When Science and Technology Collide with Politics: Patent Examiner Political Ideology and Green Innovation[☆]

Tao Shu[a], Fei Xie[b], Song Zhang[c], Wenrui Zhang[d]

[a] *Chinese University of Hong Kong (Shenzhen) and ABFER*
[b] *University of Delaware and ECGI*
[c] *University of Delaware*
[d] *Colorado State University*

This version: January 26, 2026

Abstract

We provide the first large-sample evidence on whether political ideology systematically distorts the scientific assessment of emerging technologies. Using the quasi-random assignment of patent applications to U.S. examiners, we show that Republican examiners are significantly more likely than non-Republicans to reject green patent applications, particularly those directly addressing climate change. The higher rejection rate implies over 10,000 additional rejected green patents and at least $20 billion in lost economic value. These ideological distortions manifest not only in final rejection rates but also in the statutory grounds examiners invoke and in the downstream behavior of inventors and firms, revealing a mechanism through which politics can dampen future scientific and technological activities.

JEL Classification: D72; D83; Q55; Z18
Keywords: Science and Technology; Political Ideology; Patent Examiners; Green Innovation; Climate Change

---

[☆] Authors' contact information: Tao Shu (shutao@cuhk.edu.cn), Fei Xie (xief@udel.edu), Song Zhang (songz@udel.edu), and Wenrui Zhang (wrzhang@colostate.edu), respectively. We are grateful for the helpful comments from Laura Field, Michael Gelman, Kathleen Hanley, Tong Li, Michelle Lowry, Lin Peng, Laura Starks, Austin Starkweather, Michael Weber, participants at the 2025 University of Delaware Weinberg Center - ECGI Corporate Governance Symposium, and seminar participants at the University of Delaware, the Chinese University of Hong Kong, Dongbei University of Finance and Economics, Colorado State University, and the University of Colorado, Boulder. We thank Yuqi Gu for his insight about the PatEx dataset and Yanyan Guo for his excellent research assistance. **We have no financial relationships or conflicts of interest to disclose.**

1. Introduction

Scientific and technological progress is a fundamental driver of productivity and long-run economic growth. Yet the institutions charged with evaluating and funding new ideas often operate through bureaucrats who possess discretion and, critically, ideological preferences.[1] A central and largely unanswered question in economics is whether political ideology can distort the evolution of scientific knowledge and the direction of technological development. This question is particularly salient in an era of rising political polarization, in which political identity increasingly shapes individuals' attitudes toward science, expertise, and the role of technology in addressing societal challenges.[2]

The patent examination system offers an ideal setting to investigate this question. Patent examiners act as gatekeepers in the innovation process: their decisions determine which inventions receive legal protection, influence inventors' incentives to commercialize new technologies, and ultimately shape the trajectory of scientific discovery. Although the patent system is ostensibly technocratic and guided by statutory criteria, its implementation relies on individual examiners who wield substantial discretion (e.g., Frakes and Wasserman, 2017; Farre-Mensa, Hegde, and Ljungqvist, 2020). A single rejection can delay technology commercialization, redirect R&D investment, or terminate the development of an entire technological line. This institutional environment therefore provides a natural laboratory for testing whether political beliefs held by evaluators can influence technological progress, even when formal rules attempt to constrain subjective judgment.

[1] For example, the Environmental Protection Agency (EPA) recently proposed dropping the finding that greenhouse gases harm human health (AP News, July 29, 2025). Moreover, the Transportation Department also withdrew $679 million in funding for offshore wind projects (The New York Times, September 2, 2025).

[2] A recent example of this is the controversy in the U.S. surrounding the Covid-19 vaccine during the pandemic. For a more in-depth discussion of political division in trust in science around the world, please see "Beyond Doubt", *The Economist*, June 28, 2025.

In this paper, we shed light on this issue by first investigating whether the political ideology of patent examiners affects the evaluation of environmentally beneficial ("green") patent applications submitted to the U.S. Patent and Trademark Office (USPTO). We then examine whether any such partisan effects alter the incentives of inventors and firms to develop green technologies. Green patents offer a compelling setting for our inquiry given the sharp partisan divide over environmental issues in the U.S. (Dunlap, McCright, and Yarosh, 2016; Baldauf, Garlappi, and Yannelis, 2020). Moreover, the quasi-random assignment of patent applications to examiners strengthens causal identification by mitigating selection concerns (Merges, 2001; Lemley and Sampat, 2012; Farre-Mensa, Hegde, and Ljungqvist, 2020).

Ex ante, it is unclear if political ideology plays a significant role in patent examiners' evaluation of green patent applications. On the one hand, Republican-leaning examiners may be more likely to reject green patent applications than their Democratic-leaning or politically independent counterparts. This conjecture is grounded in well-documented partisan divides in fundamental beliefs and attitudes about climate change. For example, recent Pew Research Center surveys (2022-2024) reveal several striking differences: only 12% of Republican-leaning respondents believe that climate change should be a top priority for the president and Congress, versus 59% of Democrats; and 23% of Republicans view climate change as a major threat to the U.S., compared to 78% of Democrats.[3] When considering strategies or policies addressing climate change, Republicans also put more emphasis on economic factors, such as consumer costs, job creation, and economic growth, than Democrats do. These ideological differences suggest that Republican-leaning examiners are likely to hold a more skeptical view of the importance and economic value of green technologies, especially those related to climate change.

[3] See the survey at https://www.pewresearch.org/short-reads/2024/03/01/how-republicans-view-climate-change-and-energy-issues/.

On the other hand, several factors could mitigate or even eliminate the influence of ideological preferences on patent review outcomes. First, patent examiners may be a more homogenous group than the general population because their education and work experience are more likely to be in STEM fields, potentially yielding more similar beliefs and attitudes about environmental issues. Second, institutional safeguards in the USPTO review process, including supervisory review and appeal mechanisms, are designed to minimize individual biases in decision-making. These procedural checks and balances may prevent examiners' personal views from significantly affecting review outcomes. Finally, the judicial literature presents mixed evidence on whether conservative political ideology is associated with a greater propensity to grant intellectual property protection in general (Beebe, 2008; Sag, Jacobi, and Sytch, 2009). Therefore, whether and how patent examiners' political ideology affects the review outcomes of green patent applications is ultimately an empirical question.

We investigate this question using a large sample of patent applications filed with the USPTO between 2001 and 2023. We identify patent examiners' political ideology based on their party affiliations from voter registration records. Our key outcome variable is a binary indicator for whether a patent application is rejected or granted. We first perform a placebo test by analyzing the full sample of all patent applications and find no significant relation between examiners' party affiliation and their rejection decisions. However, a clear partisan pattern emerges once we focus on *green* patent applications. Using independent examiners as the benchmark group, we find that Republican examiners exhibit a 2 percentage-point higher rejection rate, which is statistically significant at the 1% level and represents a 7.7% increase relative to the mean rejection rate of 26%. Applied to our entire sample, this effect would translate into about 10,109 additional rejections of green patent applications. In economic value terms, the higher rejection rate would

result in an estimated loss of $20.15 billion (in 2025 dollars) for shareholders based on green patents obtained by public firms in our sample.[4] In contrast, Democratic examiners do not differ significantly from independents in green patent rejection rates. Furthermore, we find that the higher rejection rate by Republican examiners is concentrated in green patent applications that pertain directly to climate change (rather than other environmental technologies such as pollution control) and becomes more pronounced when the Republican party holds the presidency and when the partisan divide over climate change is larger. Overall, these results suggest that while Democratic examiners do not appear to be overly lenient on green patent applications compared to their independent counterparts, Republican examiners tend to hold a more negative view of these patents than the other two groups of examiners.

A critical question about our findings is whether Republican examiners' higher rejection rate for green patents reflects their use of more rigorous evaluation standards ("differential standards") or their ideological skepticism about the importance of green technology ("ideological discounting"). To distinguish between these alternative interpretations, we examine the quality of approved green patents. Under the differential standard hypothesis, green patents approved by Republican examiners on average should have higher quality. On the other hand, under the ideological discounting hypothesis, Republican examiners perceive green patents in general as unimportant or economically nonviable approaches to addressing climate change. Therefore, similar to beliefs-based discrimination in the labor market, their rejection of green patent applications can be detached from the applications' underlying quality and does not result in higher average quality of approved patents. Using patent citations and economic value (Kogan, Papanikolaou, Seru, and Stoffman, 2017) as quality measures, we find no significant differences

[4] The $20.15 billion figure represents a conservative estimate because we are only able to estimate the economic value of green patents obtained by publicly traded firms.

in the overall quality of green patents approved by Republican versus non-Republican examiners. These results suggest that the higher rejection rate of green patents by Republican examiners is unlikely to be driven by their use of higher quality standards, but rather reflects their ideological beliefs in the evaluation of green innovation.

To further explore the mechanisms driving our results, we examine two outcomes from the initial round of green patent review: (1) first-action approval, in which an application is approved in the first office action; and (2) inventor amendments following non-final rejections, indicating whether inventors submit revisions in response to non-final rejections. The higher final rejection rate among Republican examiners can result from either a lower first-action approval rate, or more discouraging first-action rejections that reduce inventors' willingness to pursue amendments.

Our evidence supports the latter mechanism. Republican examiners are no more likely than non-Republican ones to issue first-action rejections for green patents. However, inventors are significantly less likely to amend and resubmit their applications following rejections by Republican examiners. A plausible explanation is that Republican examiners' response to green patent applications is based more on subjective grounds that are harder to address, lowering inventors' perceived likelihood of success and discouraging further prosecution. In support of this explanation, we find that Republican examiners are significantly more likely than their non-Republican counterparts to use Section 101 (subject matter patentability) reasons to reject green patent applications. Section 101 rejections are subject to greater examiner discretion and are more challenging for applicants to address relative to other reasons.[6]

[6] Compared to other common rejection reasons–Section 102 (novelty), 103 (obviousness), and 112 (disclosure sufficiency)–Section 101 rejections are generally the hardest to overcome because they are based on the determination of an invention involving abstract ideas, laws of nature, or natural phenomena. Such determination is more subjective and depends on the examiner's interpretation. The lack of clear boundaries for the determination makes overcoming Section 101 rejections highly challenging: applicants often must redefine the invention's scope and significance and incorporate additional technical innovations or non-abstract applications, which can complicate the original invention's structure or function. Historically, Section 101 rejections are the least likely to be overturned at appeals,

In our final set of inquiries, we examine whether green patent rejections by partisan examiners affect inventors' and firms' incentives to invest in future green innovation. If green patents are rejected at least partly based on ideological grounds rather than merits, applicants may interpret such outcomes as indicative of structural barriers to approval, eroding their confidence in the patent system and discouraging further investment in similar innovations. Both inventors and firms may respond by redirecting their R&D resources away from environmentally oriented technologies, contributing to a decline in subsequent green patenting. Consistent with this prediction, we find that inventors and firms are significantly less likely to file green patent applications in the three- and five-year periods following rejections by Republican examiners than after rejections by non-Republican examiners. These results suggest that ideologically driven rejections can have a chilling effect on future green innovation. This unintended consequence of examiner-level discretion can ultimately hinder the development of green technologies critical for addressing climate change.

