

Early disclosure of invention and reduced duplication: an empirical test

Appendices

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September 2019

Abstract

Much work on innovation strategy assumes or theorizes that competition in innovation elicits duplication of research and that disclosure decreases such duplication. We validate this empirically using the American Inventors Protection Act (AIPA), three complementary identification strategies and a new measure of blocked future patent applications. We show that AIPA – intended to reduce duplication, through default disclosure of patent applications 18 months after filing – reduced duplication in the US and European patent systems. The blocking measure provides a clear and micro measure of technological competition that can be aggregated to facilitate the empirical investigation of innovation, firm strategy, and the positive and negative externalities of patenting.

JEL-Classification: O31, O33

Keywords: AIPA, Duplicative Research, Knowledge Disclosure, Patents

Appendix A: Descriptive statistics, robustness checks, and alternative models

Table A1a: Descriptive statistics

Blocking actions					
	Obs	Mean	SD	Min	Max
<i>One month window</i>					
Number of 102 & 103 blockings	17382	1.58	3.76	0.00	187.00
Number of 102 & 103 blockings (in log)	17382	0.54	0.78	0.00	5.24
Number of X & Y blockings	17382	0.23	0.85	0.00	21.00
Number of X & Y blockings (in log)	17382	0.11	0.35	0.00	3.09
Fraction of X & Y blockings	17382	0.06	0.18	0.00	1.00
<i>One year window</i>					
Number of 102 & 103 blockings	191220	1.50	3.46	0.00	189.00
Number of 102 & 103 blockings (in log)	191220	0.52	0.76	0.00	5.25
Number of X & Y blockings	191275	0.23	0.92	0.00	48.00
Number of X & Y blockings (in log)	191275	0.11	0.35	0.00	3.89
Fraction of X & Y blockings	191275	0.06	0.18	0.00	1.00

Notes: This table reports descriptive statistics on all eventually granted patents filed with the USPTO one month, respectively, one year before and after AIPA became effective on November 29, 2000, which had no parallel foreign filing. The number of blocking actions is the number of times a given patent was referenced as a blocking patent (102 and 103) in the 4.4. Million office actions the USPTO issued between March 2008 and June 2017. The number of X and Y blockings is the number of times a given US patent was cited and classified as such by an EPO patent examiner in his official search report within 8 years since the referenced US patent was filed.

Table A1b: Top 3 blocking patents in US and European systems

Patent	Number of 102&103 blockings	Assignee	Patent title	NBER
US6587835	189	F POSZAT HU LLC	Shopping assistance with handheld computing device	Computers & Communications
US6603008	187	Pfizer Inc	Sulfamoylheteroaryl pyrazole compounds as anti-inflammatory/analgesic agents	Chemical
US6582908	131	Affymetrix Inc	Oligonucleotides	Chemical

Patent	Number of X&Y blockings	Assignee	Patent title	NBER
US6395547	48	Codexis Mayflower Holdings LLC	Methods for generating polynucleotides having desired characteristics by iterative selection and recombination	Chemical
US6330965	42	United States Surgical Corp	Surgical stapling apparatus	Mechanical
US6489950	41	BlackBerry Ltd	Hand-held electronic device with auxiliary input device	Computers & Communications

Table A1c: Descriptive statistics: Blocked and blocked and abandoned applications

Blocked applications

One month	Obs	Mean	SD	Min	Max
Number of blocked US applications	17382	0.82	1.89	0.00	135.00
Number of blocked US applications (in log)	17382	0.40	0.56	0.00	4.91
Number of blocked EP applications	17382	0.82	1.88	0.00	135.00
Number of blocked EP applications (in log)	17382	0.40	0.56	0.00	4.91
One year	Obs	Mean	SD	Min	Max
Number of blocked US applications	191220	0.79	1.63	0.00	135.00
Number of blocked US applications (in log)	191220	0.39	0.55	0.00	4.91
Number of blocked EP applications	191275	0.79	1.63	0.00	135.00
Number of blocked EP applications (in log)	191275	0.39	0.55	0.00	4.91
Blocked and abandoned applications					
One month	Obs	Mean	SD	Min	Max
Number of abandoned US applications	17382	0.25	0.95	0.00	91.00
Number of abandoned US applications (in log)	17382	0.15	0.34	0.00	4.52
Number of abandoned EP applications	17382	0.25	0.95	0.00	91.00
Number of abandoned EP applications (in log)	17382	0.14	0.34	0.00	4.52
One year	Obs	Mean	SD	Min	Max
Number of abandoned US applications	191220	0.24	0.71	0.00	91.00
Number of abandoned US applications (in log)	191220	0.14	0.33	0.00	4.52
Number of abandoned EP applications	191275	0.24	0.71	0.00	91.00
Number of abandoned EP applications (in log)	191275	0.14	0.33	0.00	4.52

Notes: This table reports descriptive statistics on all eventually granted patents filed with the USPTO within one month, respectively, and one year before and after AIPA became effective on November 29, 2000, which had no parallel foreign filing. The number of blocking actions is the number of times a given patent was referenced as a blocking patent (102 and 103) in the 4.4. Million office actions the USPTO issued between March 2008 and June 2017. The number of X and Y blockings is the number of times a given US patent was cited and classified as such by an EPO patent examiner in his or her official search report within 8 years since the referenced US patent was filed. Blocked abandoned applications refer to the number of US and European patent applications, respectively, which elicited a 102 or 103 office action (X and Y citation), and were eventually not granted.

Table A2: Patents with at least one 102 or 103 action

Dependent variable: No. of blocked US applications (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.100*** (0.017)	-0.098*** (0.017)	-0.101*** (0.017)	-0.104*** (0.017)	-0.112*** (0.024)	-0.088*** (0.033)
N	17382	17382	17382	17382	11083	11083
R ²	0.010	0.010	0.021	0.024	0.214	0.214
PANEL 2: matched data, one month						
Post AIPA	-0.090*** (0.019)	-0.090*** (0.019)	-0.086*** (0.019)	-0.088*** (0.019)	-0.091*** (0.027)	-0.077** (0.038)
N	13490	13490	13490	13490	8280	8280
R ²	0.009	0.010	0.021	0.023	0.216	0.217
PANEL 3: raw data, one year						
Post AIPA	-0.102*** (0.005)	-0.102*** (0.005)	-0.104*** (0.005)	-0.104*** (0.005)	-0.108*** (0.006)	-0.105*** (0.009)
N	191220	191220	191220	191220	139111	139111
R ²	0.008	0.008	0.016	0.018	0.182	0.182
PANEL 4: matched data, one year						
Post AIPA	-0.102*** (0.005)	-0.102*** (0.005)	-0.102*** (0.005)	-0.103*** (0.005)	-0.106*** (0.006)	-0.106*** (0.009)
N	174518	174518	174518	174518	125398	125398
R ²	0.008	0.008	0.016	0.017	0.180	0.180
Dependent variable: No. of blocked EP applications (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.102*** (0.017)	-0.100*** (0.017)	-0.102*** (0.017)	-0.106*** (0.017)	-0.113*** (0.024)	-0.089*** (0.033)
N	17382	17382	17382	17382	11080	11080
R ²	0.010	0.010	0.022	0.024	0.214	0.215
PANEL 2: matched data, one month						
Post AIPA	-0.092*** (0.019)	-0.092*** (0.019)	-0.088*** (0.019)	-0.090*** (0.019)	-0.093*** (0.027)	-0.078** (0.038)
N	13481	13481	13481	13481	8277	8277
R ²	0.009	0.010	0.021	0.023	0.216	0.217
PANEL 3: raw data, one year						
Post AIPA	-0.103*** (0.005)	-0.103*** (0.005)	-0.104*** (0.005)	-0.105*** (0.005)	-0.109*** (0.006)	-0.107*** (0.009)
N	191275	191275	191275	191275	139133	139133
R ²	0.008	0.008	0.016	0.018	0.182	0.182
PANEL 4: matched data, one year						
Post AIPA	-0.102*** (0.005)	-0.102*** (0.005)	-0.102*** (0.005)	-0.103*** (0.005)	-0.106*** (0.006)	-0.106*** (0.009)
N	174461	174461	174461	174461	125356	125356
R ²	0.008	0.008	0.016	0.017	0.180	0.180
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: RDD models, equations (1) and (2). Tech class fixed effects based on six NBER tech classes, linear time trends per technology class using filing days. Post AIPA indicates if patent filed on or after Nov. 29, 2000. Matched data is CEM balanced sample before/after AIPA, including backward cites, 6 NBER tech classes, independent claims, dependent claims per independent claim, word count of first claim, average words per claim, attorney, and pendency. Heteroscedasticity robust standard errors.

Table A3: Blocked applications (at least one 102 or 103 and eventually abandoned)

Dependent variable: No. of blocked abandoned US applications (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.050*** (0.010)	-0.049*** (0.010)	-0.048*** (0.010)	-0.049*** (0.010)	-0.039*** (0.014)	-0.020 (0.020)
N	17382	17382	17382	17382	11083	11083
R ²	0.006	0.006	0.013	0.014	0.187	0.187
PANEL 2: matched data, one month						
Post AIPA	-0.041*** (0.011)	-0.041*** (0.011)	-0.040*** (0.011)	-0.040*** (0.011)	-0.030* (0.016)	-0.011 (0.023)
N	13490	13490	13490	13490	8280	8280
R ²	0.006	0.006	0.013	0.014	0.185	0.186
PANEL 3: raw data, one year						
Post AIPA	-0.044*** (0.003)	-0.044*** (0.003)	-0.044*** (0.003)	-0.044*** (0.003)	-0.043*** (0.004)	-0.044*** (0.005)
N	191220	191220	191220	191220	139111	139111
R ²	0.004	0.004	0.010	0.010	0.149	0.149
PANEL 4: matched data, one year						
Post AIPA	-0.042*** (0.003)	-0.042*** (0.003)	-0.042*** (0.003)	-0.042*** (0.003)	-0.042*** (0.004)	-0.044*** (0.006)
N	174518	174518	174518	174518	125398	125398
R ²	0.004	0.004	0.010	0.011	0.150	0.150
Dependent variable: No. of blocked abandoned EP applications (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.051*** (0.010)	-0.049*** (0.010)	-0.048*** (0.010)	-0.049*** (0.010)	-0.039*** (0.014)	-0.019 (0.020)
N	17382	17382	17382	17382	11080	11080
R ²	0.006	0.006	0.013	0.014	0.187	0.187
PANEL 2: matched data, one month						
Post AIPA	-0.042*** (0.011)	-0.042*** (0.011)	-0.041*** (0.011)	-0.041*** (0.011)	-0.031* (0.016)	-0.011 (0.023)
N	13481	13481	13481	13481	8277	8277
R ²	0.006	0.006	0.013	0.014	0.185	0.185
PANEL 3: raw data, one year						
Post AIPA	-0.044*** (0.003)	-0.044*** (0.003)	-0.044*** (0.003)	-0.044*** (0.003)	-0.043*** (0.004)	-0.045*** (0.005)
N	191275	191275	191275	191275	139133	139133
R ²	0.004	0.004	0.010	0.011	0.149	0.149
PANEL 4: matched data, one year						
Post AIPA	-0.042*** (0.003)	-0.042*** (0.003)	-0.042*** (0.003)	-0.043*** (0.003)	-0.042*** (0.004)	-0.044*** (0.006)
N	174461	174461	174461	174461	125356	125356
R ²	0.004	0.004	0.010	0.011	0.150	0.150
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: RDD models, equations (1) and (2). Tech class fixed effects based on six NBER tech classes, linear time trends per technology class using filing days. Post AIPA indicates if patent filed on or after Nov. 29, 2000. Matched data is CEM balanced sample before/after AIPA, including backward cites, 6 NBER tech classes, independent claims, dependent claims per independent claim, word count of first claim, average words per claim, attorney, and pendency. Heteroscedasticity robust standard errors.

Table A4: RDD one year window

Dependent variable: No. of 102 & 103 blocking actions (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.135*** (0.007)	-0.135*** (0.007)	-0.137*** (0.007)	-0.138*** (0.007)	-0.146*** (0.008)	-0.141*** (0.013)
N	191220	191220	191220	191220	139111	139111
R ²	0.007	0.007	0.016	0.017	0.177	0.177
PANEL 4: matched data, one year						
Post AIPA	-0.136*** (0.007)	-0.136*** (0.007)	-0.136*** (0.007)	-0.137*** (0.007)	-0.144*** (0.009)	-0.143*** (0.013)
N	174518	174518	174518	174518	125398	125398
R ²	0.007	0.007	0.016	0.017	0.176	0.176
Dependent variable: No. of X & Y blocking actions (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.095*** (0.003)	-0.095*** (0.003)	-0.094*** (0.003)	-0.094*** (0.003)	-0.096*** (0.004)	-0.097*** (0.006)
N	191275	191275	191275	191275	139133	139133
R ²	0.023	0.023	0.030	0.031	0.161	0.161
PANEL 4: matched data, one year						
Post AIPA	-0.094*** (0.003)	-0.094*** (0.003)	-0.094*** (0.003)	-0.094*** (0.003)	-0.094*** (0.004)	-0.096*** (0.006)
N	174461	174461	174461	174461	125356	125356
R ²	0.023	0.023	0.030	0.030	0.162	0.162
Dependent variable: Fraction of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.048*** (0.003)
N	191275	191275	191275	191275	139133	139133
R ²	0.023	0.023	0.027	0.027	0.139	0.139
PANEL 4: matched data, one year						
Post AIPA	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.047*** (0.003)
N	174461	174461	174461	174461	125356	125356
R ²	0.023	0.023	0.026	0.026	0.139	0.140
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2). Technology class fixed effects are based on six NBER technology classes, and technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one year before one year after November 29, 2000, when AIPA became effective. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a balanced sample, where patents before and after AIPA are matched (CEM) based on backward cites to capture potential differences in novelty, 6 NBER technology classes to capture differences in technological popularity, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency (time from application to grant date) to capture differences in patent scope and writing. Appendix A Table A5 shows the descriptive statistics of the matched data. Heteroscedasticity robust standard errors are presented in parentheses.

