

OFFICE OF THE CHIEF ECONOMIST
IP DATA HIGHLIGHTS

Number 3, April 2020



Adjusting to *Alice*

USPTO patent examination
outcomes after *Alice Corp. v.*
CLS Bank International

UNITED STATES
PATENT AND TRADEMARK OFFICE



Adjusting to *Alice*

USPTO patent examination outcomes after *Alice Corp. v. CLS Bank International*

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KEY FINDINGS

- The likelihood of receiving a first office action with a rejection for patent-ineligible subject matter increased by 31% in the 18 months following the U.S. Supreme Court decision in *Alice Corp. v. CLS Bank International* in 33 “*Alice*-affected” technology areas.
- For these technologies, uncertainty in patent examination — measured as variability in patent subject matter eligibility determinations across examiners in the first action stage of examination — increased by 26% in the 18 months following the *Alice* decision.
- One year after the United States Patent and Trademark Office issued its January 2019 Revised Patent Subject Matter Eligibility Guidance (2019 PEG), the likelihood of *Alice*-affected technologies receiving a first office action with a rejection for patent-ineligible subject matter had decreased by 25%.
- Uncertainty in patent examination for *Alice*-affected technologies decreased by 44% in the 12 months following the issuance of the 2019 PEG.

¹ Any inquiries regarding this publication should be sent to economics@uspto.gov. Supplementary materials for this report are available at www.uspto.gov/ip-policy/economic-research/publications/reports.

Introduction

The U.S. patent system involves an interdependent and dynamic network of institutions. As one of the central institutions in this network, the United States Patent and Trademark Office (USPTO) evaluates and adjusts to changes that originate in other parts of the system. Through those adjustments, the USPTO is able to optimize the timeliness and quality of patent examination while staying within the legal parameters set by other institutions through U.S. statutes, judicial rulings, and international treaties.

On June 19, 2014, the U.S. patent system experienced a major change. The U.S. Supreme Court reached a unanimous decision in *Alice Corp. v. CLS Bank International*² that altered the law on patent subject matter eligibility.³ *Alice Corp.*, the patent owner, argued that its patent claims directed to a computer-implemented financial settlement system were valid because they did not fall into the patent-ineligible category of “abstract ideas.” Rejecting the patent owner’s arguments, the Court held the claims patent ineligible on the basis that generic computer implementation does not transform a patent-ineligible abstract idea into a patent-eligible invention. In doing so, the Court effectively broadened the scope of ineligible subject matter. Moreover, the decision created uncertainty in the business and legal communities. Ambiguity in the language of the *Alice* standard and in the scope of technologies involving “abstract ideas” made it difficult to predict how and where the standard would be applied.⁴

Although legal changes and subsequent adjustments across the institutions in the patent system are not unusual, *Alice* deserves attention because of its potential economic consequences. The primary economic function of the patent system is to provide

an incentive for greater invention and innovation. By broadening the scope of subject matter perceived as being ineligible, *Alice* is likely to have differential effects across technologies, with some inventions that were previously considered to be patent eligible no longer qualifying for patent protection. Even more importantly, economic theory and evidence show that greater uncertainty tends to reduce investments.⁵ Higher levels of uncertainty may also negatively impact previously issued patents by lowering their expected value, reducing patent purchases and licensing transactions, and limiting opportunities to obtain entrepreneurial financing.⁶

This report focuses on two USPTO patent examination outcomes and evaluates how these outcomes changed in response to the *Alice* decision and in response to two USPTO adjustments made in the form of guidance for examiners. The first outcome relates to examiner decisions on patent subject matter eligibility. A metric labeled “Percent of first office action Section 101 rejections” is used to capture the relative change in first office actions that include rejections for patent-ineligible subject matter.⁷ This metric will increase when examiners issue relatively more first office actions with a rejection for patent-ineligible subject matter.⁸ The second outcome is the degree of uncertainty in the patent examination process. A metric called “Section 101 first action examination uncertainty” is used to capture the variation across examiners in the proportion of rejections for patent-ineligible subject matter. Examination uncertainty will increase when the percentage of first office action rejections for patent-ineligible subject matter becomes more uneven across examiners within a specific technology.

2 *Alice Corp. v. CLS Bank International*, 573 U.S. 208 (2014).