Main Contributions. First, we present the first large-sample evidence that political ideology can shape the trajectory of scientific and technological development. Specifically, we show that patent examiners' ideological preferences systematically affect their assessment of politically salient technologies such as green patents. We further provide novel evidence on the mechanisms underlying the ideological effects and demonstrate how these effects alter inventors' and firms' future innovation incentives. In light of the rising political polarization in the U.S. and beyond, our findings carry broad implications for how political forces influence the outcome and allocation of innovative effort.

Our paper touches upon two major strands of literature: one on patent examination and the

compared to the other three categories.

other on ideology-driven behavior in economics. Prior research in the patent examination literature shows that several factors, including examiner experience, leniency, workload and internal deadlines, affect examiner behavior and patent review outcomes (e.g., Frakes and Wasserman, 2017; 2023; Farre-Mensa, Hegde, and Ljungqvist, 2020; Cohen, Gurun, and Li, 2021; Tu, 2021; Cockburn, Kortum, and Stern, 2022; Shu, Tian, and Zhan, 2022). We extend this literature by establishing *examiners' partisan beliefs* as a new, economically important source of systematic variation in patent examination outcomes.[7]

Relatedly, a growing literature documents ideology-driven decision making among economic agents and, more recently, among public servants such as government workers, financial regulators, and judges (e.g., Engelberg, Henriksson, Manela, and Williams, 2023; Spenkuch, Teso, and Xu, 2023; Bakke, Mahmudi, Virani, and Zhang, 2025; Gormley, Kaviani, and Maleki, 2025; Pandey, Shen, and Wu, 2025). We extend this literature by providing the first evidence that ideological preferences significantly affect patent examiners' behavior and, in turn, technological advancement–an important yet previously unexplored domain in the political economy literature.

Second, our paper contributes to the literature on green innovation. Existing studies have explored the drivers and impacts of green innovation (Chu, Liu, and Tian, 2021; Bolton, Kacperczyk, and Wiedemann, 2023; Cheng, Lin, and Yang, 2024; Cohen, Gurun, and Nguyen, 2024; Hege, Pouget, and Zhang, 2024; Dai, Duan, and Ng, 2025). Despite green innovation's critical role in mitigating climate change, a systematic understanding of the institutional factors that shape its success remains elusive. We help fill this gap by showing how ideological

[7] A recent study by Raffiee, Teodoridis, and Fehder (2023) investigates patent examiners' political affiliations and the overall approval rates for software patent applications and finds no significant relationship. Our study differs by focusing on green technology patents, a domain with pronounced partisan polarization. This ideological divide provides a powerful setting to detect how examiners' partisan beliefs shape their interpretation of patentability criteria and, consequently, patent review decisions.

preferences in the patent examination system introduce uncertainty for inventors and firms and dampen their incentives to pursue future green technology development.

Finally, our findings have important implications for the design and effectiveness of patent-based environmental policies. Firms tend to underinvest in green technologies because these innovations often generate substantial positive externalities, making their development highly sensitive to public policy and regulatory environments (Acemoglu et al., 2016; Aghion, Hemous, and Veugelers, 2009). Given the urgency of environmental challenges such as climate change and pollution (Hege, Pouget, and Zhang, 2024), the patent system, as a key mechanism for providing innovation incentives, should, at a minimum, avoid discouraging socially valuable technologies. Our finding that examiners' ideological preferences systematically influence green patent approval highlights the need for a more ideologically neutral examination process.

2. Institutional Background on USPTO's Patent Examination Process

In the U.S., the USPTO evaluates patent applications to determine their eligibility based on a set of standardized criteria. Specifically, inventions must be patent-eligible, novel, non-obvious, useful, and accompanied by comprehensive disclosures. Patent applications submitted to the USPTO contain detailed specifications, precise claims describing the invention's scope, and relevant prior art documentation. After an initial procedural screening, applications are classified based on technology classes and then assigned to specialized art units. Each art unit comprises patent examiners focused on specific technological domains. Within an art unit, patent applications are generally assigned to individual examiners by supervisory patent examiners in a largely random manner (e.g., Farre-Mensa, Hegde, and Ljungqvist, 2020; Shu, Tian, and Zhan, 2022). Prior research finds no systematic correlation between application assignment and application

quality, supporting the view that the assignment process is mostly unbiased (e.g., Merges, 2001; Lemley and Sampat, 2012).

Once assigned, patent examiners exercise considerable discretion during the patent prosecution phase. Initial evaluations typically result in either a preliminary approval (first-action allowance) or, more commonly, a non-final rejection (Aneja, Reshef, and Subramani, 2025).[8] Applicants receiving non-final rejections must respond to examiners' concerns within a specified period, usually three to six months. This iterative process, involving repeated examiner rejections, applicant amendments, and sometimes meetings between applicants and examiners (Cuny, Mehta, and Zhao, 2025), often continues over multiple rounds and several years before the application is ultimately approved or abandoned.[9] At each stage, applicants must decide whether to continue revisions or abandon the application. This prosecution process thus reflects a dynamic negotiation, with applicant responses and examiner evaluations jointly shaping the patent's scope, content, and ultimate outcome.

3. Data, Sample and Variable Construction

3.1. Data

Our primary data sources are the Patent Examination Research Dataset (PatEx) and PatentsView, both maintained by the USPTO. PatEx provides comprehensive, examiner-level data on the patent prosecution process, including detailed information on office actions, rejections, and applicant responses. This dataset enables us to track individual patent examiners' decision-making

[8] Most patent examinations are conducted by junior examiners, who are typically listed as secondary examiners rather than the signatory authority on applications. The authority to grant final approval generally resides with more senior examiners at the GS-14 level or above (Lemley and Sampat, 2012).

[9] The USPTO rarely issues final rejections. Instead, applications that fail to satisfy examiner objections are typically abandoned by the applicant. The abandonment reflects the applicant's strategic decision to discontinue prosecution, rather than a denial by the USPTO. Nonetheless, applications may also be abandoned for other reasons, such as applicant bankruptcy (Lemley and Moore, 2004; Lemley and Sampat, 2012).

behavior over time. PatentsView complements PatEx by offering standardized, inventor- and assignee-level information on granted and pre-grant patents, including application and grant dates, technology classifications, and citation data. Together, these datasets provide comprehensive information on the patent examination process and the characteristics of granted and pre-grant patents.

We use personnel data from the U.S. Office of Personnel Management (OPM) to construct demographic, geographic, and professional profiles of patent examiners. The OPM dataset includes variables such as examiner duty station (work location), pay grade (GS level), educational attainment, base salary, total compensation, agency affiliation, and age range. We obtained the OPM data in two distinct batches. The earlier dataset, covering 1973–2017, was sourced from BuzzFeed News, which obtained the federal payroll records through Freedom of Information Act (FOIA) requests and publicly released the data to support transparency and workforce analysis. The more recent dataset, covering 2014–2023, was acquired through our direct FOIA requests to the OPM.[10]

As of 2023, USPTO telework reports indicate that over 95% of patent examiners work remotely. To measure telework participation, we filed FOIA requests and obtained telework program data from the USPTO, which administers a structured, multi-tiered telework program for patent examiners. This dataset includes detailed participation records for current and past telework programs, along with metadata such as examiner email addresses, assigned offices, home states, telework application and approval dates, and program level (e.g., hoteling or part-time remote

[10] Due to increasing privacy concerns, the OPM excluded age-related variables from FOIA responses in more recent years. As a result, information on examiner age is unavailable in the post-2014 OPM data. To ensure consistency, we construct our baseline sample using the 2014–2023 OPM Patent Examiner data, which we then merge with voter registration records. Since the 2014–2023 data lacks birth year information, we link it to the 1973–2017 OPM data to retrieve examiners' birth years. The matching procedure is described in detail below.

work). By merging the USPTO telework data with the OPM dataset, we can determine each examiner's remote work status, which in turn allows more precise identification of patent examiners' political affiliations in the L2 data.

We obtain political affiliation data from L2, a commercial voter file vendor that provides individual-level records widely used in political science and public policy research. The L2 dataset contains individual-level voter registration records for all 50 states and the District of Columbia, including registered party affiliations, voter history, demographic characteristics, and geocoded residential addresses. Our L2 data, current as of April 2024, incorporate both historical and updated records. While some states allow voters to self-report party affiliations during registration, others do not collect this information. For states without official party registration, L2 employs imputation methods to determine party affiliation–a well-validated approach documented in the academic literature.[11]

3.2. Sample Construction

We begin by identifying all patent examiners who were actively processing patent applications in the PatEx database from 2001 to 2023. We start in 2001 because before the American Inventors Protection Act (AIPA), effective on November 29, 2000, unsuccessful patent applications are not published and remain confidential. We restrict our sample to non-provisional utility applications. Since we focus on the impact of examiner partisanship on patent review outcomes, we further restrict our sample to patent applications receiving the final disposition, approval or rejection.[12] We then merge the PatEx application data with the PatentsView database to obtain CPC codes

[11] These states include HI, IL, WA, MT, ND, MN, WI, MI, VT, SC, MO, AL, TX, VA, and GA.
[12] Rejection refers to cases where inventors choose to abandon a patent application by not filing amendments to address patent examiners' objections.

(technology classes), as well as disambiguated inventor and assignee identifiers. After these procedures, our sample includes 11,253 patent examiners.

Next, we match examiners to the L2 database following existing literature (e.g., Spenkuch, Teso, and Xu, 2023; Fos, Kempf, and Tsoutsoura, 2025). Since the PatEx data contains only examiner names, which are insufficient for accurate matching, we supplement this information with OPM and USPTO telework records, which offer additional granular details, including examiners' work location and age.[13] We then match the records to the L2 data through ten iterative rounds, beginning with the strictest criteria (full name, county, and exact age) and progressively relaxing requirements (e.g., name and county only). Appendix B provides a detailed description of our matching procedures.

At the examiner-year level, we successfully match 76.7% of observations. At the individual examiner level, our match rate is 82.3%. For context, Spenkuch, Teso, and Xu (2023) successfully matched 67.5% of all federal bureaucrats, while Fos, Kempf, and Tsoutsoura (2025) achieved a 77% match rate for corporate executives. In comparison, our 82.3% match rate is close to the upper bound of 86%—the proportion of civilian federal employees who are registered voters (Spenkuch, Teso, and Xu, 2023). Our higher match rate could be due to combining both standard and expanded-radius matching approaches.