Table A5: Descriptive statistics – matched data

One month	Pre AIPA					Post AIPA					t-test
	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	
Number of 102 & 103 blockings	6745	1.82	4.48	0.00	187.00	6745	1.23	2.68	0.00	36.00	9.383
Number of 102 & 103 blockings (in log)	6745	0.60	0.81	0.00	5.24	6745	0.46	0.71	0.00	3.61	10.668
Number of X & Y blockings	6745	0.34	1.06	0.00	21.00	6745	0.13	0.60	0.00	11.00	14.159
Number of X & Y blockings (in log)	6745	0.17	0.42	0.00	3.09	6745	0.07	0.27	0.00	2.48	16.506
Fraction of X & Y blockings	6745	0.08	0.21	0.00	1.00	6745	0.04	0.15	0.00	1.00	15.562
NBER											
Chemical	6745	0.11	0.32	0.00	1.00	6745	0.11	0.32	0.00	1.00	0.000
Computers and Communications	6745	0.29	0.45	0.00	1.00	6745	0.29	0.45	0.00	1.00	0.000
Drugs and Medical	6745	0.13	0.34	0.00	1.00	6745	0.13	0.34	0.00	1.00	0.000
Electrical and Electronics	6745	0.18	0.39	0.00	1.00	6745	0.18	0.39	0.00	1.00	0.000
Mechanical	6745	0.13	0.34	0.00	1.00	6745	0.13	0.34	0.00	1.00	0.000
Others	6745	0.15	0.36	0.00	1.00	6745	0.15	0.36	0.00	1.00	0.000
Number of independent claims	6745	2.97	2.10	1.00	31.00	6745	2.99	2.09	1.00	29.00	-0.749
Number of dependent claims to independent claims	6745	5.98	4.86	0.00	60.00	6745	5.85	4.73	0.00	47.00	1.594
Number of words in first claim	6745	141.13	78.41	3.00	811.00	6745	140.53	78.83	5.00	875.00	0.440
Average number of words in independent claims	6745	145.23	77.08	4.67	811.00	6745	144.80	77.11	4.00	895.50	0.327
Backward cites	6745	13.26	14.48	0.00	197.00	6745	12.99	14.38	0.00	181.00	1.079
Pendency	6745	1008.14	584.61	193.00	4054.00	6745	1005.79	585.00	182.00	4008.00	0.233
Attorney (yes / no)	6745	0.96	0.19	0.00	1.00	6745	0.96	0.19	0.00	1.00	0.000
One year	Pre AIPA					Post AIPA					t-test
	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	
Number of 102 & 103 blockings	87259	1.75	3.97	0.00	189.00	87259	1.23	2.78	0.00	115.00	23.011
Number of 102 & 103 blockings (in log)	87259	0.59	0.80	0.00	5.25	87259	0.46	0.71	0.00	4.75	34.869
Number of X & Y blockings	87259	0.35	1.10	0.00	48.00	87259	0.13	0.68	0.00	36.00	49.717
Number of X & Y blockings (in log)	87259	0.17	0.42	0.00	3.89	87259	0.06	0.26	0.00	3.61	63.393
Fraction of X & Y blockings	87259	0.09	0.21	0.00	1.00	87259	0.03	0.14	0.00	1.00	63.517
NBER											
Chemical	87259	0.11	0.32	0.00	1.00	87259	0.11	0.32	0.00	1.00	0.000
Computers and Communications	87259	0.27	0.45	0.00	1.00	87259	0.27	0.45	0.00	1.00	0.000
Drugs and Medical	87259	0.13	0.33	0.00	1.00	87259	0.13	0.33	0.00	1.00	0.000
Electrical and Electronics	87259	0.19	0.39	0.00	1.00	87259	0.19	0.39	0.00	1.00	0.000
Mechanical	87259	0.14	0.35	0.00	1.00	87259	0.14	0.35	0.00	1.00	0.000
Others	87259	0.16	0.37	0.00	1.00	87259	0.16	0.37	0.00	1.00	0.000
Number of independent claims	87259	3.18	2.48	0.00	60.00	87259	3.22	2.48	0.00	60.00	-4.099
Number of dependent claims to independent claims	87253	5.89	5.12	0.00	102.00	87253	5.98	5.12	0.00	108.00	-3.534
Number of words in first claim	87259	150.49	95.02	1.00	2533.00	87259	150.48	94.87	1.00	2544.00	0.035
Average number of words in independent claims	87253	154.26	90.78	1.00	2533.00	87253	154.13	90.97	1.00	2692.50	0.292
Backward cites	87259	15.03	21.20	0.00	683.00	87259	15.19	21.22	0.00	683.00	-1.661
Pendency	87259	989.67	584.06	148.00	4089.00	87259	989.85	584.43	95.00	4045.00	-0.066
Attorney (yes / no)	87259	0.95	0.21	0.00	1.00	87259	0.95	0.21	0.00	1.00	0.000

Matched data is CEM balanced sample before/after AIPA, including backward cites, 6 NBER tech classes, independent claims, dependent claims per independent claim, word count of first claim, average words per claim, attorney, and pendency. Two-sided t-tests on differences in means of each variable after matching.

Table A6: Only 102 actions

	Dependent variable: No. of 102 blocking actions (in logs)					
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.050*** (0.011)	-0.049*** (0.011)	-0.048*** (0.011)	-0.048*** (0.011)	-0.050*** (0.016)	-0.028 (0.021)
N	17382	17382	17382	17382	11083	11083
R ²	0.003	0.003	0.006	0.006	0.166	0.167
PANEL 2: matched data, one month						
Post AIPA	-0.051*** (0.012)	-0.051*** (0.012)	-0.049*** (0.012)	-0.049*** (0.012)	-0.057*** (0.017)	-0.038* (0.023)
N	13490	13490	13490	13490	8280	8280
R ²	0.003	0.003	0.006	0.007	0.175	0.175
PANEL 3: Raw data, one year						
Post AIPA	-0.043*** (0.003)	-0.043*** (0.003)	-0.043*** (0.003)	-0.043*** (0.003)	-0.040*** (0.004)	-0.031*** (0.006)
N	191220	191220	191220	191220	139111	139111
R ²	0.003	0.003	0.006	0.006	0.128	0.128
PANEL 4: matched data, one year						
Post AIPA	-0.042*** (0.003)	-0.042*** (0.003)	-0.042*** (0.003)	-0.042*** (0.003)	-0.039*** (0.004)	-0.031*** (0.006)
N	174518	174518	174518	174518	125398	125398
R ²	0.002	0.002	0.006	0.006	0.131	0.131
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

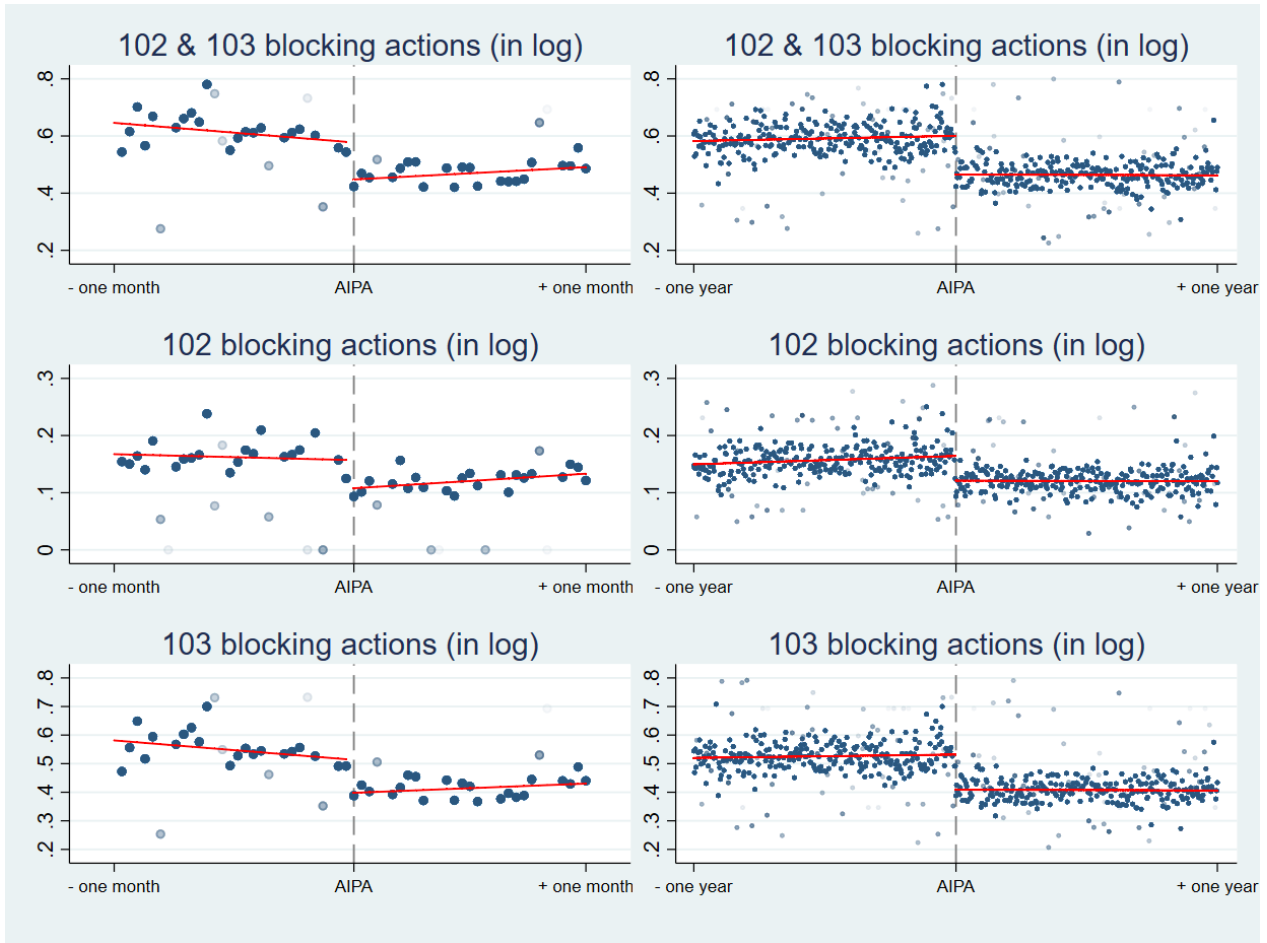
Notes: This table reports results of RDD models, equation (1) and (2). Technology class fixed effects are based on six NBER technology classes, and technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before one month after November 29, 2000, when AIPA became effective. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a balanced sample, where patents before and after AIPA are matched (CEM) based on backward cites to capture potential differences in novelty, 6 NBER technology classes to capture differences in technological popularity, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency (time from application to grant date) to capture differences in patent scope and writing. Heteroscedasticity robust standard errors are presented in parentheses.

Table A7: Only 103 actions

	Dependent variable: No. of 103 blocking actions (in logs)					
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.118*** (0.021)	-0.115*** (0.022)	-0.119*** (0.021)	-0.124*** (0.021)	-0.128*** (0.031)	-0.110** (0.043)
N	17382	17382	17382	17382	11083	11083
R ²	0.008	0.009	0.023	0.026	0.215	0.215
PANEL 2: matched data, one month						
Post AIPA	-0.105*** (0.024)	-0.104*** (0.024)	-0.098*** (0.024)	-0.102*** (0.024)	-0.091*** (0.035)	-0.088* (0.048)
N	13490	13490	13490	13490	8280	8280
R ²	0.009	0.009	0.024	0.026	0.218	0.218
PANEL 3: Raw data, one year						
Post AIPA	-0.123*** (0.006)	-0.123*** (0.006)	-0.125*** (0.006)	-0.126*** (0.006)	-0.136*** (0.008)	-0.136*** (0.012)
N	191220	191220	191220	191220	139111	139111
R ²	0.007	0.007	0.018	0.019	0.179	0.179
PANEL 4: matched data, one year						
Post AIPA	-0.124*** (0.007)	-0.124*** (0.007)	-0.125*** (0.007)	-0.125*** (0.007)	-0.134*** (0.008)	-0.138*** (0.012)
N	174518	174518	174518	174518	125398	125398
R ²	0.007	0.007	0.017	0.019	0.178	0.178
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2). Technology class fixed effects are based on six NBER technology classes, and technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before one month after November 29, 2000, when AIPA became effective. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a balanced sample, where patents before and after AIPA are matched (CEM) based on backward cites to capture potential differences in novelty, 6 NBER technology classes to capture differences in technological popularity, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency (time from application to grant date) to capture differences in patent scope and writing. Heteroscedasticity robust standard errors are presented in parentheses.

Figure A1: RDD Graphs for 102 and 103 actions combined and separately



Notes: This illustrates the discontinuous difference in blocking actions one month (year) before and after AIPA became effective on November 29, 2000. Dots represent the average amount of 102 and 103 office actions (first combined, then separately 102 and 103 only) referring to patents filed at the USPTO on a given day. AIPA represents November 29, 2000. The red lines represent fitted values.

Table A8: Fraction 102 and 103 in future cites

Dependent variable: Fraction of 102 and 103 blocking actions to future cites						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.023** (0.012)	-0.022* (0.012)	-0.021* (0.012)	-0.021* (0.012)	-0.011 (0.017)	-0.017 (0.026)
N	16050	16050	16050	16050	10119	10119
R ²	0.002	0.002	0.006	0.007	0.138	0.138
PANEL 2: matched data, one month						
Post AIPA	-0.017 (0.014)	-0.017 (0.014)	-0.019 (0.014)	-0.018 (0.014)	-0.007 (0.022)	-0.020 (0.032)
N	12406	12406	12406	12406	7520	7520
R ²	0.002	0.002	0.006	0.007	0.147	0.147
PANEL 3: Raw data, one year						
Post AIPA	-0.029*** (0.004)	-0.029*** (0.004)	-0.029*** (0.004)	-0.029*** (0.004)	-0.029*** (0.004)	-0.026*** (0.007)
N	176426	176426	176426	176426	127595	127595
R ²	0.000	0.000	0.004	0.004	0.104	0.104
PANEL 4: matched data, one year						
Post AIPA	-0.026*** (0.004)	-0.026*** (0.004)	-0.027*** (0.004)	-0.027*** (0.004)	-0.029*** (0.005)	-0.027*** (0.007)
N	161105	161105	161105	161105	115017	115017
R ²	0.000	0.000	0.005	0.005	0.107	0.107
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2). The dependent variable is the number of 102 and 103 office actions referencing the focal patent as the blocking patent divided by the total number of future cites that the focal patent received from all USPTO patents granted until end of 2017. Technology class fixed effects are based on six NBER technology classes, and technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before one month after November 29, 2000, when AIPA became effective. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a balanced sample, where patents before and after AIPA are matched (CEM) based on backward cites to capture potential differences in novelty, 6 NBER technology classes to capture differences in technological popularity, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency (time from application to grant date) to capture differences in patent scope and writing. Heteroscedasticity robust standard errors are presented in parentheses.

