Political Ideology in Patent Examination: Examiner Partisanship and Green Innovation[☆]

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Abstract

We investigate whether U.S. patent examiners' political ideology affects the outcomes of green patent applications and the innovation incentives of inventors and firms. We find that Republican examiners are significantly more likely than non-Republican examiners to reject green patent applications–particularly those addressing climate change challenges and during periods of heightened partisan polarization over climate issues. An examination of the quality of approved green patents indicates that this partisan gap in rejection rates is not explained by Republican examiners applying stricter quality standards in evaluating green patents. Further, rejections by Republican examiners disproportionately discourage inventors and firms from pursuing future green innovation. Our findings suggest that examiners' ideological beliefs, through their influence on the patent review process, can alter innovation incentives of inventors and firms and shape the trajectory of green technology development.

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1. Introduction

The patent system fosters innovation by granting patent owners exclusive rights that protect their technological advancements from imitation and allow them to appropriate the rents from research and development (R&D) activities, thereby enhancing patent owners' competitive advantages (Nordhaus, 1969; Aghion, Howitt, and Prantl, 2015). While such protection incentivizes patent owners to invest in R&D, the process of obtaining patent rights involves inherent risks, particularly due to the discretionary power exercised by individual examiners. The US Patent and Trademark Office (USPTO) administers the patent review process in the US. Once an applicant files a patent application, it is assigned to examiners by subject area. Examiners assess novelty, non-obviousness, and utility by reviewing prior art and claims. The process typically involves multiple rounds of revisions or rejections before a final decision.

Although the examination process is guided by formal criteria, recent research documents significant discretion in examiners' patent evaluation practices. For example, several studies show that examiners' patent approval decisions are influenced by their technical expertise, experience, workload, and individual judgement, which lead to inconsistent and subjective outcomes (e.g., Frakes and Wasserman, 2017; Cockburn, Kortum, and Stern, 2022; Shu, Tian, and Zhan, 2022; Raffiee, Teodoridis, and Fehder, 2023). While these studies enhance our understanding of how institutional and professional characteristics affect patent examination outcomes, they largely overlook the role of examiners' partisan beliefs, an expression of their underlying political ideology.

This paper investigates whether and how patent examiners' ideological preferences affect the outcome of environmentally beneficial patent (green patent) applications, thereby shaping the trajectory of green technology advancement and the incentives of inventors and firms to invest in

the development of such technologies. The context of green innovation offers a compelling setting for our empirical inquiry, as the sharp partisan divide over environmental issues (Dunlap, McCright, and Yarosh, 2016; Baldauf, Garlappi, and Yannelis, 2020) provides a theoretically meaningful backdrop for ideological biases to manifest. Moreover, the quasi-random assignment of patent applications to examiners strengthens causal identification by mitigating selection bias.

Previous studies show that political ideology is a pervasive force shaping economic behavior, with individuals' partisan beliefs leading to systematic differences in decision-making. For example, economic agents such as investors, households, and entrepreneurs interpret economic signals in ways that reflect their underlying ideological beliefs (Cookson, Engelberg, and Mullins, 2020; Meeuwis et al., 2022; Engelberg et al., 2024). Intermediaries, including credit rating analysts, bankers, and fund managers, also exhibit ideological biases in rating adjustments, loan pricing, and capital allocation decisions (Kempf and Tsoutsoura, 2021; Dagostino, Gao, and Ma, 2023; Kempf et al., 2023). At the firm level, recent literature relates managerial ideology to a wide range of corporate policies, including corporate investment, disclosure, and sourcing decisions (Rice, 2024; Arikan et al., 2023; Cassidy and Kempf, 2024). Moreover, ideological preferences of government officials have been shown to shape their behavior, affecting judicial rulings, regulatory enforcement, and administrative actions (e.g., Huang, Hui, and Li, 2019; Engelberg et al., 2023; Spenkuch, Teso, and Xu, 2023).

In the same vein, examiner discretion in the patent review process creates room for ideology-based value judgments to influence application outcomes. If examiners' political beliefs affect how they perceive the value of green technologies, this may lead to systematic differences in approval patterns. Specifically, we hypothesize that Republican-leaning examiners, compared to their Democratic or independent-leaning counterparts, are more likely to reject green patent applications.

This conjecture is grounded in the stark partisan differences in fundamental beliefs and attitudes about climate change-related issues documented in multiple surveys. For example, recent surveys conducted by the Pew Research Center (2022, 2023, and 2024) find that among Republican-leaning respondents, only 12% believe that climate change should be a top priority for the president and Congress and 23% view climate change as a major threat to the United States, while the corresponding percentages among Democratic-leaning respondents are 59% and 78%.[1] In addition, when considering strategies or policies addressing climate change, Republicans put more emphasis on economic factors, such as consumer costs, job creation, and economic growth, than Democrats do. Given these ideological differences, Republican-leaning patent examiners are likely to hold a more skeptical view of the importance and value of green technologies, especially those related to climate change, and thus are less likely to approve green patent applications. At the same time, it is important to recognize that there are also reasons why the partisan ideological differences documented in surveys may not manifest in the patent review process. To the extent that patent examiners on average are more educated than survey respondents and that their prior education and/or work experience are more likely to be in STEM-related fields, they may share more similar beliefs and attitudes about environmental concerns. In addition, the checks and balances that exist in the USPTO patent review process can potentially prevent patent examiners' personal biases from seeping into the review outcome.

Using a large sample of patent applications submitted to the USPTO between 2001 and 2023, we examine how the political ideology of patent examiners affects the review outcomes of green patent applications. To measure patent examiners' political ideology, we use their party affiliations

[1] Similarly, in a 2020 survey conducted by Standford University, 26% of Republicans think that they will be personally hurt by unchecked global warming, while 76% of Democrats do.

from U.S. states' voter registration records.[2] Our political ideology measure reflects examiners' personal beliefs, shaped by partisan differences in the perceived seriousness of environmental issues, in particular climate change, and the extent to which green technologies are deemed effective solutions (Gromet, Kunreuther, and Larrick, 2013; Dokshin and Gherghina, 2024). We measure the patent review outcome as a binary variable equal to one if the application is rejected and zero if granted.[3] Consistent with our hypothesis, we find that Republican examiners are significantly more likely than non-Republican examiners to reject green patent applications by about 2%, which is economically meaningful given the unconditional rejection probability of about 30%. This result is robust to controlling for an array of examiner and patent application characteristics as well as art unit and filing year fixed effects. Importantly, the higher rejection rate by Republican examiners is unique to green patents, because there is no significant partisan difference in the rejection probability among non-green patents.

