More Disclosure, Better Inventions?

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Motivation

More invention disclosures is widespread goal of TTOs

- A core mission of TTO is to encourage disclosure (Markman et al., 2005; AUTM)
- UTT performance metric (Bercovitz et al., 2001; Xu et al., 2011; Chang et al, 2023)
- significant **input** for tech transfer (Siegel et al., 2007)

Underlying assumption

more disclosures, greater chance of successful tech transfer (Carlsson & Fridh, 2002)

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Motivation

Are more disclosures necessarily desirable?

- Only a handful of inventions are filed as patents; a few of them are licensed
- Under limited resources, exploring and managing inventions are burdensome and **costly** (Swamidass & Vulasa, 2009)
- Diversifying patent portfolios do not pay off, despite high cost (Baglieri et al., 2018)

➢ **Answer depends heavily on the nature of inventions being disclosed**

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Research Question

How does an increase in disclosures change input to university technology transfer process?

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Gap in previous literature

From existing literature, we know:

What drives invention disclosure

- Individual characteristics (Colyvas et al., 2012; Thursby & Thursby, 2005; Link et al., 2007)
- Motivation: financial (Lach & Schankerman, 2008), reputation (Baldini et al., 2007)
- Organizational mechanism: TTO practice (Siegel, 2003; Markman et al., 2008), departmental support (Bercovitz & Feldman, 2008), entrepreneurial culture (Owen-Smith & Powell, 2001)

What we don't know yet:

What happens when we have more invention disclosures?
Are more disclosures necessarily desirable?

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Overview

What happens when we have more invention disclosures?

4 scenarios on how invention quality shapes commercial potential

Are more disclosures necessarily desirable?

Case study on a major engineering university with recent increase in disclosures

Ex ante **commercial potential** (Masclans et al., 2025)

Relationship between Invention quality and disclosure behaviors

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What happens when we have more disclosures?

Scenarios	Invention quality	Predicted effect on commercial potential
Stepping Through the Front Door	High	**increase**
High Profile Disclosure	High	**increase**
Lowering the Threshold	low (low variance*)	**decrease**
Finding the Right Door	High variance	**no significant change**

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Finding the Right Door

- ***Unintentional*** TTO bypassing
- TTOs are less visible for junior faculty, esp. when lacking commercialization experience (Huyghe et al., 2016)
- Researchers may not recognize the commercial potential of their research
- **Wide variance in the quality of disclosed inventions**

➢ **No significant change in the overall commercial potential of disclosures**

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Stepping Through the Front Door

- **Qualiy inventions going "backdoor”** (Markman et al., 2008); External patenting (Thursby et al., 2009; Hayter & Feeney, 2017)
- Some researchers recognize the value of their inventions early (Jensen et al., 2003)
- Researchers with high-quality inventions ***strategically*** bypass TTO to maximize commercial success (Halilem & Diop, 2025; Gianiodis et al., 2016)

➢ **If disclosed, commercial potential increases**

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High Profile Disclosure

- **“Star” scientists tend to produce high-quality inventions** (Poege et al., 2022; Breschi et al., 2007; Zucker & Darby, 1996)
- But may be reluctant to disclose (Jensen et al., 2003)
- Continuous engagement after the disclosure is required (Agrawal, 2006)
- Frustration toward TTO inefficiencies, bureaucratic inflexibility, insufficient royalty share, etc. (Siegel et al., 2003, 2004)

