

Online Appendix for: **How Does Firms’
Innovation Disclosure Affect Their Banking
Relationships?**

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A Supplementary Figures

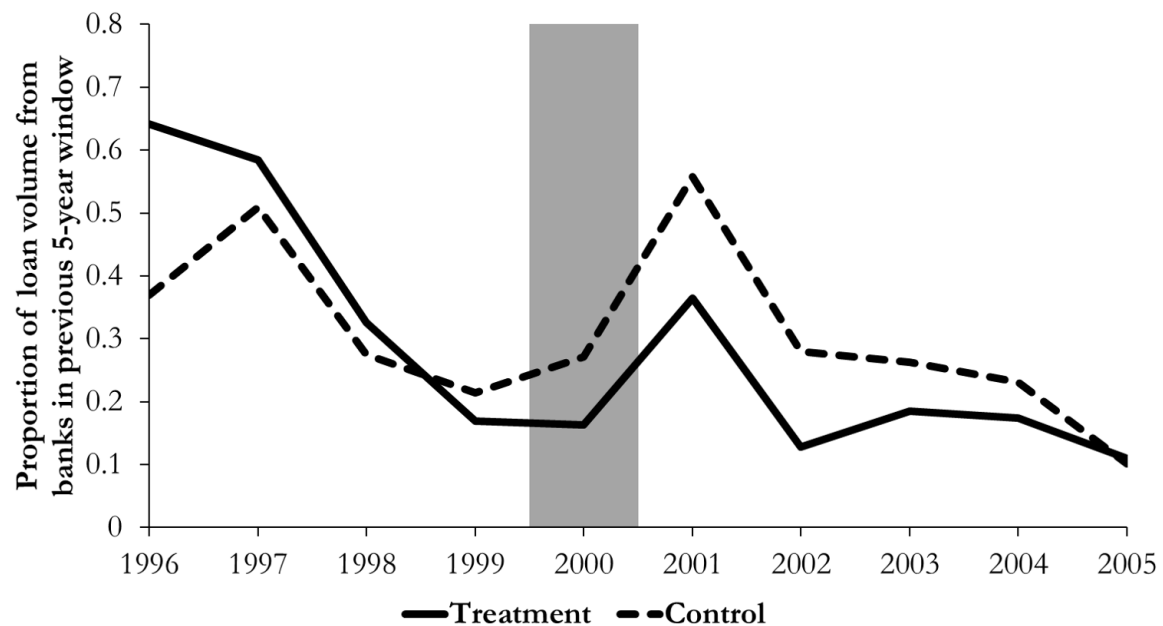


Figure A.1: **Effect of AIPA on Lending Relationships.** This figure plots the proportion of the total loan volume in a given year from 1996 to 2000 (2001 to 2005) granted by banks that firms already received loans from in the previous five-year window from 1991 to 1995 (1996 to 2000), separately for firms in the top (“treatment”) and the bottom (“control”) quintile of the distribution of the pre-AIPA delay measure.

B Supplementary Tables

Table B.1: **Stock Price Reaction on Patent Grant Dates and Publication Dates**

	Daily unadjusted stock returns (in bps)	
	Before AIPA (1)	After AIPA (2)
Grant day	6.130*** (1.526)	3.760*** (1.027)
N	42,844	77,790
Publication day		9.007*** (1.328)
N		44,851

Notes: This table displays univariate tests of whether the daily raw returns on patenting firms' stocks are equal to zero. The returns are expressed in basis points. The sample spans the years 1996 – 2005, and is comprised of all patenting firms in the sample of 5,005 firms that we use in our main analysis. The grant dates, publication dates, and the match between patent assignee and CRSP are retrieved from Kogan, Papanikolaou, Seru, and Stoffman (2017), available on Noah Stoffman's website. We separately report the stock price reaction on the day when the patent is granted (grant day) and the day when the patent is published by the USPTO (publication day). *Before AIPA* refers to the period before November 2000, and *After AIPA* refers to the period thereafter. *N* refers to unique firm-day combinations. Robust standard errors (clustered at the firm level) are in parentheses.

