

Patent Eligibility Guidance and Rejection Composition in Corporate Patenting

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Research Article

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Abstract

A patent application can clear an eligibility objection and still face rejection on other grounds. This study examines rejection composition and subsequent patent grants around the United States Patent and Trademark Office's January 2019 guidance. A local difference-in-discontinuities design compares 33 Alice-affected technology classes with other classes, using 48,695 first office actions linked to 1,197 publicly traded firms within 240 days of implementation. Three specifications report hybrid examiner groups, examiner names, and no examiner effects side by side. Eligibility-rejection estimates are -4.69 , -3.84 , and -4.72 percentage points ($p=.084$, $.174$, and $.072$), respectively. Negative estimates are concentrated in actions combining eligibility with another ground, alongside increases in other-only rejections; any-ground estimates range from -0.60 to 0.14 points. Among 41,547 rejection actions, eligibility-rejected claim counts decline by 1.49 – 1.59 , with multiplicity-adjusted q -values of $.013$ – $.055$. Grant and recorded-abandonment estimates at 24 and 36 months meet equivalence tests within ± 3 points at the 5% level with both examiner measures; without examiner effects, 36-month grant meets the 10% criterion. Concurrent Section 112 guidance and administrative action timing limit causal attribution. The category pattern is consistent with removal of eligibility objections from actions carrying another ground; an explanation based solely on adding Section 112 objections predicts different category movements. The findings distinguish changes in recorded examination objections from changes in subsequent patent acquisition among corporate applicants.

JEL classification: O31; O34; O38; K11

1. Introduction

A patent-office reform can change the objections an applicant must answer without removing every obstacle to a grant. This possibility matters for innovation policy because firms use patents to support licensing, financing, and competitive strategy. Patent grant can facilitate licensing (Gans et al., 2008), and obtaining a first patent can affect the development of young firms (Farre-Mensa et al., 2020; Gaulé, 2018). Yet an application must satisfy several legal requirements before it reaches that stage. Evaluating a change in one requirement therefore calls for evidence on the other objections that remain and on the application's subsequent outcome.

The United States Patent and Trademark Office's January 2019 examination guidance provides an opportunity to study these connections. The Revised Patent Subject Matter Eligibility Guidance (PEG), effective 7 January 2019, changed the analysis applied under Section 101, a provision especially consequential for software and related technologies after Alice. On the same date, separate guidance addressed computer-implemented functional claims under Section 112. The USPTO subsequently reported a decline in eligibility rejections after the PEG (Toole & Pairolo, 2020). Evidence on the earlier Alice decision also shows substantial changes in eligibility decisions and examination uncertainty (Frumkin et al., 2024). The question here is how the composition of first-action objections and later grant outcomes changed around the January 2019 guidance in technologies exposed to eligibility review.

The analysis follows applications linked to publicly traded firms from their first recorded office action to grant or recorded abandonment within three years. It separates four mutually exclusive first-action states: eligibility only, eligibility with another statutory ground, other grounds without eligibility, and none of the four measured statutory grounds. This decomposition distinguishes a decline in eligibility objections that leaves another rejection in place from a decline that removes the measured statutory rejection altogether. Claim-number records then show how many claims were subject to the objections. Linking these measures within an application cohort makes it possible to compare changes in examination content with changes in the probability of obtaining a patent.

The local difference-in-discontinuities design compares the cutoff change in the 33 technology classes identified by the USPTO as Alice-affected with the corresponding change in other classes. The structured sample comprises 48,695 first actions within 240 days of the effective date, linked to 1,197 firms. Three specifications use hybrid examiner groups, examiner names, or no examiner effects; all include firm, technology-class, action-week, and filing-quarter effects. They are reported side by side because each examiner treatment has a different measurement trade-off. First-action dates are administratively chosen, and both guidance documents took effect together. The estimates therefore concern conditional relative changes around the January intervention. Section 6.1 examines whether the composition of those changes is consistent with adding disclosure objections or removing eligibility objections.

Eligibility-rejection estimates are -4.69 , -3.84 , and -4.72 percentage points under hybrid groups, examiner names, and no examiner effects, respectively. The corresponding p-values are .084, .174, and .072. Across all three, the negative coefficient is concentrated in actions combining eligibility with another ground, alongside a similarly sized increase in other-only rejections. Any-ground estimates range from -0.60 to 0.14 points. Among rejection actions, Section 101 claim counts are lower by 1.49 – 1.59 , with q-values from .013 to .055. Grant and recorded-abandonment estimates satisfy the ± 3 -point equivalence criterion at the 5% level with both examiner measures; the no-examiner 36-month grant result is equivalent at the 10% level. The common pattern concerns the recorded eligibility component of examination, while its statistical precision varies across specifications.

The study contributes to research on the institutional conditions of technology transfer by examining how several patentability requirements operate together. Work on patenting uncertainty and pendency explains why the path to grant matters (Dohse et al., 2023; Zahringer et al., 2018). The evidence here addresses an earlier part of that path: whether a change in the legal grounds raised at first examination is accompanied by a change in rejection incidence or subsequent grants. The joint categories make that connection observable; the claim records describe the extent of objections within rejection actions. The contribution concerns the transmission of examination-policy changes through a system of overlapping requirements, rather than a direct estimate of licensing or commercialization effects.

