

The Paradox of Inventors' Job Security

Online Appendix

Table A.1

Wrongful-discharge laws by region, state, and year.

This table presents wrongful-discharge laws by region, state, and year. The data are sourced from Autor et al. (2006).

Region	State	Implied contract	Public policy	Good faith
New England	Connecticut	10/1985	01/1980	06/1980
New England	Maine	11/1977		
New England	Massachusetts	05/1988	05/1980	07/1977
New England	New Hampshire	08/1988	02/1974	02/1974 (Reversed 05/1980)
New England	Rhode Island			
New England	Vermont	08/1985	09/1986	
Middle Atlantic	New Jersey	05/1985	07/1980	
Middle Atlantic	New York	11/1982		
Middle Atlantic	Pennsylvania		03/1974	
East North Central	Illinois	12/1974	12/1978	
East North Central	Indiana	08/1987	05/1973	
East North Central	Michigan	06/1980	06/1976	
East North Central	Ohio	04/1982	03/1990	
East North Central	Wisconsin	06/1985	01/1980	
West North Central	Iowa	11/1987	07/1985	
West North Central	Kansas	08/1984	06/1981	
West North Central	Minnesota	04/1983	11/1986	
West North Central	Missouri	01/1983 (Reversed 02/1988)	11/1985	
West North Central	Nebraska	11/1983	11/1987	
West North Central	North Dakota	02/1984	11/1987	
West North Central	South Dakota	04/1983	12/1988	
South Atlantic	Delaware		03/1992	04/1992
South Atlantic	Florida			
South Atlantic	Georgia			
South Atlantic	Maryland	01/1985	07/1981	
South Atlantic	North Carolina		05/1985	
South Atlantic	South Carolina	06/1987	11/1985	
South Atlantic	Virginia	09/1983	06/1985	
South Atlantic	West Virginia	04/1986	07/1978	
East South Central	Alabama	07/1987		
East South Central	Kentucky	08/1983	11/1983	
East South Central	Mississippi	06/1992	07/1987	
East South Central	Tennessee	11/1981	08/1984	
West South Central	Arkansas	06/1984	03/1980	
West South Central	Louisiana			01/1998
West South Central	Oklahoma	12/1976	02/1989	05/1985 (Reversed 02/1989)
West South Central	Texas	04/1985	06/1984	
Mountain	Arizona	06/1983 (Reversed 04/1984)	06/1985	06/1985
Mountain	Colorado	10/1983	09/1985	
Mountain	Idaho	04/1977	04/1977	08/1989
Mountain	Montana	06/1987	01/1980	01/1982
Mountain	Nevada	08/1983	01/1984	02/1987
Mountain	New Mexico	02/1980	07/1983	
Mountain	Utah	05/1986	03/1989	
Mountain	Wyoming	08/1985	07/1989	01/1994
Pacific	Alaska	05/1983	02/1986	05/1983
Pacific	California	03/1972	09/1959	10/1980
Pacific	Hawaii	08/1986	10/1982	
Pacific	Oregon	03/1978	06/1975	
Pacific	Washington	08/1977	07/1984	

Table A.2**Effect of the good-faith exception on the types of innovations developed by inventors with varying cut-offs for the number of treated inventors per event.**

