

Does university ownership reduce academic invention? Evidence from the abolition of the professor's privilege in Türkiye

Can Apaydın

`can.apaydin@omu.edu.tr`

Ondokuz Mayıs University

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Does university ownership reduce academic invention? Evidence from the abolition of the professor's privilege in Türkiye

Abstract

Many countries have moved ownership of academic inventions from professors to universities, expecting technology transfer offices (TTOs) to commercialise them more effectively. In Europe, the abolition of the professor's privilege was followed by falls in academic patenting of roughly 30 to 50 percent. This paper studies the same reform in an emerging economy with young, publicly funded TTOs, using Türkiye's Industrial Property Law No. 6769, which made universities the owners of staff inventions in January 2017. I build an inventor-level dataset from the complete series of official patent bulletins and compare academic inventors with firm inventors in Poisson difference-in-differences and event-study designs with field, region and cohort controls and a matched sample. Ownership moved quickly. Filings owned by academics fell by about 76 percent, and universities came to own seven in ten academic-invented applications. Total academic filings did not decline significantly, while patent applications fell by about 18 percent through 2019. The fall was concentrated in the months between the law and its implementing regulation and faded by 2020. Post-reform academic patents were less likely to lapse for non-payment of renewal fees, and the decline in filing was concentrated among academics with few earlier inventions. Pre-reform TTO funding did not measurably soften the response. The volume estimates rule out Nordic-sized declines under parallel trends but are sensitive to plausible violations. The cost of university ownership appears to depend on the channel it replaces and on whether TTO procedures are in place when the rule takes effect.

Keywords. professor's privilege, university ownership, technology transfer offices, academic patenting, emerging economies, Türkiye

JEL classification. O31, O34, O38, I23

1. Introduction

Who should own inventions made by university scientists? Over the past four decades the answer has drifted toward the university. The Bayh-Dole Act gave US universities title to federally funded inventions, and a wave of European reforms between 2000 and 2007 abolished the professor's privilege, the rule under which academics personally owned their inventions, in Denmark, Germany, Norway and Finland. Italy, which had introduced the privilege in the early 2000s (Lissoni et al., 2013), abolished it again in 2023 (Legge n. 102,, 2023). The rationale was that universities, through technology transfer offices (TTOs), would patent and license more effectively than individual researchers. Work in this journal has questioned that rationale. University ownership can detach entrepreneurs from commercialisation in the step from disclosure to patenting (Kalantaridis, 2019), and a systematic review finds support for the strengthening role of TTOs alongside clear shortcomings (Kalantaridis & Küttim, 2021).

The evaluations of the European abolitions, reviewed in Section 2.2, found that academic patenting fell by roughly a third to a half (Hvide & Jones, 2018; Ejermo & Toivanen, 2018). Whether these results carry over to emerging economies is an open question. In most such countries the policy problem is that little academic knowledge is commercialised at all. TTOs are younger and face barriers that offices in Europe have largely overcome (Fai et al., 2018; Faccin et al., 2022), technology transfer instruments are often fragmented (Kirby & El Hadidi, 2019), individual academics lack the funds to file and maintain patents (Suluk, 2018), and governments subsidise TTOs while rewarding patent counts through promotion and pay rules. Such rewards can raise the number of university patents at the expense of their quality, as the Chinese experience shows (Lin et al., 2025). In China, an ownership reform for patents from government-funded research raised university patent applications, grants and transfer profits (Yi & Long, 2021), and a reform that gave inventors a share of ownership promoted university innovation (Gao et al., 2023). Reforms that resemble the European abolitions, moving rights from academics to universities, have not been evaluated in an emerging economy with an inventor-level counterfactual.

This paper provides that evaluation for Türkiye. Until 2017, Decree-Law No. 551 treated inventions by university teaching staff as free inventions owned by the academic (Decree-Law No. 551, 1995). Industrial Property Law No. 6769, in force from 10 January 2017, made them employee inventions belonging to the university, with at least one third of the income reserved for the inventor (Law No. 6769, 2017). The procedures that universities had to follow came only with an implementing regulation on 29 September 2017 (TÜRKPATENT, 2017). Türkiye offers a legal change, a population of academic inventors, a comparison group of firm inventors subject to the same patent office and fee schedule, and variation in institutional capacity, because some universities had received public TTO funding before 2017 and others had not.

The data come from the complete series of the official patent bulletin of the Turkish Patent and Trademark Office (TÜRKPATENT), which prints the applicant, the inventors and, until early 2021, their addresses for every published application. I parse 284 monthly issues into 155,750 national applications, classify applicants and inventors, identify academics from their university addresses and university co-applicants, and disambiguate inventors into a panel of 3,977 academic and 17,065 firm inventors. Following the comparison of university and other inventors in Hvide and Jones (2018), the design compares the filing behaviour of academic and firm inventors before and after the reform, using Poisson regressions with inventor fixed effects, cohort-by-year, technology-field-by-year and region-by-year fixed effects, and a sample matched on cohort, pre-reform productivity, field and region. A simple conceptual framework guides the analysis of mechanisms.

The reform reallocated ownership quickly and almost completely. Applications owned by academics themselves fell by about 76 percent relative to the comparison group, and within two years universities owned seven in ten academic-invented applications. The volume response was modest and concentrated in time. Total applications by academic inventors did not change significantly relative to firm inventors over 2010 to 2019 (-0.066 , s.e. 0.079), while patent applications fell by about 18 percent (-0.195 , s.e. 0.083). The decline began in the eight months between the law and its implementing regulation, when the ownership rule applied but no procedure for disclosure and filing

existed, and patent filing recovered by 2020. The entry of new academic inventors kept rising. Post-reform academic patents were less likely to lapse for non-payment of renewal fees, a revealed-value measure, and there is no evidence that university ownership lowered their value. The decline is concentrated among academics with few pre-reform inventions, while prolific academic inventors show no decline, which fits the prediction that university screening removes marginal filings. Universities that had received public TTO funding before 2017 did not show a measurably different response.

Academic filing was rising faster than firm filing before the reform, and a joint test rejects flat pre-trends in the full sample, although not in the matched sample. Under parallel trends, the matched estimates rule out declines in academic applications of more than about 29 percent in the three years after the reform, well below the Nordic estimates. Sensitivity bounds that allow post-reform deviations from parallel trends of a quarter of the largest pre-reform change already include declines of Nordic size. The ownership and composition results do not depend on this assumption.

The paper contributes to three lines of research on university technology transfer. It adds an emerging-economy case to the evaluations of professor's-privilege reforms in Norway, Finland and Germany (Hvide & Jones, 2018; Ejermo & Toivanen, 2018; Czarnitzki et al., 2016) and shows that the large losses found in Europe are not a general property of moving ownership to universities. It speaks to the work on TTO capacity, which has studied the staff, efficiency and barriers of TTOs at the level of offices and universities (Micozzi et al., 2021; Faccin et al., 2022; Belgin & Apaydın Avşar, 2026), by asking whether funded TTO capacity changed how individual academics responded to a change in ownership rules. It also adds to the debate on the quantity and quality of university patents, in which rapid growth in patent counts has come with lower quality (Lin et al., 2025) and research collaboration has raised quality (Su et al., 2026). In a system that rewards patent counts, the move to university ownership was followed by fewer marginal filings and lower lapse rates. For Türkiye, where research on university patenting and TTOs has relied on descriptive, survey-based or institution-level designs (Ranga et al., 2016; Temel et al., 2021; Ünlü et al., 2023), the paper provides causal, inventor-level evidence. To my knowledge, this is the first study to estimate the effect of

Türkiye’s 2017 abolition of the professor’s privilege with a comparison group and inventor-level data. The closest earlier study, an unpublished master’s thesis, shows that the probability that an academic patent is university-owned rose by about 30 percentage points after 2017 but has no comparison group (Çorum Aktaş, 2023), and a recent review notes that the post-2013 growth in university applications cannot be attributed to any single policy (Khalil & Şahin, 2026). The paper also documents an implementation channel that the European studies could not observe, namely that the transitional cost of the reform was concentrated in the period when the ownership rule applied but the procedures did not yet exist.