2. Patent examination and technology transfer

2.1 Patent rights and the process of obtaining them

Patents enter firms' commercialization decisions in different ways. Hall (2005) documents the concentration of the US patenting surge in electrical, electronics, computing, and instruments industries and differences in patent value between entrants and incumbents. Arora et al. (2008) and Hall and MacGarvie (2010) likewise show that the private returns to patenting depend on the invention and its commercial setting. These findings caution against equating an additional patent with a uniform economic benefit. Gans et al. (2008) connect patent grant to licensing, while Farre-Mensa et al. (2020) and Gaulé (2018) examine the consequences of obtaining patents for startups. Together, this work motivates attention to the institutional process through which an application becomes an enforceable right.

Research on patenting uncertainty and pendency examines several aspects of that process. Dohse et al. (2023) relate aggregate variation in patent grant ratios to innovation, with different short- and long-run relationships. Zahringer et al. (2018), studying patents granted to emerging life-science firms, find that pendency reflects examiner, attorney, workload, and application characteristics, as well as firms' strategic choices. These studies address uncertainty and timing; neither measure reveals which legal objections applicants had to overcome. First-action grounds provide evidence on that part of examination, and following all qualifying first actions avoids restricting the downstream analysis to applications that eventually succeed.

Patent acquisition also differs from commercialization. Krishna and Jain (2025) link granted pharmaceutical patents to India's disclosures of patent use, treating commercialization as an outcome to be measured separately. Kwon et al. (2024) examine how regulatory uncertainty affects the translation of nanomedicine research into technical applications. Their evidence illustrates why a policy's effect should be traced to the relevant stage of innovation. The present study observes examination and patent acquisition. These are potential inputs into technology transfer, but changes in their recorded measures cannot establish changes in commercial use.

Applications linked to publicly traded firms provide the population for this analysis. Such firms may prosecute patents as part of a portfolio and have resources to continue after an adverse first action. Those features make it useful to study the objections they encounter even when grant probabilities change little. They are possible explanations for the results, however, rather than tested differences from startups. Firm fixed effects account for persistent differences across the linked applicants. Exact-name matching still omits some subsidiaries and historical ownership links, and the publication-linked universe excludes unpublished applications. The evidence therefore concerns the observed public-company cohort, not all corporate invention.

2.2 Overlapping patentability requirements

Eligibility, novelty, non-obviousness, and disclosure requirements can apply to the same claim. Their overlap creates a simple distinction between changes in legal grounds and changes in rejection incidence. Consider an action containing both an eligibility and a novelty rejection. Removing the eligibility ground would leave the action in the rejection category, now classified as other-only. Removing

eligibility from an action rejected solely on that ground would instead remove its measured statutory rejection. A reduction in the Section 101 rate can therefore correspond to quite different changes in an applicant's position.

This distinction yields observable implications without requiring a claim about examiner motives. If changes occur mainly in actions combining eligibility with other grounds, eligibility-plus-other may fall while other-only rises and any-ground rejection changes little. If eligibility-only actions account for much of the change, any-ground rejection may also fall. The subsequent grant response depends on whether applicants can resolve the remaining objections, through argument or amendment, within the observed horizon. These possibilities motivate the decomposition and follow-up outcomes. Aggregate category shifts do not identify transitions for particular applications, and a rise in other-only actions does not itself show that examiners introduced new objections to compensate for relaxed eligibility review.

Claim-number records describe the extent of the objections within each action. An eligibility rejection affecting one claim differs from one affecting many claims, while a claim rejected under several statutes remains rejected if only one ground is removed. Distinct-claim and multi-statute counts make that overlap visible and avoid interpreting the sum of statute-specific counts as the number of affected claims. These measures record the incidence of objections across claims. They do not capture claim scope, for which Marco et al. (2019) develop separate measures, or the time and cost of answering an objection.

The examining organization may also influence the response to guidance. Examiner characteristics and specialization are associated with examination outcomes (Lemley & Sampat, 2012; Righi & Simcoe, 2019), and research on time constraints and examiner amendments shows how administrative practice can affect decisions (Frakes & Wasserman, 2017; deGrazia et al., 2021). More recently, Tur and Markus (2025) associate repeated examiner–attorney interactions with grant probability and processing time. These findings motivate examiner controls and caution against attributing all variation in rejection records to the legal merits of inventions. The available examiner measures and their limitations are set out in Section 4.2.

2.3 Evidence on eligibility policy and the questions examined here

The USPTO's Adjusting to Alice report documents lower first-action eligibility rejection rates and lower cross-examiner uncertainty after the PEG (Toole & Pairolero, 2020). Frumkin et al. (2024) identify changes in eligibility decisions and uncertainty after the earlier Alice judgment. Chien et al. (2020) provide an early assessment of Alice and the PEG. The present analysis extends this line of work by placing eligibility outcomes alongside the other grounds recorded in the same actions and the later outcomes of those applications. Its sample, local comparison, and initial-exposure contrast differ from the Office's aggregate assessment, so the estimated magnitudes need not coincide.

The empirical questions follow from the overlap of patentability requirements. Did the January cutoff coincide with a differential change in eligibility rejections in Alice-affected classes? Was that change concentrated in joint rejection categories, and how did the incidence of any measured statutory rejection compare? Did the same first-action cohorts exhibit different grant or recorded-abandonment probabilities two and three years later? Equivalence tests address the last question at stated margins. The claim analysis adds evidence on recorded objections among rejected applications, while recognizing that entry into this group can itself change around the intervention.

