Appendix

Proof of Lemma 1.

I will prove this result by contradiction. Suppose that the profit maximum is a strategy of patenting k technologies but is not a cut-off strategy. Then at least one technology i would be kept secret, while some technology $j > i$ is patented. For ease of exposition, suppose that there is only one such technology, and so, i is secret, while $i+1$ is patented. Under this strategy, the probability that the competitor will develop a competing product would be

$$\eta = [1-\tau]\alpha(1)\cdots\alpha(i-1)\rho(i)\lambda\alpha(i+1)\alpha(i+2)\cdots\alpha(k+1)\rho(k+2)\cdots\rho(N)\lambda^{N-k-1}. \quad \text{(A1)}$$

Now, consider an alternative strategy of patenting technology i and keeping $i+1$ secret. Then, the probability that the competitor will develop a competing product would be

$$\hat{\eta} = [1-\tau]\alpha(1)\cdots\alpha(i-1)\alpha(i)\rho(i+1)\lambda\alpha(i+2)\cdots\alpha(k+1)\rho(k+2)\cdots\rho(N)\lambda^{N-k-1}. \quad \text{(A2)}$$

Subtracting (A2) from (A1),

$$\begin{aligned}\hat{\eta}-\eta =& [1-\tau]\alpha(1)\cdots\alpha(i-1)\alpha(i+2)\cdots\alpha(k+1)\rho(k+2)\cdots\rho(N)\lambda^{N-k-1}\\ &\cdot\{\rho(i)\lambda\alpha(i+1)-\alpha(i)\rho(i+1)\lambda\}.\end{aligned} \quad \text{(A3)}$$

The sign of $\hat{\eta}-\eta$ depends on the terms in the braces,

$$\begin{aligned}\rho(i)\lambda\alpha(i+1)-\alpha(i)\rho(i+1)\lambda =& \rho(i)\lambda\alpha(i+1)-\alpha(i)\alpha(i+1)+\alpha(i)\alpha(i+1)-\alpha(i)\rho(i+1)\lambda\\ =& [\rho(i)\lambda-\alpha(i)]\alpha(i+1)+\alpha(i)[\alpha(i+1)-\rho(i+1)\lambda]\\ =& [\rho(i)\lambda-\alpha(i)]\alpha(i+1)-\alpha(i)[\rho(i+1)\lambda-\alpha(i+1)].\end{aligned}$$

By Assumption 1, $\rho(i)\lambda-\alpha(i) \geq \rho(i+1)\lambda-\alpha(i+1)$ and $\alpha(i) \leq \alpha(i+1)$, and so, the term in the braces is positive and $\eta \geq \hat{\eta}$.

Thus, the alternative strategy reduces the probability that the competitor will develop a competing product, and so, yields higher expected profit. Hence, the original strategy does not maximize profit. [ ]

Proof of Lemma 2.

By (5),

$$\begin{aligned}
&Y(i) - Y(i+1) \\
&= [1-\tau]\alpha(1)\cdots\alpha(i-1)\rho(i+1)\cdots\rho(N)\lambda^{N-i}[\rho(i)\lambda - \alpha(i)]M \\
&\quad - [1-\tau]\alpha(1)\cdots\alpha(i)\rho(i+2)\cdots\rho(N)\lambda^{N-i-1}[\rho(i+1)\lambda - \alpha(i+1)]M \\
&= [1-\tau]\alpha(1)\cdots\alpha(i-1)\rho(i+2)\cdots\rho(N)\lambda^{N-i-1}\{\rho(i+1)\lambda[\rho(i)\lambda - \alpha(i)] \\
&\quad - \alpha(i)[\rho(i+1)\lambda - \alpha(i+1)]\} M. \qquad \text{(A4)}
\end{aligned}$$

I claim that the term in braces,

$$H = \rho(i+1)\lambda[\rho(i)\lambda - \alpha(i)] - \alpha(i)[\rho(i+1)\lambda - \alpha(i+1)] \geq 0.$$

