

## ONLINE APPENDIX

**TABLE A.1: Exploring new fields share**

|  | (1)                   | (2)                    | (3)                   | (4)                    | (5)                    | (6)                    | (7)                    | (8)                    |
|--|-----------------------|------------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | New<br>comb. (ln)     | New<br>comb. (ln)      | New<br>comb. (ln)     | New<br>comb. (ln)      | Forward<br>cit. (ln)   | Forward<br>cit. (ln)   | Forward<br>cit. (ln)   | Forward<br>cit. (ln)   |
| Exploring new fields share             | 0.0846***<br>(0.0016) | 0.0623***<br>(0.0020)  | 0.0786***<br>(0.0016) | 0.0576***<br>(0.0020)  | -0.0100***<br>(0.0020) | -0.0285***<br>(0.0027) | -0.0216***<br>(0.0021) | -0.0371***<br>(0.0027) |
| Exploring new fields share*Expert team |                       | 0.0269***<br>(0.0025)  |                       | 0.0252***<br>(0.0025)  |                        | 0.0707***<br>(0.0032)  |                        | 0.0675***<br>(0.0032)  |
| Exploring new fields share *Science    |                       |                        | 0.0268***<br>(0.0030) | 0.0250***<br>(0.0030)  |                        |                        | 0.0505***<br>(0.0037)  | 0.0449***<br>(0.0037)  |
| Expert team                            |                       | -0.0430***<br>(0.0020) |                       | -0.0421***<br>(0.0020) |                        | 0.0350***<br>(0.0026)  |                        | 0.0365***<br>(0.0026)  |
| Science                                |                       |                        | -0.0013<br>(0.0020)   | -0.0005<br>(0.0020)    |                        |                        | 0.0607***<br>(0.0027)  | 0.0629***<br>(0.0027)  |
| R-squared                              | 0.539                 | 0.539                  | 0.539                 | 0.539                  | 0.066                  | 0.067                  | 0.067                  | 0.068                  |

*Notes:* The sample includes all patents of inventors that are assigned to a firm, filed and granted between 1975 and 2002. The sample is restricted to inventors with at least one prior patent (and hence are at the risk of exploring new fields), and who have at least two patents assigned to the same firm (n= 2,705,431 inventor-patent observations). All models include controls for prior patents (ln), specialization, prior collaborations (ln), move, prior move, days since last patent (ln), days since first patent (ln), team, team prior patents (ln), team specialization, firm prior patents (ln), number of classes, number of subclasses, year and technology class indicators, and inventor-firm level fixed effects. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE A.2: Field distance**

|                            | (1)                   | (2)                    | (3)                   | (4)                    | (5)                    | (6)                    | (7)                    | (8)                    |
|----------------------------|-----------------------|------------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|                            | New<br>comb. (ln)     | New<br>comb. (ln)      | New<br>comb. (ln)     | New<br>comb. (ln)      | Forward<br>cit. (ln)   | Forward<br>cit. (ln)   | Forward<br>cit. (ln)   | Forward<br>cit. (ln)   |
| Field distance             | 0.1541***<br>(0.0030) | 0.1347***<br>(0.0036)  | 0.1516***<br>(0.0031) | 0.1327***<br>(0.0037)  | -0.0158***<br>(0.0040) | -0.0412***<br>(0.0051) | -0.0290***<br>(0.0041) | -0.0517***<br>(0.0053) |
| Field distance*Expert team |                       | 0.0084**<br>(0.0041)   |                       | 0.0078*<br>(0.0041)    |                        | 0.1052***<br>(0.0058)  |                        | 0.1018***<br>(0.0058)  |
| Field distance*Science     |                       |                        | 0.0132**<br>(0.0054)  | 0.0121**<br>(0.0054)   |                        |                        | 0.0699***<br>(0.0069)  | 0.0656***<br>(0.0069)  |
| Expert team                |                       | -0.0345***<br>(0.0016) |                       | -0.0344***<br>(0.0016) |                        | 0.0680***<br>(0.0021)  |                        | 0.0683***<br>(0.0021)  |
| Science                    |                       |                        | 0.0107***<br>(0.0016) | 0.0108***<br>(0.0016)  |                        |                        | 0.0804***<br>(0.0021)  | 0.0803***<br>(0.0021)  |
| R-squared                  | 0.539                 | 0.539                  | 0.539                 | 0.539                  | 0.066                  | 0.067                  | 0.067                  | 0.068                  |