3. Institutional setting

Section 101 of the Patent Act defines the categories of eligible invention, and judicial decisions recognize exceptions for abstract ideas, laws of nature, and natural phenomena. *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66 (2012), and *Alice Corp. v. CLS Bank International*, 573 U.S. 208 (2014), established the two-step framework that examiners and applicants confront. Eligibility questions are most salient for software and related technologies, although the doctrine and the guidance apply across the Office.

The PEG grouped abstract ideas and introduced a practical-application inquiry within Step 2A of the Office's eligibility analysis. It did not amend the patent statute or bind courts. The notice described its role as internal examination guidance that USPTO personnel were expected to follow (USPTO, 2019a). The empirical exposure measure combines membership in the 33 Alice-affected technology classes with the guidance's effective date. The guidance's relevance to artificial intelligence and other digital technologies arises from their exposure to eligibility questions; no AI-specific rule defines treatment.

A separate notice on computer-implemented functional claims under Section 112 took effect on the same day. It addressed means-plus-function interpretation, definiteness, written description, and enablement (USPTO, 2019b). These technologies can face both eligibility and disclosure questions, and the notice also concerns how claims are interpreted. The two notices address distinct statutory requirements within the same examination process. Section 6.1 uses their different implications for recorded grounds to assess a specific explanation based on adding Section 112 objections, while allowing for joint responses to the notices.

Both notices applied to pending applications. A first action before 7 January 2019 therefore did not put an application on a permanently untreated path: later examination could occur under the new guidance. The downstream comparison concerns cohorts whose initial examination occurred on different sides of the cutoff, not permanent assignment to different policy regimes.

The preferred ± 240 -day window runs from 12 May 2018 to 4 September 2019; the first observed action is dated 14 May 2018. It lies after the 19 April 2018 Berkheimer memorandum and before the October 2019 eligibility update (USPTO, 2019c). These boundaries reduce overlap with those earlier and later eligibility interventions, while leaving the simultaneous January guidance inseparable. Windows of ± 90 , ± 120 , and ± 180 days assess sensitivity to the period used for estimation.

4. Data and measurement

4.1 Linked applications and first actions

The data combine the USPTO Patent Examination Research Dataset (PatEx), structured Office Action Rejection Dataset (OARD) records, office-action text and metadata, and the Artificial Intelligence Patent Dataset (AIPD; Pairolero et al., 2025). PatEx provides application dates, transaction records, classifications, examiner metadata, status information, and patent issue dates (Graham et al., 2018). Applications are linked to publicly traded firms using exact company-name variants that map unambiguously to a single GVKEY. The linkage contains 521,073 applications associated with 2,042 firms; 346,753 applications match the AIPD publication universe, including both AI and non-AI documents; and a complete first-action record exists for 320,292 applications.

A first action is the earliest recorded qualifying transaction for an application: non-final rejection, final rejection, Ex parte Quayle action, or notice of allowance. Retaining allowance and Quayle records defines a denominator beyond rejection documents, so that a rejection rate is a rate over all first actions. The $\pm$ 240-day window contains 48,834 applications. Structured OARD coding is available for 48,695 of them (99.72%), spanning 368 three-digit United States Patent Classification (USPC) classes and 1,197 firms. The 139 unresolved OARD nonmatches are treated as missing, not as zero rejections. Grant and abandonment models use all 48,834 applications because their outcomes do not require an OARD match.

The treated group comprises the 33 classes identified as Alice-affected in the USPTO report; all other observed classes form the comparison group. Within the structured sample, 20,865 actions are in affected classes. Table 1 reports unadjusted first-action outcomes by group and period.

Table 1
Unadjusted first-action outcomes (%)

Outcome	Affected pre	Affected post	Other pre	Other post
Section 101 rejection	37.9	24.1	15.4	10.4
Section 101 plus another ground	34.6	21.8	13.3	9.1
Other statutory ground(s) only	44.7	55.8	63.1	67.0
Any of the four statutory grounds	82.6	79.9	78.5	77.4
Applications	10,297	10,568	13,635	14,195
Notes: Unadjusted proportions in the 48,695-action sample; percentages except application counts.				

4.2 Examiner identifiers

Three examiner specifications are reported in the main tables. The hybrid specification uses office-action employee numbers for matched rejection actions and PatEx examiner-of-record names for actions

without those metadata, producing 10,424 groups in the complete window and 10,353 in the structured sample. The examiner-name specification uses names normalized for capitalization and whitespace across all action types, producing 7,385 and 7,382 groups, respectively. The third specification omits examiner fixed effects and examiner clustering. Hybrid groups use action-linked identifiers where available but can split the same examiner across document types. Names provide consistent coverage but may reflect reassignment in the application record. Omitting examiner effects avoids reliance on either identifier while leaving examiner heterogeneity uncontrolled.

Office-action employee numbers permit a consistency check using action-linked examiner information on 41,547 matched rejection actions. Of 7,433 employee numbers, 92.4% are paired with one PatEx name. Across actions, 97.2% of names match the modal name associated with their employee number, and 2.8% differ. The modal mapping is estimated from these same pairs, so the 97.2% statistic measures consistency of the mapping rather than an independently established accuracy rate for historical names. A docket transferred entirely to one successor can retain a consistent but historically incorrect name mapping; identical names can also merge different people. Employee-number coverage limits this check to rejection actions. Online Resource 1, Section B, gives the counts and definitions used in the comparison.

