



Patent Eligibility and Investment

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IP on the Wane: Examining the Impacts as IP Rights Are Reduced
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Overview of Patent Eligibility and Investment

- 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

<u>Type</u>	<u>Percent</u>
– Eligibility Expertise/Knowledgeable	38%
– Non-Expertise/Unknowledgeable	62%

- Investment Stage of Respondents' Firms

<u>Stage</u>	<u>Percent</u>
– Early Stage	59%
– Seed Stage	45%
– Middle Stage	27%
– Growth Stage	22%
– Expansion Stage	15%
– Late Stage	1%



Demographics

- Investment Industry of Respondents' Firms

<u>Industry</u>	<u>Percent</u>
– 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

<u>Response</u>	<u>Percent</u>
– 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

<u>Industry</u>	<u>Percent</u>
• Medical Devices	81%
• Biotechnology	79%
• Pharmaceutical	79%
• Energy	78%
• Semiconductors	76%
• Construction	76%
• Computer Electronics/Hardware	75%
• Transportation	75%
• Communications	74%
• Software and the Internet	72%



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 |
 - Eligibility Knowledgeable 4.18
 - Unknowledgeable 3.93



First Principal Finding: Importance

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

<u>Factor</u>	<u>Mean (1-9 Scale)</u>
– Quality of People	7.77
– Quality of Technology	7.55
– Size of Potential Market	7.24
– Avail. of U.S. Patents	5.31
– First Mover Advantage	4.94
– Avail. of Foreign Patents	3.72
– Avail. of Trade Secrets	3.31
– Avail. of Copyrights	3.13
– Other	2.03



Second Principal Finding: Behaviors

- 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.

<u>Industry</u>	<u>Mean (1-5 Scale)</u>
– Construction	2.78
– Transportation	2.62
– Software and the Internet	2.59
– Communications	2.54
– Energy	2.47
– Computer/Electronic Hardware	2.26
– Semiconductors	2.09
– Medical Devices	1.83
– Biotechnology	1.78
– Pharmaceutical	1.70



Second Principal Finding: Behaviors

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

–	Strongly Increase	Somewhat Increase	No Impact	Somewhat Decrease	Strongly Decrease
– Industry					
– Construction	1%	3%	71%	21%	3%
– Transportation	2%	5%	54%	32%	7%
– Soft. & Internet	1%	6%	53%	30%	9%
– Communications	1%	5%	52%	31%	11%
– Energy	2%	4%	48%	33%	13%
– Cmp./Elecs. Hd.	2%	4%	33%	40%	21%
– Semiconductors	1%	2%	30%	40%	27%
– Medical Devices	1%	3%	14%	40%	42%
– Biotechnology	3%	2%	17%	29%	50%
– Pharmaceutical	3%	1%	14%	25%	56%



Third Principal Finding: Impact

- 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

<u>Response</u>	<u>Percent</u>
– 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

<u>Response</u>	<u>Percent</u>
– 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

<u>Response</u>	<u>Percent</u>
– 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

<u>Response</u>	<u>Percent</u>
– 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

<u>Industries</u>	<u>Percent</u>
– 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

<u>Industries</u>	<u>Percent</u>
– 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

<u>Industries</u>	<u>Percent</u>
– Energy	17%
– Semiconductors	12%
– Pharmaceutical	11%
– Medical Devices	11%
– Biotechnology	10%
– Communications	10%
– Computer/Electronic Hardware	10%
– Software and the Internet	7%
– Construction	3%
– Transportation	2%



Fourth Principal Finding: Expertise

- Unknowledgeable Investors Shifted Investments Into These Industries

<u>Industries</u>	<u>Percent</u>
– 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.

