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**Table 1 Variable Definitions**

|  |  |
| --- | --- |
| Variable Names | Definitions |
| R&D and Patent | |
| *R&D\_ AST* | R&D expenditure / Total assets |
| *R&D\_REV* | R&D expenditure / Total sales |
| *R&D\_DISC* | Indicator variable: 1 if a company reported zero or positive R&D expenditure; 0 otherwise |
| *PSEUDO-BLANK* | Indicator variable for Pseudo-Blank R&D companies; 0 otherwise, where Pseudo-Blank companies are companies reporting blank R&D expenditure but have patent activity |
| *PATENT1&2* | Number of invention patent and utility model patent application |
| *PATENT1* | Number of invention patent |
| Matching variables | |
| *PPE* | Net fixed assets / Total assets |
| *LAGQ* | Lagged of Tobin’s Q, measured as (market value of equity + book value of total liabilities) divided by total assets |
| *AGE* | Number of years since the company went public |
| *LEV* | Total liabilities / Total assets |
| *PROP\_ INDU* | Proportion of companies reported zero or positive R&D within an industry |
|  |  |
| *Competition* | |
| *NUM\_INDU* | Number of companies within an industry during a year |
| *HHI* | *HHI* = ∑(*Xi* / *X*)2，where *X*=∑*Xi*，*Xi* is total sales of company *i*, *X* is the sum of total sales from all companies in the same industry as company *i* |
| *CR4* | Market shares of top four companies in sales within an industry |
| *PR\_SD* | Standard deviation of industry operating profit margin |
| *Control variables* | |
| *TECHINDU* | Indicator variable: 1 if a company belonged to high-tech industries; 0 otherwise |
| *DLOSS* | Indicator variable: 1 if net income is below zero; 0 otherwise |
| *RETVOL* | Standard deviation of monthly stock returns with cash dividends reinvestment over the prior year |
| *SIZE* | Natural logarithm of total assets |
| *INSTT* | Number of shares held by institutional investors / Number of outstanding A shares |
| *DANALYST* | Indicator variable: 1 if analysts published research reports for the company; 0 otherwise |
| *TOP10* | Indicator variable: 1 if financial statements were audited by top ten audit firms in AICPA Certified Public Accountants comprehensive evaluation; 0 otherwise |
| *OFFER* | Indicator variable: 1 if a company performed seasoned equity offerings; 0 otherwise |
| *SOE* | Indicator variable: 1 if a company was state-owned; 0 otherwise |

**Table 2 Descriptive Statistics**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Panel A：Overall sample | | | | | | | | |
| Variable | N | Mean | Std Dev | Q1 | Median | Q3 | Min | Max |
| *R&D\_ AST* | 8680 | 0.018 | 0.017 | 0.004 | 0.014 | 0.025 | 0.000 | 0.087 |
| *R&D\_ REV* | 8680 | 0.033 | 0.038 | 0.007 | 0.027 | 0.042 | 0.000 | 0.232 |
| *R&D\_DISC* | 14429 | 0.602 | 0.490 | 0.000 | 1.000 | 1.000 | 0.000 | 1.000 |
| *PSEUDO-BLANK* | 14429 | 0.068 | 0.251 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *PATENT1&2* | 14429 | 13.652 | 82.521 | 0.000 | 0.000 | 7.000 | 0.000 | 2516.000 |
| *PATENT1* | 14429 | 7.009 | 59.840 | 0.000 | 0.000 | 3.000 | 0.000 | 2390.000 |
| *PPE* | 14429 | 0.248 | 0.177 | 0.109 | 0.214 | 0.358 | 0.002 | 0.751 |
| *LAGQ* | 14429 | 2.470 | 1.692 | 1.382 | 1.940 | 2.920 | 0.901 | 10.736 |
| *AGE* | 14429 | 9.406 | 5.707 | 4.000 | 10.000 | 14.000 | 1.000 | 24.000 |
| *LEV* | 14429 | 0.473 | 0.223 | 0.303 | 0.476 | 0.635 | 0.050 | 1.112 |
| *PROP\_ INDU* | 14429 | 0.606 | 0.332 | 0.303 | 0.689 | 0.935 | 0.000 | 1.000 |
| *NUM\_INDU* | 14429 | 91.298 | 54.394 | 40.000 | 81.000 | 133.000 | 2.000 | 218.000 |
| *HHI* | 14429 | 0.113 | 0.110 | 0.046 | 0.073 | 0.128 | 0.021 | 0.497 |
| *CR4* | 14429 | 0.475 | 0.185 | 0.345 | 0.452 | 0.587 | 0.191 | 0.922 |
| *PR\_SD* | 14429 | 1.993 | 7.305 | 0.130 | 0.269 | 0.682 | 0.041 | 62.619 |
| *TECHINDU* | 14429 | 0.204 | 0.403 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *DLOSS* | 14429 | 0.102 | 0.302 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *RETVOL* | 14429 | 0.135 | 0.053 | 0.097 | 0.123 | 0.161 | 0.055 | 0.322 |
| *SIZE* | 14429 | 21.830 | 1.265 | 20.939 | 21.679 | 22.551 | 19.116 | 25.683 |
| *INSTT* | 14429 | 0.368 | 0.235 | 0.165 | 0.357 | 0.551 | 0.004 | 0.874 |
| *DANALYST* | 14429 | 0.725 | 0.446 | 0.000 | 1.000 | 1.000 | 0.000 | 1.000 |
| *TOP10* | 14429 | 0.424 | 0.494 | 0.000 | 0.000 | 1.000 | 0.000 | 1.000 |
| *OFFER* | 14429 | 0.094 | 0.292 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *SOE* | 14429 | 0.459 | 0.498 | 0.000 | 0.000 | 1.000 | 0.000 | 1.000 |