We use the most recently matched party affiliation information for each patent examiner, given that party affiliations of patent examiners remain relatively stable over time.[14] Among matched examiners, 18.3% are Republican, 55.9% are Democratic, and 25.8% are independent or

[13] For the later OPM sample, which does not contain age information, we either match inventors with the first OPM sample or manually search inventors' LinkedIn profiles and infer birth years from their undergraduate start years.
[14] In robustness tests, we alternatively identify each examiner's political ideology using either their most frequently observed party affiliation or a time-varying affiliation based on year-specific registration records. Both approaches yield consistent results.

affiliated with other parties. This distribution aligns broadly with Spenkuch, Teso, and Xu's (2023) findings for federal employees, though our sample shows slightly stronger Democratic leaning—likely reflecting patent examiners' higher educational attainment relative to the general federal workforce. Although the formatted L2 data on voter registration starts from 2014, we extend the sample to 2001 by backfilling patent examiners' party affiliations. Our final sample comprises 5,259,923 patent applications that were filed between 2001 and 2023, reviewed by 8,758 unique examiners, and reached a conclusive outcome.

Our baseline sample includes all patent applications for which we can identify the party affiliation of the assigned patent examiners. The majority of applicants are firms, encompassing both domestic and international entities, as well as public and private firms. A very small number of applications are submitted by non-firm entities. For some of our analyses, we focus on the subset of applications filed by U.S. public firms, using the patent economic value dataset constructed by Kogan, Papanikolaou, Seru, and Stoffman (2017).

Table 1 presents summary statistics, showing that green patent applications account for 9.5% of total patent applications. Approximately 21% of applications are reviewed by Republican examiners, 55% by Democratic examiners, and 24% by other examiners. The average rejection rate across all applications is approximately 26%. Definitions of all variables are provided in Appendix A.

4. Examiner Partisanship and Green Patent Rejection Decisions

4.1. Baseline Analysis

We begin by examining whether rejection rates differ across patent examiners with different political affiliations for all patent applications. The dependent variable, *Rejection*, is a binary variable that equals 100 if an application is rejected, and zero otherwise. The main independent

variables are two dummy variables for Republican examiners (*Republican*) and Democratic examiners (*Democratic*). The omitted benchmark case is examiners who are either independent or affiliated with other parties. We also construct a dummy variable, *Green*, to denote green patent application, which equals one if a patent application pertains to green technology as defined according to the OECD classification (Haščič and Migotto, 2015), and zero otherwise. The regression model also includes a comprehensive set of fixed effects, such as art unit fixed effects, patent filing year fixed effects, or art-unit-by-filing-year fixed effects, and control variables, such as examiner characteristics (e.g., age, PhD status, gender, experience, and examiner leniency) and the number of inventors listed on the application. Standard errors are clustered at the examiner level unless otherwise noted.

Columns (1) and (2) of Table 2 report the regression results, which show no significant effect of examiner political ideology on their rejection decisions, as the coefficients on both *Republican* and *Democratic* are statistically insignificant. These findings are consistent with Raffiee, Teodoridis, and Fehder (2023), who find no systematic differences in examiner rejection decisions based on party affiliation. We also find that, compared to other patent applications, green patent applications on average are associated with lower rejection rates, as indicated by the significantly negative coefficient on *Green*.

Next, we focus on green innovation and investigate whether examiners with different political affiliations exhibit varying propensities to reject green patent applications. For this analysis, we augment the regression model in columns (1) and (2) with two interaction terms, *Republican* × *Green* and *Democratic* × *Green*. This specification compares Republican and Democratic-leaning examiners against their independent counterparts in their evaluation of green patents. A recent study by Leiserowitz et al. (2024) indicates that independent voters lie between Democrats and

Republicans in their concerns about climate change, supporting their use as a politically neutral benchmark. The study also shows that the likelihood of being a pro-climate voter decreases monotonically along the entire political ideology spectrum, from liberal democrats (70%), moderate democrats (47%), independents (29%), moderate republicans (17%), to conservative republicans (6%).[15]

Columns (3) and (4) of Table 2 report the results. We find that the coefficient on *Republican* × *Green* is significantly positive in both specifications. The size of the coefficient is also economically meaningful. For example, the estimates in column (4) suggest that Republican examiners are associated with a roughly 2 percentage-point higher rejection rate for green patent applications compared to independent examiners – a 7.7% increase relative to the average rejection rate. In contrast, the coefficient on *Democratic* × *Green* is negative, but statistically insignificant and small in magnitude, indicating no difference in rejection rates for green patent applications between Democratic and independent examiners. This suggests that despite their more pro-climate stance, Democratic examiners do not appear to be more lenient than their independent counterparts when evaluating green patent applications. Overall, these findings are consistent with our conjecture that Republican examiners are significantly more likely to reject green patent applications than other examiners. Given the lack of difference between Democratic and independent examiners, we combine them as one control group in subsequent analyses.

The rejection rate difference we document carries substantial real economic consequences. Applying the higher rejection rate associated with Republican examiners to our entire sample would result in about 10,109 (= 5,259,923 × 9.5% × 2.023%) additional rejected green patent

[15] Leiserowitz et al. (2024) define *pro-climate voters* as registered voters in the U.S. who say both that global warming is a "very important" issue to their vote for president *and* that they prefer to vote for candidates who support action on global warming.

applications. To estimate the economic value lost due to additional rejected green patent applications, we begin with the economic value of all green patents approved by Republican examiners during our sample period, which totals $707.10 billion in 2025 dollars, based on the estimates from Kogan, Papanikolaou, Seru, and Stoffman (2017). Using the 73% approval rate of non-Republican examiners as a benchmark, we back out the counterfactual economic value of green patents approved by Republican examiners without the rejection rate gap to be $727.25 billion (= [707.10/(73%-2.023%)]×73%). This implies a lost economic value of $20.15 billion (= $727.25 billion – $707.10 billion) in 2025 dollars for shareholders. This estimate highlights the economic significance of partisan differences in green patent rejections. We emphasize that this estimate represents a lower bound for the economic value loss due to the rejection rate difference, because it is based on green patents filed by public firms only and excludes those filed by private firms and other organizations.

Our analysis in Table 2 primarily focuses on cross-examiner variations in rejection rates for green patents. This approach builds on the well-established quasi-random assignment of patent applications to examiners (e.g., Lemley and Sampat, 2012; Frakes and Wasserman, 2017), which ensures that green patent applications assigned to different examiners do not systematically differ in underlying quality. We conduct robustness tests to account for the possibility that the assignment of patent applications may not be entirely random. For instance, one might be concerned that some examiners systematically receive applications that differ in average quality or complexity. To address this concern, we incorporate examiner fixed effects to isolate within-examiner variation in decisions across patent types. Specifically, in columns (1) and (2) of Panel A of Appendix C, we control for examiner and filing year fixed effects and examiner-filing year pair fixed effects. The coefficient estimates on the interaction term *Republican* × *Green* remain significantly positive

under these specifications. These results suggest that among patent applications reviewed by the same Republican examiner or by the same Republican examiner in the same year, green patents are associated with a significantly higher rejection rate than non-green ones.

In column (3) of Panel A, we control for examiner-assignee pair fixed effects to account for possible sorting between examiners and applicants, such as political alignment between examiners and applicants. This specification isolates variations within each examiner and assignee pair. The interaction term *Republican* × *Green* continues to have a significantly positive coefficient, implying that even among patent applications filed by the same assignee and reviewed by the same Republican examiner, green patents are associated with a higher rejection rate than non-green ones.

We also perform several additional sensitivity analyses and present the results in Panels B to F of Appendix C. First, we identify each examiner's political ideology using either their most frequent party affiliation or a time-varying affiliation. Our results remain robust (Panels B and C) and the coefficient estimates are similar to those in Table 2.[16] Second, we exclude Virginia-based examiners because USPTO headquarters is located in that state and these examiners' party affiliations are imputed by L2. The results in Panel D indicate that our findings are robust to this exclusion and in fact somewhat stronger than those in Table 2. Third, to address the concern that our results could be driven by Republican examiners' conservatism toward all technologies, we split the full sample into green and non-green patent applications and examine the effects of examiner party affiliations within each subsample. The results in Panel E show that Republican examiners exhibit significantly higher rejection rates compared to other examiners in the subsample of green patent applications (columns (1) and (2)), while showing significantly lower rejection rates in the subsample of non-green patent applications (columns (3) and (4)). This sharp

[16] For the test using time-varying party affiliations, our sample is limited to the post-2014 period due to data availability.

contrast between Republican examiners' disposition toward green and non-green patents vis-à-vis other examiners is inconsistent with the notion of Republican examiners being conservative toward all innovations. Fourth, we restrict the sample to patent applications filed by U.S. publicly traded firms and find results consistent with those from the full sample (Panel F).

4.2. Is Political Ideology Driving Partisan Differences in Green Patent Review Outcomes?

While we have so far established a significant difference in green patent rejection rates between Republican and non-Republican examiners, the underlying drivers require further investigation because Republicans and non-Republicans may differ along dimensions other than their attitude toward climate change. To bolster our confidence that ideological differences in climate change beliefs, rather than confounding factors, explain this pattern, we conduct several additional analyses to flesh out some important heterogeneities in our results that are most consistent with a political ideology interpretation.

4.2.1. Climate-Related Patent Applications

Green patents encompass technologies addressing both climate change challenges and other environmental challenges (e.g., pollution control). Given that political ideology exhibits particularly strong partisan polarization on climate-change related issues, we conduct a refined analysis by splitting green patents into two categories: (1) climate-change-related technologies and (2) other green technologies, using the detailed OECD classification based on the Cooperative Patent Classification (CPC) codes.[17] We expect partisan differences in rejection rates to be more pronounced for climate-change-related patents than other green patents.

[17] We classify patents with CPC codes corresponding to Group 1 (environmental management technologies), Group 10.2 (ocean pollution abatement), and Group 10.5 (desalination of sea water) in the OECD green patent classification as non-climate-change-related technologies.

Table 3 presents the regression results for our subsample analyses. Columns (1) and (2) examine the differential rejection rates between climate-related green patents and non-green patents. We find that the coefficient on *Republican* × *Green* is significantly positive and its magnitude is larger by about 17~20% than that in the full sample of green patents shown in Table 2. Specifically, the results in column (2) suggest that in evaluating climate-related green patent applications Republican examiners are associated with a 2.4 percentage-point higher rejection rate than non-Republican examiners. In contrast, columns (3) and (4) show no significant partisan difference in rejection rates for non-climate-related green patents. The coefficient on *Republican* × *Green* is statistically insignificant and small in size. These findings support the interpretation that it is the political ideology related to climate change that drives the observed partisan gap in green patent review decisions.