Next, we perform ancillary tests to further substantiate the baseline result and to flesh out some interesting cross-sectional heterogeneity. Specifically, we examine how the higher rejection rate of Republican examiners for green patents varies with the ideological divergence regarding climate change and the type of green technology. We find that Republican examiners are significantly more likely to reject green patent applications, relative to non-Republican examiners, during periods when the partisan divide over climate change is widening, and when the applications pertain directly to climate change mitigation rather than to other environmental areas, such as pollution control. These results suggest that the influence of ideological differences among patent examiners intensifies when climate change issues become more politically divisive and

[2] Voter registration data represent a more precise and credible measure of political ideology compared to political contribution records (Fos, Kempf, and Tsoutsoura, 2025).
[3] Rejections include cases where inventors choose to abandon a patent application by not filing amendments to address patent examiners' objections.

when the evaluated technologies are more explicitly tied to climate change. As such, these cross-sectional variations in our baseline result provide further support to our hypothesis.

A critical question about our findings is whether the higher rejection rate by Republican examiners for green patents is due to their using more rigorous standards in evaluating these patents, or it is due to their political ideology leading them to dismiss the value and importance of green patents in general. To distinguish between these alternative interpretations, we examine the quality of approved green patents. If Republican examiners use higher standards to evaluate green patents, then the quality of the green patents they approve should be higher. On the other hand, if Republican examiners do not view climate change as an important issue and green technologies as worthy pursuits, they are likely to reject more green patents in an indiscriminate manner that is detached from the underlying patent quality. Our analysis of patent citations and economic value (Kogan et al., 2017) as quality measures reveals no significant difference between green patents approved by Republican vs. other 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 understand the mechanisms underlying our results, we investigate two key stages of the patent examination process: first-action approvals, where a patent is granted without requiring revisions, and first amendments, where inventors choose to respond following an initial non-final rejection. Economically, a higher first-action approval rate reflects a lower threshold for initial acceptance. Similarly, inventors' decision to amend reveals their willingness to invest further resources to seek patent protection. We find that non-Republican examiners are no more likely than Republican ones to issue first-action approvals for green patents. However, inventors are significantly less likely to submit amendments following rejections by Republican examiners. A

likely explanation for this finding is that Republican examiners' response to green patent applications is influenced by their ideological beliefs, which reduce inventors' perceived likelihood of success and discourage further pursuit of rejected applications.

In our final set of inquiry, we examine whether green patent rejections by partisan examiners affect inventors' and firms' incentives to invest in the development of future green innovation. When green patents are rejected at least partly based on examiners' ideological beliefs rather than technical merit, applicants may interpret such outcomes as indicative of structural barriers to approval. In turn, this perception can dampen the applicants' incentives to invest in future innovation in related areas, leading to a decline in subsequent green patent filings. Consistent with this prediction, we find that inventors and firms are significantly less likely to file green patent applications in the three- or five-year period following rejections by Republican examiners, suggesting that ideologically driven rejections can have a chilling effect on future green innovation efforts. This unintended consequence of examiner-level discretion can ultimately hinder the development of green technologies critical for addressing climate change.

Our findings have important implications for the design and effectiveness of patent-based environmental policy. 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), facilitating high-quality green innovation is of first-order importance. As a key mechanism for providing innovation incentives, the patent system should, at a minimum, avoid discouraging socially valuable technologies. Our finding that examiners' ideological preferences systematically bias the approval process against green patents

highlights the importance of an impartial and ideologically neutral examination process to ensure that the patent system effectively supports environmentally beneficial innovation.

2. Institutional Background and Related Literature

2.1. Patent Examination Process at the USPTO

In the United States, the USPTO evaluates patent applications to determine their eligibility based on a set of standardized criteria. Specifically, inventions must be novel, non-obvious, useful, patent-eligible, 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 preliminary approval (first-action allowance) or, more commonly, a non-final rejection (Aneja, Reshef, and Subramani, 2025).[4] Patent applicants receiving non-final rejections must submit responses addressing examiners' concerns within a specified period, usually three to six months. This iterative process, involving

[4] 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).

repeated examiner rejections, applicant amendments, and meetings between applicants and examiners (Tu, 2021a; Cuny, Mehta, and Zhao, 2025), often continues over multiple rounds and can take several years from initial filing until the application is ultimately approved or abandoned.[5] 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.

2.2. Related Literature

Our study relates to the growing literature on how economic agents' political ideology on economic outcomes. Previous literature documents the influence of political ideology on economic behavior across various agents, including investors, households, and entrepreneurs (Cookson, Engelberg, and Mullins, 2020; Meeuwis et al., 2022; Engelberg et al., 2024; Hsieh et al., 2025), as well as financial and information intermediaries (Kempf and Tsoutsoura, 2021; Dagostino, Gao, and Ma, 2023; Kempf et al., 2023; Chu, 2025). Within firms, ideological preferences have been shown to affect corporate investments, corporate disclosure, and sourcing decisions (Rice, 2024; Arikan et al., 2023; Cassidy and Kempf, 2024; Ayyagari, Gao, and Ma, 2025). In addition, related work demonstrates that ideological (mis)alignment affects executive-firm matching, corporate policies, and employee turnover (Duchin et al., 2024; Fos, Kempf, and Tsoutsoura, 2025; Dasgupta et al., 2025). Our study extends this literature by providing novel evidence that ideological preferences significantly affect the behavior of patent examiners–officials traditionally viewed as

[5] 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 a 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).

politically neutral.[6] Our findings uncover the relevance of partisan beliefs in the domain of technological advancement, a previously underexplored area.

Our paper also extends the literature on the determinants of patent review decisions. Prior work has examined how factors, such as examiner characteristics, expertise, experience levels, workload, institutional incentives, and procedural rules affect patent outcomes (e.g., Frakes and Wasserman, 2017; 2023; Boulanger, 2019; Farre-Mensa, Hegde, and Ljungqvist, 2020; Cohen, Gurun, and Li, 2021; deGrazia, Pairolero, and Teodorescu, 2021; Cockburn, Kortum, and Stern, 2022; Shu, Tian, and Zhan, 2022). Our findings introduce examiners' partisan beliefs as an additional source of systematic variation in patent examination. As such, we highlight how examiner discretion interacts with personal ideological preferences when assessing technologies with political relevance.

Additionally, our study is related to the research on how biases in the patent examination process distort inventors' incentives and affect long-term innovation efforts (Righi and Simcoe, 2019; Tu, 2021b; Gu et al., 2024; Aneja, Reshef, and Subramani, 2025). We extend this literature by documenting the long-term consequences of politicized subjective decision-making for technological progress. Specifically, we show that ideological preferences embedded in the patent approval system create uncertainty for inventors and ultimately hinder the development of future green innovation.

A recent study by Raffiee, Teodoridis, and Fehder (2023) investigates examiners' partisan affiliations and find no significant relationship with overall patent approval rates in their sample

[6] Previous studies document that the ideological preferences of government officials, such as judges (e.g., Liu, 2020; Huang, Hui, and Li, 2019; Canayaz and Gustafson, 2024; Gormley, Kaviani, and Maleki, 2025; Bakke et al., 2025), regulators (e.g., Engelberg et al., 2023; Pandey, Shen, and Wu, 2025), and other bureaucrats (e.g., Raffiee, Teodoridis, and Fehder, 2023; Spenkuch, Teso, and Xu, 2023), can significantly affect judicial rulings, regulatory decisions, and administrative actions across a wide range of policy contexts.

of software patent applications. Our study differs from theirs by focusing specifically on green technology patents–a domain where partisan beliefs show particularly strong polarization. This ideological divide makes green patents an ideal setting to examine how examiners' partisan beliefs may influence the application of patentability criteria and, consequently, patent review decisions.