2. Related literature

2.1 Ownership of academic inventions and the role of TTOs

The economics of university ownership starts from the observation that the allocation of property rights shapes the incentive to invest in innovation (Aghion & Tirole, 1994). University inventions are usually embryonic, and turning them into products requires the continued involvement of the inventor (Jensen & Thursby, 2001). Inventor ownership keeps the person with the best information about an invention in control of it, while university ownership pools filing costs and legal expertise in a TTO. Drawing on the experience of Greater Manchester, Kalantaridis (2019) argues that university ownership is a sub-optimal regime for commercialisation because it detaches entrepreneurs in the transition from disclosure to patenting, which limits the information available for commercialisation decisions. A systematic review of the evidence on the information conditions of commercialisation under university ownership finds support for the strengthening role of TTOs predicted by theoretical models but also points to their shortcomings and to large gaps in what is known (Kalantaridis & Küttim, 2021).

The evidence on ownership itself is mixed. University ownership raises the probability that a patent is licensed (Giuri et al., 2013), while differences between university-owned and other academic patents are small (Crespi et al., 2010) or vary across countries (Lissoni & Montobbio, 2015). Many academic inventions end up in firms. In the United States part of faculty patenting takes place outside the university (Thursby et al., 2009),

and in Italy firms that hold academic patents gain market power, although at a cost to short-term profitability (Cerulli et al., 2022). The inventor's share of income, the instrument that most ownership reforms use to compensate academics, has little or no detectable effect on academic patenting (Arqué-Castells et al., 2016; Ouellette & Tutt, 2020).

2.2 Evidence from the European abolitions

The abolitions of the professor's privilege in Europe provide the closest evidence on what the Turkish reform could have done. In Norway, patenting and start-up rates of university researchers fell by about half after the 2003 abolition (Hvide & Jones, 2018). In Finland, academic patenting fell by at least 29 percent after 2007, and by 46 percent once the announcement period is included (Ejermo & Toivanen, 2018). In Germany, the shift of rights substantially decreased patent volume, with the largest drop in patents developed jointly with firms (Czarnitzki et al., 2016), and patenting by professors did not increase even as ownership shifted to universities (von Proff et al., 2012). A six-university comparison also suggests that a university with inventor ownership generated more spin-offs per faculty member (Kenney & Patton, 2011).

The value of the patents that universities came to own also fell. University-owned patents lost importance and value after abolition (Martínez & Sterzi, 2021), the decline in the importance of academic patents accelerated after the German reform (Czarnitzki et al., 2011), and university-owned academic patents tend to be less cited, with differences across countries (Lissoni & Montobbio, 2015). The common interpretation is that a lower inventor share weakens academics' incentive to invent and disclose, and that university claims disrupt the channels through which academics had worked with firms. These estimates come from countries in which academics had established ways of commercialising inventions themselves, through their own patents, start-ups and joint work with firms (Hvide & Jones, 2018; Czarnitzki et al., 2016). They leave open how the same change works where this inventor-ownership channel was weak and where public funding of TTOs preceded the ownership rule.

2.3 TTO capacity and university patenting in emerging economies

A large body of work in this journal studies the capacity of TTOs and the institutional conditions under which universities patent. Table 1 summarises twelve studies published since 2019 that are closest to the questions of this paper, and three findings from them frame the analysis. The resources of TTOs matter. An Italian policy that funded additional TTO staff had a positive effect on technology transfer and the valorisation of intellectual property (Micozzi et al., 2021), and the efficiency of TTOs supported by TÜBİTAK in Türkiye rose between 2020 and 2022 and increased with their size, age, contracted collaboration projects and matching activities (Belgin & Apaydın Avşar, 2026). Across more than 400 European universities, size, age, research orientation and funding structure are the main determinants of patenting and co-patenting with companies (Wolszczak-Derlacz, 2025). Case evidence from life science commercialisation in Australasian universities shows TTOs building competencies in boundary spanning and de-risking (Chen et al., 2025).

Table 1. Recent studies in the Journal of Technology Transfer on university ownership, TTO capacity and university patenting

Study	Setting and data	Approach	Main finding	Relevance for this paper
Kalantaridis (2019)	Commercialisation of university research in Greater Manchester, England	Qualitative study	University ownership detaches entrepreneurs between disclosure and patenting and limits information for commercialisation	Inventor information and incentive channel
Kirby and El Hadidi (2019)	Egypt, expert interviews, survey of 400 academics, three TTO cases and 237 firms	Mixed methods	Separate measures without a coherent national policy had limited effect	Fragmented instruments in an emerging economy
Kalantaridis and Küttim (2021)	Published studies on commercialisation under university ownership	Systematic review and realist synthesis	Support for the strengthening role of TTOs together with their shortcomings	Ownership regime as an open empirical question
Micozzi et al. (2021)	Italian policy funding additional TTO staff	Policy evaluation	Positive effect on technology transfer and valorisation of intellectual property	TTO capacity as a moderator
Cerulli et al. (2022)	Italian firms holding academic patents	Firm-level econometric analysis	Higher market power and lower short-term profitability	Firm ownership of academic inventions
Faccin et al. (2022)	Survey of 103 TTOs in 21 countries	Survey and statistical analysis	Offices in developing economies face barriers that EU and UK offices have overcome	Constraints on TTOs in emerging economies
Kleiner-Schaefer and Schaefer (2022)	R&D-active manufacturing firms in Istanbul	Logistic regression	Lack of information and of finance are the main barriers to	Turkish context, firm side

			collaboration with universities	
Ünlü et al. (2023)	Turkish university science parks	Park-level quantitative analysis	Mature government-funded TTOs and research-oriented universities raise patent performance	Turkish TTO capacity
Wolszczak-Derlacz (2025)	More than 400 universities in 17 European countries, 2011 to 2018	Two-part zero-inflated models	Size, age, research orientation and funding structure drive patenting and co-patenting	University-level determinants of patenting
Lin et al. (2025)	769,133 invention patents of 538 Chinese universities, 1990 to 2019	Quantitative analysis of patent quality	Faster growth in patent counts is followed by lower citation, licensing and collateralisation	Quantity and quality of university patents
Belgin and Apaydın Aşar (2026)	TTOs supported by TÜBİTAK, 2020 to 2022	Data envelopment analysis, Malmquist index and grey model	Efficiency rose and increases with TTO size, age, projects and matching activities	Turkish TTO capacity after the reform
Su et al. (2026)	803 Chinese universities, 2006 to 2018	Panel data analysis	Research collaboration raises patent lifespan and citations, more so at weaker universities	Lapse-based measures of patent value

Notes. Studies published in the journal from 2019 to 2026 that address the ownership of academic inventions, the capacity of TTOs or university patenting, ordered by year of publication. Summaries refer to the main results reported by each study.

TTOs in developing economies work under tighter constraints. A survey of 103 TTOs in 21 countries finds that offices in the EU and the UK have overcome barriers that offices in developing economies still face, and that TTOs have a built-in conflict with researchers (Faccin et al., 2022). In Egypt, individual technology transfer measures introduced without a comprehensive national policy had limited effect (Kirby & El Hadidi, 2019). In Türkiye, mature government-funded TTOs and research-oriented universities are associated with higher patent performance of university science parks (Ünlü et al., 2023), university intermediaries and other supporting factors raise university patenting (Temel et al., 2021; Ar et al., 2023), and firms name the lack of information about collaboration opportunities and the lack of financial support as the main barriers to working with universities (Kleiner-Schaefer & Schaefer, 2022).

More university patents are not always better ones. In China, faster growth in the number of patents granted to a university was followed by lower citation, licensing and collateralisation rates, a pattern of patent bubbles that suggests scientists were pursuing more patents at the cost of better ones (Lin et al., 2025). Research collaboration raised the economic lifespan and citations of Chinese university patents, more so at universities with weaker academic ability (Su et al., 2026). Most of the studies in Table 1 observe

offices, universities or science parks, and most rely on cross-sectional, survey or case evidence. None evaluates a change in the legal ownership of academic inventions with an inventor-level counterfactual, and none asks whether TTO capacity built before such a change shaped how academics responded. The Turkish reform allows both questions to be addressed, because TÜBİTAK funded TTOs at some universities five years before the ownership rule changed (Section 3.2).