To prove the claim, suppose that $i+1 < i_0$. Then, by Assumptions 1 and 2, $\rho(i+1)\lambda > \alpha(i+1) > \alpha(i)$ and $\rho(i)\lambda - \alpha(i) \geq \rho(i+1)\lambda - \alpha(i+1) \geq 0$, and so, $H \geq 0$. Next, suppose that $i+1 = i_0$. Then, by Assumptions 1 and 2, $\rho(i)\lambda - \alpha(i) > 0 \geq \rho(i+1)\lambda - \alpha(i+1)$. Since $\rho(i+1) \geq 0$ and $\alpha(i) \geq 0$, it follows that $H \geq 0$. Finally, suppose that $i+1 > i_0$. Then, by Assumptions 1 and 2, $0 \geq \rho(i)\lambda - \alpha(i) \geq \rho(i+1)\lambda - \alpha(i+1)$ and $\rho(i+1) \leq \alpha(i)$, and so, $H \geq 0$.

Substituting $H \geq 0$ into (A4) implies that $Y(i) \geq Y(i+1)$. [ ]

Proof of Proposition 1.

By Assumption 2, $Y(1) > c$, and so, $k^* \geq 1$. Suppose that $N \geq i_0$. Then, by Assumptions 1 and 2, the marginal benefit at the two boundaries satisfies $Y(1) > c > 0$ and $Y(N) \propto [\rho(N)\lambda - \alpha(N)] < 0 < c$. By Lemma 2, $Y(i)$ is monotonically decreasing. Hence, there exists a unique k^* that satisfies (6). Further, since $Y(N) < 0$ and $Y(k^*) \geq c > 0$, it follows that $k^* < N$.

Suppose that $N < i_0$. Then, by Assumption 1, for all i, $\rho(i)\lambda > \alpha(i)$ and so, $Y(i) > 0$. By Lemma 2, $Y(i)$ is monotonically decreasing. If $Y(N) \leq c$, then there must be a unique $k^* \leq N$ that satisfies (6). If $Y(N) > c$, then $k^* = N$. [ ]

Proof of Proposition 2 (i).

Suppose $\lambda_1 < \lambda_2$, denote k_1^* as the cut-off strategy when $\lambda = \lambda_1$ and k_2^* as the cut-off strategy when $\lambda = \lambda_2$, we need to show $k_1^* \leq k_2^*$.
If k_2^* is a boundary solution, $k_2^* = N$, then $k_1^* \leq k_2^*$ is trivially satisfied.
If k_2^* is an interior solution, by Proposition 1, we have $Y(k_1^*, \lambda_1) \geq c$, $Y(k_2^*, \lambda_2) \geq c$ and $Y(k_2^* + 1, \lambda_2) < c$. From (7), we have $\frac{\partial Y}{\partial \lambda} |_{k=k_1^*, \lambda=\lambda_1} > 0$. Thus, $Y(k_1^*, \lambda_2) \geq Y(k_1^*, \lambda_1) \geq c > Y(k_2^* + 1, \lambda_2)$. By lemma 2, $k_1^* < k_2^* + 1$, i.e. $k_1^* \leq k_2^*$. [ ]

Remark 1. The effect of λ on k^* is not monotone in M.
To explain, suppose that $\lambda_1 < \lambda_2$ and $M_1 < M_2$. Let $k_{ij} \equiv k^*(\lambda_i, M_j)$ represent the profit-maximizing marginal patented technology when $\lambda = \lambda_i$ and $M = M_j$. By Proposition 2, given M_j, the marginal patented technology,

$$k^*(\lambda_2, M_j) \geq k^*(\lambda_1, M_j). \tag{A5}$$

Next, I show that, given λ_i, the marginal patented technology,

$$k^*(\lambda_i, M_2) \geq k^*(\lambda_i, M_1). \tag{A6}$$

By Proposition 1, $c > Y(k^*(\lambda_i, M_2) + 1 : \lambda_i, M_2)$. Further, by (5), $Y(i)$ is proportionate to M, and so, $Y(i, M_1) < Y(i, M_2)$. Combining with the preceding inequality implies $c > Y(k^*(\lambda_i, M_2) + 1 : \lambda_i, M_2) > Y(k^*(\lambda_i, M_2) + 1 : \lambda_i, M_1)$. By Proposition 1, $Y(k^*(\lambda_i, M_1) : \lambda_i, M_1) \geq c$, and so, the preceding inequality implies that $Y(k^*(\lambda_i, M_1) : \lambda_i, M_1) > Y(k^*(\lambda_i, M_2)+1 : \lambda_i, M_1)$. Since $Y(k)$ is monotone in k, it follows that $k^*(\lambda_i, M_1) < k^*(\lambda_i, M_2) + 1$, which implies (A6).