Table B.2: Impact of AIPA on Extensive Margin of Lending Relationships – Variation in Treatment Intensity

<i>Panel A: Role of patenting and bank dependence</i>			
Sample	Loan from bank $\in \{0, 1\}$		
	Loan(s) in pre- or post-period		
	(1)	(2)	(3)
Treatment \times Initial relationship \times Post	0.009 (0.042)	-0.034 (0.037)	-0.043 (0.041)
Initial relationship \times Post	-1.669*** (0.085)	-1.583*** (0.079)	-1.543*** (0.081)
Treatment \times Initial relationship \times Patenting \times Post	-0.344*** (0.097)		
Initial relationship \times Patenting \times Post	0.760*** (0.214)		
Treatment \times Initial relationship \times Value of patents \times Post		-0.038*** (0.014)	
Initial relationship \times Value of patents \times Post		0.089*** (0.031)	
Treatment \times Initial relationship \times Bank dependence \times Post			-0.609* (0.357)
Initial relationship \times Bank dependence \times Post			1.216 (0.747)
Bank-firm FE	Y	Y	Y
Bank-period FE	Y	Y	Y
Firm-period FE	Y	Y	Y
No. of bank-firm pairs	8,348	8,348	9,333
N	16,696	16,696	18,666
<i>Panel B: Intellectual property protection</i>			
Sample	Loan from bank $\in \{0, 1\}$		
	Loan(s) in pre- or post-period		
Industries	All	All	Manufacturing
IDD definition	No reversals	All	
	(1)	(2)	(3)
Treatment \times Initial relationship \times Post	-0.090** (0.041)	-0.117*** (0.042)	1.531 (2.049)
Initial relationship \times Post	-1.458*** (0.089)	-1.395*** (0.097)	-5.388 (4.474)
Treatment \times Initial relationship \times IDD \times Post	0.178** (0.071)	0.151** (0.073)	
Initial relationship \times IDD \times Post	-0.346** (0.157)	-0.310* (0.159)	
Treatment \times Initial relationship \times IPR index \times Post			-0.432 (0.482)
Initial relationship \times IPR index \times Post			1.027 (1.052)
Bank-firm FE	Y	Y	Y
Bank-period FE	Y	Y	Y
Firm-period FE	Y	Y	Y
No. of bank-firm pairs	6,071	6,071	2,666
N	12,142	12,142	5,332

Notes: All regressions are estimated at the bank-firm-period level (two observations per bank-firm pair). The sample is limited to bank-firm (ij) pairs with at least one loan within the previous five years leading up to the AIPA (pre-period from 1996 to 2000) or within the first five years

after the AIPA (post-period from 2001 to 2005). The sample in the first two columns of Panel B is furthermore limited to firms that did not change their headquarters. The sample in the last column of Panel B is limited to firms in the manufacturing sector (SIC codes 2000 – 3999). The dependent variable is an indicator for the occurrence of any loan transaction between firm i and bank j . $Treatment_i$ is defined at the industry level (based on two-digit SIC codes), and measures the mean difference in years between the filing date and the grant date, across all patents granted to publicly listed firms in the respective industry between 1996 and 2000. $Initial\ relationship_{ij}$ is an indicator variable for whether firm i received a loan from bank j anytime in the pre-period. $Post_t$ is a dummy variable for the post-period from 2001 to 2005. $Patenting_i$ is an indicator variable for whether firm i issued any patents in the pre-AIPA period. $Value\ of\ patents_i$ is the natural logarithm of one plus the total value of all patents of firm i in the pre-AIPA period, based on market reactions to patent publications from Kogan, Papanikolaou, Seru, and Stoffman (2017). $Bank\ dependence_i$ is the ratio between firm i 's total volume of syndicated loans over total assets in the pre-AIPA period. IDD_i reflects whether firm i was exposed to the adoption of the Inevitable Disclosure Doctrine (IDD), and is defined differently across the first two columns. In the first column of Panel B, it is an indicator variable for whether firm i operated out of a state that had adopted the IDD by the first available year of the pre-AIPA period from 1996 to 2000, and did not reverse it thereafter, whereas in the second column, we also include states the courts of which eventually rejected the IDD after its adoption (namely, Florida in 2001, Michigan in 2002, and Texas in 2003). $IPR\ index_i$ is an index capturing the export-weighted exposure of firm i 's industry to intellectual property protection around the world, based on 2000 data. Public-service firms are dropped. Robust standard errors (clustered at the bank level) are in parentheses.