Table A9: Only fraction 102 in future cites

Dependent variable: Fraction of 102 blocking actions to future cites						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.004 (0.004)	-0.004 (0.004)	-0.004 (0.004)	-0.003 (0.004)	-0.003 (0.006)	0.001 (0.008)
N	16050	16050	16050	16050	10119	10119
R ²	0.000	0.000	0.004	0.004	0.143	0.143
PANEL 2: matched data, one month						
Post AIPA	-0.006 (0.004)	-0.006 (0.004)	-0.006 (0.004)	-0.006 (0.004)	-0.008 (0.006)	-0.008 (0.009)
N	12406	12406	12406	12406	7520	7520
R ²	0.000	0.000	0.004	0.005	0.156	0.156
PANEL 3: Raw data, one year						
Post AIPA	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.003 (0.002)
N	176426	176426	176426	176426	127595	127595
R ²	0.000	0.000	0.004	0.004	0.101	0.101
PANEL 4: matched data, one year						
Post AIPA	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.003 (0.002)
N	161105	161105	161105	161105	115017	115017
R ²	0.000	0.000	0.004	0.004	0.105	0.105
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

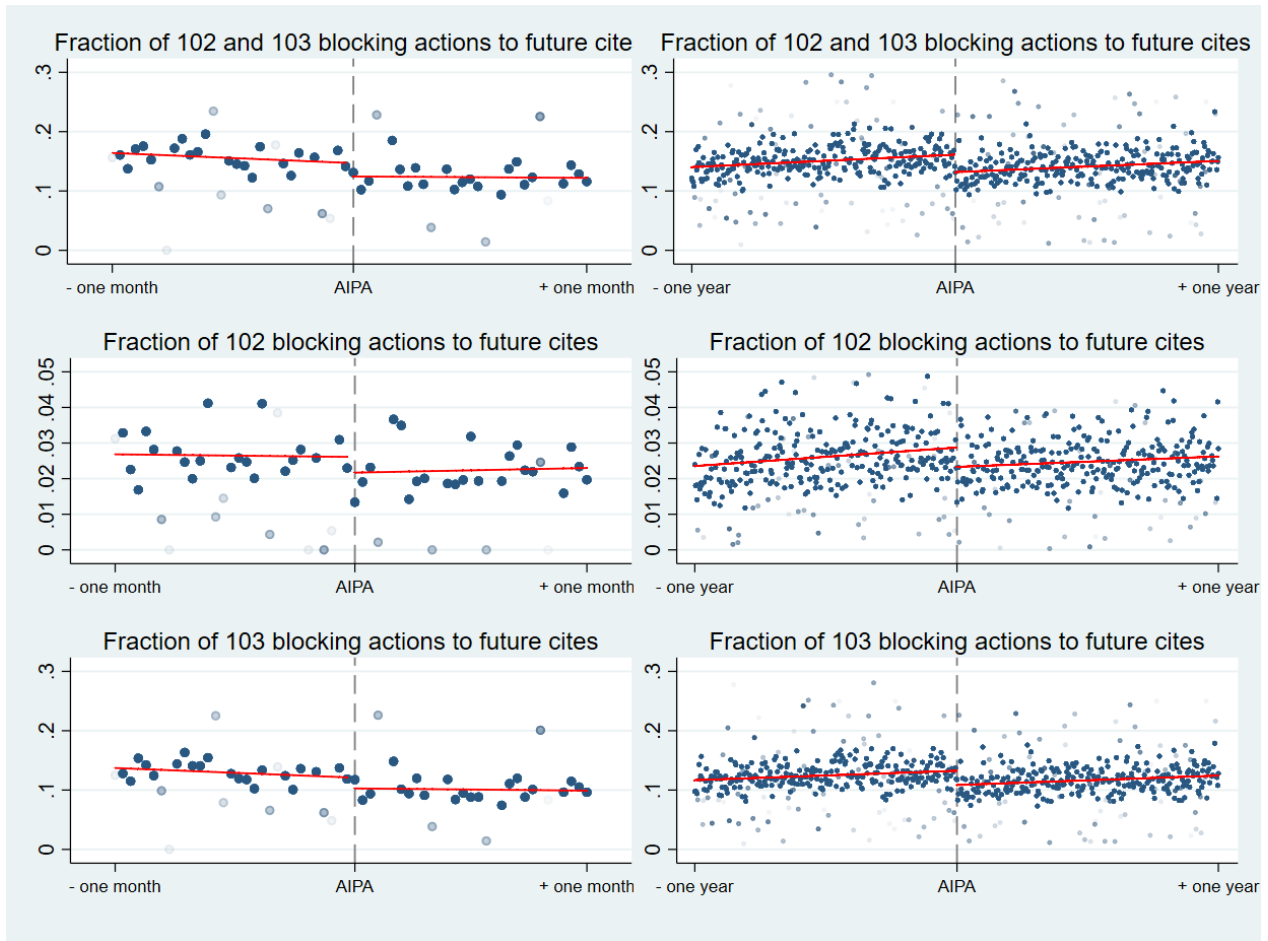
Notes: This table reports results of RDD models, equation (1) and (2). The dependent variable is the number of 102 office actions referencing the focal patent as the blocking patent divided by the total number of future cites that the focal patent received from all USPTO patents granted until end of 2017. Technology class fixed effects are based on six NBER technology classes, and technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before one month after November 29, 2000, when AIPA became effective. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a balanced sample, where patents before and after AIPA are matched (CEM) based on backward cites to capture potential differences in novelty, 6 NBER technology classes to capture differences in technological popularity, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency (time from application to grant date) to capture differences in patent scope and writing. Heteroscedasticity robust standard errors are presented in parentheses.

Table A10: Only fraction 103 in future cites

Dependent variable: Fraction of 103 blocking actions to future cites						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.018*	-0.018*	-0.017*	-0.017*	-0.008	-0.018
	(0.010)	(0.010)	(0.010)	(0.010)	(0.015)	(0.022)
N	16050	16050	16050	16050	10119	10119
R ²	0.002	0.002	0.005	0.006	0.140	0.140
PANEL 2: matched data, one month						
Post AIPA	-0.012	-0.012	-0.013	-0.012	0.001	-0.012
	(0.012)	(0.012)	(0.012)	(0.012)	(0.019)	(0.028)
N	12406	12406	12406	12406	7520	7520
R ²	0.002	0.002	0.005	0.006	0.143	0.143
PANEL 3: Raw data, one year						
Post AIPA	-0.024***	-0.024***	-0.024***	-0.024***	-0.025***	-0.023***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.006)
N	176426	176426	176426	176426	127595	127595
R ²	0.000	0.000	0.003	0.003	0.104	0.104
PANEL 4: matched data, one year						
Post AIPA	-0.021***	-0.022***	-0.022***	-0.022***	-0.025***	-0.023***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.006)
N	161105	161105	161105	161105	115017	115017
R ²	0.000	0.000	0.004	0.004	0.105	0.105
All PANEL						
	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear	linear	linear	linear	linear	quadratic
	(same slope)	(diff. slopes)	(diff. slopes)	(diff. slopes)	(diff. slopes)	(diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2). The dependent variable is the number of 103 office actions referencing the focal patent as the blocking patent divided by the total number of future cites that the focal patent received from all USPTO patents granted until end of 2017. Technology class fixed effects are based on six NBER technology classes, and technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before one month after November 29, 2000, when AIPA became effective. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a balanced sample, where patents before and after AIPA are matched (CEM) based on backward cites to capture potential differences in novelty, 6 NBER technology classes to capture differences in technological popularity, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency (time from application to grant date) to capture differences in patent scope and writing. Heteroscedasticity robust standard errors are presented in parentheses.

Figure A2: RDD Graphs for fraction of 102 and 103 actions in future cites combined and separately



Notes: This illustrates the discontinuous difference in blocking actions one month (year) before and after AIPA became effective on November 29, 2000. Dots represent the average amount of 102 and 103 office actions (first combined, then separately 102 and 103 only) referring to patents filed at the USPTO on a given day scaled by the total amount of future cites. AIPA represents November 29, 2000. The red lines represent fitted values.

Table A11: RDD estimations with Poisson regression

Dependent variable: No. of 102 & 103 blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.388*** (0.081)	-0.402*** (0.080)	-0.406*** (0.080)	-0.413*** (0.080)	-0.522*** (0.147)	-0.488** (0.219)
N	17382	17382	17382	17382	10064	10064
Pseudo R ²	0.010	0.011	0.027	0.028	0.177	0.177
PANEL 2: matched data, one month						
Post AIPA	-0.389*** (0.097)	-0.401*** (0.094)	-0.379*** (0.094)	-0.384*** (0.094)	-0.465*** (0.167)	-0.450* (0.245)
N	13490	13490	13490	13490	7460	7460
Pseudo R ²	0.011	0.011	0.027	0.028	0.177	0.177
Dependent variable: No. of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-1.032*** (0.124)	-0.972*** (0.128)	-0.928*** (0.129)	-0.938*** (0.129)	-0.913*** (0.179)	-0.604** (0.240)
N	17382	17382	17382	17382	8258	8258
Pseudo R ²	0.039	0.039	0.055	0.057	0.234	0.235
PANEL 2: matched data, one month						
Post AIPA	-0.964*** (0.132)	-0.918*** (0.131)	-0.897*** (0.132)	-0.907*** (0.132)	-0.818*** (0.168)	-0.640*** (0.223)
N	13481	13481	13481	13481	6136	6136
Pseudo R ²	0.034	0.034	0.049	0.051	0.238	0.240
Dependent variable: Fraction of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.936*** (0.093)	-0.961*** (0.103)	-0.938*** (0.104)	-0.953*** (0.104)	-0.947*** (0.138)	-0.821*** (0.191)
N	17382	17382	17382	17382	8258	8258
Pseudo R ²	0.027	0.027	0.032	0.034	0.138	0.138
PANEL 2: matched data, one month						
Post AIPA	-0.805*** (0.103)	-0.831*** (0.114)	-0.828*** (0.115)	-0.846*** (0.115)	-0.719*** (0.156)	-0.629*** (0.217)
N	13481	13481	13481	13481	6136	6136
Pseudo R ²	0.023	0.023	0.027	0.029	0.134	0.135
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2), estimated as Poisson, dependent variables in real scale without logarithmic transformation. Technology class fixed effects from six NBER technology classes, technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before and one month after November 29, 2000. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a CEM balanced before and after AIPA sample, based on backward cites, 6 NBER technology classes, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency to capture differences in patent scope and writing. Appendix A Table A5 shows the descriptive statistics of the matched data. Heteroscedasticity robust standard errors presented in parentheses.

Table A12: RDD estimations with Poisson regression

Dependent variable: No. of 102 & 103 blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.372*** (0.021)	-0.370*** (0.021)	-0.377*** (0.021)	-0.377*** (0.021)	-0.410*** (0.025)	-0.407*** (0.039)
N	191220	191220	191220	191220	132321	132321
Pseudo R ²	0.009	0.009	0.022	0.023	0.155	0.155
PANEL 4: matched data, one year						
Post AIPA	-0.380*** (0.022)	-0.377*** (0.022)	-0.379*** (0.021)	-0.380*** (0.021)	-0.412*** (0.026)	-0.422*** (0.041)
N	174518	174518	174518	174518	119085	119085
Pseudo R ²	0.009	0.009	0.022	0.023	0.154	0.154
Dependent variable: No. of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.918*** (0.036)	-0.923*** (0.039)	-0.919*** (0.039)	-0.917*** (0.039)	-0.929*** (0.046)	-0.903*** (0.068)
N	191275	191275	191275	191275	115915	115915
Pseudo R ²	0.038	0.038	0.053	0.054	0.184	0.184
PANEL 4: matched data, one year						
Post AIPA	-0.888*** (0.037)	-0.889*** (0.040)	-0.886*** (0.040)	-0.885*** (0.040)	-0.877*** (0.048)	-0.885*** (0.071)
N	174461	174461	174461	174461	104727	104727
Pseudo R ²	0.036	0.036	0.051	0.052	0.180	0.180
Dependent variable: Fraction of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.914*** (0.029)	-0.900*** (0.031)	-0.896*** (0.031)	-0.894*** (0.031)	-0.902*** (0.037)	-0.872*** (0.055)
N	191275	191275	191275	191275	115915	115915
Pseudo R ²	0.031	0.031	0.035	0.036	0.105	0.105
PANEL 4: matched data, one year						
Post AIPA	-0.897*** (0.030)	-0.884*** (0.033)	-0.882*** (0.033)	-0.881*** (0.033)	-0.877*** (0.039)	-0.862*** (0.058)
N	174461	174461	174461	174461	104727	104727
Pseudo R ²	0.030	0.030	0.034	0.034	0.103	0.103
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2), estimated as Poisson, dependent variables in real scale without logarithmic transformation. Technology class fixed effects from six NBER technology classes, technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before and one month after November 29, 2000. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a CEM balanced before and after AIPA sample, based on backward cites, 6 NBER technology classes, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency to capture differences in patent scope and writing. Appendix A Table A5 shows the descriptive statistics of the matched data. Heteroscedasticity robust standard errors presented in parentheses.