To appreciate whether $k^*(\lambda_2, M_2) - k^*(\lambda_1, M_2)$ is smaller or larger than $k^*(\lambda_2, M_1) - k^*(\lambda_1, M_1)$, consider two special cases.

Case (i). Suppose that $\Delta M \equiv M_2 - M_1$ is sufficiently small such that $k^*(\lambda_1, M_2) \approx k^*(\lambda_1, M_1)$. By (A5), k^* is weakly increasing in λ, and so, $k^*(\lambda_2, M_2) - k^*(\lambda_1, M_2) \approx k^*(\lambda_2, M_2) - k^*(\lambda_1, M_1) \geq k^*(\lambda_2, M_1) - k^*(\lambda_1, M_1)$, where the last inequality applies (A6). Hence, the effect of the weakness of trade secrets law on the secrecy/patent choice is (weakly) increasing in M.

Case (ii). By (A6), $k^*(\lambda_1, M_2) \geq k^*(\lambda_1, M_1)$. Suppose that $\Delta M \equiv M_2 - M_1$ is sufficiently large such that $k^*(\lambda_1, M_2) \geq k^*(\lambda_1, M_1) + 1$, while λ_2 is very large (trade secrets law is very weak) so that $k^*(\lambda_2, M_2) = k^*(\lambda_2, M_1) = N$. Then, $k^*(\lambda_2, M_2) - k^*(\lambda_1, M_2) = k^*(\lambda_2, M_1) - k^*(\lambda_1, M_2) \leq k^*(\lambda_2, M_1) - k^*(\lambda_1, M_1) - 1 < k^*(\lambda_2, M_1) - k^*(\lambda_1, M_1)$, i.e. the effect of the weakness of trade secrets law on the secrecy/patent choice is decreasing in M.

Supplement

Table S1. Data

Variable	Detailed construction	Source
National		
GDP deflator		U.S. Bureau of Economic Analysis
Deflator of gross domestic private investment		
State		
Industry value added		U.S. Bureau of Economic Analysis
Legal protection of trade secrets	Index comprising six items representing legal protection of trade secrets (see Table S2) in each state.	Author's calculations
Trade secrets common law	Index of legal protection of trade secrets due to common law (before UTSA taking effect).	
UTSA	Index of legal protection of trade secrets with the Uniform Trade Secrets Act in effect minus index due to common law.	
UDDA	Uniform Determination of Death Act	Uniform Law Commissioners
UFLRA	Uniform Federal Lien Registration Act	
UFTA	Uniform Fraudulent Transfers Act	
CNC in 1991 and 2009	Index of enforcement of covenants not to compete as of 1991 and 2009	Starr (2015)
Science and technology plan		State Science and Technology Institute (1997)
R&D tax credit		Wilson (2009)
State per capita spending on coop technology programs		State Science and Technology Institute (1997)
Tech program indicators	Indicators for technology development program, industrial problem-solving program, technology financing program, startup assistance program and teaming service program	Coburn and Berglund (1995)
Industry		
Complex industry	Concorded from ISIC, revision 3, to SIC using U.S. Office of Management and Budget (1997). Industries with ISIC codes less than 2900 are coded as "discrete" and industries with ISIC codes of 2900 or above are coded as complex.	Cohen et al. (2000)
High-tech industry	= 1 if 3-digit SIC listed in Hecker (1999) or	Hecker (1999);