➢ **If disclosed, commercial potential increases**

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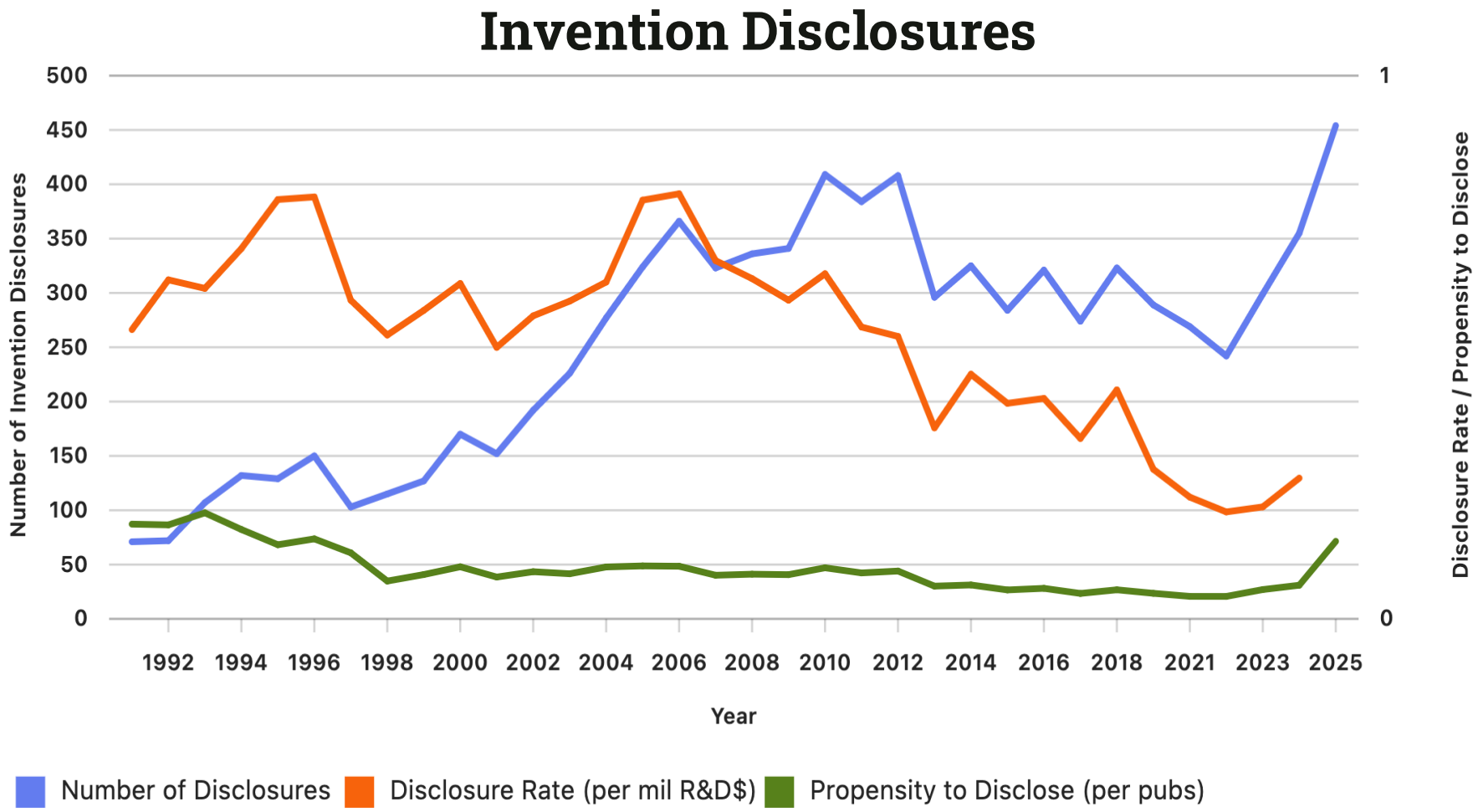
Lowering the Threshold

- High-quality inventions are often not disclosed to TTO (Jensen et al., 2003)
- Additional disclosure generates only a marginal effect in the increase in license (Thursby et al., 2001)
- Low-quality inventions are newly being disclosed