4.2.2. Republican Presidency

Spenkuch, Teso, and Xu (2023) document that government employees exhibit better performance when ideologically aligned with political leaders, suggesting that political congruence significantly affects bureaucrats' behavior. To extend this analysis to climate-related partisanship, we test whether Republican examiners' elevated rejection rates for green patents intensify during Republican administrations.

We construct a *Republican Presidency* dummy variable that equals one for patent filings during 2001-2008 and 2017-2020 and zero otherwise. In Panel A of Table 4, we estimate an augmented regression model with a triple-interaction term (*Republican* × *Green* × *Republican Presidency*) in the sample of all patent applications. We find that the coefficient on the triple interaction term is significantly positive, indicating that Republican examiners' higher rejection rates for green patents indeed become even more pronounced during Republican administrations.

In particular, column (2) reveals that under Democratic presidents, green patents examined by Republican examiners are 1.4 percentage points more likely to be rejected than those examined by non-Republican examiners. Under Republican presidency, the partisan gap in rejection rate increases by 1.6 percentage points to 3%, more than doubling the gap under Democratic presidency. In Panel B of Table 4, we restrict the sample to green patent applications only, which allows us to estimate a simpler version of the regression model with a double-interaction term (*Republican* × *Republican Presidency*). We find that the coefficient on *Republican* × *Republican Presidency* is positive and significant, indicating that Republican examiners are more likely to reject green patents during Republican administrations. These results provide further support for political ideology as the driver of the observed partisan difference in green patent review outcomes.

4.2.3. Partisan Divide on Climate Change

Our third heterogeneity analysis examines how the gap in green patent rejection rates between Republican and non-Republican examiners correlates with the extent of partisan divide on climate change. For this purpose, we use data from the American Public Opinion on Global Warming survey conducted by Stanford University's Political Psychology Research Group.[18] Specifically, we use this survey to construct a *Climate Partisan Divide* measure, which is the difference between the percentages of Democratic and Republican survey respondents who answer affirmatively to the following questions about climate change: whether global warming is occurring, and whether, if it is, it is at least partly caused by human activity. In Panel A of Table 5, we estimate a triple-interaction model (*Republican* × *Green* × *Climate Partisan Divide*) using the full sample of patent applications, while in Panel B we estimate a double-interaction model (*Republican* × *Climate Partisan Divide*) using the subsample of only green patent applications. Panel A shows that the

[18] See the survey at https://climatepublicopinion.stanford.edu/partisan-views.

coefficient on *Republican* × *Green* × *Climate Partisan Divide* is positive in both columns (1) and (2) and statistically significant in column (1). Panel B shows that the coefficient on *Republican* × *Climate Partisan Divide* is positive and significant in both columns. These results suggest that the higher rejection rate associated with Republican examiners in evaluating green patent applications becomes even more pronounced during periods when the partisan divide over climate change is more acute. Economically, based on column (1) of Panel A in Table 5, a one–standard deviation increase in *Climate Partisan Divide* leads to a 0.56% (= 0.135 × 4.132) increase in the rejection rate gap between Republican and other examiners, which represents 27.6% of the average rejection rate difference.

4.3. The Quality of Green Patents Approved by Partisan Examiners

The results in the previous section support the ideological difference explanation for our findings. There are two potential mechanisms through which this ideology difference may drive Republican examiners' higher rejection rates for green patents. The first mechanism operates through "ideological discounting", where Republican examiners discount the value of green innovation overall. This preference is analogous to beliefs-based discrimination in labor economics and leads to Republican examiners rejecting green patent applications for reasons independent of their underlying quality. Under this mechanism, green patents approved by Republican examiners should exhibit no significant difference in quality compared to those approved by non-Republican examiners. Alternatively, under a "differential standards" mechanism, Republican examiners apply stricter evaluation criteria to individual green patent applications and require green patents to have higher quality. Under this mechanism, green patents approved by Republican examiners should exhibit higher quality than those approved by non-Republican examiners.

To distinguish between these two mechanisms, we examine the difference in scientific and economic value between patents approved by Republican examiners and those approved by non-Republican examiners. First, we follow the literature and measure patent scientific value using patent citations (e.g., Hall, Jaffe, and Trajtenberg, 2001). In Table 6, columns (1)–(3) present the regression results of patent scientific value for the sample of approved patents. We find that green patents, on average, exhibit higher scientific value than non-green patents, as reflected in their higher citation counts. More relevant to our purpose, we find that the coefficient on *Republican* × *Green* is statistically insignificant, suggesting no significant differences in scientific value of green patents approved by Republican versus non-Republican examiners.

In columns (4)–(6), we further examine the economic value of approved patents based on the KPSS patent value measure (Kogan, Papanikolaou, Seru, and Stoffman, 2017). Because this measure is based on stock returns, our analysis is limited to patents filed by publicly traded firms only. In column (4), we find that in contrast to the evidence on scientific value, green patents, on average, are of lower economic value than non-green patents. But similar to columns (2)-(3), the coefficient on *Republican* × *Green* is statistically insignificant in columns (5) and (6), indicating no significant difference in the economic value of green patents approved by Republican versus non-Republican examiners. Collectively, these findings support the mechanism of beliefs-based ideological discounting rather than differential standards. In other words, the disparity in approval rates of green patents between Republican and non-Republican examiners appears to reflect their underlying ideological preferences for which types of innovation deserve protection.

5. Further Analysis: Rejection Patterns and Implications

In this section, we analyze the patent examination process in greater depth to further understand the source of the partisan gap in green patent rejections and its effects on inventors' and firms' green innovation incentives.

5.1. First Action Approvals and Inventor Amendments

For each patent application, the assigned examiner issues a first-action decision after the initial round of review. The first-action decision can be either an outright approval (occurring in approximately 13% of the cases) or a non-final rejection. In the latter case, inventors may choose to file amendments to the original patent application to address the examiner's concerns. We examine whether Republican examiners' higher rejection rates for green patents stem from granting fewer first-action approvals or issuing tougher or potentially ideology-driven rejections that are more difficult for inventors to address through amendments.

We first test whether examiners' party affiliations affect the likelihood of green patent applications receiving a first action allowance. Following Gu et al. (2025), we use the event codes and transaction data from PatEx to construct an application-level binary variable, *First Action Approval*, which equals 100 if the application is approved in the examiner's first action, and zero otherwise. Panel A of Table 7 presents the regression results of first action approval, in which the coefficient on *Republican* × *Green* is statistically insignificant, indicating that Republican examiners' higher rejection rates for green patents cannot be attributed to a lower first action approval rate. This finding is in line with the institutional structure of first-action reviews. Specifically, these early decisions are guided by standardized search procedures and checklists under close supervisory oversight, leaving limited room for ideological discretion (USPTO *Manual of Patent Examining Procedure*). In addition, because all examiners are trained to apply broad initial scrutiny to ensure completeness, first-action rejections are common across examiners,

and applicants generally anticipate these outcomes and routinely respond through amendments (Tabakovic and Wollmann, 2024). Furthermore, the USPTO's performance metrics reward completing a first action regardless of its outcome (Marco et al., 2017). Hence, first-action outcomes reflect procedural uniformity rather than examiner ideology, and partisan differences emerge primarily in later stages when interpretive discretion plays a more important role.

Next, we analyze inventors' amendment decisions following initial rejections. We define *Inventor Amendment* as a binary variable equal to 100 if inventors file an amendment after receiving first-action rejections, and zero otherwise. Panel B of Table 7 presents the regression results for amendment likelihood using the sample of patent applications that are rejected in the first action. The significantly negative coefficient on *Republican* × *Green* indicates that inventors are substantially less likely to amend green patent applications following rejections by Republican examiners relative to non-Republican examiners. Economically, the coefficient in column (2) of Panel B in Table 7 suggests that Republican examiner rejections are associated with a 1.15 percentage points lower likelihood of an amendment filed by inventors, which accounts for 10% of the unconditional probability of abandonment. Taken together, the results in Table 7 indicate that Republican examiners do not exhibit higher initial rejection rates for green patents, but inventors are significantly less likely to file amendments following rejections by Republican examiners.

5.2. Rejection Reasons

To better understand why green patent applicants are less likely to pursue amendments following rejections by Republican examiners, we investigate the reasons that examiners use to reject patent applications. The four most common grounds for rejection are: lack of patentable subject matter (Section 101 of the U.S. Patent Act), lack of novelty (Section 102), obviousness

(Section 103), and insufficient disclosure (Section 112). Among all the reasons, a Section 101 rejection is generally considered the most difficult to address and overcome because it is based on a subjective, high-level determination of whether an invention involves abstract ideas, laws of nature, or natural phenomena. The lack of clear legal standards allows for greater examiner discretion and variation in judgement. In contrast, rejections under Sections 102 and 103 rely on factual prior-art comparisons, while Section 112 rejections, though involving some interpretive discretion, are typically easier to amend and resolve.

Overcoming a Section 101 rejection is highly challenging, because it often requires applicants to fundamentally redefine an invention's scope and practical application rather than making incremental claim amendments. Consistent with this view, Patent Trial and Appeal Board (PTAB) appeal statistics show that Section 101 rejections have the lowest reversal rates, which are substantially below those for Sections 102, 103, and 112 (Pool, 2018).[20] These statistics indicate that applicants rarely succeed in challenging examiners' eligibility determinations. Therefore, examiners' use of Section 101 rejections offers a useful setting to assess whether examiner partisanship affects not only the rejection rates, but also the legal grounds for rejection.

Table 8 presents the regression results where the dependent variable is a binary variable equal to 100 if a patent application is rejected under Section 101. In columns (1)–(3), our sample includes all applications that are not first-action approved, while in columns (4)–(6), we further narrow the sample to applications that are ultimately rejected or abandoned. Columns (1) and (4) indicate that, on average, green patents are no more likely than other patents to be rejected under Section 101. However, the results in columns (2)–(3) and (5)–(6) show that the coefficient on *Republican* ×

[20] Specifically, the PTAB reversal rates are roughly 24.7% for Section 101, 50.5% for Section 102, 40.5% for Section 103, and 49.5–60.9% for Section 112, indicating that Section 101 rejections are far less likely to be overturned on appeal than other rejection types.

Green is consistently positive and statistically significant in all specifications, suggesting that Republican examiners are significantly more likely than their non-Republican counterparts to issue Section 101 rejections when reviewing green patents. Economically, green patent applications reviewed by Republican examiners are 1.113 percentage points more likely to receive a Section 101 rejection according to column (2) of Table 8, representing a 7.6% increase relative to the mean. In robust analyses, we also examine whether the use of other rejection reasons differs between Republican and non-Republican examiners in green patent applications, but find no significant differences.