3. Institutional background

3.1 From free inventions to university ownership

Under Article 41 of Decree-Law No. 551 of 1995, inventions made by teaching staff in university faculties were free inventions. The academic could file in his or her own name, and the university could claim only a reimbursement capped at its own expenditure (Decree-Law No. 551, 1995). Legal scholars compared this free-invention rule with the Bayh-Dole model (Özden Merhacı, 2015).

Article 121 of Law No. 6769 brought inventions resulting from scientific work in higher education institutions under the employee-invention regime (Law No. 6769, 2017), whose ownership and compensation rules are discussed by Koçak (2019). The inventor must notify the university in writing. The university has four months to claim the invention and, if it claims, four further months to file. If it does not claim within the deadline, the invention becomes free and the academic may file alone. The inventor receives at least one third of any income, and the university must offer an application or patent it wishes to abandon to the inventor first (Law No. 6769, 2017). Aydın (2022) discusses these ownership, notification and income-sharing rules in detail. The operational rules, including the one-month deadline for notifying a filing already made by the inventor, were set by a regulation published on 29 September 2017 (TÜRKPATENT, 2017). Between January and September 2017 the ownership rule thus applied without implementing procedures. Legal commentators have also pointed to continuing obstacles in commercialising university inventions through TTOs (Çakır Çelebi, 2022).

3.2 Concurrent policies and events

Several other changes are relevant for identification. The same law abolished the unexamined patent route. Under Decree-Law No. 551 an applicant who did not request examination received a seven-year unexamined patent by default. From 10 January 2017 examination had to be requested within three months of the search report, otherwise the application was deemed withdrawn (Law No. 6769, 2017). This change affected all applicants, and in my data the pre-reform share of patent applications that took the unexamined route was almost identical for academic-invented and firm-invented applications, at 47 and 49 percent respectively.

The academic incentive allowance (*akademik teşvik*), introduced by an amendment to the Higher Education Personnel Law in force from 2015, awards points for registered patents under its implementing regulations (Law No. 2914, 1983; Council of Ministers, 2015). Under the first regulation national and international patents counted equally. The 2016 regulation downgraded national patents to 60 percent, and the 2018 regulation excluded unexamined national patents (Council of Ministers, 2015; Council of Ministers, 2016; Council of Ministers, 2018). The allowance rewards inventorship of granted patents in the year of grant, whatever the owner, and it raised the return to academic inventorship both before and after the reform.

TÜBİTAK began funding university TTOs through its 1513 programme in 2012. Twenty-five universities received 1513 support from the calls of 2012 to 2014 (TÜBİTAK, 2026), and a further group received smaller TTO preparation grants through the 1601 programme from 2015. Section 2.3 reviews the evidence on the performance of these offices.

The reform was anticipated. The Council of Ministers adopted a draft with the same university-ownership article on 28 January 2013, and the draft was submitted to parliament in March 2013 (TBMM, 2013). It lapsed and was resubmitted in April 2016 (TBMM, 2016). The failed coup attempt of July 2016 was followed by the closure of fifteen foundation universities by Decree-Law No. 667 (Decree-Law No. 667, 2016) and by mass dismissals of public employees. During the state of emergency from July 2016 to July 2018, 6,081 academics were dismissed by emergency decrees (HRFT, 2020), a

figure of the same order as that reported in peer-reviewed work (Sertdemir Özdemir, 2021). Section 8 discusses how these events affect the estimates.

4. Conceptual framework

A simple framework, in the spirit of models in which the allocation of property rights shapes the incentive to innovate (Aghion & Tirole, 1994), clarifies what the reform should change. Consider an academic who has an idea of value v , drawn from a distribution that differs across academics. Developing the idea into a disclosed invention requires effort, and filing a patent requires paying fees and drafting costs.

Under the privilege, the academic owns the invention, bears the filing cost c_A and captures a return $a_A v$, where a_A reflects the academic's own ability to commercialise the invention through licensing, a firm or a start-up. The academic files when

$$a_A v > c_A \quad (1)$$

Where a_A is high, as for Norwegian academics who founded start-ups, many valuable inventions are filed and commercialised by academics. Where a_A is low and filing costs are high relative to academic pay, few inventions are filed, and many of those that are filed are low-cost filings that are not maintained. The cheap unexamined route available before 2017 lowered c_A and encouraged such filings.

Under university ownership, the academic receives a share s of the return $a_U v$ realised by the university, with s of at least one third, and bears a disclosure cost d . Invention and disclosure require

$$s a_U v > d \quad (2)$$

and the university files when the return exceeds its own filing cost c_U ,

$$a_U v > c_U \quad (3)$$

Because most university inventions are embryonic and need the inventor's continued effort, the inventor's share matters for the value the university can realise (Jensen & Thursby, 2001).

P1. Ownership shifts to the university for inventions the university claims, while inventions it declines remain with the academic as free inventions. P2. The effect on volume is ambiguous. It is negative where academics were effective commercialisers (high a_A relative to sa_U), as in the Nordic countries, and can be small or positive where a_A was low and the university bears the filing cost. P3. University screening removes low-value inventions that academics used to file themselves, so the average value of filed academic inventions should rise and the decline, if any, should be concentrated among marginal inventors rather than prolific ones. P4. A higher a_U , for example through an established TTO, makes the volume response less negative. P5. Before procedures exist, the disclosure cost d is high and uncertain, so the transition should produce a temporary drop in filing. If academics who worked with firms lose most from university claims, as in Germany (Czarnitzki et al., 2016), the decline should also be larger for academics with firm ties.

5. Data

5.1 Patent bulletins

The data are built from the Official Patent Bulletin (Resmi Patent Bülteni) published monthly by TÜRKPATENT (TÜRKPATENT, 2026). Each issue prints every application published or granted in that month as a record with standard INID codes, including the application number, filing date, publication and grant kind codes, classification codes, title, applicants with addresses, inventors with addresses and the patent attorney. Each issue also lists notices by application number, including grants, withdrawals, transfers, licence offers and lapses for non-payment of annual fees. I downloaded all 284 issues from 2003 to September 2026, extracted the text and parsed records from 2006 onwards, when the text layer becomes machine-readable. The parsed data contain 386,182 document records, 929,050 notices and 155,750 national applications after European patent validations are set aside. Comparing the parsed records with the application numbers listed in each issue's front index gives a median recall of 1.00 and a minimum of 0.989 for publications from 2011 onwards. Published domestic applications are 75 to 80

percent of the office's reported filings, which is consistent with withdrawals before the 18-month publication date. Appendix A describes the construction in detail.

The bulletins have one limitation. From the March 2021 issue onwards inventors are printed by name only, without addresses, so address-based classification of inventors is available for applications filed up to about 2019. The treatment group is defined from pre-reform records only, and the preferred estimates use filing years 2010 to 2019, with the longer window to 2023 reported separately.

5.2 Classification and inventor panel

Applicants are classified as universities, public research institutes, state-owned enterprises, firms or individuals using name rules. An inventor occurrence is classified as academic if the printed address refers to a university, faculty, department or campus, or if a university is a co-applicant. This follows the logic of identifying academic inventors in patent data by matching names and affiliations (Lissoni et al., 2009; Dornbusch et al., 2013). A stratified validation sample of 200 applicants and 200 inventor occurrences was coded independently and disagreements were adjudicated by hand. The initial rules classified 96 percent of applicants correctly and identified academic inventors with a precision of 0.97. After correcting the rules for housing estates named after universities, technopark addresses and acronyms, accuracy on the same sample rose to 98 percent for applicants and to 1.00 precision and 0.99 recall for academic inventors. These figures are optimistic because the sample informed the corrections.

Domestic inventors are disambiguated within normalised names, linking occurrences that share a co-inventor, a non-individual applicant, a university or an address, or that share a province when the name is uncommon. This yields 102,689 inventor identifiers. An inventor is an academic inventor if any application filed before 10 January 2017 shows an academic address or a university co-applicant, and a firm inventor if he or she is not academic and the modal owner of his or her pre-reform applications is a firm or a state-owned enterprise. For each inventor I record the home university, the modal technology field (IPC section) and the modal province of pre-reform applications. University TTO status is coded from the TÜBİTAK award lists, and 55 percent of academic inventors were based at a university with 1513 support before 2017.