➢ **Commercial potential decreases**

Case Study on Increased Invention Disclosures



Data: AUTM survey (1991-2023), OTL, WoS, HERD survey

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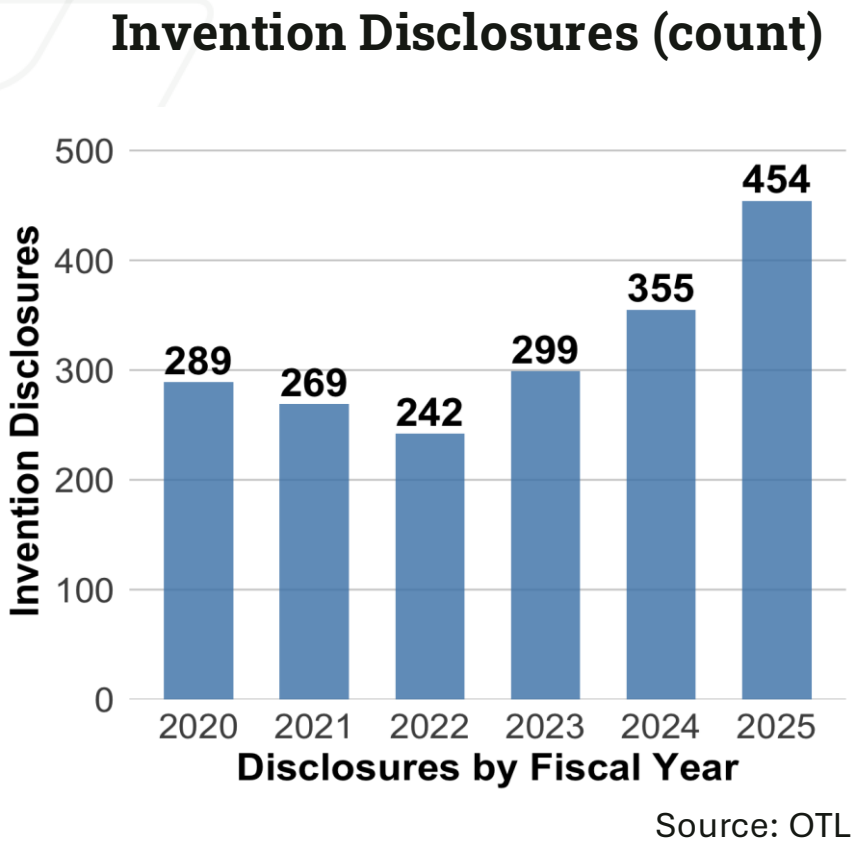

Source: OTL

Case study on a major engineering university

- Recent surge in invention disclosures (2022~)
- Growth in patenting and licensing
- Policy change around 2022 (website & interview*)
  - New leadership
  - Reorganization (OTL/commercialization units)
  - New programs
  - Cultural shift

➢ Exemplary case to examine scenarios

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Ex-ante Measure of Commercial Potential

- **Predict likelihood that scientific publication is later cited in a renewed patent** (Masclans et al., 2025)
- Firm's belief in commercial potential of publication (Marx & Fuegi, 2020)
- Out-of-sample training on historical US patent-paper citation dataset
- **Ex ante potential of inventions, not realized outcomes**

- *Ex post* measures due to unobservability of commercial potential
  - patent renewal/maintenance, international patent filing, forward citations, backward citations
  - Commercialization outcomes (licenses, licensing revenue, startups)
- Overcome selection bias, unobserved heterogeneity, time lag (Marx & Hus, 2022; Lane & Bertuzzi, 2011)

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Data

Data	Description	Source
Invention disclosure (2019-2025)	Records on inventions disclosed to E Univ OTL (2019-2025)	OTL
E University publication	E Univ affiliated publications (2019-2025)	WoS
US publication	2M U.S. affiliated publication abstracts (2000-2024)	OpenAlex
Patent-to-paper citation (Marx & Fuegi, 2020, 2022)	Link patents to publications Citation extracted from front pages/in-text mentions	Reliance on Science
Patent renewal status	Patent maintenance fee event	USPTO

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Measuring Commercial Potential

Training dataset (historical data)

USPTO
Renewed patents
(patent #)

Reliance on Science
Patent-to-paper citations
(DOIs)

US publications cited by renewed patents
(200,000 balanced sample;
64% training; 16% validation;
20% testing)

OpenAlex
US publications
Abstracts (DOIs)

Training with SciBERT
(Accuracy 0.75; AUROC 0.84; F-score 0.78)

Fuzzy matching (>0.65) **with token_set_ratio algorithm**
- title similarity (35%)
- author-inventor (40%)
- temporal proximity (25%)