Table B.3: **Impact of AIPA on Extensive Margin of Lending Relationships – Robustness I**

Sample Robustness	Loan from bank $\in \{0, 1\}$			
	At least one loan in pre- or post-period			
	No licensers	No tech	Experts	Survivors
	(1)	(2)	(3)	(4)
Treatment \times Initial relationship \times Post	-0.096*** (0.036)	-0.082** (0.033)	-0.114*** (0.041)	-0.083*** (0.030)
Initial relationship \times Post	-1.437*** (0.081)	-1.454*** (0.071)	-1.311*** (0.104)	-1.452*** (0.070)
Bank-firm FE	Y	Y	Y	Y
Bank-period FE	Y	Y	Y	Y
Firm-period FE	Y	Y	Y	Y
No. of bank-firm pairs	7,474	8,102	4,393	7,678
N	14,948	16,204	8,786	15,356

Notes: All regressions are estimated at the bank-firm-period level (two observations per bank-firm pair). Across all columns, the sample is limited to bank-firm (ij) pairs with at least one loan within the previous five years leading up to the AIPA (pre-period from 1996 to 2000) or within the first five years after the AIPA (post-period from 2001 to 2005). In the first column, we exclude all firms involved in licensing alliances anytime during our sample period from 1996 to 2005. In the second column, we drop all high-tech companies, following Ljungqvist and Wilhelm (2003), which are active in the following SIC codes: 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3674 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 4899 (communication services), and 7370, 7371, 7372, 7373, 7374, 7375, 7378, and 7379 (software). In the third column, we limit the sample to observations associated with banks in the top third of the distribution of the proportion of loans granted to patenting firms in the pre-period. In the fourth column, firms that were delisted for bankruptcy-related reasons anytime until (and including) 2005 are dropped from the sample. Bankruptcy is identified using the following CRSP delisting codes: any type of liquidation (400-490); price fell below acceptable level; insufficient capital, surplus, and/or equity; insufficient (or non-compliance with rules of) float or assets; company request, liquidation; bankruptcy, declared insolvent; delinquent in filing; non-payment of fees; does not meet exchange's financial guidelines for continued listing; protection of investors and the public interest; corporate governance violation; and delist required by Securities Exchange Commission (SEC). The dependent variable is an indicator for the occurrence of any loan transaction between firm i and bank j . $Treatment_i$ is defined at the industry level (based on two-digit SIC codes), and measures the mean difference in years between the filing date and the grant date, across all patents granted to publicly listed firms in the respective industry between 1996 and 2000. $Initial\ relationship_{ij}$ is an indicator variable for whether firm i received a loan from bank j anytime in the pre-period. $Post_t$ is a dummy variable for the post-period from 2001 to 2005. Public-service firms are dropped. Robust standard errors (clustered at the bank level) are in parentheses.

Table B.4: **Impact of AIPA on Extensive Margin of Lending Relationships – Robustness II**

Sample	Loan from bank $\in \{0, 1\}$			
	At least one loan in pre- or post-period			
Robustness	Median delay	3y window	Firm delay	Examiners
	(1)	(2)	(3)	(4)
Treatment \times Initial relationship \times Post	-0.098*** (0.028)	-0.085*** (0.030)	-0.057* (0.035)	-0.096*** (0.033)
Initial relationship \times Post	-1.446*** (0.059)	-1.515*** (0.062)	-1.507*** (0.089)	-1.482*** (0.060)
Bank-firm FE	Y	Y	Y	Y
Bank-period FE	Y	Y	Y	Y
Firm-period FE	Y	Y	Y	Y
No. of bank-firm pairs	9,333	5,917	2,321	9,333
N	18,666	11,834	4,642	18,666