It is worth noting that the results in Table 8 suggest that the higher tendency to use Section 101 as ground to reject a patent application is limited to Republican examiners evaluating green patents only. Specifically, the coefficient on *Green* is negative and occasionally significant, indicating that non-Republican examiners are slightly less likely to use Section 101 to reject green patents compared to other patents. The coefficient on *Republican* is also negative and sometimes significant, indicating that for non-green patents, Republican examiners are moderately less likely to use Section 101 as a rejection reason compared to other examiners. These findings help rule out the possibilities that green patents are more likely to be rejected for Section 101 reasons than other patents or Republican examiners are more likely to reject all patent applications, not just green ones, based on Section 101 reasons.

Overall, our results support the view that ideologically driven skepticism toward green technologies among Republican examiners manifests through Section 101 rejections. Given the greater ambiguity and subjectivity associated with Section 101 relative to other statutory grounds, this pathway may be especially susceptible to ideological influences. Our findings suggest that

partisan beliefs affect not only the likelihood of rejection, but also the statutory mechanisms through which green innovations are blocked.

5.3. Examiner Partisanship and Incentives for Future Green Innovation

Given that Republican examiners' rejections are followed by a lower probability of green patent applicants submitting amendments for reconsideration, we further examine whether such rejections also reduce future green patent applications from the inventors and firms. To explore this idea, we construct two samples—an inventor-level sample and a firm-level sample—to assess whether inventors or firms' future green patent applications are influenced by the rejections of their most recent green patent applications, particularly when those rejections are issued by Republican examiners.

From an inventor's perspective, the rejection of a green patent application can be discouraging and may dampen her incentives to pursue further innovation in the same or closely related fields. At the firm level, rejections may likewise reduce managers' willingness to allocate resources to environmentally oriented R&D. However, it is not clear ex ante whether the rejection's effect should be related to the examiner's political ideology. On the one hand, while our findings show that Republican examiners are more likely to reject green patent applications relative to their non-Republican counterparts, their rejections need not disproportionately discourage inventors' future innovations so long as their feedback and requested changes are objective, fair, and constructive, helping inventors refine and strengthen their applications. On the other hand, if Republican examiners' rejections are unreasonable, unconstructive, or influenced by personal prejudice toward climate-change-related technologies, then inventors may perceive the USPTO as unpredictable or

unsupportive of environmental innovations.[21] These perceptions may spread through professional networks, amplifying the discouragement effect beyond individual inventors. As such, these rejections could have a more detrimental effect on inventors' willingness to continue innovating in this field.[22]

Given the ambiguity, we put this question to empirical tests. For our inventor-level analysis, we construct a sample at the inventor-by-application level, where we include all inventors listed on each application. The dependent variable is the number of green patent applications filed by an inventor within the next three and five years following the current green patent application (*#Green App - 3 Years* and *#Green App - 5 Years*), respectively. For key independent variables, we first create a dummy variable to indicate whether an inventor has a green patent application rejected in a year (*Rejection*), and we then create an interaction term between *Rejection* and whether the rejected green patent is reviewed by a Republican examiner (*Republican*). In addition to the controls included in the previous regressions, we add inventor fixed effects to the regression model.

Table 9 presents the regression results. First, we find that *Rejection* has a significant and negative coefficient, indicating that receiving a rejection on a green patent application tends to discourage inventors from pursuing more green innovations in the future. More importantly, we find that the coefficient on *Rejection* × *Republican* is negative and significant across all four columns, indicating that ideologically driven rejections by Republican examiners have an even stronger dampening effect on inventors' incentives to invest further efforts in developing green technologies. Column (1) of Table 9 shows that, for inventors who file green patents, receiving a

[21] Because patent applicants cannot observe the broader distribution of examiner ideologies, even isolated negative experiences can foster perceptions of unfairness, reducing their confidence in the system and willingness to pursue future filings.

[22] Even if some firms may attempt to recycle rejected green patents by refiling modified applications, this process can be costly and may result in the loss of the original priority date, which reduces the likelihood of eventual approval and diminishes patent value.

rejection for the current application is associated with a 7.4% decrease in green patent filings over the subsequent three years. Moreover, a Republican examiner's rejection results in an additional 6.7% decline in future green patent filings over the same period. In the aggregate, a Republican-handled rejection leads to a 14.1% reduction in green patent filings over the following three years on average.

Next, we examine the impact of rejected green patent applications by Republican examiners on firms' future green innovations using a sample of U.S. public firms. Since firms often invest in multiple innovation areas and file multiple green and non-green patent applications each year with potentially varying outcomes, we aggregate all applications to the firm-year level. The dependent variable in our analysis is the number of green patent applications filed by a firm in the next three or five years (*#Green App - 3 Years* and *#Green App - 5 Years*), respectively. We then construct a variable computed as the difference between a firm's average rejection rate for green patent applications and its average rejection rate across all patent applications in each year (*Rejection Diff*). We then interact *Rejection Diff* with the fraction of rejected green patent applications processed by Republican examiners (*Frac Republican*).

Table 10 presents the regression results. In columns (1) and (3), we focus on *Rejection Diff* as the main independent variable. We find that it has a significant and negative coefficient in both columns. This result provides validation for the construct of *Rejection Diff* and suggests that firms tend to move away from future green innovations if their past green patent applications are rejected at a higher rate than their other patent applications. In columns (2) and (4), we focus on the interaction term *Rejection Diff* × *Frac Republican* as the key independent variable. We find that it has a negative and significant coefficient in both columns, suggesting that recent green patent rejections have a more discouraging effect on firms' future green innovation incentives when they

are issued by Republican examiners compared to non-Republican examiners. In terms of economic impact, for firms at the 90th percentile of the *Rejection Diff* distribution (0.1238), if all of their green patent rejections were issued by Republican examiners, they would experience a 7.68-percentage-point decrease in green patent filings over the following three years.[23] Overall, our analyses in this section demonstrate that the role of political ideology in the patent review process can have a long-lasting impact on inventors' and firms' incentives to innovate in green technologies and thus have the potential to alter the trajectory of technological development in these fields.

6. Conclusion

We examine whether political ideology can distort the evolution of science and technological development in the era of rising political polarization. Specifically, we document systematic differences in the examination of environmental technologies that reflect examiners' underlying ideological preferences. Using a large sample of patent applications filed with the USPTO, we find that Republican examiners, compared to their non-Republican counterparts, are significantly more likely to reject green patent applications. This partisan difference is particularly pronounced for technologies more explicitly aimed at addressing climate change and during Republican administrations and periods of heightened political polarization over climate issues. Further analyses reveal that applicants of green patents are less likely to pursue amendments following rejections by Republican examiners and are subsequently less likely to file new green patent applications, suggesting that ideology-driven rejections impeded follow-on green innovation.

Our findings suggest that examiners' ideological orientations can influence the patent review process, particularly in politically sensitive areas such as environmental innovation. In doing so,

[23] The economic magnitude of −7.68% is computed as -0.1238 × 0.582 × 1 − 0.1238 × 0.038.

we add to the growing literature on the role of political ideology in economic decision-making by extending it to patent examiners, an often-overlooked group, and by showing how their decisions may shape the trajectory of environmental innovation.

Although our analysis centers on green innovation in the U.S., the findings more broadly highlight how differences in evaluators' political ideology can shape innovation outcomes and incentives. Our study calls for institutional oversight and greater transparency in the patent review process to ensure that technologies in politically salient domains are evaluated on a consistent and politically neutral basis.

References

Acemoglu, D., Akcigit, U., Hanley, D., and Kerr, W., 2016. Transition to clean technology. *Journal of Political Economy* 124, 52-104.

Aghion P., Hemous D., and Veugelers, R., 2009. No green growth without innovation. *Bruegel Policy Brief* 353.

Aneja, A., Reshef, O., and Subramani, G., 2025. Attrition and the gender patenting gap. *Review of Economics and Statistics*, forthcoming.

Bakke, T.-E., Mahmudi, H., Virani, A., and Zhang, S., 2025. Politicization of the supreme court and firm value: Evidence from Ruth Bader Ginsburg's death. Working paper.

Baldauf, M., Garlappi, L., and Yannelis, C., 2020. Does climate change affect real estate prices? Only if you believe in it. *Review of Financial Studies* 33, 1256-1295.

Beebe, B., 2008. Does judicial ideology affect copyright fair use outcomes? Evidence from the fair use case law. *Columbia Journal of Law and Arts* 31, 101-111.

Becker, G. S., 1957. The economics of discrimination. University of Chicago Press.

Bolton, P, Kacperczyk, M., and Wiedemann, M., 2023. The CO2 question: Technical progress and the climate crisis. Working Paper.

Cheng, Q., Lin, A., and Yang, M., 2024, Green innovation and firms' financial and environmental performance: The roles of pollution prevention versus control. *Journal of Accounting and Economics* 79, 101706.

Chu, Y., Liu, A., and Tian, X., 2021, Environmental risk and green innovation: Evidence from evacuation spills. Working Paper.

Cockburn, I.M., Kortum, S.S., and Stern, S., 2022. Are all patent examiners equal? The impact of examiner characteristics. NBER working paper No. w8980.

Cohen, L., Gurun, U.G., and Li, D., 2023. Internal deadlines, drug approvals, and safety problems. *American Economic Review: Insights* 3, 67-82.

Cohen, L., Gurun, U., and Nguyen, Q., 2024. The ESG-innovation disconnect: Evidence from green patenting. NBER Working Paper.

Cuny, C., Mehta, M.N., and Zhao, W., 2025. Limits to political capture: Evidence from patent grants, disclosures, and litigation. *Journal of Accounting Research* 2025, forthcoming.

Dai, R., Duan, R., Ng, L., 2025, Innovating green: Competition meets regulation. *Management Science*, forthcoming.

Dunlap, R.E., McCright, A.M., and Yarosh, J.H., 2016. The political divide on climate change: Partisan polarization widens in the U.S. *Environment: Science and Policy for Sustainable Development* 58, 4-23.

Engelberg J., Henriksson, M., Manela, A., and Williams, J., 2023. The partisanship of financial regulators. *Review of Financial Studies* 36, 4373-4416.

Farre-Mensa, J., Hegde, D., and Ljungqvist, A., 2020. What is a patent worth? Evidence from the U.S. patent 'lottery'. *Journal of Finance* 75, 639-682.

Fos, V., Kempf, E., and Tsoutsoura, M., 2025. The political polarization of corporate America. NBER working paper No. w30183.

Frakes, M.D. and Wasserman, M.F., 2017. Is the time allocated to review patent applications inducing examiners to grant invalid patents? Evidence from microlevel application data. *Review of Economic and Statistics* 99, 550-563.

Frakes, M.D. and Wasserman, M.F., 2023. Investing in ex ante regulation: Evidence from pharmaceutical patent examination. *American Economic Journal: Economic Policy* 15, 151-183.

Gormley, T.A., Kaviani, M., and Maleki, H.I., 2025. When do judges throw the book at companies? The influence of partisanship in corporate prosecutions. *Review of Financial Studies*, forthcoming.