3 The phrase “patent subject matter eligibility” refers to the types of inventions that are legally eligible for patent protection. See the *Manual of Patent Examining Procedure* for a description of patent subject matter eligibility used at the USPTO (www.uspto.gov/web/offices/pac/mpep/s2106.html).

4 See USPTO (2017) and Hickey (2019).

5 See Dixit and Pindyck (1994); Abel et al. (1996); Bloom, Bond, and Van Reenen (2007); and Czarnitzki and Toole (2011).

6 See Sherry and Teece (2004); Arora, Fosfuri, and Gambardella (2004); and Gans, Hsu, and Stern (2008).

7 The data capture all types of Section 101 rejections, including utility and statutory double patenting. See the *Manual of Patent Examining Procedure* (www.uspto.gov/web/offices/pac/mpep/s2106.html).

8 This metric does not capture the full breadth of patent examination activities leading to a first office action.

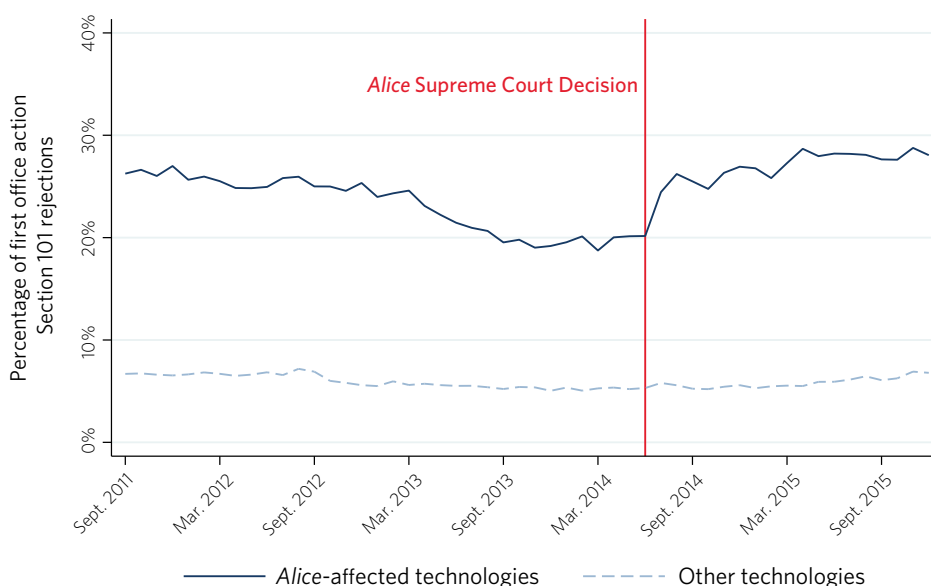
The *Alice* decision increased USPTO subject matter eligibility rejections

The early implementation of *Alice* led patent examiners to increase rejections based on patent-ineligible subject matter relative to all first office action decisions in affected technologies. Figure 1 plots the percentage of first office action Section 101 rejections for patent applications in *Alice*-affected technologies (solid blue line) and in other technologies (dashed blue line) from 2011 through 2015. The vertical bar (in red) marks the date of the *Alice* decision. Although the percentage of Section 101 rejections was always higher for applications in *Alice*-affected technologies, the upward turn in the solid blue line following *Alice* shows that early implementation of this Supreme Court decision led to a significant increase in the percentage of Section 101 rejections in those technologies.⁹

Further empirical analysis shows this change was statistically significant and large in magnitude.¹⁰ For *Alice*-affected technologies, the chances of receiving a first office action rejection with a rejection for patent-ineligible subject matter increased by 31% in the 18 months following *Alice*.¹¹

This increase reflects at least two aspects of the *Alice* decision. First, expanding the application of the *Alice* standard to other technology areas would likely lead to more Section 101 rejections. Second, and importantly, professionally trained judges, lawyers, and examiners can apply reasonable but different interpretations of the *Alice* standard. Any interpretation of the *Alice* standard that takes a broader view of patent-ineligible subject matter would lead to an increase in Section 101 rejections.

Figure 1: The probability of receiving a first office action with a Section 101 rejection in *Alice*-affected technologies and in other technologies, Sept. 2011 – Dec. 2015.



Note: Patent applications included in this figure are restricted to those filed before June 2014 to minimize any influence of applicant drafting and filing decisions in response to *Alice*.

