Patent Portfolio Valuation: What is research saying

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Figure 1. Widespread use of technology markets in the pharmaceutical industry

Percent of new approved drugs based on externally-derived technology, 1989-2004

Companies with more than 10 approved New Drug Applications

Patent valuation: Generally

- Moving the valuation exercise from the level of the patent to the level of the innovation, project, or firm (portfolio)
  - Many of the same metrics are useful
    - Citations, claims, families
  - The firm’s value itself can offer a window into valuation
  - Problems of aggregation
(Some) methods for valuing portfolios

- FMV (to a purchaser), e.g. M&A
  - Issues: complementary assets; thin markets
- NPV of stream of future revenue, e.g. licensing deals
  - Issues: having a measurable and stable stream of royalties
- “Real option,” e.g. start-ups
  - Issues: complementary assets
- Contribution to firm’s market value, e.g. public firms
  - Issues: assumptions about information and effects
Contribution to market value

**Methods**

- CARs (cumulative abnormal returns, from “news”)
  - Better for individual patents; which “news?”
- Tobins-Q (market value / asset value)
  - Contribution of patents (or certain types of patents), and patent information

\[
\log Q_{it} = \log q_t + \log[1 + \gamma_1 (RD_{it} / A_{it}) + \gamma_2 (P_{it} / RD_{it}) + \gamma_3 (SP_{it} / RD_{it})] + \varepsilon_{it}
\]

Hall and MacGarvie (2006)
Proud list valuations: Assumptions

- The standard assumption about the value of patents says that patent value “lives in the tail” of the distribution
  - < 2% are litigated (and only 5% of these go through trail)
  - 30-50% are allowed to lapse for non-payment

- Something like the exponential distribution, with Lambda << 1
Evidence is contradicting

- Value may be distributed Poisson, or even Normal
- It appears at the left of the distribution, there is substantial economic value
- But, what value of Lambda are we talking about?
Value of EU Patents

Figure 4. The value of European patents across macro technological classes

Number of observations = 7,732.

Source: Giuri, Mariani et al. (2007)
Research Policy
Value of EU Patents (2)

Zaretzki sale price estimates: $383k

$12m
Does “use” drive value?
- How firms are using portfolios

Table 7. Patent use. Distribution by inventors’ employer

<table>
<thead>
<tr>
<th></th>
<th>Internal use</th>
<th>Licensing</th>
<th>Cross-licensing</th>
<th>Licensing &amp; Use</th>
<th>Blocking Competitors</th>
<th>Sleeping Patents</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large companies</td>
<td>50.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.2%</td>
<td>21.7%</td>
<td>19.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Medium sized companies</td>
<td>65.6%</td>
<td>5.4%</td>
<td>1.2%</td>
<td>3.6%</td>
<td>13.9%</td>
<td>10.3%</td>
<td>100.0%</td>
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<tr>
<td>Small companies</td>
<td>55.8%</td>
<td>15.0%</td>
<td>3.9%</td>
<td>6.9%</td>
<td>9.6%</td>
<td>8.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Private Research Institutions</td>
<td>16.7%</td>
<td>35.4%</td>
<td>0.0%</td>
<td>6.2%</td>
<td>18.8%</td>
<td>22.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Public Research Institutions</td>
<td>21.7%</td>
<td>23.2%</td>
<td>4.3%</td>
<td>5.8%</td>
<td>10.9%</td>
<td>34.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Universities</td>
<td>26.2%</td>
<td>22.5%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>13.8%</td>
<td>27.5%</td>
<td>100.0%</td>
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<tr>
<td>Other Govt. Institutions</td>
<td>41.7%</td>
<td>16.7%</td>
<td>0.0%</td>
<td>8.3%</td>
<td>8.3%</td>
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<tr>
<td>Other</td>
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<td>17.0%</td>
<td>4.3%</td>
<td>8.5%</td>
<td>12.8%</td>
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<tr>
<td>Total</td>
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<td>6.2%</td>
<td>3.1%</td>
<td>3.9%</td>
<td>18.8%</td>
<td>17.5%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Number of observations = 7,556

Source: Giuri, Mariani et al. (2007)
Research Policy
To license or not to license?

In Sum...

- These data give us a better picture into the value distribution in the aggregate
  - But what about at the particular firm?
    - Does the same distribution hold?
  - And, what about the issue of “complements”
    - Is the value of two patents offered together more than the value of the individual parts?
      - Or, conversely, what is the value of the 99 patents without the 100th?
    - What is the value of a patent disembodied from the firm, the routines, the processes, and the other assets that drive value?
      - And, what value does it, or would it (ala “real options”) have when married up with a different set of routines, processes and assets elsewhere?

- But… we have too little understanding about the drivers of patent value
  - And too little transparency in the market
- Information, and from it, understanding, is a first step