The estimation sample contains inventors with at least one application filed between 2010 and 2016, observed every year from their first filing (or 2010) to the end of the window, with zero counts in years without applications. It includes 3,977 academic inventors from 200 universities and 17,065 firm inventors. Table 2 compares the two groups before the reform. Academic and firm inventors filed similar numbers of applications per year. Academics filed more patents and fewer utility models, and their applications were owned by themselves or their university, while firm inventors' applications were owned by firms.

Table 2. Pre-reform characteristics of academic and firm inventors, 2010–2016

Mean per inventor-year	Academic inventors	Firm inventors
Number of inventors	3,977	17,065
Applications	0.579	0.619
Patent applications	0.534	0.427
Examined-route patent applications	0.228	0.200
Utility model applications	0.045	0.192
Applications owned by the inventor as an individual	0.273	0.013
Applications owned by a university	0.198	0.000
Applications owned by a firm	0.094	0.589
Share of years with at least one application	0.420	0.365

Notes. Inventor-year means over filing years 2010 to 2016 for inventors in the estimation sample. Academic inventors have an academic address or a university co-applicant on at least one application filed before 10 January 2017. Firm inventors are non-academic inventors whose pre-reform applications were mainly owned by firms or state-owned enterprises.

6. Empirical strategy

The baseline specification is a Poisson pseudo-maximum-likelihood regression of the form

$$E[y_{it}] = \exp(\beta \text{Academic}_i \times \text{Post}_t + \alpha_i + \lambda_{c(i)t} + \mu_{f(i)t} + \rho_{r(i)t}) \quad (4)$$

where y_{it} is the number of applications filed by inventor i in year t , Academic_i indicates academic inventors, Post_t equals one from 2017 onwards, α_i is an inventor fixed effect, and $\lambda_{c(i)t}$, $\mu_{f(i)t}$ and $\rho_{r(i)t}$ are fixed effects for each combination of calendar year with the inventor's first filing year, modal pre-reform IPC section and region (the ten largest provinces and a residual category). The cohort-by-year effects absorb the mechanical decline in filings that arises because the sample is selected on pre-reform activity. The field-by-year and region-by-year effects absorb technology-specific and regional shocks,

which matter because academics are concentrated in different fields and cities from firm inventors. Poisson regression handles the many zeros in the outcome, and its coefficients are approximately proportional effects. The models are estimated with the high-dimensional fixed-effects Poisson approach of Correia et al. (2020). Standard errors are clustered by inventor, and the main estimates are also reported with clustering by home university for academics and province for firm inventors.

The event-study version replaces $\text{Academic}_i \times \text{Post}_t$ with interactions between Academic_i and year dummies, with 2016 as the reference year,

$$E[y_{it}] = \exp(\sum_{k \neq 2016} \beta_k \text{Academic}_i \times 1[t = k] + \alpha_i + \lambda_{c(i)t} + \mu_{f(i)t} + \rho_{r(i)t}) \quad (5)$$

where $1[t = k]$ indicates filing year k and β_k traces the effect of the reform year by year. The implementing regulation came only in September 2017, so filing year 2017 is a transition year excluded from the difference-in-differences estimates. The preferred window is 2010 to 2019, which avoids the period in which inventors are identified by name only. As a second design, firm inventors are re-weighted by coarsened exact matching (Iacus et al., 2012) on first-filing cohort, the number of pre-reform applications, IPC section and region. This retains 95 percent of academic inventors and balances these characteristics by construction.

Identification requires that, absent the reform, filings by academic and firm inventors would have evolved in parallel conditional on the fixed effects. I report joint tests of the pre-reform event-study coefficients, recognising that such pre-tests have limited power (Roth, 2022), and sensitivity bounds in the spirit of Rambachan and Roth (2023). The bounds allow the post-reform deviation from parallel trends to grow each year by up to a multiple $\tilde{M}$ of the largest change between consecutive pre-reform coefficients, and add this bias to the conventional confidence interval.

To study the implementation period I estimate a monthly Poisson model of academic-invented and firm-invented application counts from 2013 to 2019, with calendar-month fixed effects and group-by-month-of-year fixed effects that absorb the December seasonality. Separate indicators for academic filings during February to September 2017

and after September 2017 capture the transition and the post-regulation level, and the same model is estimated with placebo transition windows in 2014, 2015 and 2016.

To study value I estimate application-level regressions on domestic patent applications filed between 2010 and 2020, excluding 2017, by academic inventors or by firm inventors with no academic co-inventor. The main outcome is whether the application or patent lapsed for non-payment of annual fees within five years of filing, a revealed-value measure in the tradition of patent renewal studies (Schankerman & Pakes, 1986; Pakes, 1986). Other outcomes are grant for applications on the examined route, deemed withdrawal within five years, licence offers, the number of IPC subclasses, the number of inventors, foreign priority claims and PCT national-phase entry. These regressions include IPC section by filing-year fixed effects, and standard errors are clustered by university applicant.

7. Results

7.1 Ownership

Figure 1 shows the ownership of applications with at least one academic inventor. Before 2013 about 60 percent were owned by academics as individuals and a quarter to a third by firms, and universities owned very few. University ownership began to grow after the first TÜBİTAK TTO awards in 2013 and reached 42 percent of academic-invented applications in 2016, before the reform. After the reform it rose to 70 percent in 2018, while the share owned by academics fell to 18 percent. The number of domestic applications with a university applicant rose from 10 in 2011 to 412 in 2016 and 1,004 in 2018.

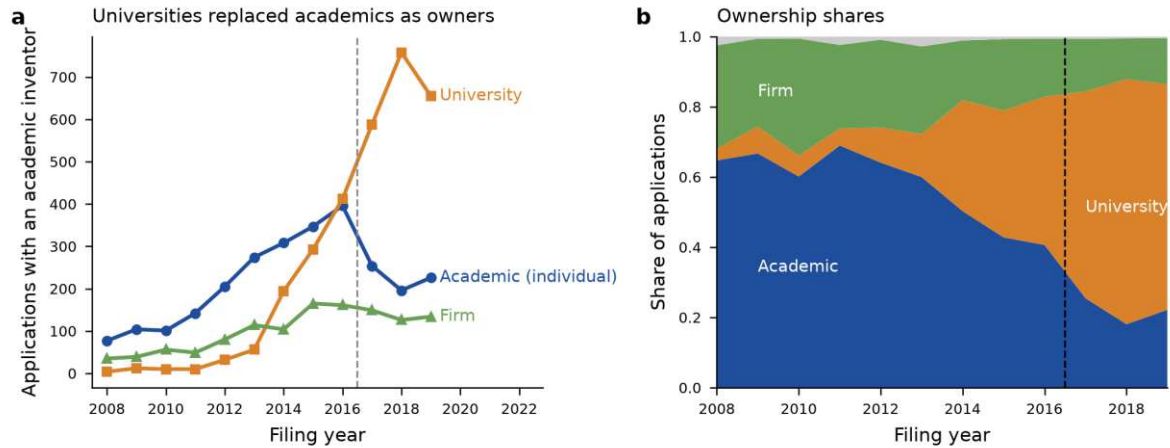


Figure 1. Ownership of applications with at least one academic inventor, by filing year, 2008–2019. Panel a shows counts and panel b shares by owner type. Academic inventors are identified from university addresses and university co-applicants. The dashed line marks the entry into force of Law No. 6769 on 10 January 2017. The series end in 2019 because inventor addresses are not printed in bulletins from March 2021.