Table A13: RDD estimations with simple linear OLS regression

Dependent variable: No. of 102 & 103 blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.611*** (0.130)	-0.601*** (0.133)	-0.607*** (0.133)	-0.626*** (0.133)	-0.773*** (0.262)	-0.720* (0.400)
N	17382	17382	17382	17382	11083	11083
R ²	0.006	0.007	0.016	0.018	0.167	0.167
PANEL 2: matched data, one month						
Post AIPA	-0.586*** (0.151)	-0.585*** (0.151)	-0.551*** (0.152)	-0.562*** (0.152)	-0.674** (0.305)	-0.662 (0.463)
N	13490	13490	13490	13490	8280	8280
R ²	0.006	0.007	0.016	0.017	0.155	0.155
Dependent variable: No. of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.222*** (0.027)	-0.224*** (0.028)	-0.214*** (0.028)	-0.213*** (0.028)	-0.204*** (0.038)	-0.129*** (0.050)
N	17382	17382	17382	17382	11080	11080
R ²	0.017	0.017	0.024	0.025	0.250	0.250
PANEL 2: matched data, one month						
Post AIPA	-0.213*** (0.031)	-0.214*** (0.031)	-0.209*** (0.031)	-0.208*** (0.031)	-0.170*** (0.037)	-0.101** (0.047)
N	13481	13481	13481	13481	8277	8277
R ²	0.015	0.015	0.022	0.022	0.288	0.288
Dependent variable: Fraction of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.051*** (0.005)	-0.051*** (0.005)	-0.049*** (0.005)	-0.049*** (0.005)	-0.046*** (0.007)	-0.037*** (0.010)
N	17382	17382	17382	17382	11080	11080
R ²	0.020	0.020	0.025	0.025	0.210	0.210
PANEL 2: matched data, one month						
Post AIPA	-0.045*** (0.006)	-0.045*** (0.006)	-0.045*** (0.006)	-0.046*** (0.006)	-0.035*** (0.008)	-0.027** (0.012)
N	13481	13481	13481	13481	8277	8277
R ²	0.017	0.017	0.021	0.021	0.216	0.216
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2), estimated as standard OLS, dependent variables in real scale without logarithmic transformation. Technology class fixed effects from six NBER technology classes, technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before and one month after November 29, 2000. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a CEM balanced before and after AIPA sample, based on backward cites, 6 NBER technology classes, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency to capture differences in patent scope and writing. Appendix A Table A5 shows the descriptive statistics of the matched data. Heteroscedasticity robust standard errors presented in parentheses.

Table A14: RDD estimations with simple linear regression

Dependent variable: No. of 102 & 103 blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.558*** (0.032)	-0.558*** (0.032)	-0.569*** (0.032)	-0.571*** (0.032)	-0.600*** (0.039)	-0.599*** (0.062)
N	191220	191220	191220	191220	139111	139111
R ²	0.006	0.006	0.015	0.016	0.165	0.165
PANEL 4: matched data, one year						
Post AIPA	-0.561*** (0.033)	-0.560*** (0.033)	-0.563*** (0.033)	-0.565*** (0.033)	-0.592*** (0.041)	-0.609*** (0.065)
N	174518	174518	174518	174518	125398	125398
R ²	0.006	0.006	0.014	0.016	0.164	0.164
Dependent variable: No. of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.197*** (0.008)	-0.197*** (0.008)	-0.196*** (0.008)	-0.196*** (0.008)	-0.200*** (0.010)	-0.195*** (0.016)
N	191275	191275	191275	191275	139133	139133
R ²	0.014	0.014	0.021	0.021	0.160	0.160
PANEL 4: matched data, one year						
Post AIPA	-0.192*** (0.008)	-0.193*** (0.008)	-0.192*** (0.008)	-0.192*** (0.008)	-0.191*** (0.011)	-0.191*** (0.016)
N	174461	174461	174461	174461	125356	125356
R ²	0.014	0.014	0.021	0.021	0.162	0.162
Dependent variable: Fraction of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.048*** (0.003)
N	191275	191275	191275	191275	139133	139133
R ²	0.023	0.023	0.027	0.027	0.139	0.139
PANEL 4: matched data, one year						
Post AIPA	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.047*** (0.003)
N	174461	174461	174461	174461	125356	125356
R ²	0.023	0.023	0.026	0.026	0.139	0.140
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2), estimated as standard OLS, dependent variables in real scale without logarithmic transformation. Technology class fixed effects from six NBER technology classes, technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before and one month after November 29, 2000. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a CEM balanced before and after AIPA sample, based on backward cites, 6 NBER technology classes, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency to capture differences in patent scope and writing. Appendix A Table A5 shows the descriptive statistics of the matched data. Heteroscedasticity robust standard errors presented in parentheses.

Table A15: RDD estimations with OLS linear probability model

Dependent variable: No. of 102 & 103 blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.064*** (0.014)	-0.061*** (0.015)	-0.064*** (0.014)	-0.067*** (0.014)	-0.071*** (0.021)	-0.062** (0.029)
N	17382	17382	17382	17382	11083	11083
R ²	0.006	0.007	0.015	0.017	0.193	0.193
PANEL 2: matched data, one month						
Post AIPA	-0.061*** (0.016)	-0.061*** (0.016)	-0.060*** (0.016)	-0.061*** (0.016)	-0.064*** (0.024)	-0.061* (0.033)
N	13490	13490	13490	13490	8280	8280
R ²	0.006	0.007	0.015	0.017	0.201	0.201
Dependent variable: No. of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.104*** (0.009)	-0.104*** (0.009)	-0.101*** (0.009)	-0.101*** (0.009)	-0.099*** (0.014)	-0.083*** (0.019)
N	17382	17382	17382	17382	11080	11080
R ²	0.025	0.025	0.031	0.031	0.220	0.220
PANEL 2: matched data, one month						
Post AIPA	-0.096*** (0.011)	-0.096*** (0.011)	-0.096*** (0.011)	-0.096*** (0.011)	-0.080*** (0.015)	-0.065*** (0.021)
N	13481	13481	13481	13481	8277	8277
R ²	0.021	0.021	0.027	0.027	0.224	0.224
Dependent variable: Fraction of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.104*** (0.009)	-0.104*** (0.009)	-0.101*** (0.009)	-0.101*** (0.009)	-0.099*** (0.014)	-0.083*** (0.019)
N	17382	17382	17382	17382	11080	11080
R ²	0.025	0.025	0.031	0.031	0.220	0.220
PANEL 2: matched data, one month						
Post AIPA	-0.096*** (0.011)	-0.096*** (0.011)	-0.096*** (0.011)	-0.096*** (0.011)	-0.080*** (0.015)	-0.065*** (0.021)
N	13481	13481	13481	13481	8277	8277
R ²	0.021	0.021	0.027	0.027	0.224	0.224
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2), estimated as standard OLS, dependent variables are dummy variables indicating whether a given patent blocked at least one claim. Technology class fixed effects from six NBER technology classes, technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before and one month after November 29, 2000. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a CEM balanced before and after AIPA sample, based on backward cites, 6 NBER technology classes, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency to capture differences in patent scope and writing. Appendix A Table A5 shows the descriptive statistics of the matched data. Heteroscedasticity robust standard errors presented in parentheses.

Table A16: RDD estimations with OLS linear probability model

Dependent variable: No. of 102 & 103 blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.075*** (0.004)	-0.075*** (0.004)	-0.075*** (0.004)	-0.076*** (0.004)	-0.079*** (0.005)	-0.077*** (0.008)
N	191220	191220	191220	191220	139111	139111
R ²	0.005	0.005	0.011	0.012	0.153	0.153
PANEL 4: matched data, one year						
Post AIPA	-0.074*** (0.005)	-0.074*** (0.005)	-0.074*** (0.005)	-0.075*** (0.005)	-0.078*** (0.006)	-0.078*** (0.008)
N	174518	174518	174518	174518	125398	125398
R ²	0.005	0.005	0.011	0.012	0.153	0.153
Dependent variable: No. of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.092*** (0.003)	-0.092*** (0.003)	-0.091*** (0.003)	-0.091*** (0.003)	-0.091*** (0.004)	-0.091*** (0.005)
N	191275	191275	191275	191275	139133	139133
R ²	0.026	0.026	0.032	0.032	0.154	0.154
PANEL 4: matched data, one year						
Post AIPA	-0.091*** (0.003)	-0.091*** (0.003)	-0.091*** (0.003)	-0.091*** (0.003)	-0.091*** (0.004)	-0.091*** (0.005)
N	174461	174461	174461	174461	125356	125356
R ²	0.025	0.026	0.031	0.031	0.154	0.154
Dependent variable: Fraction of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.092*** (0.003)	-0.092*** (0.003)	-0.091*** (0.003)	-0.091*** (0.003)	-0.091*** (0.004)	-0.091*** (0.005)
N	191275	191275	191275	191275	139133	139133
R ²	0.026	0.026	0.032	0.032	0.154	0.154
PANEL 4: matched data, one year						
Post AIPA	-0.091*** (0.003)	-0.091*** (0.003)	-0.091*** (0.003)	-0.091*** (0.003)	-0.091*** (0.004)	-0.091*** (0.005)
N	174461	174461	174461	174461	125356	125356
R ²	0.025	0.026	0.031	0.031	0.154	0.154
All PANEL						
	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2), estimated as standard OLS, dependent variables are dummy variables indicating whether a given patent blocked at least one claim. Technology class fixed effects from six NBER technology classes, technology trends are linear time trends per technology class using filing days. Raw data are all US patent applications filed between one month before and one month after November 29, 2000. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a CEM balanced before and after AIPA sample, based on backward cites, 6 NBER technology classes, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency to capture differences in patent scope and writing. Appendix A Table A5 shows the descriptive statistics of the matched data. Heteroscedasticity robust standard errors presented in parentheses.

Table A17: RDD estimations with CPC 3digit

Dependent variable: No. of 102 & 103 blocking actions (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.133*** (0.023)	-0.129*** (0.023)	-0.133*** (0.023)	-0.136*** (0.023)	-0.129*** (0.033)	-0.087* (0.046)
N	17382	17382	17379	17379	11070	11070
R ²	0.008	0.009	0.049	0.051	0.226	0.226
PANEL 2: matched data, one month						
Post AIPA	-0.142*** (0.029)	-0.141*** (0.029)	-0.129*** (0.028)	-0.133*** (0.028)	-0.120*** (0.041)	-0.047 (0.056)
N	11050	11050	11050	11050	6917	6917
R ²	0.009	0.010	0.061	0.062	0.234	0.235
Dependent variable: No. of X & Y blocking actions (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.107*** (0.011)	-0.108*** (0.011)	-0.102*** (0.011)	-0.102*** (0.011)	-0.098*** (0.015)	-0.070*** (0.021)
N	17382	17382	17379	17379	11067	11067
R ²	0.023	0.023	0.043	0.044	0.246	0.246
PANEL 2: matched data, one month						
Post AIPA	-0.104*** (0.013)	-0.104*** (0.013)	-0.104*** (0.013)	-0.105*** (0.013)	-0.093*** (0.018)	-0.063** (0.025)
N	11043	11043	11042	11042	6914	6914
R ²	0.023	0.023	0.050	0.051	0.263	0.264
Dependent variable: Fraction of X & Y blocking actions (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.051*** (0.005)	-0.051*** (0.005)	-0.049*** (0.005)	-0.050*** (0.005)	-0.045*** (0.007)	-0.035*** (0.010)
N	17382	17382	17379	17379	11067	11067
R ²	0.020	0.020	0.038	0.040	0.221	0.221
PANEL 2: matched data, one month						
Post AIPA	-0.047*** (0.006)	-0.047*** (0.007)	-0.048*** (0.007)	-0.048*** (0.007)	-0.042*** (0.009)	-0.031** (0.013)
N	11043	11043	11042	11042	6914	6914
R ²	0.021	0.021	0.040	0.041	0.226	0.227
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2), estimated as standard OLS, dependent variables are dummy variables indicating whether a given patent blocked at least one claim. Technology class fixed effects from CPC 3 digit technology classes, technology trends are linear time trends per CPC technology main class using filing days. Raw data are all US patent applications filed between one month before and one month after November 29, 2000. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a CEM balanced before and after AIPA sample, based on backward cites, 123 CPC 3-digit technology classes, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency to capture differences in patent scope and writing. Descriptive statistics of the matched data available upon request. Heteroscedasticity robust standard errors presented in parentheses.

Table A18: RDD estimations with CPC 3digit

Dependent variable: No. of 102 & 103 blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.135*** (0.007)	-0.135*** (0.007)	-0.140*** (0.007)	-0.140*** (0.007)	-0.146*** (0.008)	-0.141*** (0.012)
N	191220	191220	191215	191215	139106	139106
R ²	0.007	0.007	0.042	0.043	0.183	0.183
PANEL 4: matched data, one year						
Post AIPA	-0.131*** (0.007)	-0.130*** (0.007)	-0.135*** (0.007)	-0.135*** (0.007)	-0.141*** (0.009)	-0.136*** (0.013)
N	164034	164034	164031	164031	118361	118361
R ²	0.007	0.007	0.042	0.043	0.184	0.184
Dependent variable: No. of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.095*** (0.003)	-0.095*** (0.003)	-0.094*** (0.003)	-0.093*** (0.003)	-0.096*** (0.004)	-0.097*** (0.006)
N	191275	191275	191270	191270	139128	139128
R ²	0.023	0.023	0.037	0.038	0.166	0.166
PANEL 4: matched data, one year						
Post AIPA	-0.095*** (0.003)	-0.095*** (0.003)	-0.094*** (0.003)	-0.094*** (0.003)	-0.096*** (0.004)	-0.097*** (0.006)
N	163982	163982	163979	163979	118318	118318
R ²	0.023	0.023	0.037	0.037	0.166	0.166
Dependent variable: Fraction of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 3: raw data, one year						
Post AIPA	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.048*** (0.002)	-0.049*** (0.002)	-0.048*** (0.003)
N	191275	191275	191270	191270	139128	139128
R ²	0.023	0.023	0.034	0.034	0.143	0.143
PANEL 4: matched data, one year						
Post AIPA	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.049*** (0.002)	-0.050*** (0.002)	-0.047*** (0.003)
N	163982	163982	163979	163979	118318	118318
R ²	0.023	0.023	0.033	0.034	0.145	0.145
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: This table reports results of RDD models, equation (1) and (2), estimated as standard OLS, dependent variables are dummy variables indicating whether a given patent blocked at least one claim. Technology class fixed effects from CPC 3 digit technology classes, technology trends are linear time trends per CPC technology main class using filing days. Raw data are all US patent applications filed between one month before and one month after November 29, 2000. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a CEM balanced before and after AIPA sample, based on backward cites, 123 CPC 3-digit technology classes, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency to capture differences in patent scope and writing. Descriptive statistics of the matched data available upon request. Heteroscedasticity robust standard errors presented in parentheses.