	Brown et al. (2009); = 0 otherwise	Brown et al. (2009)
Defense industry	= 1 if 3-digit SIC is 372, 376 or 381; = 0 otherwise	Compustat: sic
HHI	Herfindahl-Hirschman Index by 3-digit industry and year	
Company		
Prior common law	Weighted average of the state-level indexes of trade secrets common law, weighted by number of facilities in which the company carried out R&D in the respective state in the preceding year.	Author's calculation based on R.R. Bowker directories
Effective UTSA, UDDA, UFLRA and UFTA	Weighted average of the state-level UTSA, UDDA, UFLRA and UFTA indexes, weighted by number of facilities in which the company carried out R&D in the respective state in the preceding year.	
CNC index in 1991 and 2009	Facility-weighted average of the state-level CNC indexes as of 1991and 2009 in the states in which the company carried out R&D in the preceding year.	Author's calculation based on R.R. Bowker directories and Starr (2015)
Company headquarter state		Compact Disclosure
Sales revenue	Sales revenue / U.S. GDP deflator	Compustat: revt
Employees	Number of employees	Compustat: emp
Property, plant, and equipment per employee	Property, plant, and equipment / U.S. GDP deflator / number of employees	Compustat: ppegt
R&D per employee	R&D expenditure / U.S. GPD deflator for investment / number of employees	Compustat: xrd
Indicator for no reported R&D	Equals one if R&D information is missing, else equals zero	Compustat: xrd
R&D intensity	(R&D expenditure / U.S. GPD deflator for investment) / (sales revenue /U.S. GDP deflator)	Compustat: xrd, revt
Number of patent applications	Number of patent applications by company and year	Kogan et al. (2017)
Number of patent IPC classes	Total number of IPC classes assigned to all patent applications by company and year	NBER patent dataset

Table S2. Index of legal protection of trade secrets

Dimension	Item	Coding	Sources
Substantive law	Whether information must be in actual or intended business use to be protected as trade secret.	= 0 if information must be in actual or intended use, = 1 otherwise.	ULA (Uniform Laws Annotated); Pedowitz et al. 1997; Malsberger et al. 2006
Substantive law	Whether reasonable efforts are required to maintain secrecy.	= 0 if reasonable efforts required, = 1 otherwise.	ULA; Pedowitz et al. 1997; Malsberger et al. 2006
Substantive law	Whether information must be used or disclosed for it to be deemed to have been misappropriated.	= 0 if information must be used or disclosed, = 1 if includes mere improper acquisition or no requirement.	ULA; Pedowitz et al. 1997; Malsberger et al. 2006
Civil procedure	Limitation on the time for the owner to take legal action for misappropriation.	Number of years divided by six.	ULA; Pedowitz et al. 1997; Malsberger et al. 2006
Remedies	Whether an injunction is limited to eliminating the advantage from misappropriation.	= 0 if yes, = 1 otherwise	Pedowitz et al. 1997; Malsberger et al. 2006
Remedies	Multiple of actual damages available in punitive damages.	Number of years divided by three.	Pedowitz et al. 1997; Malsberger et al. 2006

References:

Malsberger, Brian M., Robert A. Blackstone, and Arnold H. Pedowitz, *Trade Secrets: A State-by-State Survey*, 3rd edition, Arlington, VA: BNA Books, 2006.

Pedowitz, Arnold H., Robert W. Sikkel, Robert A. Dubault, and Brian M. Malsberger, *Trade secrets: A state-by-state survey*, Washington, DC: Bureau of National Affairs, 1997.

UTSA Endogeneity

The diagnostic tests in Table 4 of the main text suggest that the UTSA is endogenous to patenting. One possible source of endogeneity is states enacting the UTSA in response to changes in patenting. Table S3 reports estimates of a hazard model to investigate whether state enactment of the UTSA was related to state macro-economy, industry structure, or patenting. The estimates suggest that enactment of the UTSA was unrelated to the macro-economy, industry structure, and patenting.