Panel B：R&D expenditure disclosure

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | *R&D\_DISC* =1(n=8680) | | | *R&D\_DISC*=0(n=5749) | | |
| Mean | Median | Std Dev | Mean | Median | Std Dev |
| *PATENT1&2* | 19.026 | 3.000 | 97.044 | 5.539 | 0.000 | 52.571 |
| *PATENT1* | 10.004 | 1.000 | 74.641 | 2.487 | 0.000 | 23.282 |
| *PPE* | 0.238 | 0.209 | 0.151 | 0.263 | 0.227 | 0.209 |
| *LAGQ* | 2.489 | 2.011 | 1.571 | 2.442 | 1.816 | 1.859 |
| *AGE* | 8.088 | 7.000 | 5.841 | 11.396 | 12.000 | 4.865 |
| *LEV* | 0.429 | 0.426 | 0.214 | 0.539 | 0.548 | 0.220 |
| *PROP\_ INDU* | 0.790 | 0.903 | 0.240 | 0.327 | 0.290 | 0.249 |
| *NUM\_INDU* | 97.946 | 89.000 | 58.344 | 81.260 | 78.000 | 46.035 |
| *HHI* | 0.117 | 0.074 | 0.115 | 0.107 | 0.073 | 0.103 |
| *CR4* | 0.476 | 0.455 | 0.187 | 0.474 | 0.444 | 0.182 |
| *PR\_SD* | 1.079 | 0.196 | 4.749 | 3.374 | 0.349 | 9.836 |
| *TECHINDU* | 0.282 | 0.000 | 0.450 | 0.086 | 0.000 | 0.281 |
| *DLOSS* | 0.089 | 0.000 | 0.284 | 0.122 | 0.000 | 0.327 |
| *RETVOL* | 0.127 | 0.117 | 0.047 | 0.148 | 0.139 | 0.059 |
| *SIZE* | 21.816 | 21.631 | 1.211 | 21.851 | 21.770 | 1.343 |
| *INSTT* | 0.377 | 0.376 | 0.237 | 0.355 | 0.331 | 0.230 |
| *DANALYST* | 0.786 | 1.000 | 0.410 | 0.634 | 1.000 | 0.482 |
| *TOP10* | 0.492 | 0.000 | 0.500 | 0.321 | 0.000 | 0.467 |
| *OFFER* | 0.096 | 0.000 | 0.295 | 0.091 | 0.000 | 0.288 |
| *SOE* | 0.388 | 0.000 | 0.487 | 0.567 | 1.000 | 0.496 |
| % of Observations with Patent Activity | 64.25% |  |  |  | 17.03% |  |

Variables are as defined in Table 1.

**Table 3 Correlation matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| *1 R&D\_DISC* | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *2 PATENT1&2* | 0.08\* | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *3 PATENT1* | 0.06\* | 0.94\* | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *4 PPE* | -0.07\* | -0.01 | -0.02\* | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *5 LAGQ* | 0.01 | -0.05\* | -0.03\* | -0.13\* | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *6 AGE* | -0.28\* | -0.01 | 0.00 | 0.02\* | -0.09\* | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |
| *7 LEV* | -0.24\* | 0.03\* | 0.03\* | 0.11\* | -0.22\* | 0.36\* | 1.00 |  |  |  |  |  |  |  |  |  |  |  |
| *8 PROP\_ INDU* | 0.68\* | 0.11\* | 0.07\* | -0.07\* | 0.06\* | -0.22\* | -0.25\* | 1.00 |  |  |  |  |  |  |  |  |  |  |
| *9 NUM\_INDU* | 0.15\* | 0.06\* | 0.06\* | -0.20\* | 0.00 | 0.00 | -0.08\* | 0.21\* | 1.00 |  |  |  |  |  |  |  |  |  |
| *10 TECHINDU* | 0.24\* | 0.06\* | 0.07\* | -0.15\* | 0.20\* | -0.12\* | -0.23\* | 0.33\* | 0.33\* | 1.00 |  |  |  |  |  |  |  |  |
| *11 DLOSS* | -0.05\* | -0.02\* | -0.01 | 0.13\* | 0.01 | 0.11\* | 0.23\* | -0.01 | -0.03\* | -0.03\* | 1.00 |  |  |  |  |  |  |  |
| *12 RETVOL* | -0.20\* | -0.06\* | -0.04\* | -0.01 | 0.03\* | -0.06\* | 0.08\* | -0.27\* | -0.11\* | 0.01 | 0.07\* | 1.00 |  |  |  |  |  |  |
| *13 SIZE* | -0.01 | 0.21\* | 0.16\* | 0.09\* | -0.40\* | 0.20\* | 0.34\* | -0.09\* | -0.02 | -0.17\* | -0.13\* | -0.19\* | 1.00 |  |  |  |  |  |
| *14 INSTT* | 0.05\* | 0.10\* | 0.08\* | 0.02\* | -0.04\* | 0.15\* | 0.09\* | 0.03\* | 0.02\* | -0.01 | -0.11\* | -0.24\* | 0.40\* | 1.00 |  |  |  |  |
| *15 DANALYST* | 0.17\* | 0.08\* | 0.06\* | -0.01 | -0.01 | -0.23\* | -0.14\* | 0.09\* | 0.02\* | 0.05\* | -0.23\* | -0.12\* | 0.33\* | 0.25\* | 1.00 |  |  |  |
| *16 TOP10* | 0.17\* | 0.06\* | 0.05\* | -0.02\* | -0.06\* | -0.02\* | -0.04\* | 0.19\* | 0.07\* | 0.02\* | -0.02\* | -0.19\* | 0.17\* | 0.13\* | 0.11\* | 1.00 |  |  |
| *17 SOE* | -0.18\* | 0.02\* | 0.01 | 0.19\* | -0.17\* | 0.31\* | 0.25\* | -0.25\* | -0.10\* | -0.13\* | 0.04\* | 0.04\* | 0.31\* | 0.22\* | -0.01 | -0.02\* | 1.00 |  |
| *18 OFFER* | 0.01 | 0.00 | 0.00 | 0.02\* | 0.00 | -0.03\* | 0.06\* | -0.01 | -0.01 | 0.01 | -0.04\* | 0.06\* | 0.05\* | 0.05\* | 0.08\* | -0.01 | 0.00 | 1.00 |