Notes: All regressions are estimated at the bank-firm-period level (two observations per bank-firm pair). In the first, third, and fourth column, the sample is limited to bank-firm (ij) pairs with at least one loan within the previous five years leading up to the AIPA (pre-period from 1996 to 2000) or within the first five years after the AIPA (post-period from 2001 to 2005). In the second column, we vary the time window around AIPA to three years (pre-period from 1998 to 2000, post-period from 2001 to 2003). The dependent variable is an indicator for the occurrence of any loan transaction between firm i and bank j . $Treatment_i$ is defined at the industry level (based on two-digit SIC codes), and measures the median difference in the first column, and the mean difference in the second column, in years between the filing date and the grant date, across all patents granted to publicly listed firms in the respective industry between 1996 and 2000. In the third column, $Treatment_i$ is defined at the firm level (conditional on firms having patented at least once between 1996 and 2000), and measures the mean difference between the filing date and the grant date for all patents of firm i between 1996 and 2000. In the fourth column, $Treatment_i$ is at the industry level and measured using only the portions of delays that were more likely to be due to examiners. $Initial\ relationship_{ij}$ is an indicator variable for whether firm i received a loan from bank j anytime in the pre-period. $Post_t$ is a dummy variable for the post-period from 2001 to 2005 in the first, third and fourth column, and from 2001 to 2003 in the second column. Public-service firms are dropped. Robust standard errors (clustered at the bank level) are in parentheses.

Table B.5: Impact of AIPA on Lending Relationships of Patenting Firms – Stable Control Group

Sample Delay (treatment) measure	ln(1+Loan volume)		Loan from bank $\in \{0, 1\}$	
	At least one loan in pre- or post-period, pre-AIPA delay $\leq 2y$			
	Continuous	Binary	Continuous	Binary
	(1)	(2)	(3)	(4)
Treatment \times Initial relationship \times Post	-5.696*** (2.056)	-3.902*** (1.056)	-0.177** (0.085)	-0.145*** (0.041)
Initial relationship \times Post	-22.209*** (3.444)	-28.851*** (1.256)	-1.326*** (0.138)	-1.512*** (0.055)
Bank-firm FE	Y	Y	Y	Y
Bank-period FE	Y	Y	Y	Y
Firm-period FE	Y	Y	Y	Y
No. of bank-firm pairs	901	901	901	901
N	1,802	1,802	1,802	1,802

Notes: All regressions are estimated at the bank-firm-period level (two observations per bank-firm pair). The sample is limited to bank-firm (ij) pairs with at least one loan within the previous five years leading up to the AIPA (pre-period from 1996 to 2000) or within the first five years after the AIPA (post-period from 2001 to 2005). Furthermore, the sample is limited to firms that patented at least once in the pre-AIPA period from 1996 to 2000, and for which the mean difference between the filing date and the grant date for these patents was at most two years. The dependent variable in the first two columns is the natural logarithm of one plus the total volume of all loan transactions between firm i and bank j , separately for the pre- and post-period. The dependent variable in the last two columns is an indicator for the occurrence of any loan transaction between firm i and bank j . In the first and third column, $Treatment_i$ is defined at the firm level, and measures the mean difference between the filing date and the grant date for all patents of firm i between 1996 and 2000. In the second and fourth column, $Treatment_i$ is re-defined to be equal to 0 for all firms with average delays below 18 months, and 1 for all firms with average delays of at least 18 months. $Initial\ relationship_{ij}$ is an indicator variable for whether firm i received a loan from bank j anytime in the pre-period. $Post_t$ is a dummy variable for the post-period from 2001 to 2005. Public-service firms are dropped. Robust standard errors (clustered at the bank level) are in parentheses.