Table S3. UTSA enactment

VARIABLES	Macro-economy	Patents
GDP (ln)	-0.585	-0.524
	(1.617)	(1.648)
Manufacturing (ln)	0.437	0.405
	(0.568)	(0.559)
Population (ln)	-0.129	-0.172
	(0.958)	(0.983)
Chemicals	-0.104	-0.120
	(0.229)	(0.226)
Machinery & equipment	-0.192	-0.228
	(0.261)	(0.257)
Electronic & electrical equipment	-0.247	-0.232
	(0.196)	(0.199)
Other transport equipment	0.268	0.263
	(0.166)	(0.168)
Search, detection & navigation	0.082	0.016
	(0.204)	(0.232)
Business services	0.115	-0.017
	(0.752)	(0.798)
Patents (ln)		0.281
		(0.430)
Observations	713	713
log L	-129.040	-128.836
Chi-squared	15.399	15.734
p-value	0.081	0.108

Notes: Method: Cox proportional hazard model; robust standard errors clustered by states.

Table S4. Supplementary summary statistics

VARIABLES	(a) Unit	(b) Mean	(c) Std	(d) Min	(e) Max
Science and technology plan	Indicator	0.064	0.211	0	1
R&D tax credit	Indicator	1.744	1.422	0	6.850
Spending on coop-tech programs	$`000	0.379	0.435	0	1
Technology development	Indicator	0.704	0.404	0	1
Industrial problem-solving	Indicator	0.958	0.163	0	1
Technology financing	Indicator	0.946	0.192	0	1
Startup assistance	Indicator	0.547	0.430	0	1
Teaming service	Indicator	0.795	0.350	0	1
Assets	$ `000	84.72	204.5	0	1,699
CNC in 2009		-0.262	1.293	-3.737	1.153
Total observations	7,291				
Total companies	793				

Notes: Unit of observation is company-year; Sample comprises companies listed in Compustat during 1984-1999; Limited to companies-years with at least two observations, at least one patent application, matched to Bowker dataset, and reporting positive employment, revenue, and PPE, and non-negative R&D expenditure. Due to matching to different datasets, product range has 2,840 observations; due to missing R&D expenditure from Compustat, R&D intensity has 6,124 observations and patent intensity has 6,122 observations.

UTSA Disaggregated Analysis

The estimates in Table 4 of the main text show that the UTSA was associated with less patenting. Relative to the prevailing common law, the UTSA changed the legal protection of trade secrets in multiple ways. An interesting issue is the legal channel by which the UTSA affected patenting.

First, Table S5, Panel A, reports correlations of the six items of the UTSA. Two items are perfectly correlated -- whether the information must be in actual or intended business use and whether information must be used or disclosed to be deemed to be misappropriated. The other items are not correlated at all.

Next, Table S6, Panel B, reports GMM regressions of patenting on the six items of the state-level UTSA index separately as well as a principal component of the items. Patenting is significantly negatively related to business use requirement and definition of misappropriation. Patenting is also negatively and significantly related to the principal component. Apparently, the main effect of the UTSA is through the business use requirement and definition of misappropriation. Nevertheless, since the UTSA combines the six items, I prefer the estimate focusing on the UTSA rather than the individual items.

Table S5. Correlations

Panel A. UTSA items

	CBU	RE	MUD	LP	IL	PM
CBU	1					
RE	0.101	1				
MUD	1	0.101	1			
LP	0.212	-0.028	0.212	1		
IL	-0.425	0.193	-0.425	0.089	1	
PM	0.451	-0.097	0.451	0.494	-0.152	1

Panel B. Firm-level measures of effective UTSA

	Facility weighted	Facility average	Headquarter	Inventor weighted
Facility weighted	1			
Facility average	0.985	1		
Headquarter	0.866	0.840	1	
Inventor weighted	0.757	0.745	0.715	1

Panel C. Firm characteristics

	Contribution margin	R&D intensity	Revenue
Contribution margin	1		
R&D intensity	0.379	1	
Revenue	-0.043	-0.087	1

Notes: Panel A: Sample comprises of all U.S. states in 1984-1999; Items abbreviations: CBU = Continuous business use, RE = Reasonable effort, MUD = Misappropriation requires use or disclosure, LP = Limitation period, IL = Injunction length, PM = Punitive multiple. State-year UTSA index is the simple average of the six item scores. Panels B and C: Sample comprises firm-year observations in manufacturing industries during 1980-1999.