Gu, Y., Lewellen, K., Mao, C., and Qin, Y., 2025. To grant or not to grant: Inventor gender and patent examination outcomes. Working paper.

Hall, B.H., Jaffe, A.B., and Trajtenberg, M., 2001. The NBER patent and citation data file: Lessons, insights and methodological tools. NBER working paper No. w8498.

Haščič, I. and Migotto, M., 2015. Measuring environmental innovation using patent data. OECD environment working paper No. 89.

Hege, U., Pouget, S., and Zhang, Y., 2024. Climate patents and financial markets. ECGI working paper No. 961/2024.

Kogan, L., Papanikolaou, D., Seru, A., and Stoffman, N., 2017. Technological innovation, resource allocation and growth. *Quarterly Journal of Economics* 132, 665-712.

Leiserowitz, A., Maibach, E., Rosenthal, S., Kotcher, J., Goddard, E., Carman, J., Ballew, M., Verner, M., Myers, T., Marlon, J., Lee, S., Goldberg, M., Badullovich, N., and Thier, K., 2024. Climate Change in the American Mind: Politics & Policy, Spring 2024. Yale University and George Mason University.

Lemley, M.A. and Moore, K.A., 2004. Ending abuse of patent continuations. *Boston University Law Review* 82, 63-118.

Lemley, M.A. and Sampat, B., 2012. Examiner characteristics and patent office outcomes. *Review of Economics and Statistics* 94, 817-827.

Marco A.C., Toole, A., Miller, R., and Frumkin, J., 2017. USPTO patent prosecution and examiner performance appraisal. USPTO Economic Working Paper.

Merges, R., 2001. As many as six impossible patents before breakfast: Property rights for business concepts and patent system reform. *Berkeley Technology Law Journal* 14, 577-615.

Pandey, V., Shen, X., and Wu, J.S., 2025. Partisan regulatory actions: Evidence from the SEC. *Journal of Accounting and Economics*, forthcoming.

Pool, R., 2018. Should you appeal? A look at success rates before the PTAB on an individual rejection basis. *Journal of Patent and Trademark Office Society* 100, 320-331.

Raffiee, J., Teodoridis, F., and Fehder, D., 2023. Partisan patent examiners? Exploring the link between the political ideology of patent examiners and patent office outcomes. *Research Policy* 52, 104583.

Sag, M., Jacobi, T., and Sytch, M., 2009. Ideology and exceptionalism in intellectual property: An empirical study. *California Law Review* 97, 801-856.

Shu, T., Tian, X., and Zhan, X., 2022. Patent quality, firm value, and investor underreaction: Evidence from patent examiner busyness. *Journal of Financial Economics* 143, 1043-1069.

Spenkuch, J.L., Teso, E., Xu, G., 2023. Ideology and performance in publican organization. *Econometrica* 91, 1171-1203.

Tabakovic, H. and Wollmann, T.G., 2024. From revolving doors to regulatory capture? Evidence from patent examiners. NBER Working Paper.

Tu, S.S., 2021, Patenting fast and slow: Examiner rejections and applicant traversals to non-prior art rejections. *Michigan State Law Review* 411, 1-57.

Table 1: Summary Statistics

This table presents the summary statistics of all variables used in our analysis. Our sample includes 5,259,923 patent applications filed between 2001 and 2023. The definitions of all variables are in Appendix A.

	N	Mean	P50	SD
Application-Level Variables				
Republican	5,259,923	0.208	0.000	0.406
Democratic	5,259,923	0.556	1.000	0.497
Other Party	5,259,923	0.237	0.000	0.425
Rejection (%)	5,259,923	26.020	0.000	43.875
Green	5,259,923	0.095	0.000	0.293
PhD Degree	5,259,923	0.112	0.000	0.315
Age	5,259,923	41.478	40.000	11.059
Female	5,259,923	0.264	0.000	0.441
Leniency	5,259,923	0.699	0.735	0.195
Tenure	5,259,923	13.598	12.000	7.723
Number of Inventors	5,259,923	2.754	2.000	1.977
Patent-Level Variables				
Citations	3,891,261	1.358	0.532	2.446
Patent Value – Real (in millions)	1,313,720	11.914	4.045	21.595
Climate Partisan Divide	4,488,029	24.045	25.000	4.132
Inventor-Level Variables				
#Green App - 3 Years (Inventor Level)	1,103,536	4.127	1.000	9.604
#Green App - 5 Years (Inventor Level)	1,103,536	5.645	2.000	13.382
Firm-Level Variables				
#Green App - 3 Years (Firm Level)	12,128	23.015	5.000	95.818
#Green App - 5 Years (Firm Level)	12,128	36.621	7.000	154.430
Rejection Difference	12,128	-0.010	0.000	0.190
Frac Republican	12,128	0.053	0.000	0.197
Size (in $millions)	12,128	47,279.613	6,143.987	98,161.115
Market-to-Book	12,128	2.357	1.791	1.793
ROA	12,128	0.001	0.069	0.258
Leverage	12,128	0.221	0.210	0.173
R&D/Sales	12,128	0.742	0.057	3.564
Rejection Reason Variables				
Section 101	3,278,073	14.737	0.000	35.448
Section 102	3,278,073	58.060	100.000	49.346
Section 103	3,278,073	76.798	100.000	42.212
Section 112	3,278,073	44.525	0.000	49.699
Office-Action Level Variables				
First Action Approval (%)	5,177,299	13.024	0.000	33.657
Inventor Amendment (%)	4,502,999	88.486	100.000	31.919

Table 2: The Effect of Examiner Partisanship on Green Patent Rejection Rates

The table presents the regression results at the patent application level, where the final approval decision is regressed on the interaction between the patent examiner's party affiliation and the green patent indicator. The dependent variable *Rejection* equals 100 if an application is rejected and zero otherwise. *Republican* (*Democratic*) is a dummy variable equal to one if the examiner is identified as Republican (Democratic) by voter registration, and zero otherwise. *Green* is a dummy variable equal to one if the application is classified as green technology based on the OECD definition and zero otherwise. Examiner-level controls include age, PhD attainment, gender, tenure, and examiner leniency. Patent-level controls include the number of inventors listed on the application. The definitions of all variables are in Appendix A. Fixed effects specifications are detailed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*Rejection*			
	(1)	(2)	(3)	(4)
Republican × Green			1.935***	2.023***
			[0.465]	[0.437]
Democratic × Green			-0.333	-0.282
			[0.324]	[0.307]
Green	-0.246*	-0.412***	-0.439*	-0.656***
	[0.134]	[0.125]	[0.265]	[0.247]
Republican	-0.108	-0.142	-0.276	-0.319
	[0.197]	[0.195]	[0.202]	[0.199]
Democratic	0.171	0.157	0.204	0.183
	[0.158]	[0.154]	[0.162]	[0.158]
Age	-0.019**	-0.023***	-0.019**	-0.023***
	[0.008]	[0.008]	[0.008]	[0.008]
PhD Degree	0.287	0.261	0.282	0.255
	[0.284]	[0.277]	[0.284]	[0.277]
Female	1.200***	1.154***	1.197***	1.152***
	[0.160]	[0.157]	[0.160]	[0.157]
Tenure	-0.093***	-0.075***	-0.093***	-0.075***
	[0.012]	[0.012]	[0.012]	[0.012]
Leniency	-65.381***	-64.088***	-65.360***	-64.062***
	[0.585]	[0.611]	[0.585]	[0.610]
Number of Inventors	-1.068***	-1.081***	-1.068***	-1.081***
	[0.020]	[0.018]	[0.020]	[0.018]
Art Unit FEs	Yes		Yes	
Filing Year FEs	Yes		Yes	
Art Unit × Filing Year FEs		Yes		Yes
R-squared	0.152	0.165	0.152	0.165
Observations	5,259,923	5,259,614	5,259,923	5,259,614

Table 3: Climate Change versus Non-Climate Change Patent Applications

The table presents the patent application-level regression results examining how the partisan difference in the approval of green patents changes according to the nature of green patents—specifically climate change-related versus other types (mainly pollution-related). Columns (1) and (2) compare climate change-related green patent applications with non-green patent applications. Columns (3) and (4) compare non-climate-change-related green patent applications with non-green patent applications. *Republican* is a dummy variable equal to one if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy equal to one if the application is classified as green technology according to the OECD definition and zero otherwise. Green patents refer to climate-related green patents in columns (1) and (2) and to non-climate-related green patents in columns (3) and (4). Examiner-level controls include age, PhD attainment, gender, tenure, and examiner leniency. Patent-level controls include the number of inventors listed on the application. The definitions of all variables are in Appendix A. Fixed effects specifications are listed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*Rejection*			
	Climate Green Patents vs. Non-Green Patents		Non-Climate Green Patents vs. Non-Green Patents	
	(1)	(2)	(3)	(4)
Republican × *Green*	2.340***	2.404***	0.621	0.579
	[0.429]	[0.397]	[0.817]	[0.809]
Green	-0.791***	-1.013***	0.348	0.497
	[0.145]	[0.134]	[0.372]	[0.344]
Republican	-0.417**	-0.446***	-0.396**	-0.422***
	[0.166]	[0.164]	[0.165]	[0.164]
Controls	Yes	Yes	Yes	Yes
Art Unit FEs	Yes		Yes	
Filing Year FEs	Yes		Yes	
Art Unit × Filing Year FEs		Yes		Yes
R-squared	0.152	0.165	0.154	0.167
Observations	5,202,289	5,201,985	4,817,004	4,816,692

Table 4: Republican Presidency and Examiner Partisanship Effects

This table presents the regression results examining how the partisan difference in the approval of green patents changes according to the party of the sitting president. *Republican Presidency* is a dummy variable equal to one if the patent filing year falls between 2001–2008 or 2017–2020 and zero otherwise. Panel A includes all patent applications. Panel B restricts the sample to green patent applications only. The dependent variable, *Rejection*, equals 100 if the application is rejected and zero otherwise. *Republican* is a dummy variable equal to one if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy variable equal to one if the application is classified as green technology based on the OECD definition and zero otherwise. Examiner-level controls include age, PhD attainment, gender, tenure, and examiner leniency. Patent-level controls include the number of inventors listed on the application. The definitions of all variables are in Appendix A. Fixed effects specifications are listed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: The Full Sample of All Patent Applications

Dependent variable	*Rejection*	
	(1)	(2)
Republican × Green × Republican Presidency	1.590***	1.632***
	[0.497]	[0.457]
Republican × Green	1.357***	1.393***
	[0.436]	[0.405]
Green × Republican Presidency	0.569***	0.408**
	[0.200]	[0.191]
Republican × Republican Presidency	-0.158	-0.282
	[0.225]	[0.197]
Green	-0.961***	-1.060***
	[0.167]	[0.159]
Republican	-0.349*	-0.319*
	[0.188]	[0.181]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.152	0.165
Observations	5,259,923	5,259,614