3. Data, Sample and Variable Constructions

3.1. Data

Our primary data sources are the Patent Examination Research Dataset (PatEx) and PatentView, both maintained by the United States Patent and Trademark Office (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 behavior over time. PatentView complements PatEx by offering standardized, inventor- and assignee-level information on granted and pre-grant patents, including application and grant dates, technology classifications, citation data, and measures of patent quality. Together, these datasets allow for a comprehensive analysis of examiner-applicant interactions and the characteristics of granted patents.

We use personnel data from the U.S. Office of Personnel Management (OPM) to construct detailed demographic 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—for the early sample—age range.

We obtained the OPM data in two distinct portions. The earlier dataset, covering 1973–2017, was sourced from BuzzFeed News, which obtained the federal payroll records through FOIA requests and publicly released the data to support transparency and workforce analysis. The more

recent dataset (2014–2023) was acquired through direct Freedom of Information Act (FOIA) requests to the OPM. Due to growing privacy concerns, the OPM excluded age-related variables from FOIA responses in the later period. Consequently, our post-2014 OPM data does not contain examiner age information. These datasets allow us to identify each examiner's location and rank at specific time points, creating the foundation for linking personnel records with telework participation and political affiliation.

To measure telework participation, we file 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 information on examiner participation in 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 work). As of 2023, over 95% of patent examiners work remotely according to the USPTO telework report. The USPTO's telework program represents one of the most extensive in the federal government and has been a frequent subject of both policy evaluation and academic research. By merging the USPTO telework data with the OPM dataset, we can precisely determine each examiner's remote work status, physical duty station, telework program participation, and age information (for the early sample). These variables enable us to further match records with L2 data to identify patent examiners' political affiliations.

We obtain political affiliation data from L2, a commercial voter file vendor 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 affiliation, 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 affiliation 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.

3.2. Sample Construction

We begin by identifying all patent examiners who were actively processing applications in the PaTex patent application database from 2014 to 2023. We start in 2014 because formatted L2 data are only available from that year onward. When processing the PaTex data, we restrict our sample to Utility applications and exclude incomplete applications.[7] We further merge the PaTex application data with the PatentView database to obtain CPC codes (technology fields), as well as disambiguated inventor and assignee identifiers. After these procedures, our sample includes 11,253 patent examiners.

Next, we set to match examiners with the L2 database following the existing literature (e.g., Spenkuch, Teso, and Xu, 2023; Fos, Kempf, and Tsoutsoura, 2023). Since the PaTex data contains only examiner names, which are insufficient for accurate matching, we supplement this information OPM and USPTO telework records that provide more granular details location and age data.[8] We then match with the L2 data through ten iterative rounds, beginning with strict criteria (full name, county, and age) and progressively relaxing requirements (e.g., name and county only). Appendix B provides a detailed description of our matching approach.

At the examiner-year level, we successfully match 76.7% of observations. At the individual examiner level, our matching rate is 82.3%. For context, Spenkuch, Teso, and Xu (2023) match

[7] Specifically, we exclude incomplete patent applications with the following status descriptions: Docketed New Case - Ready for Examination, Application Returned Back to Preexam, Expressly Abandoned -- During Publication Process, Application Undergoing Preexam Processing, and Abandoned -- Incomplete (Filing Date Under Rule 53(b) - PreExam).

[8] 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 graduation years.

67.5% of all federal bureaucrats, while Fos, Kempf, and Tsoutsoura (2023) match 77% of corporate executives. Our 82.3% matching rate is close to the upper bound reported by Spenkuch, Teso, and Xu (2023), who estimate—based on survey data—that 86% of civilian federal employees are registered voters. We attribute our higher match rate to combing standard and expanded-radius matching approaches.

We assume patent examiners' party affiliations remain constant over time, assigning their most recent matched party affiliation. As a robust check, we also use examiners' most frequent party affiliation and obtain consistent results. Among matched examiners, 18.3% are Republican, 55.9% are Democratic, and 25.8% are independent or affiliated with other parties. This distribution is broadly consistent with Spenkuch, Teso, and Xu's (2023) findings for federal employees, though our sample shows slightly stronger Democratic lean—likely reflecting patent examiners' higher educational attainment relative to the average federal employee.

3.3. Summary Statistics

Our final sample includes 5,656,437 patent applications filed between 2001 and 2023. We begin the sample in 2001, rather than 2014, because we are able to backfill patent examiners' party affiliations. Table 1 presents summary statistics, showing that green patent applications account for 9.4% of the total. The average rejection rate across all applications is approximately 30%. Definitions of all variables are provided in Appendix Table 1.

4. Empirical Analyses

4.1. Baseline Results

We first examine whether patent examiners of different political affiliation differ in their general rejection rates for all patent applications. Columns (1) and (2) in Table 2 report the results from our regressions, where the dependent variable is the *Rejection* dummy. We include a rich set

of fixed effects (art unit FE, patent filing year FE, and art unit × filing year FE) and control variables, such as examiner characteristics (e.g., gender, PhD status, experience, and examiner leniency) and the number of inventors listed on the application. Standard errors are clustered at the examiner level unless otherwise noted. Our results indicate that examiners' party affiliations do not affect either their approval/rejection decisions, as the coefficient estimates on the *Republican* and *Democratic* dummy variables are both statistically insignificant. These findings are consistent with Raffiee, Teodoridis, and Fehder (2023), who also document no systematic differences in examiner behavior by party affiliation. This is reassuring given that our study employs a different approach to identifying examiners' political affiliations.

Next, we examine whether examiners of different political affiliation differ in their propensity to reject green patent applications, which we define using the OECD classification provided by Haščič and Migotto (2015). We argument the regression model in column (1) and (2) by a dummy variable *Green* for green patents and two interaction terms, *Republican* × *Green* and *Democratic* × *Green*. Columns (3) and (4) of Table 2 report the results. We find that compared to other patent applications, green patents are associated with lower rejection rates, as indicated by the significantly negative coefficients for *Green*. But more important for our purpose, we find that the coefficient estimates on the interaction term *Republican* × *Green* are significantly positive, suggesting that Republican examiners are associated with a more than 2% higher rejection rates for green patents than other examiners. The coefficient estimates on the interaction term *Democratic* × *Green* are insignificant, suggesting there is no significant difference in rejection rates of green patents between Democratic examiners and Other Party examiners. Therefore, we group these two types of examiners together as the control group in later analyses.