Table S6. UTSA and patenting: Robustness

Panel A. Model specifications

VARIABLES	(a) Preferred estimate	(b) UTSA: Facility average	(c) UTSA: Inventor average	(d) UTSA: Headquarter	(e) Preferred estimate: HQ sample	(f) Binary UTSA	(g) Exclude R&D variables	(h) Balanced panel
Effective	-2.448**	-1.484	-3.715***	-3.876	-7.903***	-1.228***	-2.590**	-0.985
UTSA	(1.224)	(1.256)	(1.207)	(2.687)	(2.515)	(0.469)	(1.292)	(1.125)
Observations	7,291	7,291	5,137	4,949	4,949	7,291	7,291	3,088
Companies	793	793	737	677	677	793	793	193
Marg. effect	-0.386	-0.257	-0.532	-0.609	-0.843	-0.441	-0.403	-0.166
p-value	0.045	0.238	0.002	0.149	0.002	0.009	0.045	0.381
Hausman stat	3.82	3.59	3.40	2.49	9.00	7.73	3.44	0.42
p-value	0.051	0.058	0.065	0.115	0.003	0.005	0.063	0.518
Hansen J stat	2.81	2.62	2.67	12.50	1.51	0.35	2.27	2.85
p-value	0.094	0.105	0.102	0.000	0.219	0.553	0.132	0.092

Panel B. UTSA items

VARIABLES	(a) Continuous business use	(b) Reasonable effort	(c) Misapp: use/ disclose	(d) Limitation period	(e) Injunction length	(f) Punitive multiple	(g) Principal component
Effective	-1.196***	-10.708	-1.198***	-62.727	0.856	-5.599	-0.297**
UTSA	(0.446)	(75.776)	(0.446)	(118.721)	(0.578)	(5.160)	(0.119)
Observations	7,237	7,278	7,247	6,596	6,512	6,372	5,914
Companies	789	792	790	772	772	747	735
Marg. effect	-0.473	-0.133	-0.473	-1.000	0.325	-0.840	-0.073
p-value	0.007	0.888	0.007	0.597	0.138	0.278	0.012
Hausman stat	6.89	1.27	6.96	0.05	1.84	0.45	4.70
p-value	0.009	0.259	0.008	0.825	0.175	0.502	0.030
Hansen J stat	0.31	4.55	0.31	1.02	2.97	1.33	0.16
p-value	0.576	0.033	0.577	0.312	0.085	0.249	0.692

Notes: Poisson GMM estimates using Stata routine, gmm ivxtp1, with company fixed effects and year fixed effects and indicators of UDDA, UFTA and UFLRA weighted by company R&D facilities as instruments for effective UTSA; Dependent variable: number of patent applications by company and year; Robust standard errors clustered by company in parentheses (*** p<0.01, ** p<0.05, * p<0.1); Lower panel reports marginal effects, Hausman test statistics and Over-identification test statistics with p-values. Panel A: Column (a): preferred estimate from Table 3, column (c); Columns (b): Effective UTSA and its instruments as simple average of UTSA indexes in each state; Columns (c): Effective UTSA and its instruments as average UTSA weighted by number of inventors in each state, excluding companies-years with zero patent; Columns (d): Effective UTSA and its instruments as UTSA of state of company headquarter; Column (e): Preferred estimate (column (a)) limited to company-years with non-missing headquarter states; Column (f): Effective UTSA as average of binary indicators of UTSA weighted by the number of R&D facilities in each state; Column (g): Exclude R&D per employee and indicator of missing R&D; Column (h): Limited to companies with no missing year. Panel B: Columns (a)-(f): Estimates using UTSA item scores from Png (2017), limited to observations with non-missing scores in the specific item; Column (g): Estimate using principal component of UTSA item scores from Stata routine, pca, limited to observations with non-missing scores in all items.