Invention disclosures
(N= 1,908)

WoS
Related publications

4,687 matched publications
(838 disclosures to 2,101 publications)
30,803 unmatched publications

Commercial potential score (0,1)

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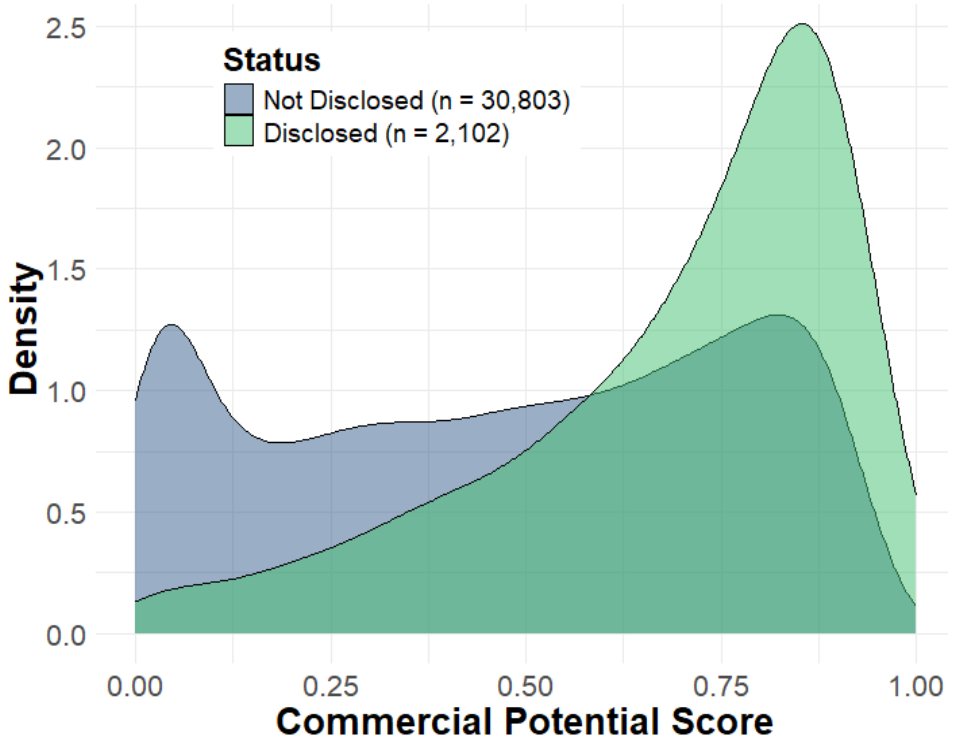
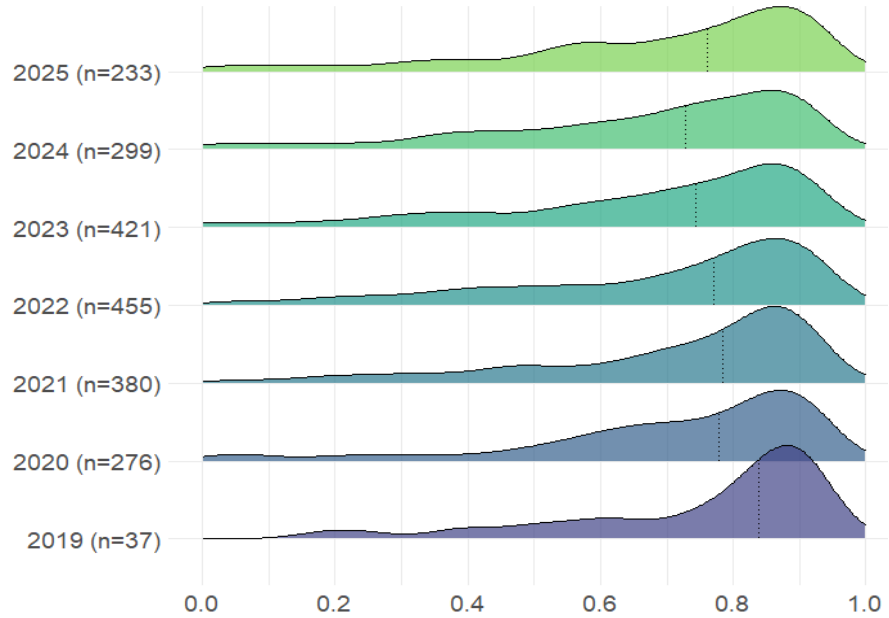
Commercial potential distribution