The primary focus of our analysis in Table 2 is on the cross-examiner variations in rejection rates for green patents. This analysis relies on the assumption—supported by prior literature documenting the quasi-random assignment of patent applications to examiners—that green patent applications assigned to different examiners do not systematically differ in the underlying quality. In our robustness tests, we address the possibility that the assignment of patent applications to examiners may not be entirely random. For instance, some examiners may systematically receive applications that differ in average quality or complexity. To mitigate this concern, we incorporate examiner fixed effects into our specification, allowing us to examine within-examiner variation in approval/rejection decisions across patent types. Consistent with our main findings, we find that Republican examiners are more likely to reject green patent applications than non-green ones, while other examiners show no significant difference in rejection rates between the two categories.

We also perform several additional robustness checks. First, we exclude examiners based in Virginia, as their party affiliations are imputed by the data vendor L2; the main findings remain unchanged after removing this group. Second, we split our full sample of all patent applications into green and non-green patent applications and examine the effect of examiner party affiliation within each subsample. The results reaffirm our earlier findings: Republican examiners are more likely to reject green patent applications, while no systematic difference is observed for non-green patents. Third, we restrict the sample to patent applications filed by publicly traded firms and find results consistent with those from the full sample. Finally, to address potential concerns about sorting between examiners and applicants—such as political alignment between examiners and patenting firms—we further include assignee-by-examiner fixed effects. Our main findings remain robust to this specification.

4.2. Cross-Sectional Heterogeneity

Green patents include patents for climate change mitigation as well as patents for pollution control. Given that the political ideology divide is most salient on climate-change related issues, we refine our analysis by splitting green patents into those related to climate change and those related to pollution control, based on CPC codes from the OECD classification. The findings are reported in Table 3. In Columns 1 and 2, we examine cross-examiner rejection rate differences in the sample of climate-related green patents and non-green patents. In the second set of regressions – Columns 3 and 4, we examine cross-examiner rejection rate differences in the sample of pollution-related green patents and non-green patents. The findings suggest that the partisan effects are concentrated in climate-related green patents.

We further examine how the green patent rejection rate difference between Republican and other examiners is related to the evolving partisan divide on climate change. For this purpose, we use data from the Stanford survey on climate change. We utilize two specifications to test this hypothesis. First, in Panel A of Table 4, we restrict the sample to green patent applications and estimate a double interaction model, where the key independent variable is *Republican* × *Climate Change Partisan Divide*. Second, in Panel B of Table 4, in the sample of all patent applications, we estimate a triple interaction model, where the key independent variable is *Republican* × *Green Patent* × *Climate Change Partisan Divide*. Across both specifications, we find that as the partisan divide increases over time, Republican examiners become more likely to reject green patent applications.

Similar to Table 4, we further test whether the green patent rejection rate difference between Republican and other examiners is related to which party controls the White House. In the analysis, we run triple interactions with the *Republican Presidency* variable, which is a dummy variable set to 1 if the patent filing year is in 2001- 2008 or 2017-2020. The regression results presented in

Table 5 suggest that the higher rejection rate of Republican examiners for green patents is more pronounced when there is a Republican president in office.

5 Further Analysis

5.1 The Quality of Green Patents Approved by Partisan Examiners

There are two potential explanations for the higher rejection rates by republican examiners for green patents. One possible explanation is that to the extent that Republicans tend to view climate change as a less serious issue than democrats, they are likely to discount the value or importance of technology or innovations that aim to slow down the pace of climate change or reduce its impact on the environment. This bias is analogous to taste-based discrimination in the labor or financial markets, which leads to more rejections of green patent applications by republican examiners that are unrelated to their underlying quality. The other possible explanation is that Republican examiners may use higher standards in judging green patent applications, perhaps because they value economic growth more and believe green innovations on average are less likely to directly translate into economic gains than other technology or innovations. This explanation suggests that the green patents approved by republican examiners on average have higher quality than those approved by democratic examiners.

To distinguish between these two explanations, we study the scientific and economic values of approved green patents and examine whether there is any difference between those approved by republican examiners and those approved by democratic or other-part examiners in Table 6. We measure the scientific and economic value of a patent using the citation data and KPSS (2017) patent value data. We find no significant differences in the scientific or economic value of green patents approved by Republican versus Democratic examiners. This evidence does not support the notion that republican examiners apply more stringent standards when evaluating green patent

applications. Instead, it aligns with the explanation based on taste-based discrimination: the higher rejection rates of Republican examiners for green patents appear to stem from an indiscriminate rejection of some green patents, regardless of their underlying quality.

5.2 Drivers of Republican Examiners' Higher Rejection Rates: First Action Decisions and Initial Amendment

In this section, we delve into the details of the patent review process to understand potential drivers of the discrepancy in rejection rates we document. For each patent application, the assigned examiner will first issue a first-action decision after the initial round of review. The first-action decision can be either outright approval (less than 10%) or non-final rejection. In the latter case, the inventors can choose to file an amendment to the original patent applications to address the examiner's concerns.

Using event codes and transaction data from PatEx, we define two outcome variables for each patent application. *First Action Rejection* is a binary variable equal to 1 if the application is rejected in the examiner's first action. *Initial Amendment* is equal to 1 if the inventor files an amendment following a Non-Final Rejection. We first examine whether examiners' party affiliation affects the likelihood of green patent applications to receive a first-action rejection. Our results, reported in Column 1 of Table 7, show no significant difference between Republican and Democratic examiners in their first action decisions. We then investigate whether the examiner's party affiliation affects the probability of inventors to file amendments after receiving a Non-Final Rejection. For this test, the sample only includes green patent applications that are not approved in the first action. We find that inventors in green patent applications are significantly less likely to file amendments following rejections by Republican examiners.

One explanation consistent with these results is that feedbacks provided by Republican examiners in their non-final rejections are more ideologically driven and thus less constructive, discouraging examiners to pursue the patent applications further. Again, this is consistent with taste-based discrimination, where the rejections are less grounded in the inherent merits of the patent applications and more driven by republican examiners discounting the importance of climate change issues and the value of technologies and innovations addressing these issues.

Table 8 tests this explanation by examining whether examiners are more likely to reject patent applications using low-effort justifications. Examiners may issue rejections based on art-based reasons, such as lack of novelty (Section 102) or obviousness (Section 103), or non-art-based reasons, such as subject matter ineligibility (Section 101) or insufficient written description (Section 112). As noted by Frakes and Wasserman (2017), art-based rejections require greater examiner effort, as they involve conducting comprehensive prior art searches and making detailed comparisons between the claimed invention and existing technologies. We define a low-effort rejection as a dummy variable equal to one if any of the examiner's rejections for an application are based on Sections 101 or 112. Our results show that Republican examiners are significantly more likely to reject green patent applications using these low-effort, non-art-based justifications.

5.3 How Does Republican Examiner's Rejection of Green Patent Applications Affect Future Green Innovations by Inventors and Firms?

To shed light on the real effects of patent examiners' political ideology, we examine how the partisan difference in the evaluation of green patent applications affects future innovation activities in green technology. We construct two samples—an inventor-level sample and a firm-level sample—to explore whether an inventor or firm's future green patent applications are influenced

by the rejection of their most recent green patent applications, particularly when those rejections are issued by Republican examiners.