Pearson correlation coefficients are reported below the diagonal. \* p<0.05 two-tailed. Variables are as defined in Table 1.

**Table 4 Patent Applications of Firms Disclosing vs. Without Disclosing R&D Expenditure**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Matched Sample | | | | Overall Sample | | | |
| Mean | | Differences in | | Mean | | Differences in | |
| *R&D\_DISC*=1  (1) | *R&D\_DISC*=0  (2) | Means  (3)=(1)-(2) | p-values  (4) | *R&D\_DISC*=1(5) | *R&D\_DISC*=0(6) | Means  (7)=(5)-(6) | p-value  (8) |
| Patent Application: |  |  |  |  |  |  |  |  |
| *PATENT1&2* | 10.798 | 10.637 | 0.161 | 0.948 | 19.026 | 5.539 | 13.652 | 0.000 |
| *PATENT1* | 5.694 | 4.836 | 0.858 | 0.525 | 10.004 | 2.487 | 7.516 | 0.000 |
|  |  |  |  |  |  |  |  |  |
| Matching variables: |  |  |  |  |  |  |  |  |
| *PPE* | 0.267 | 0.269 | -0.002 | 0.792 | 0.238 | 0.263 | -0.025 | 0.000 |
| *LAGQ* | 2.489 | 2.488 | 0.002 | 0.974 | 2.489 | 2.442 | 0.047 | 0.102 |
| *AGE* | 10.690 | 10.477 | 0.214 | 0.222 | 8.088 | 11.396 | -3.309 | 0.000 |
| *LEV* | 0.520 | 0.515 | 0.005 | 0.517 | 0.429 | 0.539 | -0.110 | 0.000 |
| *PROP\_ INDU* | 0.504 | 0.497 | 0.008 | 0.356 | 0.790 | 0.327 | 0.463 | 0.000 |
|  |  |  |  |  |  |  |  |  |
| Observations | 1886 | 1886 |  |  | 8680 | 5749 |  |  |
| % of Observations with Patent Activity | 41.89% | 25.61% |  |  | 64.25% | 17.03% |  |  |

The sample period is 2007-2014 inclusive due to R&D expenditure data availability. Control firms are matched on the nearest propensity score based on the following probit model:

Treatment group = *f* (*PPE, LAGQ, AGE, LEV, PROP\_INDU, Year Fixed Effects*)

Treatment group takes 1 if firms reported missing R&D expenditure; 0 otherwise. Variables are as defined in Table 1.

**Table 5 Regression Analysis (Matched Sample)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variables | *R&D\_DISC*=1 vs. *R&D\_DISC*=0 | | *PSEUDO-BLANK* =1 vs. *R&D\_DISC*=1 | | *PSEUDO-BLANK* =1 vs. *R&D\_DISC*=1 with Patent Activity | |
| *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* |
| (1) | (2) | (3) | (4) | (5) | (6) |
| *R&D\_DISC* | 0.016 | 0.121 | -0.573 | -0.289 | 0.101 | 0.362 |
|  | (0.053) | (0.345) | (-1.601) | (-0.675) | (0.297) | (0.831) |
| *PPE* | 0.317 | 0.401 | -2.660\*\* | -3.120\* | -0.559 | -1.103 |
|  | (0.279) | (0.304) | (-2.087) | (-1.914) | (-0.327) | (-0.498) |
| *LAGQ* | -0.764\*\*\* | -0.712\*\*\* | -0.316\*\*\* | -0.309\*\*\* | -0.224\* | -0.167 |
|  | (-4.608) | (-4.596) | (-4.142) | (-3.321) | (-1.712) | (-1.221) |
| *AGE* | -0.054\* | -0.060\*\* | 0.002 | -0.010 | 0.033 | 0.034 |
|  | (-1.885) | (-2.136) | (0.054) | (-0.343) | (1.150) | (1.224) |
| *LEV* | -0.050 | 0.277 | 0.928 | 1.403\* | 1.885\* | 3.055\*\* |
|  | (-0.077) | (0.482) | (1.326) | (1.928) | (1.677) | (2.116) |
| *PROP\_ INDU* | 1.958\*\*\* | 2.443\*\*\* | 0.424 | -0.036 | 1.510 | 1.922 |
|  | (2.906) | (3.497) | (0.441) | (-0.028) | (1.178) | (1.415) |
| Constant | 0.774 | 0.326 | 1.985\*\*\* | 1.616\*\* | 0.970 | 0.177 |
|  | (1.019) | (0.430) | (2.956) | (2.178) | (1.276) | (0.196) |
| Year & Industry Dummies | Y | Y | Y | Y | Y | Y |
|  |  |  |  |  |  |  |
| Observations | 3348 | 3348 | 1470 | 1470 | 1124 | 1124 |
| Pseudo R2 | 0.436 | 0.419 | 0.433 | 0.389 | 0.424 | 0.429 |