4.3 Statutory states and claim records

The principal legal-screen outcome is an OARD-coded Section 101 rejection, with parallel indicators for Sections 102, 103, and 112. Four mutually exclusive categories are constructed from these indicators: eligibility only; eligibility together with at least one of the other three statutes; one or more other statutes without eligibility; and none of the four measured statutes. The first three categories sum to any measured statutory rejection. The last category does not exclude procedural objections or rejections outside these four statutes.

Claim-number records are available for 41,547 actions: 41,190 non-final rejections and 357 final rejections. Allowance and Quayle actions contain no arrays and are excluded from the claim analysis. The outcomes are the number of Section 101-rejected claims, distinct rejected claims, claims rejected under multiple statutes, statutes invoked, and allowed claims within each rejection action, together with the Section 101 share of rejected claims. A further sample of 9,994 actions containing at least one Section 101-rejected claim is examined in the appendix. Entry into either sample can respond to the intervention, so the estimates describe recorded objections among the actions observed in each period. Amendment content, claim scope, attorney hours, and monetary prosecution cost are unavailable.

4.4 Downstream outcomes

Grant equals one when the patent issue date falls between the first action and the stated horizon. Recorded abandonment equals one when the observed application status indicates abandonment and the status date falls within the horizon; it is based on the available status snapshot and does not observe an abandonment followed by revival. The 24- and 36-month horizons correspond to 730 and 1,096 days.

All applications in the window reach the 36-month horizon before the 2023 status snapshot. Grant at 12 and 18 months is constructed with the same convention as an exploratory timing check.

5. Empirical strategy

5.1 Local difference in discontinuities

For application i in the selected window, the estimating equation is

$$Y_i = \beta A_c P_i + \gamma_1 A_c r_i + \gamma_2 A_c P_i r_i + X_i \delta + \alpha_c + \mu_e + \lambda_w + \varphi_q + \eta_f + \epsilon_i$$

where A denotes an Alice-affected class, P indicates an action on or after 7 January 2019, and r is days from that date divided by 180. The controls X are small-entity status, America Invents Act status, and filing-to-first-action days. Fixed effects represent technology class, examiner group, action week, filing quarter, and firm. Action-week effects absorb the common calendar path, and the explicit running-variable terms allow the affected-versus-comparison gap to have different linear slopes before and after the cutoff. Observations in the window are equally weighted.

Identification requires the affected-versus-comparison outcome gap to have been continuous at the cutoff, conditional on the specified slopes and controls, in the absence of the January intervention. The design adapts the difference-in-discontinuities approach of Grembi et al. (2016), but its running variable is an administrative action date rather than an externally fixed assignment characteristic. Standard regression-discontinuity arguments therefore require care (Lee & Lemieux, 2010; Hausman & Rapson, 2018). Examiners and the Office can influence the date. Firm and examiner fixed effects cannot rule out differential scheduling or unobserved changes in the applications reaching first examination. Filing-to-action time is included in the conditional specification, but is itself related to the timing process rather than an independent validation of assignment.

The parameter β measures the relative discontinuity between affected and comparison classes, both of which were subject to the nationwide notices. First-action cohorts examined before the cutoff could receive the guidance later, limiting the contrast in downstream exposure. Because the two January notices share an implementation date, causal attribution to the intervention requires continuity in other differential determinants of the outcomes. Attribution to the PEG separately requires additional assumptions about the concurrent Section 112 response. The decomposition in Section 6.1 evaluates a specific mechanism under explicit assumptions about which grounds change.

Standard errors use Cameron–Gelbach–Miller clustering by examiner group, class, and firm in the two specifications with examiner effects (Cameron et al., 2011); the specification without examiner effects clusters by class and firm. Confidence intervals and p-values use a t reference distribution with degrees of freedom equal to the smallest one-way cluster count minus one. Exact p-values are reported, with .05 and .10 levels distinguished when significance is discussed. Appendix C specifies the covariance

calculation and convergence checks; the remaining appendix tables report coefficients and sensitivity results.

5.2 Equivalence tests and multiple outcomes

Two one-sided tests assess whether each grant or recorded-abandonment coefficient lies within ± 3 percentage points. At the 5% test level, the 90% confidence interval must lie entirely inside that region (Lakens, 2017). The margin represents a tolerance of three additional or fewer observed outcomes per 100 applications in this relative comparison. It is a chosen benchmark, not an economically negligible difference for every applicant. Results at ± 1 and ± 2 points show sensitivity to stricter tolerances. Equivalence at a stated margin is conditional on the model and its identifying assumptions.

The nine statutory outcomes overlap through accounting identities and are reported with unadjusted p-values and a nine-outcome Benjamini–Hochberg adjustment in the appendix. The six claim outcomes among rejection actions form a separate adjustment family, reported with q-values in Table 3, and the four outcomes conditional on a Section 101 claim form a third. Estimates in nested bandwidths are not independent replications and are read as a pattern.

6. Results

6.1 Eligibility rejections and the composition of grounds

The unadjusted Section 101 rate falls from 37.9% to 24.1% in affected classes and from 15.4% to 10.4% in other classes (Table 1). Table 2 reports estimates and 95% confidence intervals under all three examiner specifications. These regressions account for the common weekly path, differential slopes, and the stated controls. Appendix D supplies the full coefficient tables and multiplicity adjustment.