From an inventor's perspective, receiving a rejection on a green patent application is not good news and will likely dampen her incentive to pursue more innovation in the same or closely related field. However, it is not clear whether the rejection's effect on the inventor is related to the political ideology of the examiner issuing the rejection. On the one hand, while republican examiners are more likely to reject green patent applications as we show in the paper, their rejections should not have a more negative effect on inventors' future innovations so long as their feedbacks and requests are objective, fair, and constructive. On the other hand, their rejections could have a more negative effect if their feedbacks and requests are unreasonable, unconstructive, and reflective of their personal views about the importance of climate change-related issues and technologies addressing them.

Given the ambiguity, we put this question to empirical tests in Table 9. The sample used for the inventor-level analysis includes all green patent applications and is structured at the inventor-by-application level. We include all inventors listed on each application. The dependent variable is the number of green patent applications filed by an inventor in the following 3 or 5 years. The key independent variables are an indicator variable for whether an inventor has a green patent application rejected in a year and an indicator variable for whether an inventor has a green patent application rejected by a republican examiner in a year.

We document two main findings. First, inventors whose recent green patent applications are rejected file fewer green patent applications in subsequent years, suggesting a discouraging effect on continued work in green technology. Second, this negative effect is even stronger when the

rejection comes from a Republican examiner, indicating that partisan bias not only affects current approval outcomes but may also discourage future innovation in green technologies.

We next examine the impact of rejected green patent applications on future innovations at the firm level. Since each year firms often file multiple patent applications, some in green fields and some in non-green fields, with potentially varying outcomes, we do not use a firm-by-patent application level sample. Instead, we aggregate all patent applications by a firm each year to a firm-by-year level. Given that firms tend to engage in innovation activities in multiple fields and have the option to shift focus and resources across these fields, what drives their decision to continue green innovations should be the *relative* success/failure rate of their recent green patent applications vis-à-vis non-green patent applications. Therefore, we construct a variable that is equal to the difference in the average rejection rate between a firm's green patent applications and all patent applications in each year. We then interact this variable with the percentage of its green patent applications reviewed by republican examiners. The dependent variable in our analysis is the number of green patent applications filed by a firm in the next 3 or 5 years.

The findings are reported in Table 10. Our regressions yield two pieces of evidence that are consistent with our inventor-level results. First, the difference in the average rejection rate between green and non-green patent applications has a negative effect on a firm's future green patent applications, and the effect is significant for the 5-year horizon. Second and more important for our purpose, the coefficient estimate on the interaction term is significantly negative for both time horizons, indicating that the discouraging effect of recent failure in green patent applications is stronger if republican examiners are likely to account for more of these failures.

6 Conclusion

We examine whether and how the political ideology of patent examiners affects the outcome

of green patent applications. While the patent system plays a pivotal role in incentivizing innovation by granting exclusive rights to protect inventors' technological advancements, the process of obtaining these rights is subject to considerable examiner discretion. Despite previous research on how factors such as examiner experience, workload, and technical expertise affect patent outcomes, studies on how examiners' ideological preferences shape the evaluation of technologies with political or societal implications are scarce. Our study fills this gap by documenting a systematic partisan bias in the examination of environmentally beneficial technologies.

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. However, the green patents approved by Republican examiners are not of higher quality. This partisan difference is particularly pronounced during periods of heightened political polarization over climate issues and for technologies more explicitly aimed at addressing climate change. Further analysis reveals that inventors are less likely to pursue amendments following rejections from Republican examiners and are less likely to file subsequent green patent applications, suggesting that ideology-driven rejections impeded follow-on green innovation.

Our findings show that ideological subjectivity among examiners in the patent review process can undermine the fairness and effectiveness of innovation policy, particularly in areas marked by political polarization. In doing so, we contribute to the growing literature on how personal ideology affects economic decision-making by extending it to include patent examiners, who are traditionally viewed as politically neutral, and highlighting the far-reaching consequences of their decisions for technological development and environmental progress.

Although our analysis is focused on green innovation in the US, our findings speak more broadly to the potential harms of allowing ideological preferences to distort innovation incentives. Given the global urgency of addressing environmental challenges, it is crucial that government agencies responsible for promoting green innovation maintain ideological neutrality and apply evaluation criteria consistently. Our study calls for stronger institutional oversight and standardized decision explanations to better detect and mitigate ideological biases within the patent system, thereby ensuring that socially valuable technologies, particularly those aimed at combating climate change, receive fair and unbiased assessment.

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, Bruegel.

Aghion, P., Howitt, P., and Prantl, S., 2015. Patent rights, product market reforms, and innovation. Journal of Economic Growth 20, 223-262.

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

Arikan, M., Kara, M., Masli, A., and Xi, Y., 2023. Political euphoria and corporate disclosures: An investigation of CEO partisan alignment with the president of the United States. Journal of Accounting and Economics 75, 101552.

Ayyagari, M., Gao, J., and Ma, P., 2025. Partisan friendshoring. Working paper.

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.

Boulanger, J., 2019. The examination of continuation applications and the problem of invalid patents in the U.S. Working paper.

Canayaz, M.I. and Gustafson, M.I., 2024. Start-ups judging judges: Evidence that litigation risk shapes the small business environment. Working paper.

Cassidy, W. and Kempf, E., 2024. Partisan corporate speech. Working paper.

Chu, Y., 2024. Partisan loan officers and the racial gap in mortgage lending. 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.

Cookson, J.A., Engelberg, J.E., and Mullins, W., 2020. Does partisanship shape investor beliefs? Evidence from the COVID-19 pandemic. Review of Asset Pricing Studies 10, 863-893.

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.

Dagostino, R., Gao, J., and Ma, P., 2023. Partisanship in loan pricing. Journal of Financial Economics 150, 103717.

Dasgupta, S., Guo, R., Ren, X., and Shu, T., 2025, Similarity breeds trust: Political homophily and CEO-Board communication. Working paper.

deGrazia, C.A.W., Pairolero, N.A., and Teodorescu, M.H.M., 2021. Examination incentives, learning, and patent office outcomes: The use of examiner's amendments at the USPTO. Research Policy 50, 104360.

Dokshin, F. and Gherghina, M., 2024. Party affiliation predicts homeowners' decisions to install solar PV, but partisan gap wanes with improved economics of solar. Proceedings of the National Academy of Sciences 121, e2303519121

Duchin, R., Farroukh, A.E.K, Harford, J., and Patel, T., 2024. The economic effects of political polarization: Evidence from the real asset market. Working paper.

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

Engelberg, J., Guzman, J., Lu, R., Mullins, W., 2024. Partisan entrepreneurship. Journal of Finance, forthcoming.

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.

Gromet, D.M., Kunreuther, H., Larrick, R.P., 2013. Political ideology affects energy-efficiency attitudes and choices. Proceedings of the National Academy of Sciences 110, 9314-9319.

Gu, Y., Lewellen, K., Mao, C.X., and Qin, Y., 2024. 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.

Hascic, 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.