This table presents stacked DiD results from OLS regressions examining the effect of the good-faith exception on inventors' reliance on their employers' prior technologies, using varying cut-offs for the number of treated inventors per event. Column 1 includes all events. Column 2 excludes events with fewer than five treated inventors. Column 3 excludes events with fewer than ten treated inventors. Column 4 excludes events with fewer than 20 treated inventors. Column 5 corresponds to our main sample, which excludes events with fewer than 100 treated inventors. Column 6 excludes events with fewer than 200 treated inventors. The unit of observation is the inventor-patent. Robust standard errors are clustered by state (reported in parentheses). *Other WDLs* refers to the implied-contract and public-policy exceptions. Control variables and variable definitions are provided in Table 1 of the main article. *Number of events* refers to the unique number of adoption events in the sample. *Number of states* refers to the unique number of states in the sample. *Number of inventors* refers to the unique number of inventors in the sample. *Number of observations* refers to the total number of inventor-patent observations in the sample. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Dependent variable: Share firm refs						
Minimum number of treated inventors required per event	None	≥ 5	≥ 10	≥ 20	≥ 100	≥ 200
Estimation: OLS	(1)	(2)	(3)	(4)	(5)	(6)
Good faith $\times$ PostGF	0.022*** (0.007)	0.022*** (0.007)	0.022*** (0.007)	0.022*** (0.007)	0.022*** (0.007)	0.020*** (0.007)
Other WDLs active	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Event-state FEs	Y	Y	Y	Y	Y	Y
Event-technology-time FEs	Y	Y	Y	Y	Y	Y
Event-region-time FEs	Y	Y	Y	Y	Y	Y
Event-inventor-firm FEs	Y	Y	Y	Y	Y	Y
Number of events	11	10	9	8	7	6
Number of states	47	46	45	44	43	42
Number of inventors	81,869	81,819	81,552	81,477	81,211	80,405
Number of observations	1,968,259	1,812,665	1,650,410	1,440,788	1,235,472	1,083,415

Table A.3**Effect of the good-faith exception on the types of innovations developed by inventors: Event-specific estimates.**

This table presents stacked DiD results from OLS regressions examining the effect of the good-faith exception on the inventors' reliance on their employers' prior technologies. The events are organized by the timing of the adoption of the good-faith exception. Column 1 reports estimates for Connecticut (CT), Column 2 for California (CA), Column 3 for Oklahoma (OK), Column 4 for Arizona (AZ), Column 5 for Idaho (ID), Column 6 for Delaware (DE), and Column 7 for Louisiana (LA). Column 8 presents the stacked DiD results excluding Oklahoma (OK) and Louisiana (LA). The unit of observation is the inventor-patent. Robust standard errors are clustered by state (reported in parentheses). *Other WDLs* refers to the implied-contract and public-policy exceptions. Control variables and variable definitions are provided in Table 1 of the main article. *Number of events* refers to the unique number of adoption events in the sample. *Number of states* refers to the unique number of states in the sample. *Number of inventors* refers to the unique number of inventors in the sample. *Number of observations* refers to the total number of inventor-patent observations in the sample. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Dependent variable: Share firm refs								
Event	CT	CA	OK	AZ	ID	DE	LA	Excluding OK & LA
Estimation: OLS	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Good faith $\times$ PostGF	0.019 (0.014)	0.032 (0.020)	0.048** (0.021)	-0.081*** (0.023)	0.001 (0.029)	0.007 (0.010)	0.058** (0.022)	0.019** (0.008)
Other WDLs active	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Event-state FEs	Y	Y	Y	Y	Y	Y	Y	Y
Event-technology-time FEs	Y	Y	Y	Y	Y	Y	Y	Y
Event-regional-time FEs	Y	Y	Y	Y	Y	Y	Y	Y
Event-inventor-firm FEs	Y	Y	Y	Y	Y	Y	Y	Y
Number of events	1	1	1	1	1	1	1	5
Number of states	37	37	37	37	37	37	37	41
Number of inventors	33,511	38,136	20,256	41,055	51,012	47,871	33,709	79,708
Number of observations	151,699	169,728	83,326	191,073	253,442	234,147	152,057	1,000,089

Table A.4**Effect of the good-faith exception on the types of innovations developed by inventors: Financial constraints.**