Density distribution of commercial potential score

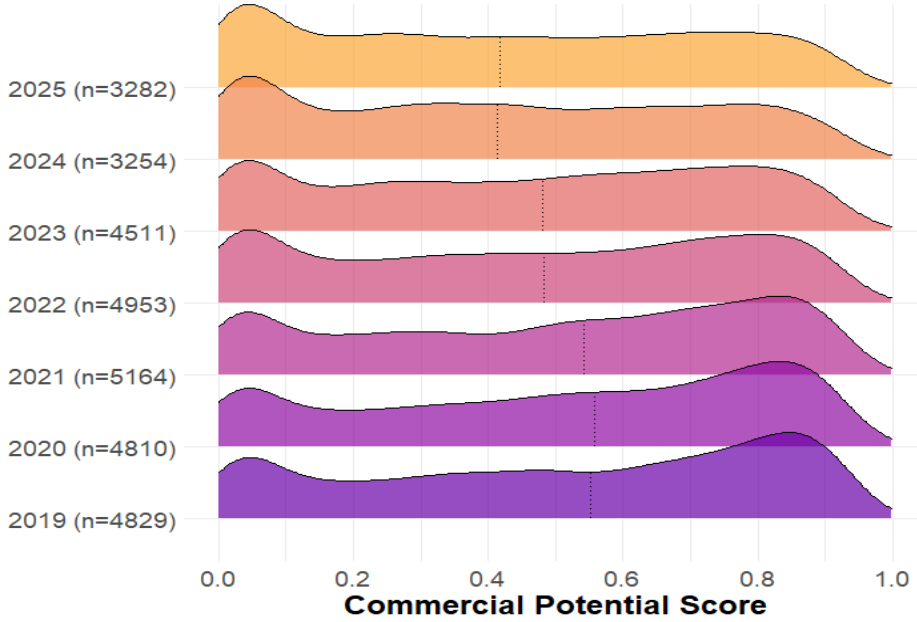


Disclosed publications tend to have much higher com. potential than nondisclosed publications