Potential limitations of modeling disclosure with AIPA and blocking data

Some concerns remain despite these varied robustness checks (see also Appendix E for evidence against selection mechanisms).

AIPA was unfortunately an imperfect experiment, because it simultaneously changed two things: 1) the timing of the disclosure of the application, 2) the population of documents that we can now observe referencing blocking art. Prior to AIPA, we can only see cites to published patents – but not applications, even though examiners were citing both at the time. After AIPA, we can now observe blocking citations to published patents and applications. To maintain consistency across the time periods, we modeled only citations to granted patents, both pre and post AIPA. This approach remains vulnerable, however, to the possibility that examiners changed their citation behavior with AIPA, and redirected some citations that had previously gone to granted patents before AIPA, to applications, after AIPA.

A marked shift in citation behavior is unlikely, however, for two reasons. First, pre-grant applications and post-grant patents differ significantly; even if change in content is ignored, independent claims decline by 21.5%, dependent claims by 35.9%, and general scope declines (for further details see Marco et al., 2019). These differences undermine the comparability of blocking citations to applications as compared to blocking citations to granted patents.

Second, AIPA was an American law – it did not change European citation rules. Furthermore, EPO examiners followed much more specific and stringent citation rules both before and after AIPA. Every citation of any kind in the European system must be explicitly linked to a specific reason (as opposed to US prior art citations, which can simply be listed, for an example of the European conventions, please see Appendix G). If European examiner behavior did not change with AIPA, and examiners continued to cite applications and grants where each were appropriate, then our estimations of the effect of AIPA should remain unbiased.

Our estimations would also be accurate (at least for the fractional models) if European examiners changed their behavior consistently across types of citations. This insight motivated our development of the fractional citation dependent variable (considering the change in the proportion of citations to granted patents only, pre and post AIPA, with the numerator as blocking citations

and the denominator as all others plus blocking citations). If examiners began citing applications more often for *both* blocking and non-blocking citations, then this proportional measure should remain unbiased. For this measure to fail, examiners would need to preferentially redirect their blocking citations to applications only for blocking cites.

Finally, third parties might change their influence on the examination process, due to pre-grant applications now being public. This mechanism could work in either direction. If it increases the number of blockings, because the examiners are made aware of more prior art, blockings might increase and the real negative impact of AIPA might be larger than estimated. If inventors anticipate such third party behavior and thus submit narrower claims that are less likely to be blocked in the first place, the negative impact on blockings might be lower than estimated. The small differences in observable patent characteristics before and after AIPA suggests these are not influential factors.

Appendix B: Twins study (TW) details

For the twins study approach, we select all US patents with a parallel foreign filing at the EPO. Parallel foreign filings are identified via the ‘DOCDB’ family identifier available in Patstat. “A patent family is a collection of patent documents that are considered to cover a single invention. The technical content covered by the applications is considered to be identical. Members of a simple patent family will all have exactly the same priorities.” (For further details see <https://www.epo.org/searching-for-patents/helpful-resources/first-time-here/patent-families/docdb.html>).

We then collect all X and Y citations to each USPTO and EPO patent within a family (typically just 2, and all results robust to restriction to just the two patent member case), where X and Y classifications come from EPO patent examiners as reported in their official publicly available EPO search report. We took all US patents into account that were filed 5 years before and 5 years after AIPA (EPO vs. USPTO application, before and after AIPA; restricting the sample to shorter time windows produces similar coefficients, coefficients are statistically significant but smaller in magnitude if the data is restricted to a one year window before and after AIPA). European parallel filings could happen earlier or later than the US application. We then estimate the following equation using OLS:

$$\log(\text{blockings} + 1)_i = \beta_1 \cdot \text{PostAIPA}_i + \beta_2 \cdot \text{US}_i + \beta_3 \cdot \text{Post}_i + \delta_i + \varepsilon_i \quad (\text{A1})$$

where blockings_i , refers either to the number of times an EPO examiner references patent i with an X and Y in his search report, or the fraction of X and Y cites out of all references that patent i receives from EPO search reports, respectively. PostAIPA_i is an indicator indicating whether patent i was filed in the US on or after November 29, 2000, US_i is an indicator indicating a US patent with US and EU parallel findings (in contrast to the RDD models, where it indicates US only patents), Post_i indicates all patents filed after AIPA, δ_i represents family fixed effects, and ε_i is the error term. Assuming models assumptions are met, β_1 should capture the causal influence of AIPA on the number of blocked claims of future patent applications. Alternatively, we estimate the same model as (1) but add year fixed effects (2) and technology class specific trends (3). Table B1 presents the results. Note that in the RDD study, “US” identifies US only patents.

Table B1: Twins match estimates

	X and Y (in log)			Fraction X and Y		
	(1)	(2)	(3)	(4)	(5)	(6)
Post AIPA	-0.074*** (0.002)	-0.073*** (0.002)	-0.073*** (0.002)	-0.050*** (0.001)	-0.049*** (0.001)	-0.049*** (0.001)
N	1216536	1216536	1216536	1216536	1216536	1216536
R ²	0.465	0.465	0.466	0.463	0.463	0.463
Family fixed effects	yes	yes	yes	yes	yes	yes
Year fixed effects	no	Yes	yes	no	yes	yes
Technology trends	no	no	yes	no	no	yes

Table B2: Twins match estimates of blocked EU inventors

	X and Y (in log)			Fraction X and Y		
	(1)	(2)	(3)	(4)	(5)	(6)
Post AIPA	-0.025*** (0.001)	-0.024*** (0.001)	-0.021*** (0.001)	-0.017*** (0.001)	-0.017*** (0.001)	-0.017*** (0.001)
N	914717	914717	914717	914717	914717	914717
R ²	0.470	0.470	0.468	0.449	0.449	0.449
Family fixed effects	yes	yes	yes	yes	yes	yes
Year fixed effects	no	Yes	yes	no	yes	yes
Technology trends	no	no	yes	no	no	yes

Table B3: Twins match estimates of blocked US inventors

	X and Y (in log)			Fraction X and Y		
	(1)	(2)	(3)	(4)	(5)	(6)
Post AIPA	-0.014*** (0.001)	-0.015*** (0.001)	-0.015*** (0.001)	-0.006*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)
N	914717	914717	914717	914717	914717	914717
R ²	0.453	0.454	0.454	0.440	0.440	0.440
Family fixed effects	yes	yes	yes	yes	yes	yes
Year fixed effects	no	Yes	yes	no	yes	yes
Technology trends	no	no	yes	no	no	yes

Splitting the blocking cites into those from blocked US vs. blocked EU inventors shows small effects in general, and EU inventors appear to be affected more, despite the possibility that EU inventors who search the prior art citations of EU applications should see EU blocking cites sooner, regardless of AIPA. This may occur because 1) US inventors are more likely to become aware of the blocking technology through other channels (because of closer geographical distance, for example), or 2) EU inventors might preferentially use the US database, 3) if EU inventors work for a US company or are aiming for the US market, they may give up more quickly.

Appendix C: Difference in differences (DiD) details

For the DiD approach, we build on Graham and Hegde (2015) and define the treated group to be patents that have no parallel foreign filing and the control group as all patents with at least one parallel foreign filing with the same or earlier filing date than the US counterpart. We took all US patents into account that were filed 5 years before and 5 years after AIPA. We then estimate the following equation using OLS:

$$\log(\text{blockings} + 1)_i = \beta_1 \cdot \text{PostAIPA}_i + \beta_2 \cdot \text{US}_i + \beta_3 \cdot \text{Post}_i + \varepsilon_i \quad (\text{A2})$$

where blockings_i , refers either to the number of 102 and 103 blocking actions patent i receives, the times an EPO examiner references patent i with an X and Y in his or her search report, or the fraction of X and Y cites out of all references that patent i receives from EPO search reports, respectively. PostAIPA_i is an indicator indicating whether patent i was filed in the US on or after November 29, 2000 and has no parallel foreign application, US_i is an indicator indicating a US patent, Post_i indicates all patents filed on or after AIPA, and ε_i is the error term. Alternatively, we estimate the same model as (1) adding year fixed effects, (2) NBER technology class fixed effects (3), technology class specific trends (4), and firm fixed effects (5). We use all three previously used dependent variables, including the number of blocked US patent applications (102 and 103 references), number of X and Y cites, and fraction of X and Y cites out of all cites. Table C1 presents the results.

Figure C1: Visual test of parallel trends assumption

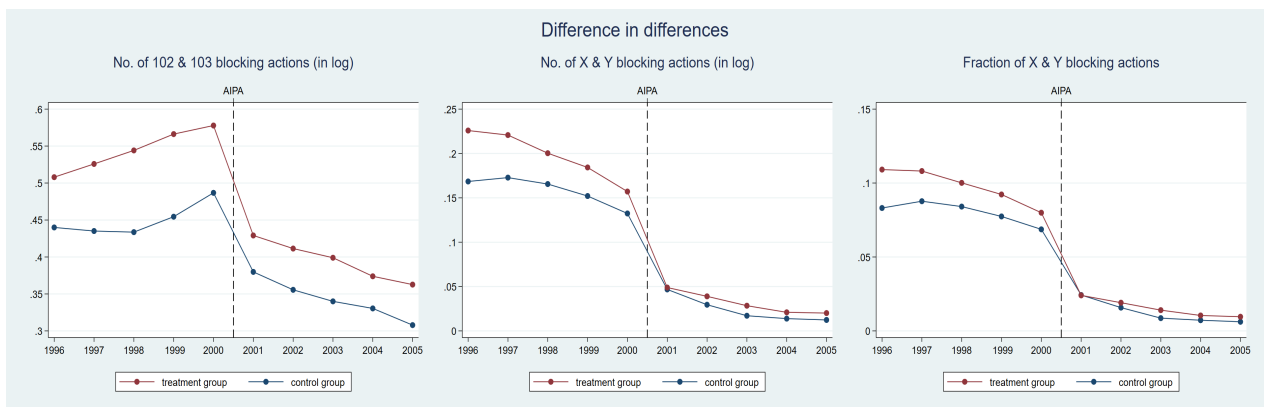


Table C1: Difference-in-differences estimates

Dependent variable: No. of 102 & 103 blocking actions (in logs)					
	(1)	(2)	(3)	(4)	(5)
Post AIPA	-0.039*** (0.002)	-0.046*** (0.002)	-0.044*** (0.002)	-0.038*** (0.002)	-0.045*** (0.003)
US	0.093 (0.002)	0.099 (0.002)	0.091 (0.002)	0.089 (0.002)	-0.009*** (0.003)
Post	-0.113 (0.002)	-0.118*** (0.006)	-0.119*** (0.006)	-0.123*** (0.006)	-0.124*** (0.007)
N	1351834	1351834	1351834	1351834	1099165
R ²	0.013	0.014	0.017	0.019	0.123
Dependent variable: No of X & Y blocking actions (in logs)					
	(1)	(2)	(3)	(4)	(5)
Post AIPA	-0.033*** (0.001)	-0.029*** (0.001)	-0.030*** (0.001)	-0.029*** (0.001)	-0.041*** (0.001)
US	0.041*** (0.001)	0.036*** (0.001)	0.035*** (0.001)	0.035*** (0.001)	0.039*** (0.002)
Post	-0.134 (0.001)	-0.090 (0.002)	-0.089 (0.002)	-0.090 (0.002)	-0.087*** (0.003)
N	1351822	1351822	1351822	1351822	1099155
R ²	0.057	0.059	0.062	0.063	0.147
Dependent variable : Fraction of X & Y blocking actions					
	(1)	(2)	(3)	(4)	(5)
Post AIPA	-0.015*** (0.001)	-0.013*** (0.001)	-0.014*** (0.001)	-0.014*** (0.001)	-0.018*** (0.001)
US	0.018*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.019*** (0.001)
Post	-0.068 (0.000)	-0.046*** (0.001)	-0.045*** (0.001)	-0.045*** (0.001)	-0.045*** (0.001)
N	1351822	1351822	1351822	1351822	1099155
R ²	0.056	0.058	0.059	0.060	0.134
Year fixed effects	no	yes	yes	yes	yes
Technology class fixed effects	no	no	yes	yes	yes
Technology trends	no	no	no	yes	yes
Firm fixed effects	no	no	no	no	yes

Notes: Technology class fixed effects are based on six NBER technology classes, and technology trends are linear time trends per technology class using filing days. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Heteroscedasticity robust standard errors are presented in parentheses.