Table S7. Alternative explanations

VARIABLES	(a) Control: State Science & Tech plan	(b) Control: State tech coop expenditure	(c) Control: State R&D tax credit	(d) Control: State technology programs	(e) Exclude software patents	(f) Exclude software patents by IPC	(g) Exclude defense industries
Effective UTSA	-2.942**	-2.403**	-2.649**	-2.336*	-2.505**	-2.150*	-2.105*
	(1.437)	(1.222)	(1.326)	(1.248)	(1.225)	(1.216)	(1.188)
Observations	7,291	7,291	7,291	7,291	7,291	7,291	6,974
Companies	793	793	793	793	793	793	755
Marg. effect	-0.443	-0.380	-0.410	-0.372	-0.393	-0.348	-0.343
p-value	0.041	0.049	0.046	0.061	0.041	0.077	0.076
Hausman stat	4.03	3.69	3.60	3.68	4.06	3.16	2.79
p-value	0.045	0.055	0.058	0.055	0.044	0.075	0.095
Hansen J stat	2.39	3.17	3.39	2.78	2.96	2.75	2.02
p-value	0.122	0.075	0.066	0.095	0.085	0.097	0.155

Notes: Poisson GMM estimates using Stata routine, gmm ivxtp1, with company fixed effects and year fixed effects and indicators of UDDA, UFTA and UFLRA weighted by company R&D facilities as instruments for effective UTSA; Dependent variable: number of patent applications by company and year; Robust standard errors clustered by company in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$); Lower panel reports marginal effects, Hausman test statistics and Over-identification test statistics with p-values. Columns (a)-(d): Control for indicators of state science and technology plan (State Science and Technology Institute, 1997: Table A2), state per capita spending on technology cooperative programs (State Science and Technology Institute, 1996: Table 3); indicator of state R&D tax credit (Wilson, 2009), and indicators for state science and technology programs (DETD, DIPS, DETF, DSAS and DTEM), respectively; Columns (e)-(f): Exclude software patents; Column (g): Exclude companies in defense industries (SIC 372, 376, 381).

Table S8. UTSA and patenting: Contingencies

VARIABLES	(a) Low citation	(b) High citation	(c) Low assets	(d) High assets	(e) Low revenue	(f) High revenue	(g) Weak CNC 09	(h) Strong CNC 09
Effective	-0.570	-1.965	-1.233	-2.291*	-1.445	-2.505*	-1.391	-0.261
UTSA	(0.778)	(1.270)	(0.805)	(1.300)	(0.929)	(1.363)	(1.485)	(0.628)
Observations	2,731	2,752	3,645	3,646	3,645	3,646	3,461	3,830
Companies	660	597	499	417	492	409	422	457
Marg. effect	-0.112	-0.329	-0.210	-0.378	-0.239	-0.408	-0.242	-0.051
p-value	0.464	0.122	0.126	0.078	0.120	0.066	0.349	0.678
Hausman stat	0.95	0.92	0.03	3.38	0.72	3.39	1.20	1.49
p-value	0.330	0.337	0.858	0.066	0.395	0.066	0.274	0.223
Hansen J stat	1.04	1.26	1.42	2.79	0.74	2.62	0.84	4.29
p-value	0.309	0.261	0.234	0.095	0.388	0.105	0.358	0.038

Notes: Poisson GMM estimates using Stata routine, gmm ivxtp1, with company fixed effects and year fixed effects and indicators of UDDA, UFTA and UFLRA weighted by company R&D facilities as instruments for effective UTSA; Dependent variable: number of patent applications by company and year; Robust standard errors clustered by company in parentheses (*** p<0.01, ** p<0.05, * p<0.1); Lower panel reports marginal effects, Hausman test statistics and Over-identification test statistics with p-values. In each pair of split-sample regressions, the total number of companies may exceed the number of companies in complex technology industries as companies shift from below to above the median and vice versa from year to year. Columns (a) and (b): Companies with below and above median citation per patent; Columns (c) and (d): Companies with below and above median total assets; Columns (e) and (f): Companies with below and above median number of employees; Columns (g) and (h): Companies facing below and above median enforcement of covenants not to compete based on Starr (2015) CNC index for the year 2009.