The regression estimates confirm a large reallocation (Table 3). In the preferred sample, the coefficient for applications owned by academic inventors as individuals is -1.442 (0.191), a decline of 76 percent relative to firm inventors, and the matched estimate is similar (-1.732 , s.e. 0.206). Ownership by firms of academics' applications did not change through 2019 (-0.023 , s.e. 0.131) but rose over the longer window (0.460, s.e. 0.105), a form of leakage of academic inventions to firm owners also observed in the United States (Thursby et al., 2009). The pattern is close to that in Germany and Denmark, where patenting moved from professors to universities after abolition (von Proff et al., 2012; Lissoni et al., 2009). Adjustment was faster than in Germany, where universities owned more than half of faculty-invented patents four to five years after abolition (Schoen & Buenstorf, 2013), probably because Turkish universities with TTOs were already filing on behalf of their academics before 2017, consistent with prediction P1.

Table 3. Effect of the reform on academic inventors relative to firm inventors

Outcome	(1) 2010–2019	(2) 2010–2023	(3) Matched, 2010–2019	(4) Matched, 2010–2023
Applications	−0.066 (0.079)	0.136** (0.062)	−0.017 (0.080)	0.130** (0.064)
Patent applications	−0.195** (0.083)	−0.016 (0.069)	−0.197** (0.088)	−0.065 (0.071)
Examined-route patent applications	−0.185** (0.090)	−0.002 (0.069)	−0.238** (0.095)	−0.098 (0.073)

Utility model applications	-0.485** (0.200)	0.279** (0.117)	–	–
Owned by the inventor as an individual	-1.442*** (0.191)	-1.704*** (0.136)	-1.732*** (0.206)	-1.958*** (0.156)
Owned by a firm	-0.023 (0.131)	0.460*** (0.105)	-0.043 (0.138)	0.429*** (0.115)
Any application (linear probability model)	0.003 (0.005)	0.023*** (0.004)	–	–
Observations, applications model	124,775	208,943	92,318	156,826

Notes. Each cell reports the coefficient on Academic $\times$ Post from a separate Poisson pseudo-maximum-likelihood regression, except the linear probability model in the last outcome row. Post equals one for filing years from 2017, and filing year 2017 is excluded. All models include inventor fixed effects and calendar-year fixed effects interacted with first-filing cohort, modal pre-reform IPC section and region (ten largest provinces and a residual category). In the row for individually owned applications in column 3, field-by-year and region-by-year effects are omitted because the estimator does not converge. Columns 3 and 4 weight firm inventors by coarsened exact matching on cohort, pre-reform applications, IPC section and region. Standard errors clustered by inventor in parentheses. Significance levels are *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

7.2 Volume of academic invention

Table 3 reports the difference-in-differences estimates. With field, region and cohort controls, total applications by academic inventors changed by -0.066 (0.079) relative to firm inventors over 2010 to 2019, and by 0.136 (0.062) over 2010 to 2023. The coefficient for patent applications through 2019 is -0.195 (0.083), a decline of about 18 percent, and that for examined-route patent applications is -0.185 (0.090). Over the longer window the patent estimates are close to zero (-0.016 , s.e. 0.069). Utility models fell through 2019 (-0.485 , s.e. 0.200) and rose afterwards (0.279, s.e. 0.117). The probability that an inventor files in a given year did not change (0.003, s.e. 0.005, linear probability model). The matched estimates are very similar, with -0.017 , s.e. 0.080 for total applications and -0.197 , s.e. 0.088 for patent applications.

Figure 2 shows the dynamics. Relative to 2016, applications by academic inventors were 0.185 log points lower than those of firm inventors in 2017 and 0.140 lower in 2018, and the gap had closed by 2019 (-0.026 , s.e. 0.099). Patent applications show the same pattern (-0.270 in 2017, -0.202 in 2018 and -0.088 in 2019). In the full sample the pre-reform coefficients rise from 2010 to 2014 and fall back in 2015, and a joint test rejects that they are all zero. In the matched sample the joint test does not reject ($p = 0.14$), but the coefficients still drift upwards from 2010 to 2014. Academic filing was growing relative to firm filing before the reform. This likely reflects the expansion of TTO-led filing after 2013, the academic incentive allowance from 2015 and the announcement of the draft law in 2013.

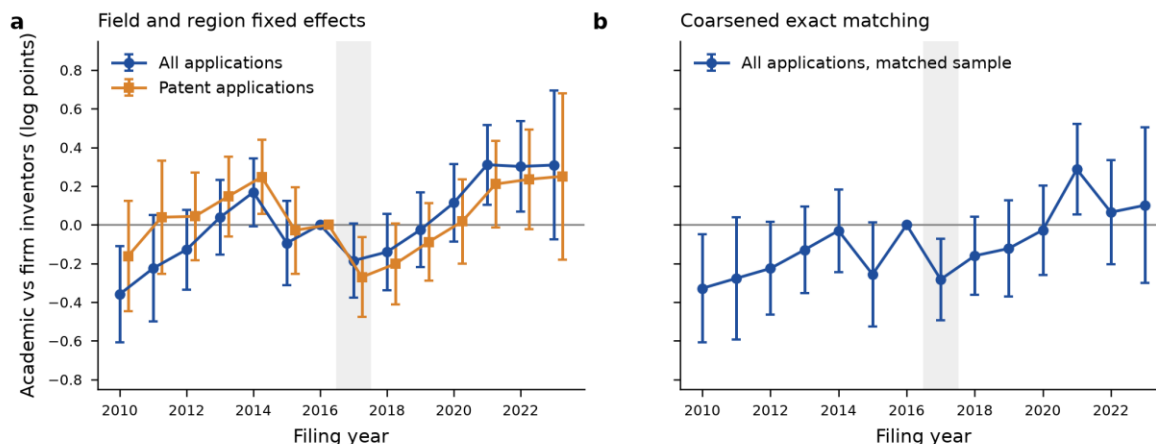


Figure 2. Event-study estimates for academic inventors relative to firm inventors. Poisson regressions with inventor fixed effects and year effects interacted with first-filing cohort, IPC section and region, with 2016 as the reference year. Panel a shows all applications and patent applications in the full sample, and panel b all applications in the sample matched by coarsened exact matching. Bars are 95 percent confidence intervals based on standard errors clustered by inventor. The shaded band marks the 2017 transition year.

Figure 3 reports sensitivity bounds for the average matched effect over 2017 to 2019.

Under exact parallel trends the 95 percent interval is $[-0.343, -0.034]$, which excludes declines of more than about 29 percent and the Nordic magnitudes. Allowing the post-reform deviation to grow by a quarter of the largest pre-reform change per year widens the interval to $[-0.471, 0.094]$, which includes both zero and a decline of about a third. The volume results should be read as evidence against a large and persistent decline under parallel trends, not as a precise estimate. The ownership results and the composition and value results below do not rest on the same assumption, because they compare outcomes within academic filings.

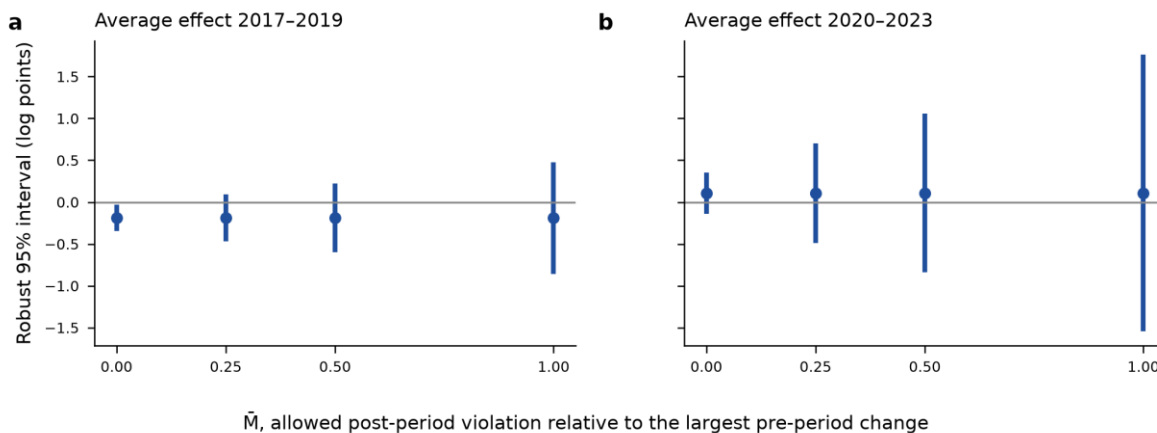


Figure 3. Sensitivity of the average matched effect on applications to violations of parallel trends. Each bar is a 95 percent interval that allows the post-reform deviation from parallel trends to grow each year by up to $\bar{M}$ times the largest change between consecutive pre-reform event-study coefficients. Panel a averages 2017 to 2019 and panel b 2020 to 2023.