Hsieh, C.H., Low, A., Sharma, V., and Zhu, Q., 2024. Partisan consumers. Nanyang Business School working paper.

Huang, A., Hui, K.W., and Li, R.Z., 2019. Federal judge ideology: A new measure of ex ante litigation risk. Journal of Accounting Research 57, 431-489.

Kempf, E., Luo, M., Schafer, L., and Tsoutsoura, M., 2023. Political ideology and international capital allocation. Journal of Financial Economics 148, 150-173.

Kempf, E. and Tsoutsoura, M., 2021. Partisan professionals: evidence from credit rating analysts. Journal of Finance 148, 150-173.

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

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.

Liu, C., 2020. Judge political affiliation and impacts of corporate environmental litigation. Journal of Corporate Finance 64, 101670.

Meeuwis, M., Parker, J.A., Schoar, A., and Simester, D.I., 2022. Belief disagreement and portfolio choice. Journal of Finance 77, 3191-3247.
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.
Nordhaus, W., 1969. Invention, growth, and welfare, Cambridge, MA: MIT Press.
Pandey, V., Shen, X., and Wu, J.S., 2025. Partisan regulatory actions: Evidence from the SEC. Journal of Accounting and Economics, forthcoming.
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.
Righi, C. and Simcoe, T., 2019. Patent examiner specialization. Research Policy 48, 137-148.
Rice, A.B., 2024. Executive partisanship and corporate investment. Journal of Financial and Quantitative Analysis 59, 2226-2255.
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.
Tu, S.S., 2021a, Patent examination and examiner interviews. Law Faculty Scholarship 98.
Tu, S.S., 2021b, Patenting fast and slow: Examiner rejections and applicant traversals to non-prior art rejections. Michigan State Law Review 411, 1-57.

Appendix A: Variable Definitions

Variable	Definition
Rejection	Dummy variable equal to one 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 L2 data, and zero otherwise. This variable is not time-varying.
Other Party	Dummy variable equal to one if the patent examiner is affiliated with neither the Republican Party nor the Democratic Party, based on L2 data, and zero otherwise. This variable is not time-varying.
Age	The age of the patent examiner, based on L2 data.
Female	Dummy variable equal to one if the patent examiner is female, based on L2 data and zero otherwise.
PhD Degree	Dummy variable equal to one if the patent examiner holds a PhD degree, based on OPM 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.
Patent Value - Real	The KPSS patent value data, based on Kogan, Papanikolaou, Seru, and Stoffman (2017).
First Action Approval	Dummy variable equal to one 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.
Initial Amendment	Dummy variable equal to one if the inventor files an amendment (Coded as "A…") after the first non-final rejection and zero otherwise.
Climate Change Partisan Divide	The partisan divide in public sentiment over climate change based on the Stanford survey: https://climatepublicopinion.stanford.edu/partisan-views

#Green App 1-3 year	Green patent applications filed by the inventors (Table 7) or the firm (Table 8) in the three years following the current patent application.
#Green App 1-5 year	Green patent applications filed by the inventors (Table 7) or the firm (Table 8) in the five years following the current patent application.
Rejection Rate Difference	The difference in rejection rates between green patent applications and all patent applications for the firm-year.
Fraction Republican Examiners	The fraction of green patent applications processed by Republican examiners in the firm-year.
Less Effort Rejection	Dummy variable equal to one if the patent application's rejection reasons include Section 101 or Section 112 and zero otherwise.
Republican Presidency	Dummy variable equal to one if the patent filing year falls between 2001–2008 or 2017–2020 and zero otherwise.

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 more granular details on examiner location and age. Because the OPM data covers nearly all federal employees—with the exception of a few agencies—we isolate patent examiners by filtering on agency code CM56. The FOIA-requested OPM data serves as our primary source of examiner information.

We conduct the matching process in multiple steps, following the methodologies of Spenkuch, Teso, and Xu (2023). An important difference from Spenkuch, Teso, and Xu (2023) is that our OPM data for the later sample does not provide age range due to privacy concerns. Spenkuch, Teso, and Xu (2023) match federal employees based on name, duty station, and age range. We address this issue by estimating the birth year of federal employees. For the later OPM sample, we merge the FOIA data with the earlier 1973–2017 OPM data, which contains age information reported in age 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. We then compute both the average and median estimated birth year for each examiner. For examiners not matched in the earlier OPM dataset, we manually search for their information on LinkedIn and infer birth years based on their undergraduate graduation year.

Our approach is to begin with the strictest matching criteria and gradually relax them. Neither the PatEx nor the OPM dataset provides separate fields for first, middle, and last names; instead, they only contain full names. To extract name components for PatEx patent examiners, we assume the first word is the last name, the last word is the first name, and any words in between are 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 is carried out in 10 rounds, starting with the most detailed information (e.g., full name, county, and age) and progressively using less strict criteria (e.g., name and county only). The steps are 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 L2 data from that same year. If no match is found, we sequentially match using L2 data from one, two, and three years earlier. If no match is found, we repeat the process using L2 data from one, two, and three years after the OPM year. If a patent examiner remains unmatched within one round, we move to the next (less strict) round and repeat the temporal matching procedure.

For VA examiners who remain unmatched after the initial 10 rounds of matching, we conduct an additional set of 10 matching rounds, restricting the search to counties outside Virginia but within a 50-mile radius of Alexandria, VA. This matching procedure follows the approach used by Fos, Kempf, and Tsoutsoura (2023). The 50-mile threshold is based on the USPTO Patent Hoteling Program, which allows eligible patent examiners to telework full-time if they reside within 50 miles of the USPTO headquarters in Alexandria.

Table 1: Summary statistics

This table presents the summary statistics of all variables used in our regression analysis. The definitions of all variables are in Appendix A.

	(1) N	(2) Mean	(3) P50	(4) SD
Republican	5,656,437	0.207	0.000	0.405
Democratic	5,656,437	0.555	1.000	0.497
Other Party	5,656,437	0.238	0.000	0.426
Rejection	5,656,437	31.017	0.000	46.257
Green	5,656,437	0.094	0.000	0.292
PhD Degree	5,656,437	0.113	0.000	0.317
Age	5,656,437	41.707	40.000	11.083
Female	5,656,437	0.266	0.000	0.442
Leniency	5,656,437	0.684	0.720	0.196
Tenure	5,656,437	13.818	13.000	7.787
Number of Inventors	5,656,437	2.777	2.000	1.997
Citations	3,901,943	1.360	0.532	2.452
Patent Value - Real	1,317,463	11.959	4.060	21.678
Climate Partisan Divide	4,870,237	24.022	25.000	4.029
#Green App - 3 Years (Inventor Level)	1,202,339	4.319	1.000	10.257
#Green App - 5 Years (Inventor Level)	1,202,339	5.914	2.000	14.074
#Green App - 3 Years (Firm Level)	11,275	29.799	6.000	111.973
#Green App - 5 Years (Firm Level)	11,275	47.510	9.000	180.509
Rejection Difference	11,275	-0.010	0.000	0.202
Fraction Republican	11,275	0.061	0.000	0.206
Firm Size	11,274	8.315	8.493	2.527
Book/Market	10,808	0.420	0.335	0.317
Return on Equity	10,732	0.008	0.117	0.525
Total Debt/Total Assets	11,250	0.227	0.211	0.183
Research and Development/Sales	11,275	0.619	0.061	2.562
First Action Approval	5,541,761	12.764	0.000	33.369
Initial Amendment	4,834,391	87.615	100.000	32.941
Less Effort Rejection	1,754,427	56.331	100.000	49.598