Table 2
Statutory outcomes under three examiner specifications

Outcome	Hybrid groups	Examiner names	No examiner effects
Section 101 rejection	-4.69 (.084) [- 10.02, 0.63]	-3.84 (.174) [- 9.39, 1.71]	-4.72 (.072) [- 9.85, 0.42]
Section 102 rejection	-2.17 (.216) [- 5.62, 1.27]	-1.62 (.407) [- 5.44, 2.21]	-1.69 (.354) [- 5.29, 1.90]
Section 103 rejection	-1.54 (.284) [- 4.35, 1.28]	0.24 (.887) [- 3.04, 3.51]	-0.24 (.882) [- 3.36, 2.89]
Section 112 rejection	1.39 (.415) [- 1.96, 4.74]	1.88 (.297) [- 1.66, 5.43]	0.77 (.630) [- 2.36, 3.90]
Section 101 only	-0.45 (.583) [- 2.07, 1.17]	-0.45 (.567) [- 1.97, 1.08]	-0.29 (.581) [- 1.31, 0.74]
Section 101 plus another ground	-4.24 (.088) [- 9.11, 0.63]	-3.40 (.188) [- 8.45, 1.66]	-4.43 (.076) [- 9.33, 0.47]
Other statutory ground(s) only	4.09 (.091) [- 0.66, 8.83]	3.62 (.163) [- 1.47, 8.72]	4.85 (.036) [0.32, 9.39]
None of the four statutory grounds	0.60 (.649) [- 2.00, 3.21]	0.22 (.891) [- 2.89, 3.32]	-0.14 (.924) [- 2.90, 2.63]
Any of the four statutory grounds	-0.60 (.649) [- 3.21, 2.00]	-0.22 (.891) [- 3.32, 2.89]	0.14 (.924) [- 2.63, 2.90]
Notes: Alice-affected × Post coefficients. All models control for small-entity status, America Invents Act status, and filing-to-first-action days, with firm, USPC-class, action-week, and filing-quarter fixed effects. Hybrid groups use employee numbers on matched rejection actions and names otherwise; examiner names use the PatEx name field throughout. Both include examiner effects and cluster by examiner group, class, and firm. No examiner effects omits that group and clusters by class and firm. Section 4.2 explains the measurement trade-offs. pp = percentage points. Cells report the estimate in pp, unadjusted p-value in parentheses, and 95% CI. N = 48,695 in every column. The first four outcomes overlap; the next four are mutually exclusive; the final row sums the three rejection categories.			

The Section 101 coefficients are - 4.69, - 3.84, and - 4.72 percentage points for hybrid groups, examiner names, and no examiner effects, respectively. Their p-values are .084, .174, and .072. The hybrid and no-examiner estimates are significant at the 10% level; the examiner-name estimate is not significant at that level. All three 95% intervals include zero. None of the separate Section 102, 103, or 112 coefficients is significant at the 10% level in the preferred window.

The decomposition locates the negative eligibility coefficient mainly in actions that also contain another ground. In the same column order, eligibility-plus-other estimates are – 4.24, – 3.40, and – 4.43 points, while other-only estimates are 4.09, 3.62, and 4.85. Eligibility-only estimates are small in each specification. Their offset leaves any-ground estimates of – 0.60, – 0.22, and 0.14 points. The examiner-name 95% interval for any-ground rejection is [– 3.32, 2.89]; all three intervals appear in Table 2. Equivalence testing is reserved for the downstream outcomes in Section 6.3.

The estimated category pattern is consistent with removal of an eligibility element from actions that also contain another ground, leaving a measured statutory rejection in place. The regressions compare category shares across cohorts; individual applications' transitions between these categories are unobserved. Similar signs across the three specifications describe a common pattern, while their different confidence intervals show its sensitivity to examiner treatment.

The decomposition helps evaluate an explanation based solely on adding Section 112 objections. Holding existing grounds and the application mix fixed, adding such an objection to an eligibility-only action moves it into eligibility-plus-other; adding it to an action with no measured ground moves it into other-only and raises any-ground rejection. Adding it to an action already carrying another ground leaves the four-category classification unchanged. The observed signs—lower eligibility-plus-other and higher other-only—run against that addition-only account and are consistent with removal of eligibility objections from joint rejections. Section 112 estimates are 1.39, 1.88, and 0.77 points across the three specifications ($p=.415$, $.297$, and $.630$). Multi-statute claim counts also fall, although these estimates condition on rejection. This is evidence about a mechanism under stated assumptions, rather than separate identification of the two notices. Claim interpretation, examination practice, and cohort composition can respond jointly. The any-ground interval bounds the net relative discontinuity; offsetting responses to the two notices can leave a small net change even when their separate contributions are larger.

6.2 Recorded objections within rejection actions

Table 3 reports claim outcomes among 41,547 rejection actions under all three examiner specifications, with unadjusted p-values, Benjamini–Hochberg q-values for the six-outcome family, and 95% confidence intervals. Appendix G supplies the remaining estimates and sample definitions.