Table B.6: **Impact of AIPA on Firms' Loan Conditions**

	ln(Maturity)	ln(Loan amount)	Covenant $\in \{0, 1\}$	Secured $\in [0, 1]$
	(1)	(2)	(3)	(4)
Treatment \times Post	0.392*	-0.167	-0.018	-0.206
	(0.229)	(0.229)	(0.149)	(0.190)
Treatment \times Initial rel. \times Post	-0.405	-0.015	-0.002	0.120
	(0.268)	(0.260)	(0.159)	(0.197)
Initial relationship \times Post	0.716	0.008	-0.003	-0.166
	(0.584)	(0.599)	(0.352)	(0.433)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Bank FE	Y	Y	Y	Y
Industry-year (SIC1) FE	Y	Y	Y	Y
N	17,566	18,922	18,922	12,373

Notes: The sample consists of all completed syndicated loans (package level) of publicly listed firms i at date t granted by lead arranger(s) j . The dependent variable in the first column is the natural logarithm of maturity, in the second column the natural logarithm of the loan amount, in the third column an indicator for whether the loan has at least one financial covenant, and in the fourth column the proportion of facilities within the package that are secured. $Treatment_i$ is defined at the industry level (based on two-digit SIC codes), and measures the mean difference in years between the filing date and the grant date, across all patents granted to publicly listed firms in the respective industry between 1996 and 2000. $Post_t$ is a dummy variable for the post-AIPA period from 2001 onwards. $Initial\ relationship_{ij}$ is a dummy variable for whether firm i already received at least one loan from lead arranger j anytime during the pre-AIPA period from 1996 to 2000; the variable is non-zero only for the post-AIPA period ($Post_t = 1$). Control variables are measured in year t , and include the natural logarithm of firm i 's sales and the natural logarithm of its number of employees. Bank fixed effects are included for all lead arrangers. Industry-year fixed effects are based on one-digit SIC codes. Public-service firms are dropped. Robust standard errors (clustered at the bank level) are in parentheses.

C Alternative Innovation-disclosure Events

Table C.1: Impact of Alternative Innovation-disclosure Events on Intensive Margin of Lending Relationships

Sample	ln(1+Loan volume)			
	Loan(s) in pre- or post-period			
	1990 – 1999		1993 – 2002	
	(1)	(2)	(3)	(4)
Initial relationship \times Patenting \times Post	-0.937* (0.485)		-0.679** (0.269)	
Initial relationship \times Value of patents \times Post		-0.186* (0.109)		-0.216*** (0.077)
Initial relationship \times Post	-30.618*** (0.391)	-30.682*** (0.376)	-31.592*** (0.344)	-31.472*** (0.324)
Bank-firm FE	Y	Y	Y	Y
Bank-period FE	Y	Y	Y	Y
Firm-period FE	Y	Y	Y	Y
No. of bank-firm pairs	5,935	5,935	7,704	7,704
N	11,870	11,870	15,408	15,408

Notes: All regressions are estimated at the bank-firm-period level (two observations per bank-firm pair). In the first two columns, the sample is limited to bank-firm (ij) pairs with at least one loan within the previous five years leading up to the online publication of patent bibliographical data and abstracts by the USPTO (pre-period from 1990 to 1994) or within the first five years thereafter (post-period from 1995 to 1999). In the last two columns, the sample is limited to bank-firm (ij) pairs with at least one loan within the previous five years leading up to the online publication of full patent texts by the USPTO (pre-period from 1993 to 1997) or within the first five years thereafter (post-period from 1998 to 2002). The dependent variable is the natural logarithm of one plus the total volume of all loan transactions between firm i and bank j , separately for the pre- and post-period. $Initial\ relationship_{ij}$ is an indicator variable for whether firm i received a loan from bank j anytime in the pre-period. $Post_t$ is a dummy variable for the post-period from 1995 to 1999 in the first two columns, and from 1998 to 2002 in the last two columns. $Patenting_i$ is an indicator variable for whether firm i issued any patents in the pre-period from 1990 to 1994 in the first two columns, and from 1993 to 1997 in the last two columns. $Value\ of\ patents_i$ is the natural logarithm of one plus the total value of all patents of firm i in the pre-period from 1990 to 1994 in the first two columns, and from 1993 to 1997 in the last two columns, based on market reactions to patent publications from Kogan, Papanikolaou, Seru, and Stoffman (2017). Public-service firms are dropped. Robust standard errors (clustered at the bank level) are in parentheses.