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1 two-tailed. Robust z-statistics in parentheses are based on company-level clustering. The sample period is 2007-2014 inclusive due to R&D expenditure data availability.

Use the following Poisson Regression Model:

*PATENT1&2*（*PATENT1*）=*f*（*PPE*，*LAGQ*，*AGE*，*LEV*，*PROP\_INDU*，*YEAR AND INDUSTRY FIXED EFFECTS*）。

Variables are as defined in Table1.

**Table 6 Firms without Disclosing R&D Expenditure but with Patent Application vs. Firms Disclosing R&D Expenditure and Patent Application**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Panel A：Firms without disclosing R&D expenditure but with patent application vs. Firms disclosing R&D expenditure | | | | | | | | | | |
| Variable | Matched Sample | | | | | Overall Sample | | | | |
| *R&D\_DISC*=1（n=765） | | *PSEUDO-BLANK* =1（n=765） | | Diff. | *R&D\_DISC*=1（n=8680） | | *PSEUDO-BLANK* =1（n=979） | | Diff. |
| Mean  （1） | Std Dev  （2） | Mean  （3） | Std Dev  （4） | （5）=（1）-（3） | Mean  （6） | Std Dev  （7） | Mean  （8） | Std Dev  （9） | （10）=（6）-（8） |
| Patent Application: |  |  |  |  |  |  |  |  |  |  |
| *PATENT1&2* | 16.119 | 117.825 | 32.345 | 129.293 | -16.226\*\* | 19.026 | 97.044 | 32.528 | 123.952 | -13.502\*\*\* |
| *PATENT1* | 10.707 | 105.088 | 14.750 | 57.534 | -4.043 | 10.003 | 74.641 | 14.606 | 54.851 | -4.602\* |
|  |  |  |  |  |  |  |  |  |  |  |
| Matching Variables: |  |  |  |  |  |  |  |  |  |  |
| *PPE* | 0.284 | 0.166 | 0.278 | 0.174 | 0.006 | 0.238 | 0.151 | 0.284 | 0.175 | -0.045\*\*\* |
| *LAGQ* | 2.331 | 1.425 | 2.371 | 1.582 | -0.040 | 2.489 | 1.571 | 2.309 | 1.506 | 0.180\*\*\* |
| *AGE* | 9.339 | 5.072 | 8.935 | 4.527 | 0.404 | 8.088 | 5.841 | 8.950 | 4.462 | -0.862\*\*\* |
| *LEV* | 0.524 | 0.206 | 0.512 | 0.198 | 0.012 | 0.429 | 0.214 | 0.518 | 0.195 | -0.088\*\*\* |
| *PROP\_INDU* | 0.520 | 0.260 | 0.514 | 0.245 | 0.006 | 0.790 | 0.240 | 0.476 | 0.242 | 0.314\*\*\* |
| % of Observations with Patent Activity | 49.54% |  |  | 100% |  | 64.25% |  | 100% |  | |

Table 6 (continued)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Panel B：Firms disclosing R&D expenditure but with patent application vs. firms disclosing R&D and with patent application | | | | | | | | | | |
| Variable | Matched Sample | | | | | Overall Sample | | | | |
| *R&D\_DISC*=1 with Patent Activity（n=587） | | *PSEUDO-BLANK* =1（n=587） | | Diff. | *R&D\_DISC*=1 with Patent Activity（n=5580） | | *PSEUDO-BLANK* =1（n=980） | | Diff. |
| Mean  （1） | Std Dev  （2） | Mean  （3） | Std Dev  （4） | （5）=（1）-（3） | Mean  （6） | Std Dev  （7） | Mean  （8） | Std Dev  （9） | （10）=（6）-（8） |
| Patent Application: |  |  |  |  |  |  |  |  |  |  |
| *PATENT1&2* | 35.937 | 181.513 | 38.341 | 147.291 | -2.404 | 29.612 | 119.770 | 32.528 | 123.952 | -2.916 |
| *PATENT1* | 23.165 | 160.262 | 17.664 | 66.052 | 5.501 | 15.570 | 92.655 | 14.606 | 54.851 | 0.964 |
|  |  |  |  |  |  |  |  |  |  |  |
| Matching Variables: |  |  |  |  |  |  |  |  |  |  |
| *PPE* | 0.267 | 0.164 | 0.273 | 0.165 | -0.006 | 0.232 | 0.141 | 0.284 | 0.175 | -0.051\*\*\* |
| *LAGQ* | 2.435 | 1.606 | 2.395 | 1.576 | 0.040 | 2.455 | 1.461 | 2.309 | 1.506 | 0.146\*\*\* |
| *AGE* | 8.761 | 5.010 | 8.635 | 4.596 | 0.126 | 6.874 | 5.336 | 8.950 | 4.462 | -2.076\*\*\* |
| *LEV* | 0.506 | 0.192 | 0.493 | 0.197 | 0.013 | 0.404 | 0.207 | 0.518 | 0.195 | -0.113\*\*\* |
| *PROP\_INDU* | 0.570 | 0.234 | 0.564 | 0.238 | 0.006 | 0.847 | 0.190 | 0.476 | 0.242 | 0.371\*\*\* |
| % of Observations with Patent Activity | 100% | | 100% |  | | 100% |  | 100% |  | |