*Notes:* The sample includes all patents of inventors that are assigned to a firm, filed and granted between 1975 and 2002. The sample is restricted to inventors with at least one prior patent (and hence are at the risk of exploring new fields), and who have at least two patents assigned to the same firm (n= 2,705,431 inventor-patent observations). All models include controls for prior patents (ln), specialization, prior collaborations (ln), move, prior move, days since last patent (ln), days since first patent (ln), team, team prior patents (ln), team specialization, firm prior patents (ln), number of classes, number of subclasses, year and technology class indicators, and inventor-firm level fixed effects. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE A.3: New citation combinations and renewals**

|                                  | (1)                   | (2)                    | (3)                    | (4)                    | (5)                    | (6)                    | (7)                    | (8)                    |
|----------------------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|                                  | New cit<br>comb. (ln) | New cit<br>comb. (ln)  | New cit<br>comb. (ln)  | New cit<br>comb. (ln)  | Renewals<br>(ln)       | Renewals<br>(ln)       | Renewals<br>(ln)       | Renewals<br>(ln)       |
| Exploring new fields             | 0.1149***<br>(0.0017) | 0.0731***<br>(0.0021)  | 0.0977***<br>(0.0018)  | 0.0592***<br>(0.0022)  | -0.0117***<br>(0.0009) | -0.0095***<br>(0.0012) | -0.0125***<br>(0.0009) | -0.0102***<br>(0.0012) |
| Exploring new fields*Expert team |                       | 0.0600***<br>(0.0030)  |                        | 0.0549***<br>(0.0030)  |                        | 0.0069***<br>(0.0015)  |                        | 0.0067***<br>(0.0015)  |
| Exploring new fields*Science     |                       |                        | 0.0789***<br>(0.0040)  | 0.0745***<br>(0.0040)  |                        |                        | 0.0036**<br>(0.0015)   | 0.0031**<br>(0.0015)   |
| Expert team                      |                       | -0.0737***<br>(0.0023) |                        | -0.0716***<br>(0.0023) |                        | 0.0187***<br>(0.0011)  |                        | 0.0188***<br>(0.0011)  |
| Science                          |                       |                        | -0.0739***<br>(0.0028) | -0.0728***<br>(0.0028) |                        |                        | 0.0029***<br>(0.0010)  | 0.0030***<br>(0.0010)  |
| R-squared                        | 0.612                 | 0.612                  | 0.612                  | 0.612                  | 0.012                  | 0.012                  | 0.012                  | 0.012                  |

*Notes:* The sample includes all patents of inventors that are assigned to a firm, filed and granted between 1975 and 2002. The sample is restricted to inventors with at least one prior patent (and hence are at the risk of exploring new fields), and who have at least two patents assigned to the same firm. The sample includes 2,705,431 inventor-patent observations. Renewals are only available for patents since 1981. All models include controls for prior patents (ln), specialization, prior collaborations (ln), move, prior move, days since last patent (ln), days since first patent (ln), team, team prior patents (ln), team specialization, firm prior patents (ln), number of classes, number of subclasses, number of backward patent citations (models 1-4), year and technology class indicators, and inventor-firm level fixed effects. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE A.4: Summary statistics for inventors at risk of moving**

