Appendix A: Methodology

A. Sampling Frame

In quantitative survey research, the gold standard is to pick a random sample (selection of potential respondents) from a larger frame (list or source of the targeted respondents) that is representative of the target population. The target respondent in this study was either an executive or an investor in a startup with experience with the patent system. Since the subject of the study was patent assertion, which not all startups have experienced, I sought a sufficiently large number of responses from which to observe and analyze the subject of study.

To leverage previous research efforts, I worked with a team of research assistants and a statistics consulting firm, Tech Society Research, to develop a sample of startups and their investors based on the steps described in the Berkeley Patent Study.[1] That study drew from two primary sources: Thompson's *Venture Xpert* database and Dun and Bradstreet's company listings with emails. Building upon the steps carried out by the Berkeley Patent Survey, we included in our sample companies less than 10 years old with at least one email address. However, rather than limit our search to particular industries, as did the authors of the Berkeley Patent Survey, we included companies in any industry, for a total of 6,636 addresses, not counting opt-outs or bounced emails. In addition, we could not include the Berkeley Patent Survey's other key source, Dun and Bradstreet, because as part of transferring the business line to Mergent Intellect, academic licenses to company email lists were discontinued in 2012.

Table A: The Surveyed Population – Venture Capitalists and Startups

Survey Branch	Primary Sampling Frame and Source*	Completed Responses	Respondent Profile
Startup	6,636 Employees and Investors affiliated with companies younger than 10 years old (Venture Xpert database)	173**	73% founders/executives; 75% of companies with revenue under $10M, 93% with fewer than 500 employees.
Venture Capitalist	Venture Xpert database; Directory of 2,373 venture capitalists	134***	52% seed/early stage investor, skew from national average towards bio/pharma and hardware/semiconductor industries

*Excluding opt-outs and bounced emails. See below for full description of sampling frame.
**Excluding 27 disqualifications.
***Excluding 14 disqualifications.

Table B: Companion Surveys – Large Company and Law Firm Lawyers

Survey Branch	Primary Sampling Frame and Source*	Completed Responses	Respondent Profile
Large Company IP Lawyers Survey	262 in-house members of Santa Clara University Law School High-Tech Community, attendants at 2013 IP Counsel Café Conference	122**	95% from public companies or companies with $100M annual revenue
Law firm Lawyers Survey	12,052 litigation counsel randomly selected out of ~40,000 counsel identified on litigation pleadings in the last 10 years (Academic Experts Group database)	394***	65% of qualified respondents had more than 10+ years of litigation experience, the rest had 5-10 years.

*Excluding opt-outs and bounced emails. See below for full description of sampling frame.
**Excluding 34 disqualifications. 53% of the completed responses were from the closed list.
***Excluding 105 disqualifications.

Thus, to supplement the *Venture Xpert* sample we added 2,373 additional email addresses, not counting opt-outs or bounced emails, of venture capitalists provided based on a privately-held proprietary directory of investors. We cannot confirm how many respondents received the email, and at least some of the messages were caught by respondent spam filters. We also encouraged a handful of respondents who took the survey and contacted us expressing interest in its results to endorse the survey and invite colleagues to participate. We do not know the precise number of survey-takers that took the survey in response to these solicitations. The startup survey was also provided to listeners of a webcast that I did for Engine Advocacy, a Silicon Valley startup advocacy group. We received 14 survey responses from this source.

We distributed the surveys via web survey. Web surveys are increasingly the 'go-to' method for data collection because they are much less expensive than conventional methods, and the results are immediate. However, web surveys also suffer from low response rates—single digit response rates where no relationship exists between the surveyor and the surveyed population are not unusual.[2]

Given our low response rate and the fact that the sampling frame included only those companies and investors whose e-mail addresses were known through the methods described above, the survey results should not be generalized to the general population. Rather, our sample reflects a hybrid of sampling methods—a convenience sample (available lists) and snowball sample (direct contacts for inviting people into the study). We also employed a mixed methods approach[3] for analyzing the data. That is, we used the numeric results to set a context and the open-ended comments provided by respondents as thick description behind these numbers. The resulting analysis is a meld of qualitative analysis that is informed by quantitative results. While not generalizable, the results are instructive for describing concerns and impacts of patent demands. The yield from these efforts is presented in Table A, above.