The sample period is 2007-2014 inclusive due to R&D expenditure data availability. In Panel A, matched sample companies are drawn from Pseudo-Blank companies and Positive R&D companies and are matched on the nearest propensity score based on the following probit model:

Treatment group = *f* (*PPE, LAGQ, AGE, LEV, PROP\_INDU, Year Fixed Effects*)

Treatment group takes 1 if firms reported positive R&D expenditure; 0 if Pseudo-Blank companies.

In panel B, matched sample companies are drawn from Pseudo-Blank companies and Positive R&D companies with patent activity and are matched on the nearest propensity score based on the following probit model:

Treatment group = *f* (*PPE, LAGQ, AGE, LEV, PROP\_INDU, Year Fixed Effects*)

Treatment group takes 1 if firms reported positive R&D expenditure with patent activity; 0 if Pseudo-Blank companies.

Variables are as defined in Table 1.

**Table 7 Product Market Competition and R&D Expenditure Disclosure（PSM Matching Sample ）**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variables | *NUM\_INDU* | | | *HHI* | | | *CR4* | | *PR\_SD* |
| （1） | | （2） | | | （3） | | | （4） |
| *COMPETITION* | 0.011\*\* | -3.848 | | | -3.019\* | | | -0.015 | |
|  | (2.516) | (-1.325) | | | (-1.812) | | | (-1.433) | |
| *TECHINDU* | -0.004 | -0.126 | | | -0.206 | | | -0.041 | |
|  | (-0.003) | (-0.111) | | | (-0.187) | | | (-0.036) | |
| *DLOSS* | 0.390 | 0.353 | | | 0.364 | | | 0.343 | |
|  | (1.389) | (1.270) | | | (1.301) | | | (1.235) | |
| *RETVOL* | 0.179 | 0.456 | | | 0.477 | | | 0.372 | |
|  | (0.106) | (0.274) | | | (0.283) | | | (0.222) | |
| *SIZE* | 0.140 | 0.164\* | | | 0.164\* | | | 0.162\* | |
|  | (1.484) | (1.751) | | | (1.735) | | | (1.721) | |
| *INSTT* | -0.007 | -0.096 | | | -0.075 | | | -0.089 | |
|  | (-0.022) | (-0.289) | | | (-0.225) | | | (-0.268) | |
| *DANALYST* | -0.622\*\*\* | -0.641\*\*\* | | | -0.639\*\*\* | | | -0.619\*\*\* | |
|  | (-3.117) | (-3.211) | | | (-3.220) | | | (-3.119) | |
| *TOP 10* | -0.287\* | -0.283\* | | | -0.287\* | | | -0.289\* | |
|  | (-1.727) | (-1.695) | | | (-1.726) | | | (-1.734) | |
| *OFFER* | -0.106 | -0.088 | | | -0.095 | | | -0.082 | |
|  | (-0.536) | (-0.449) | | | (-0.482) | | | (-0.419) | |
| *SOE* | -0.288 | -0.286 | | | -0.293 | | | -0.292 | |
|  | (-1.597) | (-1.583) | | | (-1.617) | | | (-1.611) | |
| *PPE* | 0.194 | 0.229 | | | 0.214 | | | 0.153 | |
|  | (0.317) | (0.377) | | | (0.353) | | | (0.252) | |
| *LAGQ* | -0.004 | -0.001 | | | -0.005 | | | -0.001 | |
|  | (-0.077) | (-0.022) | | | (-0.093) | | | (-0.023) | |
| *AGE* | -0.001 | -0.002 | | | -0.002 | | | -0.001 | |
|  | (-0.064) | (-0.115) | | | (-0.094) | | | (-0.036) | |
| *LEV* | -0.657 | -0.676 | | | -0.674 | | | -0.652 | |
|  | (-1.286) | (-1.331) | | | (-1.327) | | | (-1.281) | |
| *PROP\_INDU* | 1.304 | 1.494 | | | 1.413 | | | 1.390 | |
|  | (1.480) | (1.558) | | | (1.577) | | | (1.410) | |
| Constant | -1.601 | -1.801 | | | -0.764 | | | -2.065 | |
|  | (-0.749) | (-0.843) | | | (-0.339) | | | (-0.969) | |
| Year & Industry Dummies | Y | | Y | | | Y | | | Y |
|  |  | |  | | |  | | |  |
| Observations | 1167 | | 1167 | | | 1167 | | | 1167 |
| Pseudo R2 | 0.051 | | 0.047 | | | 0.048 | | | 0.047 |

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1 two tailed. Robust z-statistics in parentheses are based on company-level clustering. The sample period is 2007-2014 inclusive due to R&D expenditure data availability. Control companies are matched on the nearest propensity score based on the following probit model:

Treatment group = *f* (*PPE, LAGQ, AGE, LEV, PROP\_INDU, Year Fixed Effects*)

Treatment group takes 1 if firms are Pseudo-Blank companies; 0 if firms reported positive R&D expenditure with patent activity.

