11%</td>
</tr>
<tr>
<td>Energy</td>
<td>2%</td>
<td>4%</td>
<td>48%</td>
<td>33%</td>
<td>13%</td>
</tr>
<tr>
<td>Cmp./Elecs. Hd.</td>
<td>2%</td>
<td>4%</td>
<td>33%</td>
<td>40%</td>
<td>21%</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>1%</td>
<td>2%</td>
<td>30%</td>
<td>40%</td>
<td>27%</td>
</tr>
<tr>
<td>Medical Devices</td>
<td>1%</td>
<td>3%</td>
<td>14%</td>
<td>40%</td>
<td>42%</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>3%</td>
<td>2%</td>
<td>17%</td>
<td>29%</td>
<td>50%</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>3%</td>
<td>1%</td>
<td>14%</td>
<td>25%</td>
<td>56%</td>
</tr>
</tbody>
</table>
The third principal finding is that the Supreme Court’s eligibility cases have impacted many firms’ existing investments and, more significantly going forward, firms’ investment behaviors.

- A substantial portion of investors with knowledge of the Supreme Court’s eligibility decisions reported that those cases have impacted their firms’ investment decisions, primarily in the sense of decreasing investments or shifting investments between industries.
- Those industries most negatively impacted include the pharmaceutical, medical device, and biotechnology industries.
### Third Principal Finding: Impact

- **Impact of Supreme Court’s Eligibility Cases on Existing Investments**
  - Response Percent
    - Very positive 1%
    - Somewhat positive 13%
    - No Impact 46%
    - Somewhat negative 33%
    - Very negative 7%

- **Have Any of the Supreme Court’s Eligibility Cases Affected Firm Decisions Whether to Invest In Companies**
  - Response Percent
    - Yes 33%
    - No 61%
    - Don’t know 6%
### Third Principal Finding: Impact

- **Which of the Supreme Court’s Eligibility Cases Affected Firm Decisions Whether to Invest In Companies**
  - **Response**
  - **AMP v. Myriad** 38%
  - **Mayo v. Prometheus** 29%
  - **Alice v. CLS Bank** 20%
  - **Bilski v. Kappos** 13%

- **How Have the Cases You Selected Affected Firm Decisions Whether to Invest in Companies**
  - **Response**
  - **Decreased investments overall** 49%
  - **Shifted investments between industries** 34%
  - **Increased investments overall** 8%
  - **Other** 9%
### Third Principal Finding: Impact

- Knowledgeable Investors Shifted Investments Away from These Industries
  - **Industries**
  - Pharmaceutical: 26%
  - Biotechnology: 24%
  - Medical Devices: 21%
  - Software and the Internet: 21%
  - Communications: 6%
  - Computer/Electronic Hardware: 3%
  - Construction: 0%
  - Transportation: 0%
  - Energy: 0%
  - Semiconductors: 0%
Third Principal Finding: Impact

- Knowledgeable Investors Shifted Investments Into These Industries
  - Computer/Electronic Hardware 16%
  - Energy 16%
  - Medical Devices 13%
  - Software and the Internet 13%
  - Pharmaceutical 6%
  - Biotechnology 6%
  - Semiconductors 6%
  - Construction 3%
  - Communications 3%
  - Transportation 0%
Fourth Principal Finding: Expertise

- The fourth principal finding is that investors with knowledge of the Supreme Court's eligibility cases indicated different changes in firm investment behavior as compared to investors without this knowledge.
### Fourth Principal Finding: Expertise

- Unknowledgeable Investors Shifted Investments Away from These Industries

<table>
<thead>
<tr>
<th>Industries</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>17%</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>12%</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>11%</td>
</tr>
<tr>
<td>Medical Devices</td>
<td>11%</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>10%</td>
</tr>
<tr>
<td>Communications</td>
<td>10%</td>
</tr>
<tr>
<td>Computer/Electronic Hardware</td>
<td>10%</td>
</tr>
<tr>
<td>Software and the Internet</td>
<td>7%</td>
</tr>
<tr>
<td>Construction</td>
<td>3%</td>
</tr>
<tr>
<td>Transportation</td>
<td>2%</td>
</tr>
</tbody>
</table>
Fourth Principal Finding: Expertise

- Unknowledgeable Investors Shifted Investments Into These Industries
  - **Industries**
    - Software and the Internet: 32%
    - Computer/Electronic Hardware: 11%
    - Transportation: 11%
    - Medical Devices: 10%
    - Communications: 8%
    - Biotechnology: 5%
    - Energy: 5%
    - Pharmaceutical: 3%
    - Construction: 3%
    - Semiconductors: 2%
Fourth Principal Finding: Expertise

- In short, over the time period of the Supreme Court’s eligibility cases, eligibility knowledgeable investors more often reduced investment in software and the Internet as compared to eligibility unknowledgeable investors, who more often increased investment in software and the Internet over the same time period.
Major Conclusions

• The results of the survey highlight the importance of patent eligibility and the negative impact of the Supreme Court’s eligibility cases in venture capital and private equity investment in all industries, but particularly in the most important areas of technological development in terms of its impact on public health: the biotechnology, medical device, and pharmaceutical industries.
Limitations

- Surveys, for example, reveal stated preferences, but not necessarily actual preferences.
- Some of the questions received a small number of responses.
- The views of the investors who responded to the survey may not perfectly represent the views of all investors and investment firms.
- It is at least possible that the description of the survey or the first part of the survey, which asked about the importance of patent eligibility to investment decisions, impacted responses to the second part of the survey, which asked more specific questions about the impact of changes to patent eligibility law on investment decisions.
Limitations

• Selection bias
  – The collection of investors identified in the database from 2017 no doubt differs from the collection of venture capitalists that might have been identified in a similar database in 2009.
  – Suppose, for example, that at least some firms that engaged in venture capital financing in 2009 decided to stop engaging in venture capital financing after the Supreme Court’s Mayo decision in 2013.
  – Unlike other surveys related to patent reform topics, however, the survey here was not sent to an inherently biased sample, nor did it indicate one way or the other whether the survey was intended to provide data to support or defeat proposed legislation related to patent eligibility.

• The respondents may not have understood each question or, for other reasons, not answered questions accurately.
  – E.g., eligibility vs. patentability
Limitations

• It may be that large investors have different views compared to small investors, and so the impact of the Supreme Court’s cases on investment as a whole may be different than the impact the average investor reports.

• The survey also does not really answer the question of whether increased investment in technological development is a net benefit for society.

• Despite all these limitations, the survey does provide evidence that the Supreme Court’s cases have generally reduced investment in the development of technologies in all industries, but particularly in the biotechnology, medical device, and pharmaceutical industries.