| Variables                    | Description  | Mean | Stdev. | Min. | Max.  |
|------------------------------|--|------|--------|------|-------|
| Sum new combinations (ln)    | Total number of new pairwise subclass combinations for all prior patents of the focal inventor.  | 2.37 | 1.81   | 0.00 | 8.27  |
| Sum forward citations (ln)   | Total number of forward citations within 10 years for all prior patents of the focal inventor.   | 3.09 | 1.63   | 0.00 | 8.75  |
| Prior patents (ln)           | Number of prior patents of the focal inventor.   | 1.92 | 0.94   | 0.69 | 5.83  |
| Specialization               | Technical specialization of the focal inventor, calculated as a Herfindahl index based on the three-digit technology classes of all prior patents of the inventor. | 0.58 | 0.31   | 0.02 | 1.00  |
| Prior collaborations (ln)    | Number of unique co-inventors on all prior patents of the focal inventor.  | 1.62 | 0.78   | 0.00 | 6.10  |
| Prior move                   | Binary: focal inventor previously moved between employers.   | 0.32 | 0.47   | 0.00 | 1.00  |
| Days since first patent (ln) | Number of days since the focal inventor's first patent application.  | 7.48 | 1.48   | 0.00 | 10.42 |
| Michigan                     | Binary: focal inventor resides in Michigan.  | 0.18 | 0.39   | 0.00 | 1.00  |
| Postmara                     | Binary: patent is filed after 1985.  | 0.46 | 0.50   | 0.00 | 1.00  |
| Move                         | Binary: first patent of the focal inventor assigned to a new firm.   | 0.08 | 0.28   | 0.00 | 1.00  |
| Michigan*Postmara            | Binary: focal inventor resides in Michigan after MARA.   | 0.07 | 0.26   | 0.00 | 1.00  |
| Michigan*Move                | Binary: first patent of the focal inventor assigned to a new firm in Michigan.   | 0.01 | 0.10   | 0.00 | 1.00  |
| Postmara*Move                | Binary: first patent of the focal inventor assigned to a new firm after MARA.  | 0.05 | 0.22   | 0.00 | 1.00  |
| Michigan*Postmara*Move       | Binary: first patent of the focal inventor assigned to a new firm in Michigan after MARA.  | 0.01 | 0.08   | 0.00 | 1.00  |

Notes: The sample includes all firm-assigned patents of inventors with at least one prior patent before MARA in a non-enforcing state, and filed between 1975 and 1995. The sample includes 162,586 inventor-patent observations and 29,956 inventors. Inventor characteristics are calculated based on all prior patents of an inventor. (ln) indicates logarithmic transformation after adding one for measures with zero values.

**TABLE A.5: Characteristics of inventors at risk of moving**

|                        | (1)<br>Sum new<br>combinations (ln) | (2)<br>Sum forward<br>citations (ln) | (3)<br>Prior<br>patents (ln) | (4)<br>Specialization | (5)<br>Prior<br>collaborations (ln) | (6)<br>Prior<br>move | (7)<br>Days since<br>first patent (ln) |
|------------------------|-------------------------------------|--------------------------------------|------------------------------|-----------------------|-------------------------------------|----------------------|--|
| Michigan               | 0.05<br>(0.08)                      | -0.13***<br>(0.05)                   | 0.09*<br>(0.06)              | -0.01<br>(0.01)       | -0.04**<br>(0.02)                   | -0.38***<br>(0.09)   | -0.00<br>(0.03)                        |
| Postmara               | 1.44***<br>(0.03)                   | 1.64***<br>(0.04)                    | 0.71***<br>(0.02)            | -0.20***<br>(0.00)    | 0.76***<br>(0.01)                   | 1.72***<br>(0.04)    | 1.58***<br>(0.01)                      |
| Move                   | -0.26***<br>(0.03)                  | -0.22***<br>(0.03)                   | -0.34***<br>(0.02)           | 0.03***<br>(0.01)     | -0.06***<br>(0.01)                  | 0.42***<br>(0.04)    | 0.43***<br>(0.02)                      |
| Michigan*Postmara      | -0.05<br>(0.09)                     | -0.13**<br>(0.06)                    | -0.08<br>(0.06)              | -0.01<br>(0.01)       | -0.04<br>(0.03)                     | -0.27***<br>(0.10)   | -0.01<br>(0.03)                        |
| Michigan*Move          | -0.15*<br>(0.09)                    | -0.06<br>(0.06)                      | -0.10<br>(0.06)              | 0.04***<br>(0.02)     | 0.00<br>(0.03)                      | 0.03<br>(0.13)       | -0.05<br>(0.05)                        |
| Postmara*Move          | -0.48***<br>(0.04)                  | -0.59***<br>(0.04)                   | -0.26***<br>(0.03)           | 0.05***<br>(0.01)     | -0.32***<br>(0.02)                  | -0.46***<br>(0.05)   | -0.42***<br>(0.02)                     |
| Michigan*Postmara*Move | -0.06<br>(0.12)                     | -0.10<br>(0.09)                      | 0.02<br>(0.07)               | -0.00<br>(0.02)       | -0.06<br>(0.04)                     | 0.22<br>(0.15)       | 0.04<br>(0.06)                         |
| Constant               | 1.75***<br>(0.02)                   | 2.42***<br>(0.02)                    | 1.62***<br>(0.01)            | 0.67***<br>(0.00)     | 1.30***<br>(0.01)                   | -1.61***<br>(0.03)   | 6.74***<br>(0.01)                      |
| Log likelihood         |                                     |                                      |                              |                       |                                     | -90047.61            |  |
| R-squared              | 0.151                               | 0.239                                | 0.144                        | 0.107                 | 0.219                               |                      | 0.276                                  |