7.3 The implementation gap

Figure 4 plots the number of academic-invented applications per firm-invented application by quarter. The ratio was stable at about 0.19 between 2014 and 2016. It fell to 0.13 and 0.12 in the first two quarters of 2017, after the law entered into force, and returned to around its pre-reform level from the fourth quarter of 2017, after the implementing regulation was published. Averaged over February to September 2017 the ratio was 0.139, against 0.196 over the first eleven months of 2016, a fall of 29 percent. In the twelve months after the regulation it was 0.203.

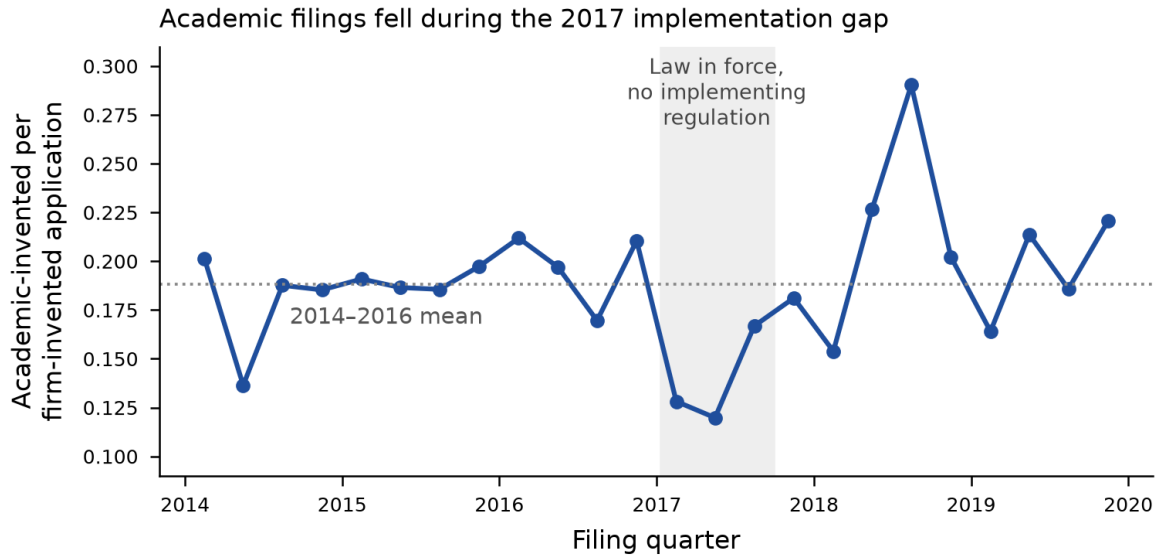


Figure 4. Academic-invented applications per firm-invented application, by filing quarter, 2014–2019. The shaded area marks the period between the entry into force of Law No. 6769 (10 January 2017) and the publication of its implementing regulation on university inventions (29 September 2017). The dotted line is the 2014–2016 mean.

The monthly model confirms this pattern (Table 4, panel A). Academic filings during February to September 2017 were 0.248 log points lower than expected (s.e. 0.137), while the post-regulation level was not significantly different from the pre-reform level (0.103, s.e. 0.080). Placebo transition windows in 2014, 2015 and 2016 give positive coefficients between 0.12 and 0.23. The decline is specific to the period when the ownership rule applied but no procedure existed for academics to disclose and for universities to claim and file, consistent with prediction P5.

Table 4. Implementation gap, exit and entry

Specification	Coefficient	After window	Observations
Panel A. Monthly filing counts			
Transition window Feb-Sep 2017	−0.248* (0.137)	0.103 (0.080)	168
Placebo window Feb-Sep 2014	0.176 (0.180)	0.271** (0.131)	94
Placebo window Feb-Sep 2015	0.233** (0.109)	0.195* (0.109)	94
Placebo window Feb-Sep 2016	0.124 (0.115)	0.131 (0.177)	96
Panel B. Continued filing after base year			
Academic × base year 2017, against 2013–2015	−0.043*** (0.011)		48,179

Panel C. First-time inventors			
Academic $\times$ Post, group and year effects	0.665*** (0.224)		18
Adding a group-specific trend	−0.408 (0.295)		18

Notes. Panel A estimates Poisson regressions of monthly academic-invented and firm-invented application counts (2013–2019) on indicators for academic filings within the window and after it, with calendar-month and group-by-month-of-year fixed effects. Placebo models use data before 2017 only. Robust standard errors. Panel B is a linear probability model of filing again in the two years after a base year, for inventors active in the four years before it, with base year by cohort and base year by IPC section fixed effects and standard errors clustered by inventor. Panel C is a Poisson regression of annual counts of first-time academic and first-time firm inventors, 2010–2019 excluding 2017, with robust standard errors. Significance levels are *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

7.4 Entry, exit and stayers

The inventor panel cannot capture academics who began patenting after the reform.

Address-based counts of first-time academic inventors rose from 928 in 2016 to 1,371 in 2019, and the ratio of new academic to new firm inventors rose from 0.34 to 0.51. Entry grew strongly before the reform as well, and a model with a group-specific trend gives a deviation of −0.408 (s.e. 0.295). The larger number of new academic inventors partly reflects larger teams on university-owned applications.

Among inventors active in the four years before 2017, 16.4 percent of academics filed again in 2018 or 2019, against 20.8 percent of firm inventors. For comparable windows around 2013 the academic rate was higher than the firm rate (24.3 against 20.3 percent). Relative to the placebo base years, the probability that an academic continued filing fell by 4.3 percentage points (s.e. 1.1, Table 4, panel B). Part of this exit coincides with the 2016 purges discussed in Section 8. Among inventors who filed at least once after 2017, academic and firm inventors filed at similar rates (0.089, s.e. 0.067).

7.5 Mechanisms

Table 5 tests the heterogeneity predicted by the framework. The decline is concentrated among academics with few pre-reform applications (−0.216, s.e. 0.118), while the most prolific quarter of academic inventors shows no decline (interaction 0.243, s.e. 0.136), consistent with prediction P3. Academics with pre-reform firm-owned applications did not respond differently (0.039, s.e. 0.140), so the faculty-firm channel that drove the German results is not visible in Türkiye. Academics whose pre-reform patent applications mostly took the unexamined route did not respond differently either (0.100, s.e. 0.128). The interaction with pre-reform 1513 TTO support is positive but imprecise (0.107, s.e.

0.143 through 2019 and 0.122, s.e. 0.115 through 2023), and Figure A1 shows similar event-study paths for academics at universities with and without TTO support. The evidence on prediction P4 is weak, in line with Italian evidence that the value gap of university-owned patents is unrelated to having a TTO (Sterzi et al., 2019). The weak moderation contrasts with office-level evidence that additional TTO staff and mature TTOs raise technology transfer and patenting (Micozzi et al., 2021; Ünlü et al., 2023), a point taken up in Section 9.3.