Table 3
Recorded claim objections under three examiner specifications

Outcome	Hybrid groups	Examiner names	No examiner effects
Claims rejected under Section 101	-1.594 (.007; .035) [- 2.748, - 0.441]	-1.494 (.013; .055) [- 2.677, - 0.311]	-1.527 (.003; .013) [- 2.540, - 0.515]
Distinct rejected claims	-0.812 (.030; .045) [- 1.545, - 0.079]	-0.748 (.027; .055) [- 1.412, - 0.084]	-0.462 (.140; .168) [- 1.077, 0.152]
Claims rejected under multiple statutes	-1.078 (.016; .035) [- 1.953, - 0.203]	-1.041 (.024; .055) [- 1.944, - 0.138]	-1.086 (.004; .013) [- 1.832, - 0.340]
Number of statutes invoked	-0.078 (.112; .134) [- 0.173, 0.018]	-0.061 (.234; .281) [- 0.162, 0.040]	-0.076 (.109; .163) [- 0.168, 0.017]
Section 101 share of rejected claims (pp)	-6.78 (.017; .035) [- 12.36, - 1.20]	-6.43 (.037; .055) [- 12.45, - 0.40]	-6.72 (.013; .025) [- 11.99, - 1.46]
Allowed claims in rejection actions	-0.290 (.715; .715) [- 1.849, 1.269]	-0.383 (.633; .633) [- 1.961, 1.194]	-0.731 (.390; .390) [- 2.401, 0.939]
Notes: Alice-affected × Post coefficients. All models control for small-entity status, America Invents Act status, and filing-to-first-action days, with firm, USPC-class, action-week, and filing-quarter fixed effects. Hybrid groups use employee numbers on matched rejection actions and names otherwise; examiner names use the PatEx name field throughout. Both include examiner effects and cluster by examiner group, class, and firm. No examiner effects omits that group and clusters by class and firm. Section 4.2 explains the measurement trade-offs. pp = percentage points. Cells report the estimate, unadjusted p-value and six-outcome Benjamini–Hochberg q-value in parentheses, and 95% CI. N = 41,547 rejection actions in every column. The share is in pp; other outcomes are counts. The analysis conditions on a rejection action.			

The coefficient for the number of Section 101-rejected claims is - 1.594 with hybrid groups (p=.007, q=.035), - 1.494 with examiner names (p=.013, q=.055), and - 1.527 without examiner effects (p=.003, q=.013). The pooled sample mean is 2.9 claims per rejection action. The Section 101 share falls by 6.43–6.78 percentage points, and the multi-statute claim count falls by 1.041–1.086. These outcomes are significant at the 5% level before adjustment in all three specifications. After adjustment, they are significant at the 5% level with hybrid groups and without examiner effects, and at the 10% level with examiner names. Distinct rejected claims decline significantly at the 5% level after adjustment with hybrid groups and at the 10% level with examiner names; the no-examiner estimate has q=.168. The number of statutes invoked and the number of allowed claims have p-values above .10 in all three specifications.

The claim records thus show fewer recorded eligibility objections among rejection actions issued after the cutoff, relative to the comparison classes. They describe recorded objections among the rejection actions issued in each period, not prosecution cost or a fixed population of rejected applications; a near-zero change in rejection incidence does not by itself hold the composition of that sample fixed. The further restriction to 9,994 actions with at least one Section 101-rejected claim illustrates the issue: the multi-statute count rises by 1.170 with examiner names ($q=.042$), but its estimate without examiner effects is 0.005 ($p=.990$). These conditional results provide no stable evidence of a reduction within a fixed group of applications facing eligibility objections.

6.3 Grant and recorded abandonment

Table 4 reports grant and recorded-abandonment estimates at 24 and 36 months for all 48,834 applications under each examiner specification. Each cell presents the estimate, its 90% interval, and the two one-sided-test p-value at the ± 3 -percentage-point margin.

Table 4
Grant and recorded-abandonment outcomes under three examiner specifications

Outcome	Hybrid groups	Examiner names	No examiner effects
Grant within 24 months	0.08 [− 2.18, 2.33] TOST p = .017	−0.03 [− 2.20, 2.14] TOST p = .012	0.10 [− 2.57, 2.76] TOST p = .037
Grant within 36 months	0.42 [− 1.83, 2.68] TOST p = .030	0.38 [− 1.58, 2.35] TOST p = .014	1.10 [− 1.15, 3.35] TOST p = .082
Recorded abandonment within 24 months	−0.15 [− 2.27, 1.97] TOST p = .014	−0.05 [− 1.88, 1.79] TOST p = .004	−0.44 [− 2.27, 1.40] TOST p = .011
Recorded abandonment within 36 months	0.24 [− 1.89, 2.37] TOST p = .017	0.34 [− 1.51, 2.19] TOST p = .009	−0.07 [− 2.00, 1.86] TOST p = .006
Notes: Alice-affected $\times$ Post coefficients. Controls and fixed effects follow Table 2. The first two columns cluster by examiner group, class, and firm; the third clusters by class and firm. Cells report the estimate in percentage points (pp), 90% CI, and TOST p-value at the ± 3 pp margin. N = 48,834 in every column. TOST p < .05 indicates equivalence at the 5% level; p < .10 indicates equivalence at the 10% level.			

All four outcomes satisfy the ± 3 -percentage-point equivalence criterion at the 5% level with both hybrid groups and examiner names, with TOST p-values ranging from .004 to .030. Without examiner effects,

three outcomes satisfy the same 5% criterion. The 36-month grant interval extends to 3.35 points and has TOST $p=.082$, satisfying equivalence at the 10% level. Across the three specifications, point estimates range from -0.03 to 1.10 points for grant and from -0.44 to 0.34 points for recorded abandonment. These are relative differences between initial-examination cohorts at the stated horizons and margin.