Disclosed Publications

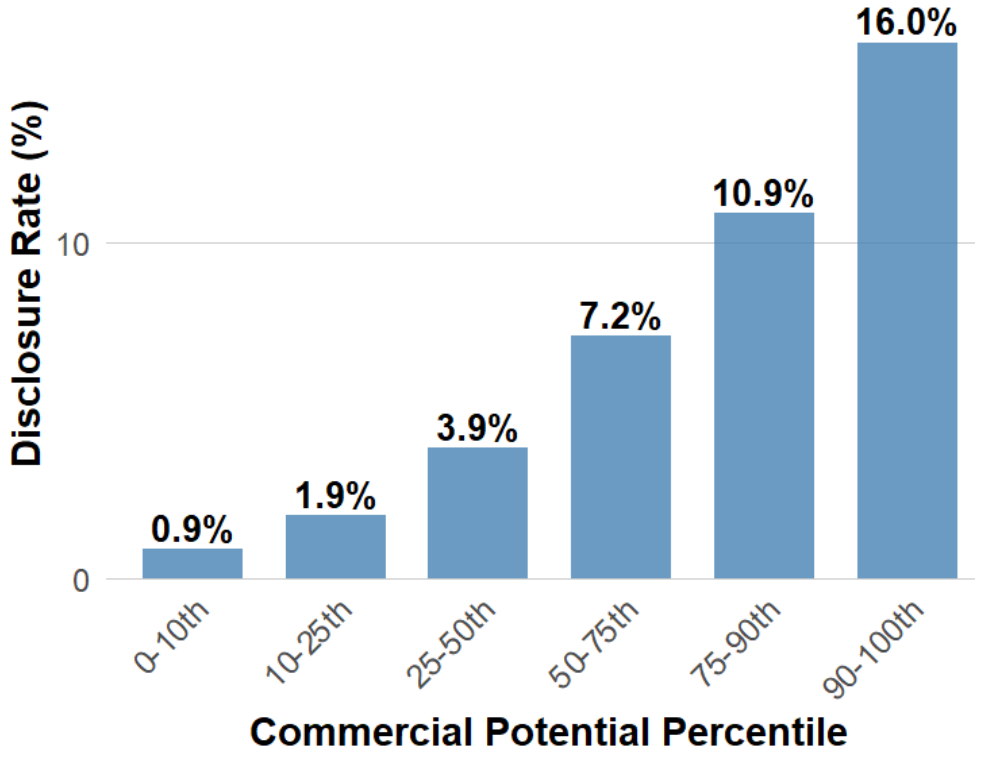


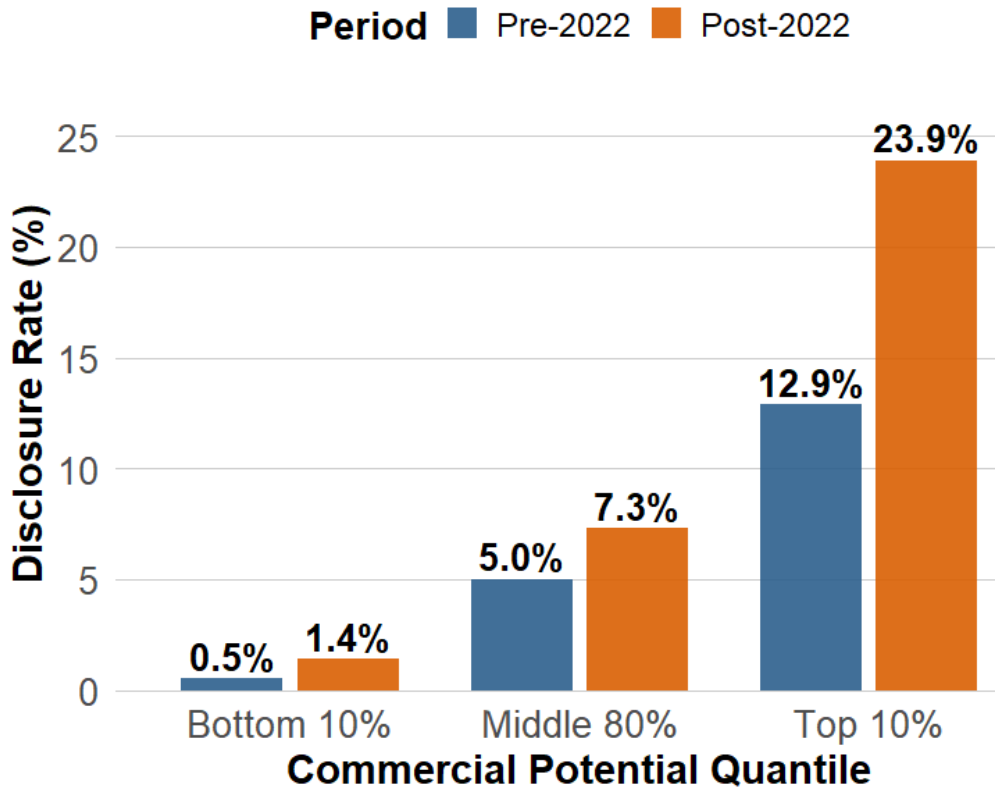
Nondisclosed Publications



Disclosure Behaviors by Commercial Potential Scores

Disclosure rates by commercial potential percentiles





Publications with higher commercial potential are more likely to be disclosed

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Empirical Strategy

Do publications with high commercial are more likely to be disclosed?