Table 5. Heterogeneity of the effect on applications

Group	(1) Interaction, 2010–2019	(2) Interaction, 2010–2023	(3) Base effect, 2010–2019
Prolific academic (top quarter of pre-reform applications)	0.243* (0.136)	0.004 (0.097)	−0.216* (0.118)
Academic with pre-reform firm-owned applications	0.039 (0.140)	0.004 (0.108)	−0.075 (0.093)
Academic with mostly unexamined pre-reform patents	0.100 (0.128)	−0.011 (0.100)	−0.115 (0.086)
Home university with 1513 TTO support before 2017	0.107 (0.143)	0.122 (0.115)	−0.129 (0.120)
Home university with any TÜBİTAK TTO support before 2017	0.044 (0.143)	0.046 (0.116)	−0.094 (0.126)

Notes. Each row is a separate Poisson regression of applications on Academic $\times$ Post and Academic $\times$ Post $\times$ Group, with the preferred fixed effects, excluding filing year 2017. Columns 1 and 2 report the triple interaction and column 3 the effect for academics outside the group. Standard errors clustered by inventor. Significance levels are *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

7.6 Value of academic patents

Table 6 reports application-level estimates. After the reform, academic patent applications were 8.7 percentage points less likely than firm-invented applications to lapse for non-payment of annual fees within five years of filing (s.e. 2.8), relative to the pre-reform difference and on a pre-reform academic lapse rate of 30 percent. The estimate is 5.0 percentage points (s.e. 1.7) for applications on the examined route only, which removes the mechanical effect of the end of the unexamined route. Academic applications also listed more inventors (a proportional increase of 15 percent) and were slightly more likely to claim foreign priority (1.4 percentage points from a very low base). The changes in grant probability (0.032, s.e. 0.042), deemed withdrawal (−0.051, s.e. 0.042), IPC breadth and PCT entry are not significant at the 5 percent level once

standard errors are clustered by university applicant, and licence offers are too rare to be informative.

Table 6. Value and characteristics of academic patent applications

Outcome	Academic $\times$ Post	Pre-reform mean, academic	Pre-reform mean, firm	Observations
Granted (examined route, filed 2010–2019)	0.032 (0.042)	0.650	0.617	16,604
Deemed withdrawn within five years	−0.051 (0.042)	0.048	0.089	31,036
Lapsed for non-payment of fees within five years	−0.087*** (0.028)	0.305	0.238	31,036
Lapsed within five years, examined route only	−0.050*** (0.017)	0.154	0.117	21,046
Licence offer within five years	0.000 (0.001)	0.001	0.001	31,036
Number of IPC subclasses (Poisson)	0.031* (0.018)	1.215	1.188	30,094
Number of inventors (Poisson)	0.135*** (0.027)	2.587	2.050	31,036
Foreign priority claim	0.014*** (0.003)	0.008	0.025	31,036
PCT national-phase entry	−0.007 (0.006)	0.026	0.030	31,036

Notes. Application-level regressions on domestic patent applications filed 2010 to 2020, excluding 2017, by academic inventors or by firm inventors with no academic co-inventor. Linear probability models unless stated otherwise. All models include an academic indicator and IPC section by filing-year fixed effects. Standard errors clustered by university applicant in parentheses. Significance levels are *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

Lower lapse rates can reflect higher private value or a greater willingness of universities to pay renewal fees, for example because TTO budgets cover them. The Turkish evidence shows no counterpart to the European findings that university-owned patents lost importance and value after abolition (Martínez & Sterzi, 2021) and that the importance of academic patents declined faster after the German reform (Czarnitzki et al., 2011). It fits better with evidence that differences between university-owned and university-invented patents are small (Crespi et al., 2010) and with prediction P3, under which university screening removes low-value filings. It also differs from the Chinese experience, where rapid growth in university patent counts was followed by lower citation and licensing rates (Lin et al., 2025).

8. Robustness and threats to identification

Table 7 collects robustness checks for the preferred sample. Adding field-by-year and region-by-year fixed effects moves the estimate for total applications from -0.127 to -0.066 . Clustering by home university for academics and by province for firm inventors raises the standard error to 0.110 . Defining academics from addresses only removes identification through a university co-applicant and gives -0.075 , s.e. 0.084 . Restricting the sample to inventors whose normalised name corresponds to a single identifier removes most disambiguation errors and gives -0.074 , s.e. 0.081 for applications and -0.213 , s.e. 0.086 for patents.

Table 7. Robustness of the effect on applications

Specification	(1) 2010–2019	(2) 2010–2023
Cohort-by-year fixed effects only	$-0.127^* (0.072)$	$0.115^{**} (0.059)$
Adding field-by-year fixed effects	$-0.109 (0.076)$	$0.122^{**} (0.061)$
Adding region-by-year fixed effects	$-0.079 (0.075)$	$0.134^{**} (0.062)$
Field-by-year and region-by-year fixed effects (preferred)	$-0.066 (0.079)$	$0.136^{**} (0.062)$
Clustering by home university or province	$-0.066 (0.110)$	$0.136 (0.086)$
Academic status from addresses only	$-0.075 (0.084)$	$0.123^{**} (0.059)$
Inventors with a unique normalised name	$-0.074 (0.081)$	$0.141^{**} (0.057)$
Excluding universities closed in 2016	$-0.045 (0.079)$	$0.154^{**} (0.062)$
Inventors filing at least once after 2017	$0.089 (0.067)$	$0.088 (0.058)$

Notes. Poisson regressions of applications on Academic $\times$ Post with inventor fixed effects and the fixed effects listed, excluding filing year 2017. Rows below the preferred specification use the preferred fixed effects. The closed-university row excludes 123 academic inventors whose home university was closed by Decree-Law No. 667 in July 2016. The last row conditions on a post-treatment outcome and should be read as a bound. Standard errors clustered by inventor unless stated otherwise. Significance levels are *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

The unexamined-route abolition is unlikely to explain the results. Academic-invented and firm-invented applications used that route at almost the same rate before the reform, and the heterogeneity by pre-reform route is small. The academic incentive allowance raised the return to academic inventorship of granted patents from 2015 onwards whatever the owner, and it was tightened in 2018 by excluding unexamined national patents. These changes would have encouraged academic filing before the reform and may have contributed to the pre-reform growth. They do not explain the timing of the 2017 dip and recovery, which tracks the implementing regulation rather than the incentive calendar.

The events after the July 2016 coup attempt are the most serious concern. Academics at the eight closed universities that appear in the data (123 academic inventors) disappear mechanically from the post-reform period, and excluding them gives -0.045 , s.e. 0.079 . Dismissals of individual academics at other universities cannot be identified in the bulletins. Evidence from university publication records shows that research output fell below trend after 2016, most strongly at universities with the highest dismissal shares (Hosoglu & Aktürk, 2024). Inventors at public research institutes, who were never covered by the professor's privilege but were affected by the same dismissals, filed about 60 percent less than firm inventors after the reform (224 inventors). This group is not a clean placebo for the ownership reform, but its decline suggests that the public-sector shock of 2016 depressed patenting by public employees. The same shock affected academics and is reflected in the higher academic exit rate, so the estimated academic decline is more likely to overstate than understate any negative effect of the ownership reform.

Two measurement issues remain. The treatment group is defined from pre-reform activity, so new academic inventors are captured only in the aggregate series of Figure 4 and Section 7.4. From 2021 inventors are matched by name only, so the post-2020 coefficients could be affected if name-only matching links academics to their earlier records more or less successfully than firm inventors. The preferred estimates end in 2019.

9. Discussion and conclusion

Türkiye's abolition of the professor's privilege moved ownership of academic inventions to universities quickly, with a modest and temporary fall in patent filing and no evidence of lower patent value.

9.1 Comparison with the European abolitions

The volume response in Türkiye was much smaller than in Europe. Patent applications by academic inventors fell by about 18 percent through 2019 and total applications did not fall significantly, against declines of about half in Norway and of 29 to 46 percent in Finland (Hvide & Jones, 2018; Ejermo & Toivanen, 2018). Under parallel trends the

matched estimates rule out declines larger than about 29 percent, although sensitivity bounds that allow modest violations include declines of Nordic size. The value evidence also points the other way. European university-owned patents lost importance and value after abolition (Martínez & Sterzi, 2021), while Turkish academic patents became less likely to lapse.

The framework points to the reasons for the contrast. The counterfactual was different. In Norway the reform halved both the patenting and the start-up rates of university researchers (Hvide & Jones, 2018), which suggests that academics had commercialised many inventions themselves, and in Germany the largest drop after the reform was in patents developed jointly with firms (Czarnitzki et al., 2016). In Türkiye most pre-reform academic applications were owned by academics as individuals and almost half of academic patent applications took the cheap unexamined route, which suggests that the inventor-ownership channel that the reform closed was of limited commercial value. University filing capacity was already in place. Publicly funded TTOs had been filing for universities since 2013, and university-owned applications grew rapidly before the reform. Other incentives for academic patenting stayed in force. The academic incentive allowance continued to reward inventorship regardless of ownership, and the law guaranteed the inventor at least a third of income. Evidence that royalty shares have little or no detectable effect on academic patenting (Arqué-Castells et al., 2016; Ouellette & Tutt, 2020) is consistent with a modest volume response to the change in the inventor's share.