Tighter margins produce narrower conclusions. With examiner names, 24-month recorded abandonment satisfies the 5% equivalence criterion at ± 2 points; the other outcomes have TOST p -values between $.05$ and $.10$ at that margin. No outcome meets the 10% criterion at ± 1 point (Appendix Table F1). Exploratory 12- and 18-month grant estimates with examiner names are -0.35 and 0.57 points ($p=.835$ and $p=.651$; Table F2). Both p -values exceed $.10$. These models retain all applications and estimate horizon-specific probabilities, rather than processing time among eventual grants.

The downstream results constrain the relative differences between initial-examination cohorts in this model. Effects shared by affected and comparison classes, or exposure received by both cohorts later in prosecution, can produce a smaller contrast than the total effect of the January guidance. The results therefore support a bounded statement about near-term patent acquisition in the linked cohort, rather than a conclusion that the guidance had no effect on corporate access to patents.

7. Sensitivity and diagnostics

7.1 Bandwidth and functional form

Table 5 reports the four key statutory outcomes across ± 90 -, ± 120 -, ± 180 -, and ± 240 -day windows, with the three examiner specifications shown side by side.

Table 5
Bandwidth sensitivity under three examiner specifications

±Days	Outcome	Hybrid groups	Examiner names	No examiner effects
90	Section 101	-1.85 (.479)	-3.52 (.250)	-6.47 (.039)
	Section 101 plus other	-2.03 (.446)	-3.47 (.242)	-5.70 (.037)
	Other-only	2.78 (.144)	5.29 (.028)	5.96 (.020)
	Any measured ground	0.93 (.745)	1.78 (.562)	-0.51 (.834)
120	Section 101	-4.11 (.133)	-4.18 (.161)	-4.66 (.124)
	Section 101 plus other	-3.98 (.119)	-3.83 (.143)	-4.19 (.130)
	Other-only	3.46 (.101)	4.93 (.070)	4.95 (.079)
	Any measured ground	-0.65 (.726)	0.75 (.744)	0.28 (.892)
180	Section 101	-7.08 (.004)	-5.89 (.026)	-6.76 (.018)
	Section 101 plus other	-6.51 (.006)	-5.32 (.029)	-6.39 (.012)
	Other-only	6.22 (.002)	6.63 (.004)	7.81 (< .001)
	Any measured ground	-0.86 (.580)	0.74 (.710)	1.05 (.579)
240	Section 101	-4.69 (.084)	-3.84 (.174)	-4.72 (.072)
	Section 101 plus other	-4.24 (.088)	-3.40 (.188)	-4.43 (.076)
	Other-only	4.09 (.091)	3.62 (.163)	4.85 (.036)
	Any measured ground	-0.60 (.649)	-0.22 (.891)	0.14 (.924)

Notes: Alice-affected × Post coefficients. All models control for small-entity status, America Invents Act status, and filing-to-first-action days, with firm, USPC-class, action-week, and filing-quarter fixed effects. Hybrid groups use employee numbers on matched rejection actions and names otherwise; examiner names use the PatEx name field throughout. Both include examiner effects and cluster by examiner group, class, and firm. No examiner effects omits that group and clusters by class and firm. Section 4.2 explains the measurement trade-offs. pp = percentage points. Cells report estimates in pp with unadjusted p-values in parentheses. Sample sizes are 17,337 at ± 90 days, 24,402 at ± 120, 36,464 at ± 180, and 48,695 at ± 240, identical across specifications. Windows are nested.

The signs of the composition estimates are similar across windows, but their magnitudes and precision vary. At ± 180 days, eligibility, eligibility-plus-other, and other-only are significant at the 5% level in all three specifications. The corresponding examiner-name estimates are - 5.89, - 5.32, and 6.63 points. At ± 90 days, the hybrid eligibility estimate has p=.479, the examiner-name estimate has p=.250, and the no-examiner estimate has p=.039. At ± 120 days, their p-values are .133, .161, and .124. The any-ground

coefficient has $p > .10$ throughout Table 5. Appendix Table E1 also shows a positive Section 112 estimate with examiner names at ± 180 days (5.41 points, $p = .021$). The preferred ± 240 -day window is retained because it sits between the earlier and later eligibility interventions; Table 5 reports the sensitivity to narrowing it.

Appendix Table E2 reports donut exclusions from 0 to 30 days and a local-quadratic specification with examiner names. Section 101 donut estimates range from -3.48 to -5.15 points, with p -values above $.10$. The quadratic coefficient is -5.00 points ($p = .098$), significant at the 10% level, and the other-only coefficient is 7.65 ($p = .002$), significant at the 5% level. Table E3 provides the hybrid bandwidth estimates in detail. These checks describe sensitivity to specification and observation timing; causal interpretation still depends on the assumptions about the calendar cutoff.

7.2 Filing cohort, coverage, and text-based coding

Restricting the sample to applications filed before 7 January 2019 retains 46,707 structured actions and yields an examiner-name Section 101 coefficient of -3.68 points ($p = .197$; Appendix Table H1). The similarity to the full-sample estimate suggests that newly filed post-guidance applications do not drive the point estimate. The restriction leaves open amendment of pending applications and selective timing of their examination.