*COMPETITION* represents *NUM\_INDU*, *HHI, CR4* and *PR\_SD* in Column (1), (2), (3) and (4) respectively.

Variables are as defined in Table1.

**Appendix T1: Sample Distribution by Industry**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Industry code | Industry | Sample size | Without disclosure of R&D: Sample size | % of non-disclosure |
| A | Agriculture, forestry, animal husbandry and fishery | 244 | 119 | 48.77% |
| B | Mining industry | 437 | 204 | 46.68% |
| C13 | Agricultural and sideline food processing industry | 206 | 75 | 36.41% |
| C14 | Food manufacturing | 133 | 39 | 29.32% |
| C15 | Alcohol, beverage and refined tea manufacturing | 259 | 140 | 54.05% |
| C17 | Textile industry | 277 | 98 | 35.38% |
| C18 | Textile garment and apparel industry | 148 | 37 | 25.00% |
| C19 | Leathers, furs, feathers and related products and footwear industry | 26 | 6 | 23.08% |
| C20 | Wood processing and wood, bamboo, rattan, Palm fiber, and straw product industry | 52 | 21 | 40.38% |
| C21 | Furniture manufacturing | 14 | 2 | 14.29% |
| C22 | Papermaking and paper product industry | 180 | 64 | 35.56% |
| C23 | Printing and recording media reproduction industry | 40 | 10 | 25.00% |
| C24 | Manufacturing of stationery, industrial arts, sports and entertainment supplies | 36 | 0 | 0.00% |
| C25 | Industries of petroleum processing, coking, and nuclear fuel processing | 132 | 69 | 52.27% |
| C26 | Manufacturing of chemical raw materials and chemical products | 1024 | 273 | 26.66% |
| C27 | Pharmaceutical industry | 879 | 170 | 19.34% |
| C28 | Chemical fiber manufacturing | 153 | 58 | 37.91% |
| C29 | Industry of rubber and plastic products | 242 | 46 | 19.01% |
| C30 | Industry of non-metallic mineral products | 437 | 184 | 42.11% |
| C31 | Industry of ferrous metal smelting and rolling processing | 249 | 83 | 33.33% |
| C32 | Industry of non-ferrous metal smelting and rolling processing | 330 | 85 | 25.76% |
| C33 | Metal product industry | 214 | 34 | 15.89% |
| C34 | General equipment manufacturing | 495 | 41 | 8.28% |
| C35 | Special-purpose equipment manufacturing | 610 | 62 | 10.16% |
| C36 | Automobile manufacturing | 463 | 86 | 18.57% |
| C37 | Manufacturing of railways, ships, aircrafts, spacecrafts and other transportation equipment | 216 | 50 | 23.15% |
| C38 | Electric machinery and equipment manufacturing | 804 | 125 | 15.55% |
| C39 | Manufacturing of computers, communications and other electronic equipment | 1123 | 183 | 16.30% |
| C40 | Instrument and meter manufacturing | 87 | 6 | 6.90% |
| C41 | Other manufacturing industries | 76 | 19 | 25.00% |
| D | Industry of electric power, heat, gas and water production and supply | 587 | 425 | 72.40% |
| E | Construction industry | 356 | 145 | 40.73% |
| F | Wholesale and retail industry | 1043 | 813 | 77.95% |
| G | Transport, storage and postal service industry | 544 | 460 | 84.56% |
| H | Accommodation and catering industry | 96 | 87 | 90.63% |
| I | Industry of information transmission, software and information technology services | 575 | 92 | 16.00% |
| K | Real estate industry | 983 | 891 | 90.64% |
| L | Leasing and commercial service industry | 133 | 103 | 77.44% |
| M | Scientific research and technical service industry | 50 | 4 | 8.00% |
| N | Water conservancy, environment and public facility management industry | 148 | 107 | 72.30% |
| Q | Health and social work | 16 | 10 | 62.50% |
| R | Industry of culture, sports and entertainment | 139 | 97 | 69.78% |
| S | Diversified industries | 173 | 126 | 72.83% |
| Summary |  | 14429 | 5749 | 39.84% |