Table C2: Difference-in-differences estimates for matched sample

Dependent variable: No. of 102 & 103 blocking actions (in logs)					
	(1)	(2)	(3)	(4)	(5)
Post AIPA	-0.053*** (0.003)	-0.059*** (0.003)	-0.059*** (0.003)	-0.053*** (0.003)	-0.054*** (0.003)
US	0.099 (0.002)	0.105 (0.002)	0.099 (0.002)	0.096 (0.002)	-0.006** (0.003)
Post	-0.108 (0.002)	-0.126*** (0.007)	-0.125*** (0.007)	-0.128*** (0.007)	-0.131*** (0.008)
N	1034852	1034852	1034852	1034852	835978
R ²	0.013	0.014	0.017	0.019	0.126
Dependent variable: No of X & Y blocking actions (in logs)					
	(1)	(2)	(3)	(4)	(5)
Post AIPA	-0.031*** (0.001)	-0.027*** (0.001)	-0.027*** (0.001)	-0.026*** (0.001)	-0.033*** (0.002)
US	0.040*** (0.001)	0.036*** (0.001)	0.033*** (0.001)	0.033*** (0.001)	0.035*** (0.002)
Post	-0.128 (0.001)	-0.085*** (0.003)	-0.086*** (0.003)	-0.087*** (0.003)	-0.087*** (0.003)
N	1034840	1034840	1034840	1034840	835968
R ²	0.049	0.051	0.054	0.055	0.138
Dependent variable : Fraction of X & Y blocking actions					
	(1)	(2)	(3)	(4)	(5)
Post AIPA	-0.014*** (0.001)	-0.013*** (0.001)	-0.013*** (0.001)	-0.012*** (0.001)	-0.015*** (0.001)
US	0.018*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.017*** (0.001)
Post	-0.065 (0.000)	-0.044*** (0.001)	-0.044*** (0.001)	-0.044*** (0.001)	-0.045*** (0.002)
N	1034840	1034840	1034840	1034840	835968
R ²	0.048	0.050	0.051	0.052	0.126
Year fixed effects	no	yes	yes	yes	yes
Technology class fixed effects	no	no	yes	yes	yes
Technology trends	no	no	no	yes	yes
Firm fixed effects	no	no	no	no	yes

Notes: Technology class fixed effects are based on six NBER technology classes, and technology trends are linear time trends per technology class using filing days. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Heteroscedasticity robust standard errors are presented in parentheses.

Figure C2: Visual test of parallel trends assumption for the matched sample

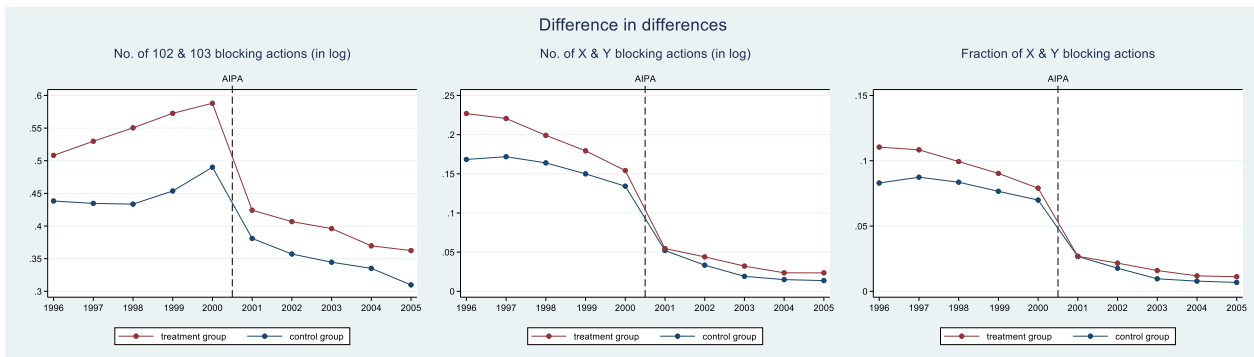


Table C3: Descriptive statistics – matched data

US only	Pre AIPA					Post AIPA					t-test
	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	
Number of 102 & 103 blockings	312834	1.63	3.82	0.00	265.00	312834	1.01	2.51	0.00	415.00	76.28
Number of 102 & 103 blockings (in log)	312834	0.56	0.79	0.00	5.58	312834	0.39	0.66	0.00	6.03	87.72
Number of X & Y blockings	312834	0.40	1.16	0.00	48.00	312834	0.07	0.53	0.00	36.00	143.56
Number of X & Y blockings (in log)	312834	0.20	0.44	0.00	3.89	312834	0.04	0.20	0.00	3.61	182.12
Fraction of X & Y blockings	312834	0.10	0.22	0.00	1.00	312834	0.02	0.10	0.00	1.00	183.52
NBER											
Chemical	312834	0.11	0.31	0.00	1.00	312834	0.11	0.31	0.00	1.00	0.00
Computers and Communications	312834	0.27	0.44	0.00	1.00	312834	0.27	0.44	0.00	1.00	0.00
Drugs and Medical	312834	0.11	0.31	0.00	1.00	312834	0.11	0.31	0.00	1.00	0.00
Electrical and Electronics	312834	0.22	0.42	0.00	1.00	312834	0.22	0.42	0.00	1.00	0.00
Mechanical	312834	0.14	0.35	0.00	1.00	312834	0.14	0.35	0.00	1.00	0.00
Others	312834	0.15	0.35	0.00	1.00	312834	0.15	0.35	0.00	1.00	0.00
Number of independent claims	312833	3.16	2.51	0.00	60.00	312833	3.09	2.51	0.00	61.00	12.12
Number of dependent claims to independent claims	312821	5.69	5.18	0.00	307.00	312821	6.28	5.58	0.00	304.00	-43.65
Number of words in first claim	312833	157.97	103.46	1.00	3437.00	312833	157.03	103.48	1.00	3478.00	3.57
Average number of words in independent claims	312821	161.95	98.50	1.00	3437.00	312821	159.21	98.35	1.00	3477.00	10.98
Backward cites	312834	12.64	21.59	0.00	766.00	312834	15.56	22.42	0.00	794.00	-52.41
Pendency	312834	938.34	494.88	1.00	4170.00	312834	943.39	495.98	95.00	4045.00	-4.03
Attorney (yes / no)	312834	0.96	0.21	0.00	1.00	312834	0.96	0.21	0.00	1.00	0.00
Foreign protection											
	Pre AIPA					Post AIPA					t-test
	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	
Number of 102 & 103 blockings	204592	1.22	2.83	0.00	223.00	204592	0.85	2.03	0.00	73.00	48.58
Number of 102 & 103 blockings (in log)	204592	0.46	0.71	0.00	5.41	204592	0.35	0.62	0.00	4.30	52.21
Number of X & Y blockings	204592	0.31	0.97	0.00	74.00	204592	0.05	0.41	0.00	39.00	110.33
Number of X & Y blockings (in log)	204592	0.16	0.40	0.00	4.32	204592	0.03	0.17	0.00	3.69	134.04
Fraction of X & Y blockings	204592	0.08	0.20	0.00	1.00	204592	0.01	0.09	0.00	1.00	132.74
NBER											
Chemical	204592	0.13	0.34	0.00	1.00	204592	0.13	0.34	0.00	1.00	0.00
Computers and Communications	204592	0.25	0.43	0.00	1.00	204592	0.25	0.43	0.00	1.00	0.00
Drugs and Medical	204592	0.06	0.24	0.00	1.00	204592	0.06	0.24	0.00	1.00	0.00
Electrical and Electronics	204592	0.25	0.43	0.00	1.00	204592	0.25	0.43	0.00	1.00	0.00
Mechanical	204592	0.19	0.39	0.00	1.00	204592	0.19	0.39	0.00	1.00	0.00
Others	204592	0.12	0.33	0.00	1.00	204592	0.12	0.33	0.00	1.00	0.00
Number of independent claims	204592	2.66	2.23	0.00	40.00	204592	2.65	2.22	0.00	39.00	2.23
Number of dependent claims to independent claims	204590	5.95	5.46	0.00	102.00	204590	6.13	5.41	0.00	104.00	-10.64
Number of words in first claim	204592	159.39	89.14	1.00	2401.00	204592	164.65	89.77	1.00	2671.00	-18.81
Average number of words in independent claims	204590	162.96	86.68	1.00	2402.00	204590	166.40	86.96	1.00	2671.00	-12.69
Backward cites	204592	6.75	6.06	0.00	334.00	204592	6.62	6.27	0.00	337.00	6.66
Pendency	204592	936.43	419.60	138.00	3963.00	204592	939.15	421.84	141.00	3970.00	-2.06
Attorney (yes / no)	204592	0.98	0.13	0.00	1.00	204592	0.98	0.13	0.00	1.00	0.00

Appendix D: Placebo test details (RDD only)

Table D1: Placebo Test Secrecy

Dependent variable: No. of 102 & 103 blocking actions (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	0.156*** (0.039)	0.127** (0.053)	0.083 (0.052)	0.088* (0.053)	0.045 (0.075)	0.075 (0.101)
N	9535	9535	9535	9535	5671	5671
R ²	0.002	0.002	0.023	0.025	0.243	0.243
PANEL 2: matched data, one month						
Post AIPA	0.033 (0.070)	0.031 (0.070)	0.069 (0.069)	0.055 (0.069)	0.119 (0.114)	0.061 (0.157)
N	2534	2534	2534	2534	1531	1531
R ²	0.000	0.001	0.038	0.045	0.230	0.231
Dependent variable: No. of X & Y blocking actions (in logs)						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.033* (0.019)	-0.015 (0.025)	0.003 (0.025)	0.002 (0.025)	0.040 (0.032)	0.071* (0.040)
N	9541	9541	9541	9541	5673	5673
R ²	0.001	0.001	0.009	0.010	0.250	0.250
PANEL 2: matched data, one month						
Post AIPA	-0.015 (0.034)	-0.013 (0.034)	-0.013 (0.033)	-0.015 (0.033)	0.007 (0.045)	0.017 (0.059)
N	2533	2533	2533	2533	1530	1530
R ²	0.001	0.002	0.019	0.020	0.191	0.191
Dependent variable: Fraction of X & Y blocking actions						
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL 1: Raw data, one month						
Post AIPA	-0.006 (0.009)	-0.005 (0.012)	0.002 (0.012)	0.002 (0.012)	0.023 (0.017)	0.029 (0.021)
N	9541	9541	9541	9541	5673	5673
R ²	0.000	0.000	0.004	0.006	0.225	0.225
PANEL 2: matched data, one month						
Post AIPA	-0.007 (0.017)	-0.007 (0.017)	-0.008 (0.017)	-0.010 (0.017)	0.014 (0.024)	0.008 (0.033)
N	2533	2533	2533	2533	1530	1530
R ²	0.000	0.001	0.014	0.016	0.184	0.184
All PANEL	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: Technology class fixed effects are based on six NBER technology classes, and technology trends are linear time trends per technology class using filing days. Post AIPA is an indicator that equals one if the patent was filed on or after November 29, 2000. Matched data is a balanced sample, where patents before and after AIPA are matched (CEM) based on backward cites to capture potential differences in novelty, 6 NBER technology classes to capture differences in technological popularity, number of independent claims, dependent claims per independent claim, word count of the first claim, average number of words per claim, whether an attorney was involved, and patent pendency (time from application to grant date) to capture differences in patent scope and writing. Heteroscedasticity robust standard errors are presented in parentheses.

Table D2: Placebo Test Same Assignee/Inventor Incidence of Self Blocking

	All	Same assignee	Same inventor
Year			
Patents	191,275	191,220	191,220
Blocking patents	21,050 (11.01%)	937 (0.49%)	388 (0.20%)
Blocking actions	44,012	1745	621
Month			
Patents	17,382	17,382	17,382
Blocking patents	1,896 (10.91%)	96 (0.55%)	41 (0.24%)
Blocking actions	3,947	167	59

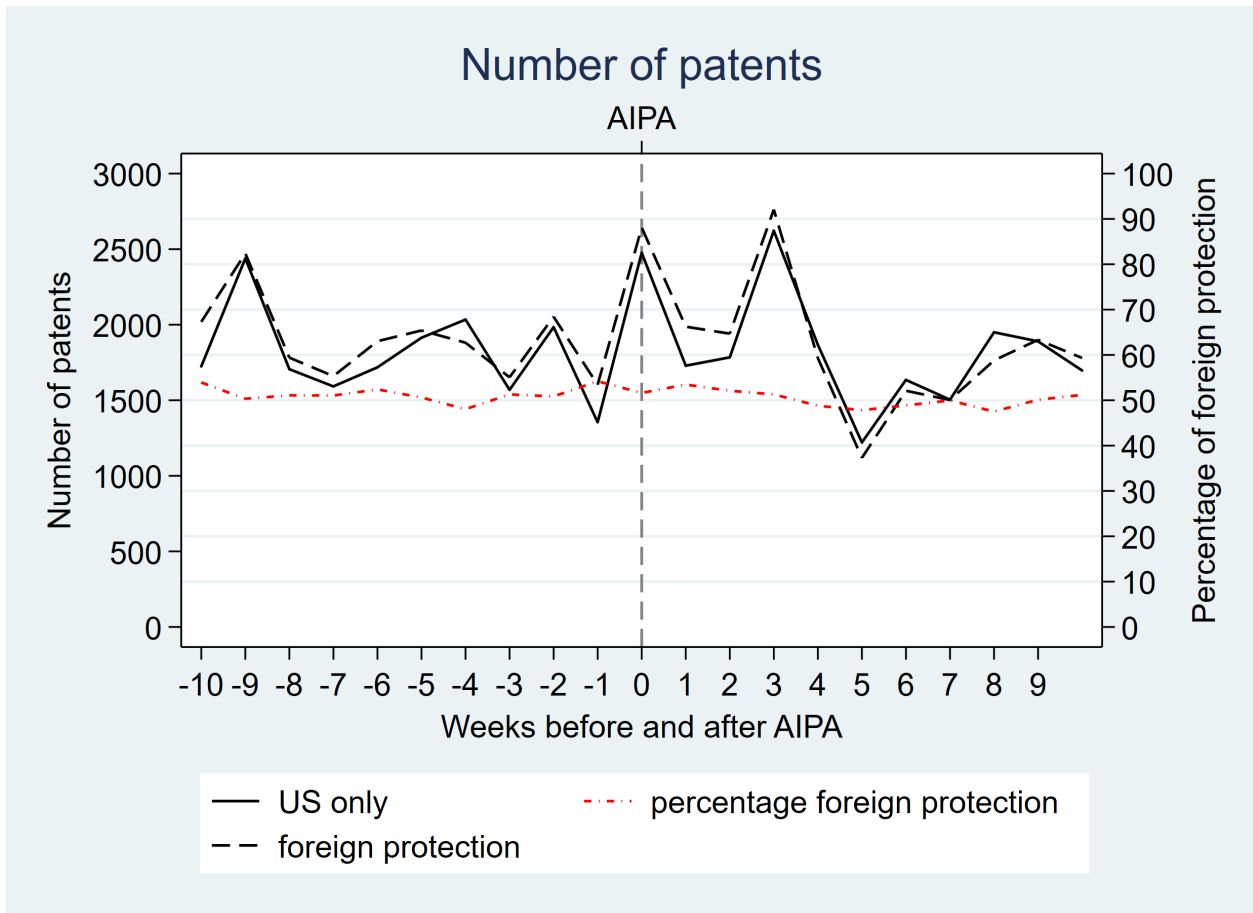
Notes: Year(month) data refers to all patents applied to one year(month) before and after AIPA. Blocking actions refer to European X or Y citations. Inventor and assignee data come from PATSTAT.