Structured OARD coverage is 99.72%; its estimated differential change is 0.012 points ($p = .889$). Claim-array coverage coincides with matched rejection-action status, so its change is a selection outcome, not a test of random missingness. A separate text-based Section 101 measure differs from structured coding by -1.63 points in the cutoff contrast ($p = .064$; Appendix Table H2). This discrepancy indicates sensitivity to how eligibility objections are extracted and recorded. Structured coding remains the principal outcome, but the text measure is not treated as independent validation of the legal classification.

7.3 Timing diagnostics

Appendix Table H4 examines action timing using a class-week count regression that includes zero-count cells and does not depend on examiner identifiers. The differential change in $\log(1 + \text{count})$ has $p = .421$ at ± 240 days, $p = .005$ at ± 120 days, and $p = .072$ at ± 180 days. These results indicate that the timing process is sensitive to the chosen window. Covariate-balance estimates show no detectable cutoff change in small-entity status, America Invents Act status, or filing-to-action days (Table H3). Failure to reject in the preferred window does not establish random timing, and the count regression is not a conventional density test for an externally assigned running variable.

8. Discussion

Across the three examiner specifications, the negative eligibility coefficient is concentrated in actions that also contain another ground, while the any-ground estimate is close to zero. Claim records show fewer eligibility-rejected claims among the rejection actions observed in each period. Downstream

estimates satisfy the chosen three-point equivalence margin at the 5% level with both examiner measures; the no-examiner 36-month grant result is equivalent at the 10% level. The composition provides evidence consistent with removal of eligibility objections from joint rejections. Its precision varies across specifications, and attributing that pattern to the PEG separately requires assumptions about the concurrent Section 112 response.

The substantive implication concerns how examination changes may reach firms. When several grounds sustain a rejection, clarification of eligibility can leave applicants facing prior-art or disclosure objections. The relevant policy question is then whether remaining objections still prevent or delay the acquisition of rights. The evidence here is compatible with that constraint: the composition estimates move more than the net rejection estimate, and the subsequent grant contrast is limited at the stated margins. This interpretation offers a possible explanation for why changes in eligibility practice need not translate proportionately into changes in grants.

This finding complements the literature on uncertainty and technology transfer. The grant and pendency measures studied by Dohse et al. (2023) and Zahringer et al. (2018) address different aspects of the patenting process from first-action objections. Gans et al. (2008) connect grant timing to licensing, but similar grant probabilities at a few horizons do not imply unchanged licensing opportunities or unchanged uncertainty. Krishna and Jain (2025) further demonstrate the value of observing commercialization separately from patent acquisition. The present estimates identify an examination-stage pattern that those later outcomes alone would not describe; they do not determine its commercial value.

For patent offices, the practical implication is to evaluate statutory grounds jointly and connect them to application outcomes. A lower Section 101 rate can reflect fewer actions with an eligibility-only rejection or fewer eligibility elements in actions that remain rejected. Reporting these categories makes the distinction visible without inferring intentional substitution by examiners. The simultaneous Section 112 guidance reinforces the need to consider the combination of examination requirements when assessing the January intervention.

For corporate applicants, the evidence gives a reason to distinguish exposure to eligibility objections from the broader prospects of obtaining a grant. Fewer recorded eligibility objections could reduce the arguments needed in a response, but claim counts cannot establish lower attorney fees, fewer amendment rounds, or broader surviving claims. Established applicants may also have resources to continue prosecution despite an adverse first action. Testing those mechanisms would require response documents, prosecution costs, or claim-scope measures, and linking the examination records to licensing or commercialization would be needed to assess benefits beyond patent acquisition.

The main limitations concern attribution, timing, and measurement. The shared January implementation date leaves the individual contributions of the two notices unresolved by the cutoff comparison. Administrative scheduling and the uneven action-count diagnostics leave uncertainty about selection into first examination. The examiner specifications expose different trade-offs between action-linked

information, uniform coverage, and control for examiner heterogeneity. The claim analysis conditions on rejection, and the status snapshot can miss abandonment followed by revival. Finally, the conservatively linked public-company cohort and relative exposure comparison limit generalization. These limitations remain relevant when the reported confidence intervals are narrow.

9. Conclusion

The January 2019 examination guidance is associated with a pattern in which recorded eligibility objections decline while other grounds continue to sustain many first-action rejections. This pattern appears under hybrid examiner groups, examiner names, and no examiner effects, with variation in statistical precision. Conditional claim records provide additional evidence on the extent of eligibility objections. Grant and recorded-abandonment results meet the three-point equivalence criterion at the 5% level with both examiner measures, while the no-examiner 36-month grant result meets the 10% criterion. Together, the findings describe different responses along the path from examination to patent acquisition.

For innovation policy, the study shows why evidence about a targeted legal ground must be interpreted alongside the remaining patentability requirements. A change in examination practice can have limited implications for near-term grants when other objections remain. The present evidence supports that possibility for the linked corporate cohort, while leaving the separate effects of the January notices and the consequences for commercialization unresolved.

Declarations

Supplementary information

Online Resource 1. Online Appendix containing sample construction, examiner measurement, complete estimates, and sensitivity analyses.

Author Contribution

The author confirms sole responsibility for study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

Data availability

The study combines public USPTO PatEx, OARD, office-action metadata, and AIPD records with a company-name linkage constructed from licensed inputs that cannot be redistributed. Public source datasets are available through the USPTO research-data portal (<https://www.uspto.gov/ip-policy/economic-research/research-datasets>).

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