**Appendix T2: Robust Tests（PSM Matching Sample with Lag One Period Patent Application）**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Without disclosure vs. Disclosure | | Without disclosure but with patent application vs. disclosure with patent application | | Without disclosure but with patent application vs. disclosure with patent application | |
| *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* |
| （1） | （2） | （3） | （4） | （5） | （6） |
| *R&D\_DISC* | 0.203 | 0.508 | -0.755\*\* | -0.492 | -0.104 | 0.0433 |
|  | (0.558) | (1.113) | (-2.233) | (-1.205) | (-0.394) | (0.143) |
| *PPE* | 0.497 | 0.187 | -1.174 | -1.682 | -0.542 | -0.817 |
|  | (0.331) | (0.100) | (-0.917) | (-1.207) | (-0.456) | (-0.585) |
| *LAGQ* | -0.538\*\*\* | -0.531\*\*\* | -0.246\*\* | -0.137 | -0.297\*\*\* | -0.253\*\* |
|  | (-3.786) | (-3.889) | (-2.222) | (-1.282) | (-2.862) | (-2.404) |
| *AGE* | -0.039 | -0.046\* | 0.012 | -0.002 | 0.038 | 0.036 |
|  | (-1.375) | (-1.729) | (0.346) | (-0.067) | (1.269) | (1.242) |
| *LEV* | 1.009 | 1.713\* | 1.018 | 1.493\*\* | 1.567\*\* | 2.086\*\* |
|  | (1.168) | (1.914) | (1.359) | (1.963) | (2.130) | (2.393) |
| *PROP\_ INDU* | 2.158\*\*\* | 2.298\*\*\* | 0.461 | 0.737 | 0.723 | 0.988 |
|  | (2.820) | (2.810) | (0.493) | (0.638) | (0.731) | (0.774) |
| Constant | 0.274 | -0.260 | 1.366\* | 1.034 | 0.994 | 0.734 |
|  | (0.382) | (-0.320) | (1.721) | (1.233) | (1.211) | (0.819) |
| Year & Industry Dummies | Y | Y | Y | Y | Y | Y |
|  |  |  |  |  |  |  |
| Observations | 3337 | 3337 | 1489 | 1489 | 1128 | 1128 |
| Pseudo R2 | 0.417 | 0.429 | 0.416 | 0.373 | 0.448 | 0.424 |

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1 two-tailed. Robust z-statistics in parentheses are based on company-level clustering. The sample period is 2007-2013 inclusive due to R&D expenditure data availability.

Use the following Poisson Regression Model:

*PATENT1&2*（*PATENT1*）=*f*（*PPE*，*LAGQ*，*AGE*，*LEV*，*PROP\_INDU*，*YEAR AND INDUSTRY FIXED EFFECTS*）。

Variables are as defined in Table1.

**Appendix T3: Robust Tests（PSM Matching Sample without 2008-2009 Sample Period）**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Without disclosure vs. Disclosure | | Without disclosure but with patent application vs. disclosure with patent application | | Without disclosure but with patent application vs. disclosure with patent application | |
| *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* |
| （1） | （2） | （3） | （4） | （5） | （6） |
| *R&D\_DISC* | -0.106 | 0.155 | -0.599 | -0.193 | -0.00579 | 0.366 |
|  | (-0.272) | (0.357) | (-1.375) | (-0.392) | (-0.0151) | (0.773) |
| *PPE* | -0.018 | -0.411 | -2.952\*\* | -3.691\*\* | -1.205 | -1.799 |
|  | (-0.014) | (-0.255) | (-2.216) | (-2.265) | (-0.711) | (-0.784) |
| *LAGQ* | -0.648\*\*\* | -0.552\*\* | -0.332\*\*\* | -0.344\*\*\* | -0.213\* | -0.156 |
|  | (-2.969) | (-2.551) | (-4.319) | (-3.462) | (-1.778) | (-1.216) |
| *AGE* | -0.029 | -0.038 | 0.0223 | 0.005 | 0.0621\* | 0.0553\* |
|  | (-0.884) | (-1.273) | (0.621) | (0.145) | (1.841) | (1.679) |
| *LEV* | 0.640 | 1.539\* | 0.875 | 1.579\* | 1.711 | 3.142\*\* |
|  | (0.755) | (1.880) | (1.083) | (1.904) | (1.377) | (2.082) |
| *PROP\_ INDU* | 2.084\*\*\* | 1.942\*\* | -0.551 | -1.155 | 0.462 | 0.761 |
|  | (2.777) | (2.429) | (-0.565) | (-1.019) | (0.373) | (0.607) |
| Constant | 1.117 | 0.572 | 1.887\*\*\* | 1.418\* | 1.048 | 0.0938 |
|  | (1.377) | (0.657) | (2.942) | (1.909) | (1.362) | (0.0942) |
| Year & Industry Dummies | Y | Y | Y | Y | Y | Y |
|  |  |  |  |  |  |  |
| Observations | 2842 | 2842 | 1530 | 1530 | 1174 | 1174 |
| Pseudo R2 | 0.4161 | 0.4054 | 0.4743 | 0.4692 | 0.4409 | 0.4594 |

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1 two-tailed. Robust z-statistics in parentheses are based on company-level clustering. The sample period is 2007 and 2010-2014 inclusive due to R&D expenditure data availability.

Use the following Poisson Regression Model:

*PATENT1&2*（*PATENT1*）=*f*（*PPE*，*LAGQ*，*AGE*，*LEV*，*PROP\_INDU*，*YEAR AND INDUSTRY FIXED EFFECTS*）。

Variables are as defined in Table1.