Panel B: The Subsample of Green Patent Applications

Dependent variable	*Rejection*	
	(1)	(2)
Republican × Republican Presidency	1.514***	1.457***
	[0.488]	[0.453]
Republican	0.648	0.757**
	[0.395]	[0.365]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.131	0.158
Observations	500,524	499,376

Table 5: The Political Divide on Climate Change and Examiner Partisanship Effects

The table presents the patent application-level regression results examining how the partisan difference in the approval of green patents changes as according to the partisan divide in public opinion over climate change increases over time. *Climate Partisan Divide* is partisan divide in public sentiment over climate change, defined as the average partisan gap (in percentage points) in response to two beliefs: whether global warming is occurring, and whether, if it is, it is at least partly caused by human activity, based on the American Public Opinion on Global Warming survey conducted by Stanford University. Panel A includes all patent applications filed between 2006 and 2023, with 2006 as the starting year because it marks the beginning of consistent data collection by the Stanford Survey. Panel B restricts the sample to green patent applications only. The dependent variable, *Rejection*, equals 100 if the application is rejected and zero otherwise. *Republican* is a dummy variable equal to one if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy equal to one if the application is classified as green technology according to the OECD definition and zero otherwise. Examiner-level controls include age, PhD attainment, gender, tenure, and examiner leniency. Patent-level controls include the number of inventors listed on the application. The definitions of all variables are in Appendix A. Fixed effects specifications are detailed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: The Full Sample of All Patent Applications

Dependent variable	*Rejection*	
	(1)	(2)
Republican × *Green* × *Climate Partisan Divide*	0.135*	0.078
	[0.072]	[0.067]
Republican × *Green*	-1.091	0.402
	[1.825]	[1.700]
Green × *Climate Partisan Divide*	0.069**	0.084***
	[0.029]	[0.027]
Republican × *Climate Partisan Divide*	0.011	0.021
	[0.026]	[0.024]
Green	-2.301***	-2.701***
	[0.730]	[0.679]
Republican	-0.624	-0.913
	[0.634]	[0.600]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.152	0.161
Observations	4,488,029	4,487,804

Panel B: The Subsample of Green Patent Applications

Dependent variable	*Rejection*	
	(1)	(2)
Republican × Climate Partisan Divide	0.141***	0.120***
	[0.049]	[0.042]
Republican	-1.755	-1.214
	[1.136]	[0.960]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.131	0.158
Observations	500,524	499,376

Table 6: Examiner Partisanship and the Quality of Approved Green Patents

The table presents the regression results examining the quality differences in patents approved by examiners with different party affiliations. Columns (1) and (2) analyze the citation counts of approved patents using Poisson regressions. Columns (3) and (4) analyze the market value of approved patents, measured by the KPSS patent values from Kogan, Papanikolaou, Seru, and Stoffman (2017), using OLS regressions. *Republican* is a dummy variable equal to one if the patent examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy variable equal to one if the application is classified as green technology according to the OECD definition and zero otherwise. Examiner-level control variables include age, PhD attainment, gender, tenure, and examiner leniency. Patent-level controls include the number of inventors listed on the application. The definitions of all variables are in Appendix A. Fixed effects specifications are listed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variables	*Citations*			*Economic Value*		
	(1)	(2)	(3)	(4)	(5)	(6)
Republican × *Green*		0.026	0.013		0.637	0.588
		[0.018]	[0.017]		[0.414]	[0.373]
Green	0.488***	0.483***	0.488***	-1.214***	-1.336***	-1.109***
	[0.008]	[0.009]	[0.008]	[0.151]	[0.165]	[0.153]
Republican	0.017*	0.013	0.012	-0.009	-0.058	-0.017
	[0.009]	[0.009]	[0.009]	[0.122]	[0.120]	[0.098]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Art Unit FEs	Yes	Yes		Yes	Yes	
Patent Year FEs	Yes	Yes		Yes	Yes	
Art Unit × Grant Year FEs			Yes			Yes
(Pseudo) R-squared	0.046	0.046	0.057	0.138	0.138	0.173
Observations	3,891,261	3,891,261	3,890,764	1,313,720	1,313,720	1,313,291

Table 7: Partisan Differences in First Action Approval and Inventor Amendment

The table presents the patent application-level regression results examining first action decisions by patent examiners and inventor responses following first action rejections. Panel A analyzes first action approval decisions. *First Action Approval* is a binary variable equal to 100 if an application is rejected in the first action by the examiner and zero otherwise. Panel B reports the results on whether inventors choose to file amendments following a first action rejection. *Inventor Amendment* is a binary variable equal to 100 if the inventors file an amendment after a non-final rejection in the first action and zero otherwise. In Panel B, the sample is restricted to applications that were not approved in the first action. *Republican* is a dummy equal to one if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy equal to one if the patent application is classified as green technology according to the OECD definition and zero otherwise. Examiner-level controls include age, PhD attainment, gender, tenure, and examiner leniency. Patent-level controls include the number of inventors listed on the application. The definitions of all variables are in Appendix A. Fixed effects specifications are listed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Examiner Partisanship and First Action Approval

Dependent variable	*First Action Approval*	
	(1)	(2)
Republican × *Green*	0.063	0.033
	[0.563]	[0.544]
Green	-0.112	-0.077
	[0.182]	[0.165]
Republican	0.710**	0.715**
	[0.319]	[0.312]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.079	0.094
Observations	5,177,299	5,176,989

Panel B: Examiner Partisanship and Inventor Amendment

Dependent variable	*Inventor Amendment*	
	(1)	(2)
Republican × Green	-1.156***	-1.145***
	[0.254]	[0.238]
Green	0.300***	0.333***
	[0.096]	[0.092]
Republican	0.042	0.033
	[0.086]	[0.083]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.029	0.042
Observations	4,502,999	4,502,708

Table 8: Examiner Partisanship and Section 101 Rejections

This table presents the regression results examining whether Republican examiners are more likely to reject green patent applications under Section 101 of the Patent Act, which governs subject matter eligibility. Columns (1)–(3) include applications that are not first-action approved. Columns (4)–(6) further restrict the sample to applications that are ultimately rejected. *Section 101 Rejection* is a binary variable equal to 100 if Section 101 is listed as one of the rejection reasons for the application, and zero otherwise. *Republican* is a dummy equal to one if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy equal to one if the patent application is classified as green technology according to the OECD definition and zero otherwise. Examiner-level controls include age, PhD attainment, gender, tenure, and examiner leniency. Patent-level controls include the number of inventors listed on the application. The definitions of all variables are in Appendix A. Fixed effects specifications are listed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*Section 101 Rejection*					
	First Action Rejected Subsample			Final Rejected Subsample		
	(1)	(2)	(3)	(4)	(5)	(6)
Republican × *Green*		1.113***	1.064***		0.817**	0.773*
		[0.372]	[0.357]		[0.414]	[0.402]
Green	-0.161	-0.371***	-0.250*	-0.137	-0.291*	-0.058
	[0.126]	[0.138]	[0.130]	[0.156]	[0.169]	[0.163]
Republican		-0.279	-0.321*		-0.215	-0.172
		[0.208]	[0.195]		[0.254]	[0.247]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Art Unit FEs	Yes	Yes		Yes	Yes	
Filing Year FEs	Yes	Yes		Yes	Yes	
Art Unit × Filing Year FEs			Yes			Yes
R-squared	0.179	0.179	0.199	0.288	0.288	0.313
Observations	3,278,073	3,278,073	3,277,479	906,190	906,190	905,505

Table 9: Examiner Partisanship and the Effect of Green Patent Rejections on Subsequent Green Innovation

The table presents the inventor-level Poisson regression results examining how the rejection of green patent applications affects inventors' future green innovation. The sample includes all green patent applications during our sample period. *#Green App - 3 Years* and *#Green App - 5 Years* are the number of green patent applications filed by an inventor within the next three and five years following the current green patent application. *Rejection* is a dummy variable equal to one if an inventor has a green patent application rejected in a year and zero otherwise. *Republican* is a dummy variable equal to one if the examiner is identified as Republican in the voter registration data and zero otherwise. Examiner-level controls include age, PhD attainment, gender, tenure, and examiner leniency. The definitions of all variables are in Appendix A. Fixed effects specifications are detailed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variables	*#Green App - 3 Years*		*#Green App - 5 Years*	
	(1)	(2)	(3)	(4)
Rejection × *Republican*	-0.067***	-0.018*	-0.069***	-0.019*
	[0.020]	[0.011]	[0.020]	[0.010]
Rejection	-0.074***	-0.072***	-0.073***	-0.073***
	[0.006]	[0.005]	[0.005]	[0.004]
Republican	0.002	0.002	-0.000	0.004
	[0.006]	[0.005]	[0.005]	[0.004]
Controls	Yes	Yes	Yes	Yes
Art Unit FEs	Yes		Yes	
Filing Year FEs	Yes		Yes	
Art Unit × Filing Year FEs		Yes		Yes
Inventor FEs	Yes	Yes	Yes	Yes
Pseudo R-squared	0.652	0.664	0.722	0.731
Observations	1,059,224	1,051,413	1,103,536	1,095,543

Table 10: Examiner Partisanship and the Effect of Green Patent Rejections on Firms' Subsequent Green Innovation

This table presents the firm-year level Poisson regression results examining whether firms' future green innovations are affected by the rejection of their current green patent applications by partisan examiners. *#Green App - 3 Years* and *#Green App - 5 Years* are the number of green patent applications filed by a firm in the next three or five years. *Rejection Diff* is defined as the difference between a firm's rejection rate for green patent applications and its overall patent rejection rate in a given year. *Frac Republican* measures the fraction of rejected green patent applications processed by Republican examiners. If *Frac Republican* is missing, it is set to zero. The definitions of all variables are in Appendix A. Fixed effects specifications are listed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent variables	*#Green App - 3 Years*		*#Green App - 5 Years*	
	(1)	(2)	(3)	(4)
Rejection Diff × Frac Republican		-0.582***		-0.355**
		[0.207]		[0.155]
Rejection Diff	-0.123**	-0.038	-0.120**	-0.056
	[0.054]	[0.058]	[0.052]	[0.054]
Frac Republican		-0.060		-0.079
		[0.066]		[0.060]
Size	0.097	0.098	0.042	0.043
	[0.092]	[0.093]	[0.090]	[0.091]
Market-to-Book	0.018	0.018	0.014	0.013
	[0.016]	[0.016]	[0.013]	[0.013]
ROA	0.002	0.005	-0.084	-0.080
	[0.139]	[0.139]	[0.090]	[0.090]
Leverage	0.083	0.081	0.066	0.064
	[0.206]	[0.207]	[0.190]	[0.191]
R&D/Sales	-0.001	-0.001	-0.003	-0.003
	[0.004]	[0.004]	[0.004]	[0.004]
Year FEs	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Pseudo R-squared	0.901	0.901	0.929	0.930
Observations	11,992	11,992	12,128	12,128