Appendix E: Exploration of possible selection effects

Here we explore three possible selection effects, before and after AIPA: 1) changes in parallel foreign filings, 2) changes in timing of applications, 3), changes in the scope and character of patents. We also compare the distribution of blockings over time, pre and post AIPA.

Figure E1 roughly indicates that the number of patents in the months before and after AIPA did not dramatically change. There is no distinct trend in the number of patents, in particular, the percentage of filings under foreign protection, thus indicating no evidence for changes in parallel foreign filings. Figure E2 illustrates practically no differences in observable patent characteristics one year before and after. Figure E3, however, at the more granular level of a month before and after AIPA, illustrates small differences in trends.

Figure E1: Illustration of little strategic change in applications pre and post AIPA



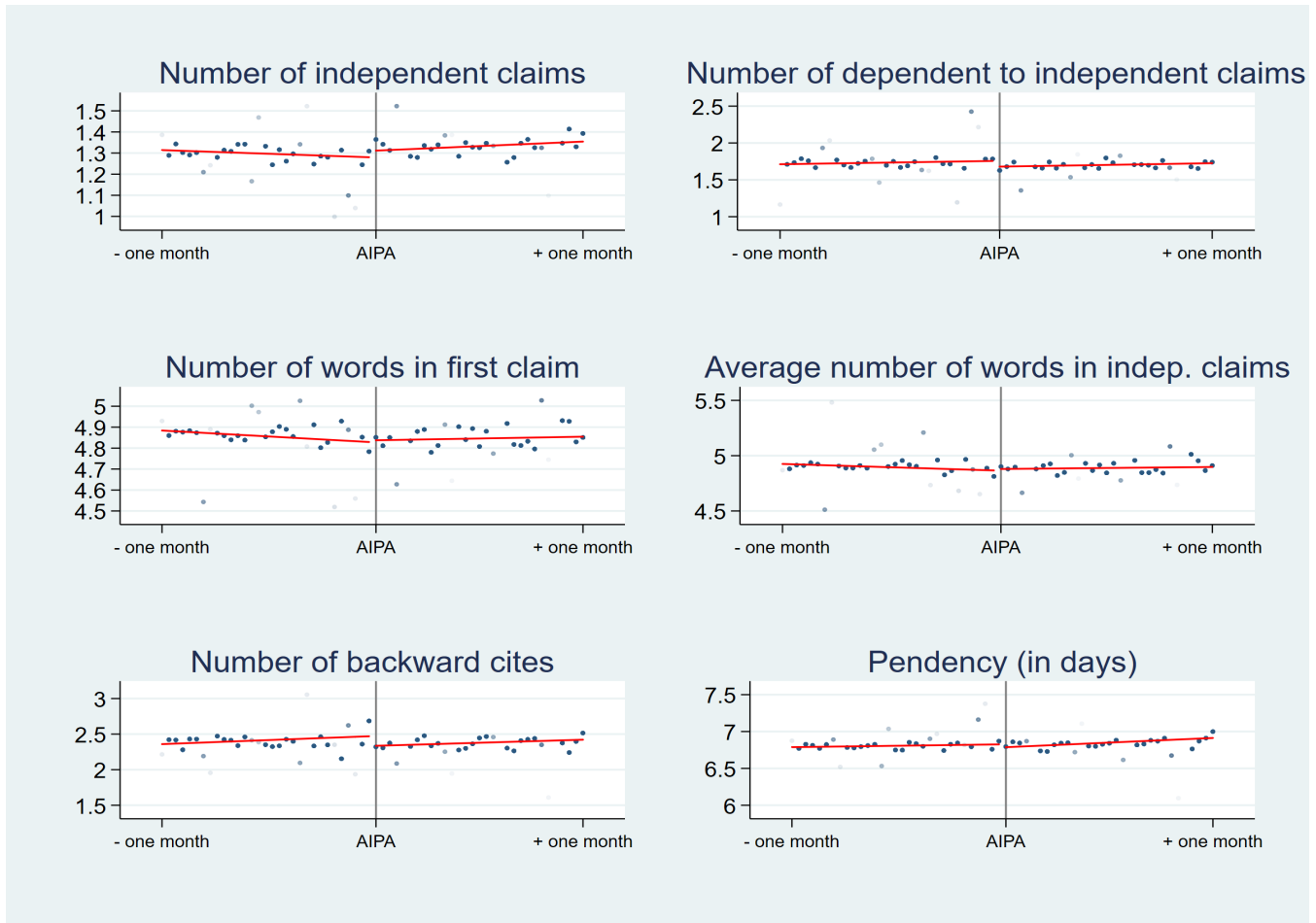
Notes: This figure illustrates the number of patents filed with the USPTO closely around AIPA with and without parallel foreign protection. AIPA became effective on November 29, 2000.

Figure E2: Observable patent characteristics one year before and after AIPA.



Notes: The characteristics of patents filed with the USPTO closely around AIPA do not appear to change much within one year before and after AIPA became effective on November 29, 2000.

Figure E3: Observable patent characteristics one month before and after AIPA.



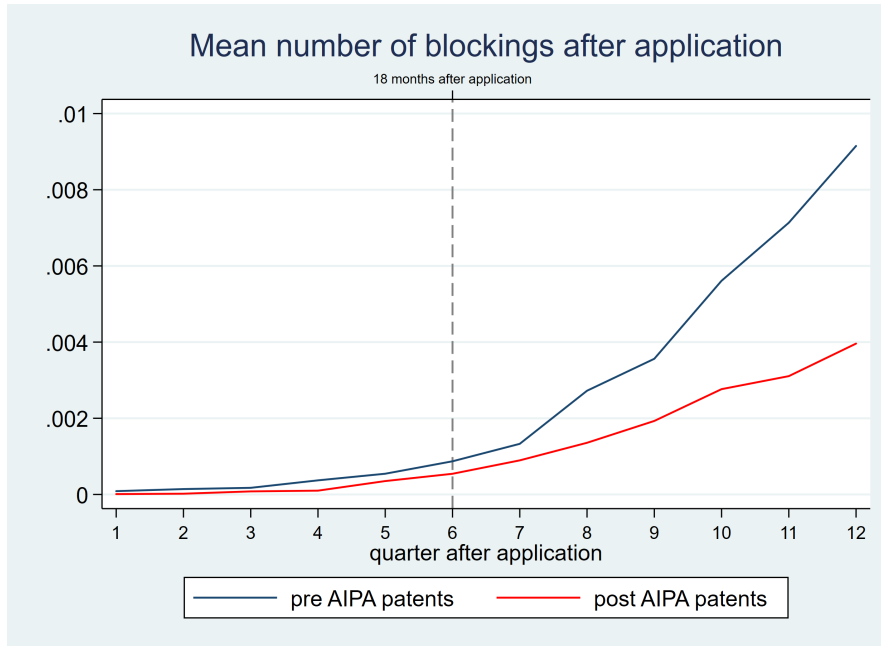
Notes: The characteristics of patents filed with the USPTO closely around AIPA do not appear to change much within one month, before and after AIPA became effective on November 29, 2000.

To investigate the small differences of Figure E3, Table E1 details the corresponding RDD regressions for these variables. Table E1 quantifies these differences; the effects become insignificant in the most complete models, with the exception of backward citations. Investigation of this significance revealed leverage from the day before AIPA came into effect, where some firms appear to have submitted patents with an unusually high number of backward prior art cites (for example, Nintendo applied for 29 patents the day before AIPA, with an average of 201 backward citations). Removal of the day before patents (out of the 30 days before and 30 days after that were previously modeled) eliminated any significant difference in all backward cite models.

To systematically investigate this selection due to possibly strategic behavior by firms, we investigated the daily patenting activity of each firm in the 60 day sample and removed the 4.5% of firms for which their highest patenting occurred on the day before AIPA. All differences in the control regressions again decrease in magnitude and become insignificant, see Tables E2 and E3. Dropping either the day before or 4.5% of assignees did not change or increased the magnitude of the main blocking estimations, see Table E4.

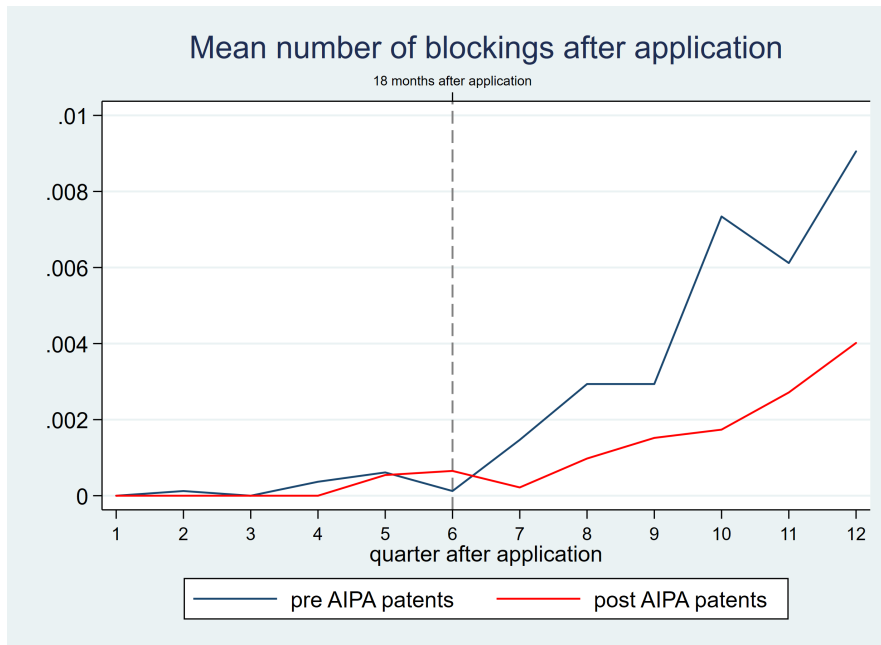
Figures E4 and E5 illustrates the distribution over time of blocking citations pre and post AIPA and supports an explanation of disclosure rather than selection. Figure E4 illustrates one year of pre and post AIPA patents, split by those before and those after the law change. Figure E5 illustrates the same for one month. It illustrates the mean number of blocked patents per quarter starting from the filing date of each focal patent for the pre- and post AIPA patent group. It essentially illustrates the distribution of blocking actions over time for each patent group. Given the lack of difference before the 18 month publication, and substantial difference afterwards (post AIPA patents generate fewer blockings on average), this provides evidence for the effects of disclosure. Had there been substantial differences before the 18 month publication line, that would have provided evidence for selection.

Figure E4: Observable patent characteristics one month before and after AIPA.



Notes: The distribution of blocking actions over time, starting from the date of application, for the 1 year prior and 1 year after AIPA cohorts.

Figure E5: Observable patent characteristics one month before and after AIPA.



Notes: The distribution of blocking actions over time, starting from the date of application, for the 1 month prior and 1 month after AIPA cohorts.

Table E1: Control variable RDD

PANEL 1: Raw data, one month						
	(1)	(2)	(3)	(4)	(5)	(6)
Number of independent claims (in logs)						
Post AIPA	0.030** (0.015)	0.033** (0.015)	0.021 (0.014)	0.021 (0.014)	0.021 (0.020)	0.037 (0.028)
N	17382	17382	17382	17382	11083	11083
R ²	0.002	0.002	0.063	0.063	0.300	0.300
Relation of dependent to independent claims (in logs)						
Post AIPA	-0.078*** (0.022)	-0.078*** (0.022)	-0.072*** (0.022)	-0.072*** (0.022)	-0.006 (0.029)	0.027 (0.040)
N	17381	17381	17381	17381	11082	11082
R ²	0.001	0.001	0.009	0.009	0.253	0.253
Number of words in first claim (in logs)						
Post AIPA	0.008 (0.018)	0.010 (0.018)	-0.009 (0.018)	-0.011 (0.018)	-0.017 (0.024)	0.003 (0.034)
N	17382	17382	17382	17382	11083	11083
R ²	0.000	0.000	0.060	0.061	0.330	0.330
Average number of words in independent claims (in logs)						
Post AIPA	0.012 (0.017)	0.015 (0.017)	-0.006 (0.017)	-0.007 (0.017)	-0.019 (0.022)	0.010 (0.031)
N	17381	17381	17381	17381	11082	11082
R ²	0.000	0.001	0.073	0.074	0.344	0.344
Number of backward cites (in logs)						
Post AIPA	-0.137*** (0.029)	-0.138*** (0.029)	-0.144*** (0.029)	-0.147*** (0.029)	-0.087** (0.036)	-0.136*** (0.050)
N	17382	17382	17382	17382	11083	11083
R ²	0.001	0.001	0.012	0.013	0.417	0.418
Pendency in days (in logs)						
Post AIPA	-0.042*** (0.016)	-0.039** (0.016)	-0.049*** (0.014)	-0.049*** (0.014)	-0.032* (0.019)	-0.022 (0.026)
N	17382	17382	17382	17382	11083	11083
R ²	0.004	0.005	0.228	0.228	0.480	0.480
	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: RDD models, equations (1) and (2). Tech class fixed effects based on six NBER tech classes, linear time trends per technology class using filing days. Post AIPA indicates if patent filed on or after Nov. 29, 2000. Heteroscedasticity robust standard errors.