9.2 Limitations and further research

The analysis has limitations. Academic filing was growing faster than firm filing before the reform, and the volume estimates are sensitive to modest departures from parallel trends. Patent applications are only one output of academic invention, the bulletins print transfers and use declarations only from 2017, and licences are rarely recorded, so the effect on commercialisation is largely unobserved. Lapse rates are an imperfect measure of value, and forward citations are not available for Turkish national applications. Disentangling the ownership reform from the institutional changes that surrounded it is difficult, a problem noted for European reforms as well (Geuna & Rossi, 2011). Future

work could link the bulletin data to university licensing records, technopark firm registers and the publication records of academic inventors, which would allow tests of whether university ownership changed the direction of academic research, as faculty patenting shifted research toward commercially relevant questions in the United States (Azoulay et al., 2009), and whether it affected local firms (Hausman, 2022).

9.3 Implications for technology transfer policy

The implementation gap of 2017 is a lesson for countries considering such reforms. The temporary fall in academic filing coincided with the months in which universities owned academic inventions in law but had no procedures for disclosure, claim and filing. Publishing the implementing rules together with the ownership rule might have avoided part of this cost, although the counterfactual timing is not observed. The composition and value results suggest that university ownership can act as a screening device when TTOs have the capacity and incentive to file only promising inventions, in line with evidence that university ownership raises the probability of licensing (Giuri et al., 2013).

The weak moderation by pre-reform TTO funding is informative for the literature on TTO capacity. Office-level studies show that additional TTO staff raised technology transfer (Micozzi et al., 2021) and that the efficiency of Turkish TTOs increases with their size and age (Belgin & Apaydın Avşar, 2026), and Turkish science parks linked to mature TTOs patent more (Ünlü et al., 2023). At the level of individual academics, the response to the ownership change was similar at universities with and without such support. One reading is that the binding constraint during the transition was procedural, because no university had rules for disclosure and claims until September 2017. Another is that 1513 support measures differences in TTO practice too coarsely. In a system in which patent counts are rewarded in pay and promotion, university ownership may also act as a filter against the kind of patent inflation documented for Chinese universities (Lin et al., 2025).

For policy, the Turkish case suggests that the effect of moving ownership from academics to universities depends on what it replaces and on the capacity of the institutions that take over. Where academics rarely commercialise inventions themselves and universities have functioning TTOs, the reform can reallocate rights without the large losses observed in

Europe, provided the transition is managed so that disclosure and filing procedures are in place when the ownership rule takes effect.

Statements and Declarations

Competing interests

The author has no relevant financial or non-financial interests to disclose.

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Data availability

The patent bulletins used in this study are publicly available from the Turkish Patent and Trademark Office at <https://www.turkpatent.gov.tr/bultenler>. The application-level and inventor-level datasets constructed from the bulletins and the code that reproduces all results will be deposited in a public repository on acceptance and are available from the author on reasonable request.

Ethics approval

Not applicable. The study uses publicly available administrative records on patent applications and did not involve experiments with human participants.

Declaration of generative AI use

During the preparation of this work, the author used Claude (Anthropic) to assist with drafting and language editing of the manuscript to enhance readability. After using this tool, all content was reviewed, edited, and approved by the author, who takes full responsibility for the article's content.

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Appendix A. Data construction

Source files. TÜRKPATENT publishes the Official Patent Bulletin monthly. Issues from 2015_06 onwards are individual PDF files, and earlier issues are distributed as RAR bundles covering 2003 to 2010 and 2011 to 2015_04. Issue 2015_05 is missing from the office's archive and the body of issue 2011_10 is missing from its bundle, which affects about 450 publications of mainly 2010 filings, many of which re-enter the data through later grant records. Issues from 2003 to 2005 are scanned images with unusable text layers, so filings from those years enter only through later publications and grants.

Parsing. The text of each issue was extracted page by page and split into records at each INID code 11 (document number). Fields were read from INID codes 12 (document type), 21 (application number), 22 (filing date), 30 to 33 (priority), 43 and 45 (publication and grant dates), 51 (IPC), 54 (title), 71 and 73 (applicants and owners with addresses), 72 (inventors with addresses), 74 (attorney) and 86 (PCT). Kind codes were harmonised, including the UA2 code used for utility-model publications in 2017. The notice index at the front of each issue, which lists every application number with its notice type, was parsed into a table of 929,050 events.

Recall. For each issue the set of parsed publication and grant records was compared with the application numbers listed in the notice index under the corresponding notice types. Publication recall has a median of 1.00 and a minimum of 0.989 for issues from 2011 onwards, and a median of 0.997 and a minimum of 0.923 for 2006 to 2010. Grant recall has a median of 0.997 and a minimum of 0.881.

Classification. Applicant types were assigned by ordered name rules. Universities were identified by the words *Üniversitesi*, *University*, *Rektörlüğü* and similar terms, public research institutes by the names of TÜBİTAK institutes, ministries and other public bodies, state-owned enterprises by a list of names, firms by legal-form suffixes, and the remaining applicants were classified as individuals. Inventor occurrences were classified as academic if the printed address matched university, faculty, department or campus patterns, after excluding residential estates named after universities, faculty housing and technopark firms, or if a university was a co-applicant on the application. The validation procedure is described in Section 5.2.

Disambiguation. Inventor names were upper-cased, Turkish characters were folded and academic titles were removed. Within each normalised name, occurrences were linked by union-find if they shared a co-inventor, a non-individual applicant, a university matched from the address, the first 35 characters of the normalised address, or a province for names that appear in fewer than three provinces and on fewer than 40 applications. Occurrences without addresses after March 2021 were attached to the single existing identifier of a non-common name. In total, 258,671 domestic inventor occurrences were grouped into 102,689 identifiers, and 0.5 percent of identifiers span more than one province.

Replication. The bulletin text archive, the parsed application, person, event and inventor files, the code for parsing, classification, disambiguation and estimation, and a codebook will be deposited in a public repository on acceptance.

Figure A1 compares the event-study paths of academics at universities with and without TTO support before 2017.

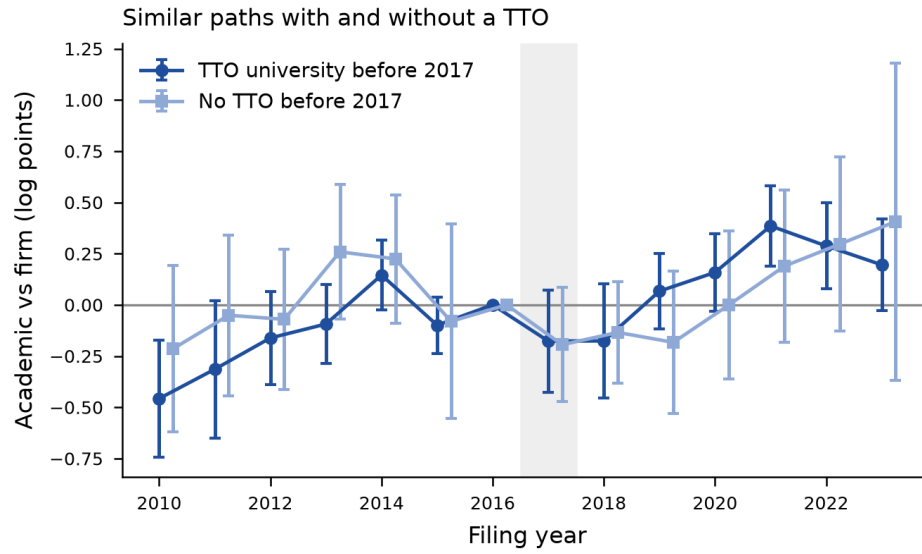


Figure A1. Event-study estimates for academics at universities with and without TÜBİTAK 1513 TTO support before 2017, relative to firm inventors. Specification as in Figure 2, panel a.

Supplementary Files

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