Appendix A: Variable Definitions

Variable	Definition
Rejection	Binary variable equal to 100 if the patent application is abandoned and zero otherwise.
Green	Dummy variable equal to one if the patent application is classified as a green patent under the OECD definition and zero otherwise.
Republican	Dummy variable equal to one if the patent examiner is affiliated with the Republican Party, based on the L2 data, and zero otherwise. This variable is time-invariant.
Democratic	Dummy variable equal to one if the patent examiner is affiliated with the Democratic Party, based on the L2 data, and zero otherwise. This variable is time-invariant.
Other Party	Dummy variable equal to one if the patent examiner is affiliated with neither the Republican Party nor the Democratic Party, based on the L2 data, and zero otherwise. This variable is not time-varying.
Age	The age of the patent examiner, based on L2 data.
PhD Degree	Dummy variable equal to one if the patent examiner holds a PhD degree, based on OPM data and zero otherwise.
Female	Dummy variable equal to one if the patent examiner is female, based on L2 data and zero otherwise.
Tenure	The number of years between the first patent application processed by the examiner and the filing year of the current application.
Leniency	The historical cumulative patent approval rate of the examiner, calculated from the first application processed up to one year prior to the filing year of the current application.
Number of Inventors	The number of inventors listed in the patent application.
Citations	The number of citations for the granted patent as of 2024.
Economic Value	The KPSS patent value data, based on Kogan, Papanikolaou, Seru, and Stoffman (2017).
First Action Approval	Binary variable equal to 100 if the patent application is approved in the first action by the patent examiner and zero otherwise. This is based on the event codes of each patent application. The first of these actions—CTNF (non-final rejection), N/= (notice of allowance), and CTFR (final rejection)—are classified as the first action.
Inventor Amendment	Binary variable equal to 100 if the inventor files an amendment (Coded as "A…") after the first non-final rejection and zero otherwise.
Climate Partisan Divide	The partisan divide in public sentiment over climate change, defined as the average partisan gap, in percentage points, on two beliefs: whether global warming is occurring, and whether, if it is, it is at least partly caused by human activity, based on the American Public Opinion on Global Warming survey conducted

	by Stanford University: https://climatepublicopinion.stanford.edu/partisan-views
Section 101 Rejection	Binary variable equal to 100 if Section 101 is listed as one of the rejection reasons for the application, and zero otherwise
#Green App 1-3 year	Green patent applications filed by the inventors (Table 9) or the firm (Table 10) in the three years following the current patent application.
#Green App 1-5 year	Green patent applications filed by the inventors (Table 9) or the firm (Table 10) in the five years following the current patent application.
Rejection Diff	The difference in rejection rates between green patent applications and all patent applications for the firm-year.
Frac Republican	The fraction of rejected green patent applications processed by Republican examiners in the firm-year.
Republican Presidency	Dummy variable equal to one if the patent filing year falls between 2001–2008 or 2017–2020 and zero otherwise.
Size	Natural logarithm of book value of total assets
Market-to-Book	Market value of total assets over book value of total assets
ROA	EBIT over book value of total assets
Leverage	Total debt over total assets
R&D/Sales	R&D expenses over sales

Appendix B: Supplemental Sample Construction Details

Since the PatEx data only contains examiner names, which are insufficient for accurate matching, we supplement this information with data from the OPM and USPTO telework records, which provide additional granular details on examiner location and age. The OPM data covers nearly all federal employees (excluding only a few specialized agencies). We specifically identify patent examiners by filtering for agency code CM56 (USPTO examiners). The OPM records serve as our primary source of examiner demographic and geographic information.

We conduct the matching process in multiple steps, following the methodologies of Spenkuch, Teso, and Xu (2023), which match federal employees based on name, duty station, and age range. An important difference from Spenkuch, Teso, and Xu (2023) is that our OPM data for the later sample does not provide age ranges due to privacy concerns. We address this issue by estimating federal employees' birth years. Specifically, for our later OPM sample, we merge the FOIA OPM data with the earlier 1973–2017 OPM data, which contains age information reported in ranges. Since age is reported in ranges, we estimate each examiner's birth year using the midpoint of the reported age range and the year of each application filing. Since the estimated birth year for each patent examiner may vary across years, we compute both the average and median estimated birth year for each examiner across all years. For examiners not matched in the earlier OPM dataset, we manually search for their information on LinkedIn and infer birth years by subtracting 18.5 from their college starting year.

Our approach begins with the strictest matching criteria and gradually relaxes them. Neither the PatEx nor the OPM dataset provides separate fields for first, middle, and last names; instead, they contain only full names. To extract name components for PatEx patent examiners, we assume the first word represents the last name, the last word represents the first name, and any intervening words represent middle names. From the OPM data, we obtain each examiner's full name, estimated age, and county-level duty station.

For the L2 database, we use formatted data from 2014 to 2023, covering all 50 states and Washington, D.C. Since L2 collected multiple waves of data at different times, we aggregate them into a single dataset per year before matching.

The matching process consists of ten iterative rounds, beginning with the most detailed information (e.g., full name, county, and age) and progressively relaxing requirements (e.g., name and county only). The step-by-step procedure is as follows:

1. First name + middle name + last name + state FIPS + county FIPS + birth year within ±3 years
2. Combined name (first + middle + last, no spaces) + state FIPS + county FIPS + birth year within ±3 years. *This step addresses cases where the initial name parsing may misidentify multi-word last names* (*e.g., "de Angles" may be parsed as last name = "de"*).
3. First name + middle initials + last name + state FIPS + county FIPS + birth year within ±3 years
4. Combined name (first + middle initials + last, no spaces) + state FIPS + county FIPS + birth year within ±3 years
5. First name + middle name + last name + state FIPS + birth year within ±3 years
6. Combined name (first + middle + last, no spaces) + state FIPS + birth year within ±3 years
7. First name + middle initials + last name + state FIPS + birth year within ±3 years
8. Combined name (first + middle initials + last, no spaces) + state FIPS + birth year within ±3 years
9. First name + middle name + last name + state FIPS + county FIPS (used when OPM age is missing)
10. First name + middle initials + last name + state FIPS + county FIPS (used when OPM age is missing)

We refrain from matching solely based on first name, last name, location, and age, as our manual reviews indicate such matches are significantly less accurate.

Matching is performed on a year-by-year basis. For each OPM examiner in a given year, we first attempt to match them to the L2 data from that same year. If no match is found, we sequentially match using the L2 data from one, two, and three years earlier. If the examiner is still unmatched, we repeat the process using the L2 data from one, two, and three years after the OPM year. If a patent examiner remains unmatched within one round, we proceed to the next (less strict) round and repeat this temporal matching procedure.

For Virginia examiners still unmatched after ten rounds, we conduct ten additional matching rounds, restricting to counties outside Virginia but within a 50-mile radius of Alexandria, VA. This follows Fos, Kempf, and Tsoutsoura's (2025) approach. The 50-mile threshold reflects the USPTO Patent Hoteling Program's requirement that eligible teleworking examiners must reside within 50 miles of USPTO headquarters in Alexandria, according to the USPTO telework dataset.

Appendix C: Robustness Checks

The table presents the regression results at the patent application level. The dependent variable *Rejection* equals 100 if the application is rejected and zero otherwise. *Republican* is a dummy variable equal to one if the examiner is identified as Republican by voter registration, and zero otherwise. *Green* is a dummy variable equal to one if the application is classified as green technology based on the OECD definition and zero otherwise. Examiner-level controls include age, PhD attainment, gender, tenure, and examiner leniency. Patent-level controls include the number of inventors listed on the application. The definitions of all variables are in Appendix A. Fixed effects specifications are detailed at the bottom of the table. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Including examiner and year or examiner-by-year fixed effects and examiner-by-assignee fixed effects

Dependent variable	*Rejection*		
	(1)	(2)	(3)
Republican × Green	2.100***	1.431***	1.099***
	[0.409]	[0.354]	[0.313]
Green	-0.560***	-0.562***	-0.958***
	[0.121]	[0.111]	[0.112]
Controls	Yes	Yes	Yes
Examiner FEs	Yes		
Filing Year FEs	Yes		Yes
Examiner × Filing Year FEs		Yes	
Examiner × Assignee FEs			Yes
R-squared	0.167	0.211	0.442
Observations	5,259,886	5,255,995	3,099,589

Panel B: Identifying examiners' political partisanship using their most frequent party affiliations

Dependent variable	*Rejection*	
	(1)	(2)
Republican × Green	1.901***	1.951***
	[0.403]	[0.381]
Green	-0.645***	-0.822***
	[0.141]	[0.130]
Republican	-0.253	-0.298*
	[0.163]	[0.161]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.152	0.165
Observations	5,259,923	5,259,614

Panel C: Identifying examiners' political partisanship using time-varying party affiliations

Dependent variable	*Rejection*	
	(1)	(2)
Republican × Green	1.483***	1.526***
	[0.418]	[0.410]
Green	-0.531***	-0.512***
	[0.151]	[0.149]
Republican	-0.106	-0.122
	[0.170]	[0.169]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.133	0.138
Observations	2,048,995	2,048,898

Panel D: Excluding Virigina-based examiners

Dependent variable	*Rejection*	
	(1)	(2)
Republican × Green	2.352***	2.236***
	[0.590]	[0.545]
Green	-0.785***	-0.895***
	[0.197]	[0.184]
Republican	-0.269	-0.249
	[0.238]	[0.235]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.152	0.168
Observations	2,511,486	2,511,180

Panel E: Splitting the sample into subsamples of green and non-green patent applications

Dependent variable	*Rejection*			
	Green Applications		Non-Green Applications	
	(1)	(2)	(3)	(4)
Republican	1.434***	1.522***	-0.394**	-0.419**
	[0.360]	[0.344]	[0.165]	[0.164]
Controls	Yes	Yes	Yes	Yes
Art Unit FEs	Yes		Yes	
Filing Year FEs	Yes		Yes	
Art Unit × Filing Year FEs		Yes		Yes
R-squared	0.131	0.158	0.154	0.168
Observations	500,524	499,376	4,759,370	4,759,062

Panel F: Restricting the sample to patent applications by U.S. public firms only

Dependent variable	*Rejection*	
	(1)	(2)
Republican × Green	1.715***	1.709***
	[0.367]	[0.340]
Green	-0.691***	-0.855***
	[0.132]	[0.123]
Republican	-0.297**	-0.301***
	[0.122]	[0.116]
Controls	Yes	Yes
Art Unit FEs	Yes	
Filing Year FEs	Yes	
Art Unit × Filing Year FEs		Yes
R-squared	0.122	0.140
Observations	2,522,005	2,521,676