Notes: The sample includes all firm-assigned patents of inventors with at least one prior patent before MARA (1985) in a non-enforcing state, and filed between 1975 and 1995. The sample includes 162,586 inventor-patent observations and 29,956 inventors. Inventor characteristics are calculated based on all prior patents of an inventor. All models are estimated with OLS except model (6) with logit. Robust standard errors in parentheses, clustered by inventor. The triple interaction

*Michigan\*Postmara\*Move* indicates that the population of inventors that moved between firms in Michigan after MARA, i.e. our treatment group, are not significantly different. \*\*\* p<0.01, \*\* p<0.05, \* p<0.10

**TABLE A.6: State-level enforceability of non-compete agreements**

|                        | (1)<br>New<br>comb. (ln) | (2)<br>New<br>comb. (ln) | (3)<br>Forward<br>cit. (ln) | (4)<br>Forward<br>cit. (ln) |
|------------------------|--------------------------|--------------------------|-----------------------------|-----------------------------|
| Enforcing state        | 0.0142***<br>(0.0015)    |                          | -0.1547***<br>(0.0021)      |                             |
| Enforcement index (ln) |                          | 0.0119***<br>(0.0010)    |                             | -0.0856***<br>(0.0014)      |
| Constant               | 0.0634***<br>(0.0033)    | 0.0540***<br>(0.0035)    | 4.0449***<br>(0.0047)       | 4.0592***<br>(0.0050)       |
| R-squared              | 0.537                    | 0.537                    | 0.237                       | 0.236                       |

Notes: The sample includes all patents of inventors with a U.S. address that are assigned to a firm, filed and granted between 1992 and 2002 (n= 1,184,966 inventor-patent observations). All models include controls for number of classes, number of subclasses, year and technology class indicators. *Enforcing state* is a binary indicator equal to one for inventor address in enforcing state (non-enforcing states are Alaska, California, Connecticut, Minnesota, Montana, North Dakota, Nevada, Oklahoma, Washington, West Virginia). *Enforcement index (ln)* is a state-level and time-varying index of the enforceability of non-compete agreements from Garmaise (2009), available for 1992-2004, ranging from 0 to 9, log transformed after adding one. Higher index means increased enforceability. All models are estimated with OLS. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE A.7: Michigan experiment**

|                   | (1)<br>New<br>comb. (ln) | (2)<br>Forward<br>cit. (ln) |
|-------------------|--------------------------|-----------------------------|
| Michigan          | -0.0584***<br>(0.0046)   | -0.0433***<br>(0.0057)      |
| Postmara          | -0.3495***<br>(0.0067)   | 0.8309***<br>(0.0088)       |
| Michigan*Postmara | 0.0345***<br>(0.0057)    | -0.0409***<br>(0.0073)      |
| Constant          | -0.4675***<br>(0.0457)   | 0.5545***<br>(0.0440)       |
| R-squared         | 0.607                    | 0.313                       |