This table presents stacked DiD results from OLS regressions examining the effect of the good-faith exception on the inventors' reliance on their employers' prior technologies across different levels of firms' financial constraints. Following Almeida et al. (2004) and Hadlock and Pierce (2010), the proxies for financial constraints are the firm's payout ratio (the ratio of dividends (Compustat Annual Data Item #21 plus #19) plus share repurchases (#115) to operating income (#13)) in Column 1, cash flow (income before extraordinary items (#18) plus depreciation and amortization (#14), scaled by lagged net property, plant, and equipment (#8)) in Column 2, asset size (#6) in Column 3, and sales (#12) in Column 4. Firms that are financially constrained (unconstrained) are those in the bottom (top) quartile of each measure in the fiscal year preceding the adoption of the good-faith exception. The unit of observation is the inventor-patent. Robust standard errors are clustered by state (reported in parentheses). *Other WDLs* refers to the implied-contract and public-policy exceptions. Control variables and variable definitions are provided in Table 1 of the main article. *Number of events* refers to the unique number of adoption events in the sample. *Number of states* refers to the unique number of states in the sample. *Number of inventors* refers to the unique number of inventors in the sample. *Number of observations* refers to the total number of inventor-patent observations in the sample. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Dependent variable: Share firm refs				
Heterogeneity variable 'X'	Payout ratio	Cash flow	Assets	Sales
Estimation: OLS	(1)	(2)	(3)	(4)
Good faith $\times$ PostGF $\times$ 1(Low 'X')	0.007 (0.026)	0.008 (0.020)	0.030 (0.030)	0.025 (0.026)
Good faith $\times$ PostGF $\times$ 1(High 'X')	0.058** (0.026)	0.077*** (0.024)	0.133*** (0.037)	0.125*** (0.029)
Difference (Low 'X' Vs. High 'X')	F=2.11 (p=0.15)	F=6.29 (p=0.02)	F=4.21 (p=0.05)	F=8.96 (p<0.01)
Other WDLs active	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Event-state FEs	Y	Y	Y	Y
Event-technology-time FEs	Y	Y	Y	Y
Event-region-time FEs	Y	Y	Y	Y
Event-inventor-firm FEs	Y	Y	Y	Y
Number of events	7	7	7	7
Number of states	43	43	43	43
Number of inventors	52,973	50,977	46,566	42,718
Number of observations	491,442	506,612	509,055	489,689

Table A.5

Effects of the good-faith exception on backward and forward citations of inventors' patents.

This table presents stacked DiD results from OLS regressions examining the effects of the good-faith exception on the number of backward references in inventors' patents and the number of forward citations those patents receive. Column 1 uses the natural logarithm of (one plus) the number of *firm* references in a patent as the dependent variable. Column 2 uses an indicator variable equal to one if a patent includes at least one *firm* reference. Column 3 uses the natural logarithm of (one plus) the total number of backward references in a patent. Column 4 uses an indicator variable equal to one if a patent includes at least one backward reference. Column 5 uses the natural logarithm of (one plus) the number of *firm* references, where each cited patent is weighted by its subsequent forward citation count. Column 6 analogously uses the natural logarithm of (one plus) the number of *non-firm* references, weighted by the subsequent forward citation counts of the cited patents. Column 7 uses the natural logarithm of (one plus) the total number of forward citations a patent receives. Column 8 uses an indicator variable equal to one if a patent receives at least one forward citation. The unit of observation is the inventor-patent. Robust standard errors are clustered by state (reported in parentheses). *Other WDLs* refers to the implied-contract and public-policy exceptions. Control variables and variable definitions are provided in Table 1 of the main article. *Number of events* refers to the unique number of adoption events in the sample. *Number of states* refers to the unique number of states in the sample. *Number of inventors* refers to the unique number of inventors in the sample. *Number of observations* refers to the total number of inventor-patent observations in the sample. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Dependent variable	Ln(1+No. of firm refs)	Any firm refs	Ln(1+No. of total refs)	Any refs	Ln(1+No. of citation-weighted firm refs)	Ln(1+No. of citation-weighted non-firm refs)	Ln(1+No. of forward citations)	Any forward citation
Estimation: OLS	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Good faith $\times$ PostGF	0.035* (0.018)	0.031*** (0.013)	0.002 (0.020)	0.001 (0.003)	0.106** (0.050)	-0.051 (0.076)	-0.041 (0.032)	0.004 (0.005)
Other WDLs active	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Event-state FEs	Y	Y	Y	Y	Y	Y	Y	Y
Event-technology-time FEs	Y	Y	Y	Y	Y	Y	Y	Y
Event-region-time FEs	Y	Y	Y	Y	Y	Y	Y	Y
Event-inventor-firm FEs	Y	Y	Y	Y	Y	Y	Y	Y
Number of events	7	7	7	7	7	7	7	7
Number of states	43	43	43	43	43	43	43	43
Number of inventors	81,211	81,211	81,211	81,211	81,211	81,211	81,211	81,211
Number of observations	1,235,472	1,235,472	1,235,472	1,235,472	1,235,472	1,235,472	1,235,472	1,235,472