Did the disclosure behaviors change after 2022?

if publication i was linked to at least one invention disclosure

$$\mathbf{Disclosed_i} = \beta_0 + \beta_1 \mathit{CP_i} + \beta_2 \mathit{Post2022_i} + \beta_3 (\mathit{CP_i} \times \mathit{Post2022_i}) + \mathbf{X_i'}\gamma + \varepsilon_i$$

commercial potential score for publication i

publications after 2022

Cited reference count
ln(citation count)
# of authors
Funding
Research field

Results

	M1	M2	M3	M4	M5
Com. potential		0.1513***	0.1212***	0.1236***	0.1269***
		(-0.0046)	(-0.0052)	(-0.0053)	(-0.006)
post_2022	0.0245***	0.0324***	-0.0076**	-0.0062	-0.0088**
	(-0.0029)	(-0.0029)	(-0.0037)	(-0.0042)	(-0.0042)
Com. Potential * post_2022			0.0842***	0.0826***	0.0822***
			(-0.0103)	(-0.0103)	(-0.0103)
cited_ref				0.0000	0.0000
				(0.0000)	(0.0000)
ln(citation)				0.0000	-0.0023**
				(-0.0011)	(-0.0011)
author_count				0.0001***	0.0001***
				(0.0000)	(0.0000)
has_funding				-0.0009	-0.0054
				(-0.0032)	(-0.0033)
field fixed effects	No	No	No	No	Yes
N	32889	32889	32889	32889	32889
R-squared	0.0023	0.0351	0.0374	0.038	0.043
Adj. R-squared	0.0023	0.035	0.0373	0.0378	0.0425

Tertile (CP range)	**Low** (0.016-0.330)	**Medium** (0.330-0.687)	**High** (0.687-0.951)
Disc. Rate	**1.80%**	**5.40%**	**11.90%**
Com. potential	**0.084*****	**0.083*****	**0.370*****
Post-2022	0.004	-0.005	-0.138
Interaction	-0.011	0.041	**0.267****
N	10963	10963	10963
R^2	0.013	0.01	0.034

*** p<0.001, ** p<0.01, * p<0.05.

- Recent surge in disclosures is driven by high CP group
- Across all groups, CP coef is positive and highly significant
- After 2022, CP impact on disclosure is stronger for high CP group

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Field	Biological Science	Multidisciplinary Science	Engineering	Chemistry	Computer Science	Medical Science	Physics
Disc. Rate	6.10%	9.70%	8.50%	8.40%	4.90%	4.60%	6.50%
Com. potential	**0.147*** **	**0.196*** **	**0.162*** **	**0.159*** **	**0.046*** **	**0.109*** **	**0.117*** **
Post-2022	-0.006	0.006	-0.027***	0.016	0.001	-0.023	-0.021
Interaction	**0.135*** **	**0.127** **	**0.111*** **	**0.096** **	**0.050** **	**0.05**	**0.038**
N	2163	1341	12384	3000	5020	2319	1632
R^2	0.062	0.073	0.04	0.035	0.014	0.022	0.034

- Consistently positive interaction coef across fields (except…)

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Summary

- Disclosed publications have higher CP than nondisclosed publications
- **Publications with high CP are more likely to be disclosed**
- Substantial increase in disclosures after 2022 policy changes
- **The effect of CP significantly increases after 2022**
- 2022 changes are mainly driven by ***high CP group***
  - Stepping Through Front Door?
  - High Profile Disclosure?
- **Still, substantial amount of research with high CP remain undisclosed**

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Discussions / Limitations

- Not realized outcome: *Ex ante* measure; predicted commercial potential
- Not testing scenarios; exploring which of four is consistent with the bump
- Not causality; descriptive study on exploring correlational relationship between CP and disclosure behavior

- Not sure which policy affected disclosure behaviors
- Not sure which mechanism caused increase in disclosure or high CP
- Not sure if the relationship between increased disclosures and high CP will be observed in other universities (single case study)

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Next Steps

- Explore details of policy changes before/after 2022
- Inventor reactions to changes (qualitative study)
- Cross-field robustness
- Sensitivity check (logit/probit models)
- Matching disclosed vs. non-disclosed publications by inventor characteristics
- Validate measure: CP and tech transfer outcomes

Thank you!

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