**Appendix T4: Robust Tests（Matching Sample by Industry, Year, and Size）**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Without disclosure vs. Disclosure | | Without disclosure but with patent application vs. disclosure with patent application | | Without disclosure but with patent application vs. disclosure with patent application | |
| *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* |
| （1） | （2） | （3） | （4） | （5） | （6） |
| *R&D\_DISC* | 0.116 | 0.278 | -0.324 | -0.134 | 0.184 | 0.381 |
|  | (0.311) | (0.705) | (-1.034) | (-0.386) | (0.663) | (1.195) |
| *PPE* | -0.369 | -0.321 | -0.406 | -0.563 | -0.174 | -0.372 |
|  | (-0.451) | (-0.351) | (-0.364) | (-0.468) | (-0.167) | (-0.322) |
| *LAGQ* | -0.314\*\*\* | -0.220\*\* | -0.131 | -0.0741 | -0.134 | -0.051 |
|  | (-3.136) | (-2.218) | (-1.622) | (-0.952) | (-1.549) | (-0.623) |
| *AGE* | -0.0430 | -0.043 | 0.0179 | 0.006 | 0.0490\* | 0.034 |
|  | (-1.461) | (-1.496) | (0.646) | (0.208) | (1.778) | (1.109) |
| *LEV* | 0.740 | 0.965\* | -0.134 | 0.589 | -0.016 | 0.846 |
|  | (1.600) | (1.846) | (-0.208) | (1.020) | (-0.026) | (1.491) |
| *PROP\_ INDU* | 0.864 | 1.299 | -0.027 | 1.084 | -1.076 | 0.0482 |
|  | (0.724) | (1.066) | (-0.012) | (0.465) | (-0.541) | (0.023) |
| Constant | -0.652 | -1.257 | 0.367 | -0.508 | 0.121 | -1.063 |
|  | (-0.777) | (-1.377) | (0.525) | (-0.608) | (0.170) | (-1.205) |
| Year & Industry Dummies | Y | Y | Y | Y | Y | Y |
|  |  |  |  |  |  |  |
| Observations | 1982 | 1982 | 1016 | 1016 | 800 | 800 |
| Pseudo R2 | 0.3700 | 0.3147 | 0.4301 | 0.3732 | 0.4095 | 0.3688 |

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1 two-tailed. Robust z-statistics in parentheses are based on company-level clustering. The sample period is 2007 and 2010-2014 inclusive due to R&D expenditure data availability.

Use the following Poisson Regression Model:

*PATENT1&2*（*PATENT1*）=*f*（*PPE*，*LAGQ*，*AGE*，*LEV*，*PROP\_INDU*，*YEAR AND INDUSTRY FIXED EFFECTS*）。

Variables are as defined in Table1.

**Appendix T5: Robust Tests（Overall Sample）**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Without disclosure vs. Disclosure | | Without disclosure but with patent application vs. disclosure with patent application | | Without disclosure but with patent application vs. disclosure with patent application | |
| *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* | *PATENT1&2* | *PATENT1* |
| （1） | （2） | （3） | （4） | （5） | （6） |
| *R&D\_DISC* | 0.162 | 0.558 | -0.716 | -0.337 | -0.177 | 0.213 |
|  | (0.333) | (0.938) | (-1.513) | (-0.550) | (-0.371) | (0.354) |
| *PPE* | -0.713 | -1.455 | -0.649 | -1.434 | -0.658 | -1.391 |
|  | (-0.629) | (-0.877) | (-0.557) | (-0.844) | (-0.575) | (-0.834) |
| *LAGQ* | -0.352\*\*\* | -0.347\*\*\* | -0.264\*\*\* | -0.269\*\* | -0.191\*\* | -0.187\* |
|  | (-4.073) | (-3.226) | (-3.295) | (-2.527) | (-2.501) | (-1.908) |
| *AGE* | -0.007 | -0.000 | 0.003 | 0.007 | 0.033\*\*\* | 0.037\*\*\* |
|  | (-0.518) | (-0.0224) | (0.252) | (0.626) | (2.816) | (3.029) |
| *LEV* | 1.642\*\*\* | 2.107\*\*\* | 1.721\*\*\* | 2.205\*\*\* | 1.861\*\*\* | 2.363\*\*\* |
|  | (2.914) | (2.672) | (2.978) | (2.784) | (3.198) | (2.936) |
| *PROP\_ INDU* | 1.071\*\* | 1.037\* | 0.734 | 0.692 | -0.338 | -0.440 |
|  | (1.964) | (1.777) | (1.491) | (1.370) | (-0.645) | (-0.738) |
| Constant | -0.384 | -0.754 | 0.499 | 0.147 | 0.860\* | 0.568 |
|  | (-0.778) | (-1.358) | (1.073) | (0.279) | (1.820) | (0.994) |
| Year & Industry Dummies | Y | Y | Y | Y | Y | Y |
|  |  |  |  |  |  |  |
| Observations | 14429 | 14429 | 9659 | 9659 | 6556 | 6556 |
| Pseudo R2 | 0.3544 | 0.3385 | 0.2973 | 0.2813 | 0.3179 | 0.3073 |

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1 two-tailed. Robust z-statistics in parentheses are based on company-level clustering. The sample period is 2007 and 2010-2014 inclusive due to R&D expenditure data availability.

Use the following Poisson Regression Model:

*PATENT1&2*（*PATENT1*）=*f*（*PPE*，*LAGQ*，*AGE*，*LEV*，*PROP\_INDU*，*YEAR AND INDUSTRY FIXED EFFECTS*）。

Variables are as defined in Table1.