Table 2: The Effects of Partisan Examiners on Green Patent Rejection

The table reports OLS regression results at the patent application level, where the final approval decision is regressed on the patent examiner's party affiliation and a green patent indicator. The dependent variable *Rejection* equals 100 if the application is rejected and zero otherwise. *Republican* (*Democratic*) is a dummy variable equal to 1 if the examiner is identified as Republican (Democratic) in the voter registration data and zero otherwise. *Green* is a dummy variable equal to 1 if the application is classified as green technology based on the OECD definition and zero otherwise. Examiner-level controls include age, tenure, PhD attainment, gender, 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. Leading Inventor FE refers to fixed effects based on the leading inventor listed on the application. Standard errors are heteroskedasticity-robust and clustered at the examiner level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Dependent variable		*Rejection*		
Green			-0.554**	-0.698***
			[0.267]	[0.253]
Republican × Green			2.018***	2.097***
			[0.478]	[0.454]
Democratic × Green			-0.344	-0.312
			[0.330]	[0.318]
Republican	-0.022	-0.089	-0.198	-0.273
	[0.202]	[0.198]	[0.206]	[0.202]
Democratic	0.214	0.170	0.247	0.199
	[0.160]	[0.156]	[0.164]	[0.160]
Age	-0.015**	-0.022***	-0.015**	-0.022***
	[0.008]	[0.008]	[0.008]	[0.008]
PhD Degree	0.305	0.188	0.293	0.176
	[0.280]	[0.275]	[0.280]	[0.276]
Female	1.240***	1.184***	1.236***	1.181***
	[0.161]	[0.158]	[0.161]	[0.157]
Tenure	-0.092***	-0.067***	-0.092***	-0.067***
	[0.012]	[0.012]	[0.012]	[0.012]
Leniency	-67.827***	-66.251***	-67.803***	-66.219***
	[0.564]	[0.593]	[0.564]	[0.592]
Number of Inventors	-0.908***	-0.927***	-0.908***	-0.926***
	[0.018]	[0.017]	[0.018]	[0.017]
Art Unit FE	Yes		Yes	
Filing Year FE	Yes		Yes	
Art Unit x Filing Year FE		Yes		Yes
R-squared	0.167	0.185	0.168	0.185
Observations	5,656,437	5,656,033	5,656,437	5,656,033

Table 3: Subsample Analysis – Climate Change vs. Non-climate Change Patent Applications
The table presents patent application-level regression results examining whether the nature of green patents—specifically climate change-related versus other types (mainly pollution-related)—affects the partisan difference in approval outcomes. 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 1 if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy equal to 1 if the application is classified as green technology according to the OECD definition and zero otherwise. Examiner-level controls include age, tenure, PhD attainment, gender, and examiner leniency. 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.

	(1)	(2)	(3)	(4)
Dependent variable	*Rejection*			
	Green = Climate Green Patents		*Green* = Non-Climate Green Patents	
Republican × *Green*	2.395***	2.459***	0.795	0.808
	[0.438]	[0.412]	[0.944]	[0.945]
Green	-0.846***	-1.002***	-0.330	-0.220
	[0.147]	[0.137]	[0.387]	[0.377]
Republican	-0.369**	-0.411**	-0.350**	-0.389**
	[0.170]	[0.167]	[0.169]	[0.167]
Controls	Yes	Yes	Yes	Yes
Art Unit FE	Yes		Yes	
Filing Year FE	Yes		Yes	
Art Unit - Filing Year FE		Yes		Yes
R-squared	0.168	0.186	0.169	0.187
Observations	5,600,623	5,600,219	5,178,660	5,178,245

Table 4: Cross-sectional Heterogeneity– Climate Change Partisan Divide

The table presents patent application-level regression results examining whether the partisan difference in the approval of green patents widens as the partisan divide in public opinion over climate change increases over time. *Climate Change Partisan Divide* measures the public opinion gap over time, sourced from the Stanford Survey on Climate Change. Columns (1) and (2) include 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. Columns (3) and (4) restrict the sample to green patent applications only. *Republican* is a dummy variable equal to 1 if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy equal to 1 if the application is classified as green technology according to the OECD definition and zero otherwise. Examiner-level controls include age, tenure, PhD attainment, gender, 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.

Panel A: A subsample of green patent applications only

	(1)	(2)
Dependent variable	*Rejection*	
Republican × Climate Partisan Divide	0.165**	0.130*
	[0.070]	[0.067]
Republican	-2.249	-1.384
	[1.700]	[1.647]
Controls	Yes	Yes
Art Unit FE	Yes	
Filing Year FE	Yes	
Art Unit - Filing Year FE		Yes
R-squared	0.158	0.185
Observations	485,349	484,561

Panel B: A full sample of all patent applications

	(1)	(2)
Dependent variable	*Rejection*	
Republican × Green × Climate Partisan Divide	0.137*	0.089
	[0.073]	[0.068]
Republican × Green	-1.012	0.201
	[1.812]	[1.692]
Climate Partisan Divide × Green	0.092***	0.096***
	[0.029]	[0.027]
Republican × Climate Partisan Divide	-0.003	0.011
	[0.026]	[0.024]
Green	-2.989***	-3.057***
	[0.720]	[0.679]
Republican	-0.248	-0.645
	[0.632]	[0.590]
Controls	Yes	Yes
Art Unit FE	Yes	
Filing Year FE	Yes	
Art Unit - Filing Year FE		Yes
R-squared	0.173	0.189
Observations	4,870,237	4,869,925

Table 5: Cross-sectional Heterogeneity - President in Office

This table presents OLS regression results examining whether the partisan difference in green patent application outcomes is influenced by the party of the sitting president. The dependent variable, *Rejection*, equals 100 if the application is rejected and zero otherwise. *Republican* is a dummy variable equal to 1 if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy variable equal to 1 if the application is classified as green technology based on the OECD definition and zero otherwise. *Republican Presidency* is a dummy variable equal to 1 if the patent filing year falls between 2001–2008 or 2017–2020 and zero otherwise. Examiner-level controls include age, tenure, PhD attainment, gender, and examiner leniency. 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.