B. Data Collection

We distributed the survey via SurveyMonkey, and sent up to eight reminder emails in the case of the startup branch of the survey, and up to four reminder emails in the case of the VC branch. To encourage participation in the study, we gave survey respondents the option to receive a copy of the survey results and also told them that the purpose of the survey was to gather input for a report intended for lawmakers and the members of the startup community. However, given cost and related constraints, we did not provide additional incentives. We did not precede or follow-up email invitations by postal mail or telephone.

C. Survey Design

We invited recipients of the survey solicitation to participate if they had experience with patents or patent assertion, positive or negative. We asked questions pertaining to a variety of aspects of the patent system, ranging from the reading of patents, to sources consulted to obtain information about patents, to licensing and patenting behavior and attitudes, to experiences with patent assertion. We asked questions pertaining to "NPEs" (non-practicing entities) which we defined in the survey as "an entity that asserts patents as a business, not including universities or startups" or "a company that asserts patents, rather than makes products, as a business."

This paper focuses on the impacts of assertions on innovation and young companies; reports on other topics will be released at a later date. In the case of the startup branch of the survey, question modules were provided based on the companies' experiences – for example if a company answered "no" to the question of whether it had reserved an assertion, it would not get questions about the impacts and its responses to the assertions. In the case of the venture capitalist branch of the survey, question modules were developed for better response rates; the version of the questions received depended solely on when the respondent took the survey.

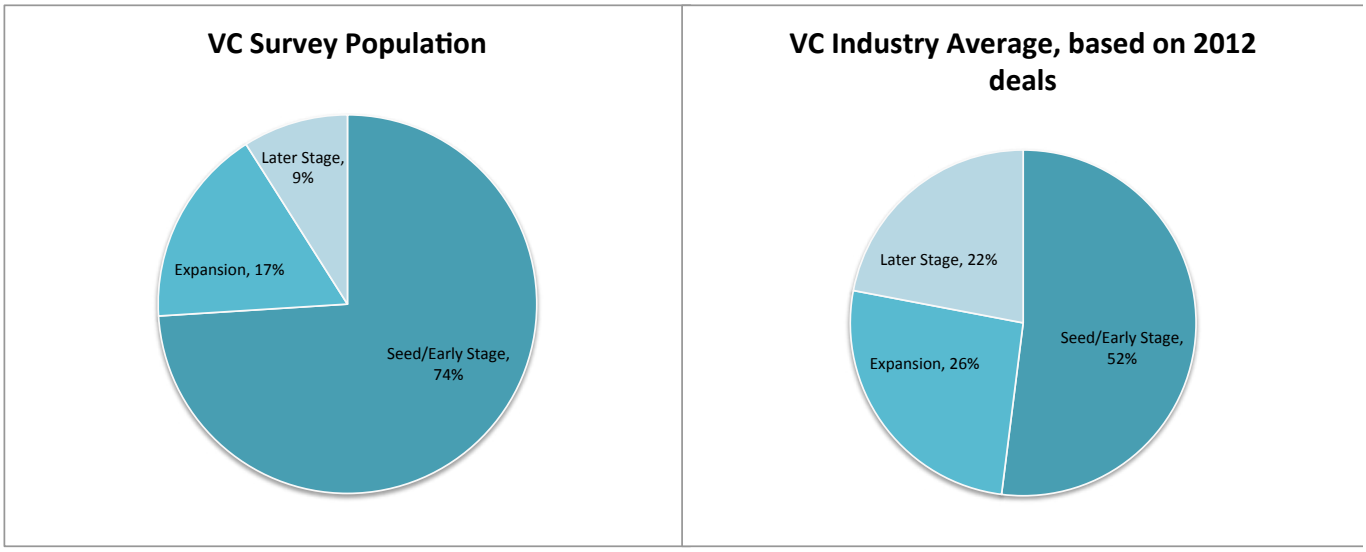
D. Respondent Profiles

a. Venture Capitalist Respondent Profiles

We asked venture capitalists to identify their areas of investment and the stage of company of primary investment. Normalizing the numbers to add to 100% (multiple responses were allowed), the highest share of respondents among company types were seed or early stage investors (74%) (Fig. 1), and among industries, were investors in software/internet (46%) (Fig. 2).[4]