Notes: The sample includes all patents of inventors from Michigan or other non-enforcing states (Alaska, California, Connecticut, Minnesota, Montana, North Dakota, Nevada, Oklahoma, Washington, West Virginia) that are assigned to a firm, filed between 1975 and 1995 (n= 388,366 inventor-patent observations). All models include controls for number of classes, number of subclasses, year and technology class indicators. All models are estimated with OLS. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE A.8: Likelihood to invent a breakthrough**

|                                  | (1)<br>Forward<br>cit. top 5% | (2)<br>Forward<br>cit. top 5% | (3)<br>Forward<br>cit. top 5% | (4)<br>Forward<br>cit. top 5% |
|----------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Exploring new fields             | 0.0475***<br>(0.0096)         | 0.0297**<br>(0.0134)          | 0.0083<br>(0.0108)            | -0.0025<br>(0.0140)           |
| Exploring new fields*Expert team |                               | 0.1233***<br>(0.0170)         |                               | 0.1145***<br>(0.0170)         |
| Exploring new fields*Science     |                               |                               | 0.1383***<br>(0.0171)         | 0.1294***<br>(0.0172)         |
| Expert team                      |                               | 0.1341***<br>(0.0129)         |                               | 0.1372***<br>(0.0129)         |
| Science                          |                               |                               | 0.2531***<br>(0.0102)         | 0.2552***<br>(0.0102)         |
| Prior patents (ln)               | -0.3597***<br>(0.0125)        | -0.3505***<br>(0.0125)        | -0.3554***<br>(0.0125)        | -0.3460***<br>(0.0125)        |
| Specialization                   | -0.1860***<br>(0.0229)        | -0.1825***<br>(0.0229)        | -0.1841***<br>(0.0229)        | -0.1812***<br>(0.0229)        |
| Prior collaborations (ln)        | 0.0383***<br>(0.0105)         | 0.0483***<br>(0.0106)         | 0.0406***<br>(0.0105)         | 0.0496***<br>(0.0107)         |
| Move                             | 0.0680***<br>(0.0180)         | 0.0682***<br>(0.0180)         | 0.0622***<br>(0.0180)         | 0.0626***<br>(0.0180)         |
| Prior move                       | 0.0057<br>(0.0178)            | 0.0042<br>(0.0178)            | 0.0072<br>(0.0178)            | 0.0058<br>(0.0178)            |
| Days since last patent (ln)      | 0.0166***<br>(0.0019)         | 0.0162***<br>(0.0019)         | 0.0175***<br>(0.0019)         | 0.0171***<br>(0.0019)         |
| Days since first patent (ln)     | -0.0047<br>(0.0053)           | -0.0042<br>(0.0053)           | -0.0049<br>(0.0053)           | -0.0043<br>(0.0053)           |
| Team                             | 0.3215***<br>(0.0136)         | 0.2790***<br>(0.0142)         | 0.3189***<br>(0.0137)         | 0.2757***<br>(0.0142)         |
| Team prior patents (ln)          | 0.0111*<br>(0.0064)           | -0.0173**<br>(0.0068)         | 0.0095<br>(0.0064)            | -0.0191***<br>(0.0068)        |
| Team specialization              | 0.1508***<br>(0.0237)         | 0.1914***<br>(0.0238)         | 0.1494***<br>(0.0237)         | 0.1899***<br>(0.0238)         |
| Firm prior patents (ln)          | -0.2409***<br>(0.0105)        | -0.2454***<br>(0.0105)        | -0.2425***<br>(0.0105)        | -0.2469***<br>(0.0105)        |
| Log likelihood                   | -239185.6                     | -239015.65                    | -238670.73                    | -238505.93                    |

Notes: The sample includes all patents of inventors that are assigned to a firm, filed and granted between 1975 and 2002. The sample is restricted to inventors with at least one prior patent (and hence are at the risk of exploring new fields), and who have at least two patents assigned to the same firm (n= 2,705,431 inventor-patent observations). All models include controls for number of classes, number of subclasses, year and technology class indicators. *Forward cit. top 5%* is a binary indicator equal to one for patents in the top 5% in terms of forward citations in the group of patents from the same class and year. The models are estimated with an inventor-firm level fixed-effects logit. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1