	(1)	(2)
Dependent variable	*Rejection*	
Republican × *Green x Republican Presidency*	1.516***	1.380***
	[0.507]	[0.458]
Republican × *Green*	1.465***	1.602***
	[0.466]	[0.443]
Republican × *Green*	0.309	0.385**
	[0.199]	[0.191]
Republican × *Republican Presidency*	0.007	-0.154
	[0.235]	[0.195]
Green	-0.950***	-1.112***
	[0.171]	[0.166]
Republican	-0.376*	-0.342*
	[0.201]	[0.191]
Controls	Yes	Yes
Art Unit FE	Yes	
Filing Year FE	Yes	
Art Unit - Filing Year FE		Yes
R-squared	0.168	0.185
Observations	5,656,437	5,656,033

Table 6: The Effects of Partisan Examiners on the Quality of Approved Green Patents

The table examines the quality differences of patent applications 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 et al. (2017), using OLS regressions. *Republican* is a dummy variable equal to 1 if the patent examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy variable equal to 1 if the application is classified as green technology according to the OECD definition and zero otherwise. Examiner-level control variables include age, tenure, PhD attainment, gender, and examiner leniency. 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.

	(1)	(2)	(3)	(4)
Dependent variables	*Citations*		*Patent Value - Real*	
Republican × *Green*	0.025	0.012	0.612	0.563
	[0.018]	[0.017]	[0.413]	[0.372]
Green	0.489***	0.495***	-1.367***	-1.126***
	[0.009]	[0.008]	[0.165]	[0.155]
Republican	0.013	0.012	-0.050	-0.009
	[0.009]	[0.009]	[0.120]	[0.099]
Controls	Yes	Yes	Yes	Yes
Art Unit FE	Yes		Yes	
Patent Year FE	Yes		Yes	
Art Unit-Patent Year FE		Yes		Yes
R-squared			0.139	0.174
Observations	3,901,943	3,901,434	1,317,463	1,317,028

Table 7: The Effects of Partisan Examiners on First Action Approval and Inventors' Initial Amendment

The table presents patent application-level regression results examining first action decisions by patent examiners and inventor responses following first action rejections. Columns (1) and (2) analyze first action rejection decisions. *First Action Approval* is a dummy variable equal to 100 if the application is rejected at the first action by the examiner and zero otherwise. Columns (3) and (4) report the results on whether inventors choose to file amendments following a first action rejection. *Initial Amendment* is a dummy variable equal to 100 if the inventors file an amendment after a non-final rejection at the first action stage and zero otherwise. Columns (3) and (4) restrict the sample to applications that were not approved at first action. *Republican* is a dummy equal to 1 if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy equal to 1 if the patent application is classified as green technology according to the OECD definition and zero otherwise. Examiner-level controls include age, tenure, PhD attainment, gender, and examiner leniency. 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.

	(1)	(2)	(3)	(4)
Dependent variables	*First Action Approval*		*Initial Amendment*	
Republican × Green	0.060	0.043	-1.239***	-1.210***
	[0.567]	[0.547]	[0.247]	[0.232]
Green	-0.044	-0.023	0.417***	0.424***
	[0.181]	[0.165]	[0.093]	[0.090]
Republican	0.715**	0.720**	0.036	0.040
	[0.315]	[0.308]	[0.084]	[0.080]
Controls	Yes	Yes	Yes	Yes
Art Unit FE	Yes		Yes	
Filing Year FE	Yes		Yes	
Art Unit - Filing Year FE		Yes		Yes
R-squared	0.070	0.085	0.045	0.060
Observations	5,541,761	5,541,361	4,834,391	4,833,996

Table 8: The Effects of Examiner Partisanship on Rejection Reasons in Green Patent Applications

This table presents patent application-level regression results examining the reasons for examiner rejections. The dependent variable, *Low Effort Rejection*, is a dummy variable equal to 100 if the rejection reason for the patent application falls under Section 101 or Section 112, based on the classification in Frakes and Wasserman (2017), and zero otherwise. *Republican* is a dummy variable equal to 1 if the examiner is identified as Republican in the voter registration data and zero otherwise. *Green* is a dummy variable equal to 1 if the application is classified as green technology according to the OECD definition and zero otherwise. Examiner-level controls include age, tenure, PhD attainment, gender, and examiner leniency. 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.

	(1)	(2)
Dependent variable	*Low Effort Rejection*	
Republican × *Green*	2.427**	2.523***
	[0.962]	[0.941]
Green	0.193	0.255
	[0.385]	[0.372]
Republican	0.134	0.098
	[0.579]	[0.569]
Controls	Yes	Yes
Art Unit FE	Yes	
Filing Year FE	Yes	
Art Unit - Filing Year FE		Yes
R-squared	0.111	0.124
Observations	1,754,427	1,754,170

Table 9: The Effects of Green Patent Rejections by Partisan Examiners on Inventors' Subsequent Green Patent Applications

The table presents inventor-level regression results examining how the rejection of green patent applications affects inventors' future green innovation. The dependent variables are the number of green patent applications filed by the inventor within the next three years in columns (1)-(3) and in the next five years in columns (4)-(6) following the current green patent application. The sample is restricted to green patent applications only. *Rejection* is a dummy variable equal to 1 if the green patent application was rejected by the examiner and zero otherwise. *Republican* is a dummy variable equal to 1 if the examiner is identified as Republican in the voter registration data and zero otherwise. Examiner-level controls include age, tenure, PhD attainment, gender, 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.

	(1)	(2)	(3)	(4)
Dependent variables:	*#Green App - 3 Years*		*#Green App - 5 Years*	
Rejection × Republican	-0.055***	-0.020*	-0.058***	-0.020**
	[0.019]	[0.010]	[0.018]	[0.010]
Rejection	-0.078***	-0.073***	-0.076***	-0.074***
	[0.006]	[0.004]	[0.005]	[0.004]
Republican	0.002	0.001	0.000	0.003
	[0.006]	[0.005]	[0.006]	[0.004]
Controls	Yes	Yes	Yes	Yes
Art Unit FE	Yes		Yes	
Filing Year FE	Yes		Yes	
Art Unit - Filing Year FE		Yes		Yes
Inventor FE	Yes	Yes	Yes	Yes
Observations	1,155,667	1,144,580	1,202,339	1,190,748

Table 10: The Effects of Green Patent Rejections by Partisan Examiners on Firms' Subsequent Green Innovation

This table presents 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. *Rejection Rate Difference* 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. *Fraction Republican Examiners* measures the fraction of rejected patent applications processed by Republican examiners. If *Fraction Republican Examiners* is missing, it is set to zero. Control variables include firm size, book-to-market ratio, return on equity, leverage ratio, and R&D expenses scaled by sales. 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.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	*#Green App - 3 Years*			*#Green App - 5 Years*		
Rejection Diff × Frac Republican		-0.850***	-0.738***		-0.579***	-0.471***
		[0.220]	[0.206]		[0.186]	[0.177]
Rejection Diff	-0.083	0.008	0.021	-0.118**	-0.049	-0.036
	[0.061]	[0.062]	[0.063]	[0.055]	[0.054]	[0.053]
Frac Republican		0.028	-0.026		-0.003	-0.049
		[0.061]	[0.056]		[0.059]	[0.055]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,583	11,583	10,909	11,686	11,686	11,002