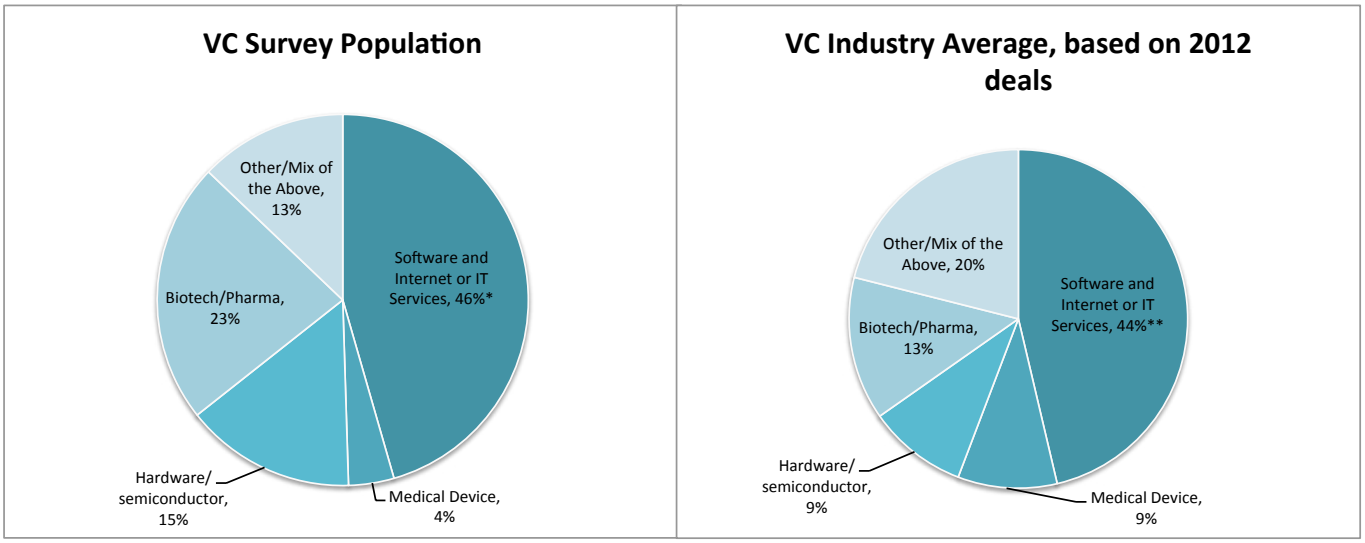
The respondent group was skewed from the national average in two ways: it had a higher percentage of seed and early stage investors (74% in the sample vs. 52% on average) (Fig. 1), and an overrepresentation of biotech and pharma (23% vs. 13% on average) and hardware/semiconductor investors (15% vs. 9% on average), relative to the number of 2012 deals (Fig. 2). The skew in these industries may be explained by the known importance of patents to the biopharma industry, relative to others and the prevalence of patents in the semiconductor and hardware industries.[5]

Figure 1: In what stage are the companies in which you primarily invest?



N= 158
Source of Industry Averages: MoneyTree

Figure 2: In what industry do you primarily invest?



N= 157
*Software and Internet
**Software and IT Services (the Software and Internet share of VC deals in 2012 is likely larger than this number)
Source of Industry Averages: MoneyTree

In order to observe any industry effects, for certain views we reported the responses of IT (software/internet, hardware/semiconductor) and biopharma (biotech/pharm and medical devices) VCs separately. If a VC identified as investing in both, we excluded them from both populations.

b. Startup Survey Respondents

We asked survey respondents to answer questions about themselves and their companies. 73% responded that they were founders or executives, and 12% were managers. 93% of the surveyed companies were privately held, and the industry of the respondents, similar to the population of the VC survey, slightly skewed towards the biopharma (17% v. 13%, on average) and hardware/semiconductor industries (11% v. 9%, on average) (Fig. 3).