Table E2: Control variable RDD without day before AIPA

PANEL: Raw data, one month, without day -1						
	(1)	(2)	(3)	(4)	(5)	(6)
Number of independent claims (in logs)						
Post AIPA	0.034** (0.016)	0.049*** (0.016)	0.041*** (0.016)	0.042*** (0.016)	0.008 (0.023)	0.019 (0.038)
N	16566	16566	16566	16566	10482	10482
R ²	0.002	0.003	0.065	0.065	0.301	0.301
Relation of dependent to independent claims (in logs)						
Post AIPA	-0.066*** (0.024)	-0.062** (0.025)	-0.061** (0.025)	-0.061** (0.025)	-0.023 (0.034)	-0.011 (0.056)
N	16565	16565	16565	16565	10481	10481
R ²	0.001	0.001	0.009	0.009	0.254	0.254
Number of words in first claim (in logs)						
Post AIPA	-0.021 (0.020)	-0.016 (0.020)	-0.024 (0.020)	-0.026 (0.020)	-0.021 (0.027)	0.005 (0.043)
N	16566	16566	16566	16566	10482	10482
R ²	0.000	0.000	0.058	0.060	0.330	0.331
Average number of words in independent claims (in logs)						
Post AIPA	-0.021 (0.019)	-0.016 (0.019)	-0.024 (0.019)	-0.025 (0.019)	-0.019 (0.025)	0.030 (0.040)
N	16565	16565	16565	16565	10481	10481
R ²	0.000	0.000	0.071	0.072	0.345	0.345
Number of backward cites (in logs)						
Post AIPA	-0.037 (0.030)	-0.015 (0.032)	-0.016 (0.032)	-0.020 (0.032)	-0.054 (0.040)	-0.092 (0.066)
N	16566	16566	16566	16566	10482	10482
R ²	0.000	0.001	0.012	0.013	0.410	0.410
Pendency in days (in logs)						
Post AIPA	-0.032* (0.018)	-0.014 (0.018)	-0.025 (0.016)	-0.025 (0.016)	-0.045** (0.022)	-0.044 (0.037)
N	16566	16566	16566	16566	10482	10482
R ²	0.004	0.005	0.229	0.229	0.479	0.479
	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: RDD models, equations (1) and (2). Tech class fixed effects based on six NBER tech classes, linear time trends per technology class using filing days. Post AIPA indicates if patent filed on or after Nov. 29, 2000. Heteroscedasticity robust standard errors.

Table E3: Control variable RDD without strategic assignees

PANEL: Raw data, one month, without potentially strategic acting assignees						
	(1)	(2)	(3)	(4)	(5)	(6)
Number of independent claims (in logs)						
Post AIPA	0.019 (0.017)	0.030* (0.017)	0.029* (0.017)	0.029* (0.017)	-0.000 (0.021)	-0.005 (0.030)
N	13886	13886	13886	13886	10329	10329
R ²	0.001	0.002	0.065	0.065	0.306	0.306
Relation of dependent to independent claims (in logs)						
Post AIPA	-0.028 (0.025)	-0.025 (0.025)	-0.020 (0.025)	-0.020 (0.025)	0.003 (0.031)	0.046 (0.043)
N	13885	13885	13885	13885	10328	10328
R ²	0.000	0.000	0.009	0.009	0.258	0.258
Number of words in first claim (in logs)						
Post AIPA	-0.021 (0.021)	-0.015 (0.021)	-0.025 (0.021)	-0.026 (0.021)	-0.039 (0.025)	-0.013 (0.037)
N	13886	13886	13886	13886	10329	10329
R ²	0.001	0.001	0.060	0.061	0.335	0.335
Average number of words in independent claims (in logs)						
Post AIPA	-0.020 (0.020)	-0.015 (0.020)	-0.027 (0.020)	-0.027 (0.020)	-0.037 (0.023)	-0.001 (0.033)
N	13885	13885	13885	13885	10328	10328
R ²	0.001	0.001	0.073	0.073	0.350	0.350
Number of backward cites (in logs)						
Post AIPA	-0.043 (0.033)	-0.028 (0.034)	-0.037 (0.034)	-0.040 (0.034)	-0.062* (0.037)	-0.106* (0.054)
N	13886	13886	13886	13886	10329	10329
R ²	0.000	0.001	0.013	0.013	0.408	0.409
Pendency in days (in logs)						
Post AIPA	-0.056*** (0.019)	-0.044** (0.019)	-0.041** (0.017)	-0.040** (0.017)	-0.040** (0.020)	-0.044 (0.029)
N	13886	13886	13886	13886	10329	10329
R ²	0.004	0.005	0.229	0.229	0.490	0.490
	(1)	(2)	(3)	(4)	(5)	(6)
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: RDD models, equations (1) and (2). Tech class fixed effects based on six NBER tech classes, linear time trends per technology class using filing days. Post AIPA indicates if patent filed on or after Nov. 29, 2000. Heteroscedasticity robust standard errors.

Table E4: RDD blockings without day before AIPA and without strategic assignees

PANEL: Raw data, one month, without day -1						
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: No. of 102 & 103 blocking actions (in logs)						
Post AIPA	-0.162*** (0.025)	-0.150*** (0.027)	-0.151*** (0.027)	-0.156*** (0.027)	-0.194*** (0.039)	-0.230*** (0.065)
N	16566	16566	16566	16566	10482	10482
R ²	0.009	0.009	0.021	0.023	0.214	0.214
Dependent variable: No. of X & Y blocking actions (in logs)						
Post AIPA	-0.102*** (0.011)	-0.103*** (0.013)	-0.101*** (0.012)	-0.100*** (0.013)	-0.113*** (0.018)	-0.085*** (0.030)
N	16566	16566	16566	16566	10479	10479
R ²	0.023	0.023	0.031	0.031	0.236	0.236
Dependent variable: Fraction of X & Y blocking actions						
Post AIPA	-0.050*** (0.006)	-0.049*** (0.006)	-0.048*** (0.006)	-0.048*** (0.006)	-0.050*** (0.009)	-0.041*** (0.015)
N	16566	16566	16566	16566	10479	10479
R ²	0.020	0.020	0.025	0.025	0.212	0.212
PANEL: Raw data, one month, without potentially strategic acting assignees						
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: No. of 102 & 103 blocking actions (in logs)						
Post AIPA	-0.154*** (0.027)	-0.144*** (0.028)	-0.143*** (0.028)	-0.147*** (0.028)	-0.159*** (0.035)	-0.141*** (0.050)
N	13886	13886	13886	13886	10329	10329
R ²	0.009	0.009	0.022	0.024	0.217	0.218
Dependent variable: No. of X & Y blocking actions (in logs)						
Post AIPA	-0.101*** (0.012)	-0.101*** (0.013)	-0.099*** (0.013)	-0.098*** (0.013)	-0.106*** (0.016)	-0.074*** (0.022)
N	13884	13884	13884	13884	10326	10326
R ²	0.023	0.023	0.032	0.033	0.243	0.243
Dependent variable: Fraction of X & Y blocking actions						
Post AIPA	-0.048*** (0.006)	-0.046*** (0.006)	-0.046*** (0.006)	-0.046*** (0.006)	-0.048*** (0.008)	-0.037*** (0.011)
N	13884	13884	13884	13884	10326	10326
R ²	0.020	0.020	0.025	0.026	0.215	0.215
RDD time controls	linear (same slope)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	linear (diff. slopes)	quadratic (diff. slopes)
Technology class fixed effects	no	no	yes	yes	yes	yes
Technology trends	no	no	no	yes	yes	yes
Firm fixed effects	no	no	no	no	yes	yes

Notes: RDD models, equations (1) and (2). Tech class fixed effects based on six NBER tech classes, linear time trends per technology class using filing days. Post AIPA indicates if patent filed on or after Nov. 29, 2000. Heteroscedasticity robust standard errors.

Appendix F: Data sources

Disclosure dataset from Graham and Hegde *Science* 2015

Description: Graham, S. and Hegde, D. (2015): Disclosing patents' secrets. Inventors prefer to disclose know-how before patent grant. *Science*. Vol. 347, issue 6219, pp. 236-237.

Url: www.sciencemag.org/content/347/6219/236/suppl/DC1

Datasets: patentdisclosure_datafile_gh.dta

Purpose: *secrecy – disclosure – foreign equivalent information, identify technology class, application date, granting date*

USPTO dataset: Office Action Research Dataset for Patents

Description: Lu, Qiang and Myers, Amanda F. and Beliveau, Scott, USPTO Patent Prosecution Research Data: Unlocking Office Action Traits (November 20, 2017). USPTO Economic Working Paper No. 2017-10

Url: <https://www.uspto.gov/learning-and-resources/electronic-data-products/office-action-research-dataset-patents>

Datasets: citations.dta & office_actions.dta

Purpose: *calculate the number of blocked patent applications*

From citations.dta kept all office actions by application id

- Kept only actions with an action type (102 or 103) (Type of action raised, indicated by section of 35 USC or category (double patent).
- Retained only actions related to patent id (identified by the variable parsed).

From office_actions.dta kept

- date of the office action. Each office action can be exactly identified by the ifw_number (image file wrapper of the office action) in both datasets.

USPTO Patent Examination Research Dataset

Description: Graham, S., Marco, A. and Miller, R., The USPTO Patent Examination Research Dataset: A Window on the Process of Patent Examination (November 30, 2015).

Url: <https://www.uspto.gov/learning-and-resources/electronic-data-products/patent-examination-research-dataset-public-pair>

Dataset: application_data.dta

Purpose: *identify attorneys and the disposal type (abandoned, issued or pending)*

USPTO Patent Claims Research Dataset

Description: Marco, Alan C. and Sarnoff, Joshua D. and deGrazia, Charles, Patent Claims and Patent Scope (October 2016). USPTO Economic Working Paper 2016-04.

Url: <https://www.uspto.gov/learning-and-resources/electronic-data-products/patent-claims-research-dataset>

Dataset: patent_document_stats.dta

Purpose: *identify claim statistics (no. of independent claims, dependent claims per independent claim, average number of words per claim)*

Dataset: patent_claims_stats.dta

Purpose: *identify claim statistics (word count of the first claim)*

Patentsview: Assignee information

Description: Graham, S., Marco, A. and Miller, R., The USPTO Patent Examination Research Dataset: A Window on the Process of Patent Examination (November 30, 2015).

Url: <http://www.patentsview.org/download/>

Dataset: rawassignee.tsv

Purpose: *identify assignee*

European patent search database: ‘PATSTAT Biblio - 2016 Autumn Edition’

Description + Url: <https://www.epo.org/searching-for-patents/business/patstat>

Dataset: us_ep_cites.dta

Purpose: *identify blocked European patent applications*

Appendix G: Example of an EPO search report

As an example of the EPO examination practice, we consider an EPO patent application filed by Samsung Electronics Co., Ltd. Samsung is a Korean company, with the largest patent portfolio among the biggest patent offices worldwide. Of course, the size of the patent portfolio and origin country of the applicant does not play any role and the examination process is the same for all firms applying for EPO patent protection, irrespective of the country of the applicant.

The patent application with application number ‘EP10150472’ for an ‘Image restoring apparatus and method thereof’ was filed on January 21, 2010. The whole application and examination process is documented on <https://register.epo.org/regviewer?lng=en> where all relevant documents and legal details can be found for any EPO patent. The search report was already published on July 07, 2010, because the filing refers to a so-called priority filing at the Korean patent office from January 2009 (covering the same invention), and the EPO filing is a so-called subsequent filing in order to gain protection in European countries as well.


The search report is a list of ‘documents considered to be relevant’ (see next page for the first page of the search report). It thus contains citations of other patent documents and their relevance to claims of the patent under examination. Each citation has a category, the most important being X, Y and A citations. ‘X’ and ‘Y’ citations indicate whether references to other patent documents call the novelty or inventive step of the claimed invention into question. ‘A’ citations indicate that the cited documents only represent state of the art and are thus not critical. In our context, in order to define patents that are potentially blocked by cited patent documents, X and Y citations are the relevant category.

The EPO defines an X citation as: “...where a document is such that when taken alone, a claimed invention cannot be considered novel or cannot be considered to involve an inventive step”, and a Y citation as, “...applicable where a document is such that a claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents of the same category, such combination being obvious to a person skilled in the art.”

Source: https://www.epo.org/law-practice/legal-texts/html/guidelines/e/b_x_9_2_1.htm.

The search report lists several X and Y citations, for example to US patent US2008238942 that is a Microsoft patent on ‘Object-Based Image Inpainting’. As a result, there were several amendments to the claims until the patent was granted on August 08, 2013.

Figure G1: Example of an EPO search report

 Europäisches Patentamt European Patent Office Office européen des brevets		EUROPEAN SEARCH REPORT		Application Number EP 10 15 0472
DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)	
X	LIN Y ET AL: "Fast image completion" VISUAL COMMUNICATIONS AND IMAGE PROCESSING; 12-7-2005 - 15-7-2005; BEIJING, 12 July 2005 (2005-07-12), XP030080885	1,5-8, 12-15	INV. G06T5/00 G06T11/00	
Y	* abstract * * Section 3 * * figures 1,2 * * tables 1,2 *	2,3,9,10		
X	US 2008/238942 A1 (SUN XIAOYAN [CN] ET AL) 2 October 2008 (2008-10-02)	1,5,6,8, 12,13,15		
Y	* paragraph [0042] - paragraph [0049] * * figure 4 (d) *	2,3,9,10		
X	HONGYING Z ET AL: "Image completion algorithm based on texture synthesis" CHINESE JOURNAL OF SYSTEMS ENGINEERING AND ELECTRONICS, SECOND ACADEMY MINISTRY OF AERO-SPACE INDUSTRY, BEIJING, CN, vol. 18, no. 2, 1 January 2007 (2007-01-01), pages 385-391, XP022936689 ISSN: 1004-4132 [retrieved on 2007-01-01] * abstract * * Section 2 *	1,4-8, 11-15	TECHNICAL FIELDS SEARCHED (IPC) G06T	

-/--				
The present search report has been drawn up for all claims				
1	Place of search Munich	Date of completion of the search 13 April 2010	Examiner Salvador, Elena	
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background Q : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document				