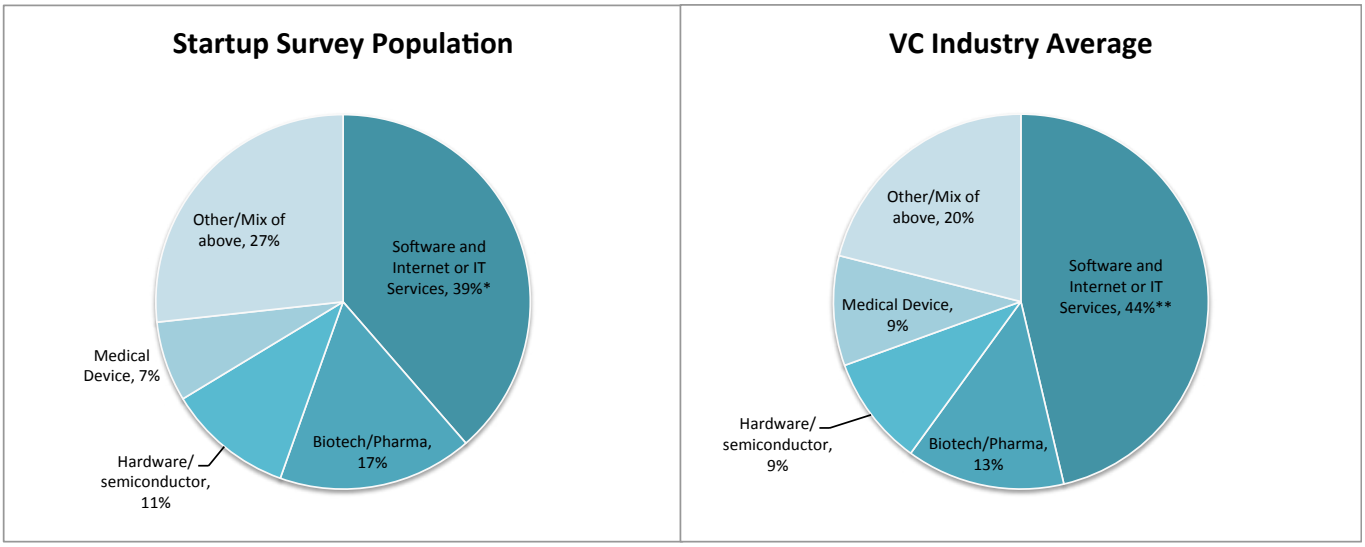
E. Survey Reporting

This study reports on the responses of startups and VCs to the current survey. However, at times we also report (but do not combine) the results from the companion surveys described above as well as an earlier study I produced in 2012[6] based on a survey of 223 respondents, 79 of whom had received a patent assertion demand and several of whom had monetized their patents through patent assertion entities (PAEs). While containing a number of suggestive findings, the survey was a non-random, non-probability sample, distributed primarily, openly to a universe of readers of technology and law and public interest/academic blogs that had to "opt-in" in order to take the survey. This study is denoted as 'Chien 2012' and serves as a point of comparison for the current study.

In accordance with standard statistical practice as applied to this study, we report results with at least 30 respondents except in the case of smaller sub-samples.[7] Where we asked the respondent to select a range for ease of answering, we recalculated the range to a midpoint and derived averages based on that number.

In this report, we refer interchangeably to NPE and PAE, which we understand and believe our survey respondents to understand does not include universities or startups. We quote liberally from survey responses, and have removed obvious spelling errors in order to improve readability. We also include data on customer

Figure 3: In what industry is your company?



N= 158
*Software and Internet
**Software and IT Services (the Software and Internet share of VC deals in 2012 is likely larger than this number)
Source of Industry Averages: MoneyTree

suits shared with us by Patent Freedom. Its methodology is provided in Appendix D.

References

1. Stuart J.H. Graham, et al., "High Technology Entrepreneurs and The Patent System: Results Of The 2008 Berkeley Patent Survey," *Berkeley Technology Law Journal* 24 (2010): 1255.
2. Roger Tourangeau, Frederick Conrad, and Mick Couper, *The Science of Web Surveys* (New York: Oxford Univerity Press, 2013).
3. Charles Teddlie and Abbas Tashakkori, *Foundations of Mixed Methods Research: Integrating Quantitative and Qualitative Approaches in the Social and Behavioral Sciences* (Thousand Oaks, CA; Sage Publications, 2009).
4. See 2012 Year-End VC Investment Stats – MoneyTree, National Venture Capital Association, "Industry Stats by Date," http://www.nvca.org/index.php?option=com_content&view=article&id=78&Itemid=102; (accessed August 30, 2013). See Fig. 1 above.
5. Bronwyn H. Hall and Rosemarie Ham Ziedonis, "The Patent Paradox Revisited: An Empirical Study of Patenting the U.S. Semiconductor Industry, 1975-1995," *RAND Journal of Economics* 32, no. 1 (2001): 101, available at http://www.jstor.org/discover/10.2307/2696400?uid=3739560&uid=2&uid=4&uid=3739256&sid=21102566963011.
6. Colleen V. Chien, "Startups and Patent Trolls," *Stanford Technology Law Review* (forthcoming 2014). Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2146251.
7. Jason W. Osbourne, ed, *Best Practices in Quantitative Methods* (Thousand Oaks, CA; Sage Publications, 2008).