⁹ Notice that the increase in first office action Section 101 rejection rates is reflected only in applications in the *Alice*-affected technologies and not in applications in the other technologies. In the empirical analysis, the other technologies are the “control group” that captures the influence of all other events besides the *Alice* decision on USPTO Section 101 rejections.

¹⁰ Other first office action examination rejection types (e.g., Sections 102, 103, 112) do not show statistically significant changes after *Alice*. Please refer to the supplementary materials for this report available at www.uspto.gov/ip-policy/economic-research/publications/reports

¹¹ Our results are consistent with the finding in Chien and Wu (2018) that *Alice* increased the share of office actions that contain a Section 101 rejection across several of the World Intellectual Property Organization’s technology categories.

The *Alice* decision increased uncertainty in patent examination

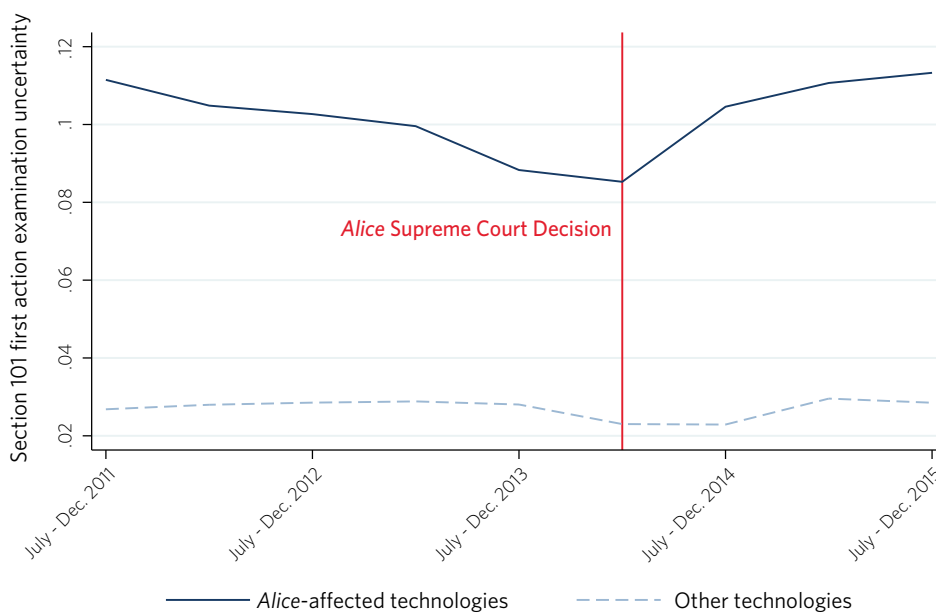
The early implementation of *Alice* increased uncertainty in the first action stage of patent examination in affected technologies (Figure 2). Within *Alice*-affected technologies, a higher degree of variability is observed across examiners in first office action rejections for patent-ineligible subject matter. For patent applicants the examination process for *Alice*-affected technologies became more unpredictable. Figure 2 plots the variability for patent applications in *Alice*-affected technologies and in other technologies. The upward turn in the solid blue line following the *Alice* decision shows that another effect of *Alice* was to increase uncertainty related to patent subject matter eligibility in those affected technologies. Further empirical analysis shows this change was statistically significant and large in magnitude. In those technologies, uncertainty

The increase in uncertainty seems to reflect the interpretive latitude in the language of the *Alice* standard.

about patent subject matter eligibility determinations in the first action stage of patent examination increased by 26% in the 18 months following *Alice*.

The increase in uncertainty seems to reflect the interpretive latitude in the language of the *Alice* standard, which fueled a wide variety of perspectives.¹² This widening resulted in a higher degree of variability in subject matter-related rejection decisions across examiners. As will become evident, the USPTO's efforts to clarify the *Alice* standard have substantially offset the uncertainty created by *Alice*.

Figure 2: Variation in examiner first office action Section 101 rejection rates in *Alice*-affected technologies and in other technologies, July 2011 - Dec. 2015.



Note: Patent applications included in this figure are restricted to those filed before June 2014 to minimize any influence of applicant drafting and filing decisions in response to the *Alice* decision.

12 See USPTO (2017), Hickey (2019), and Taylor (2019).

USPTO examiner guidance reversed the upward trend in subject matter eligibility rejections

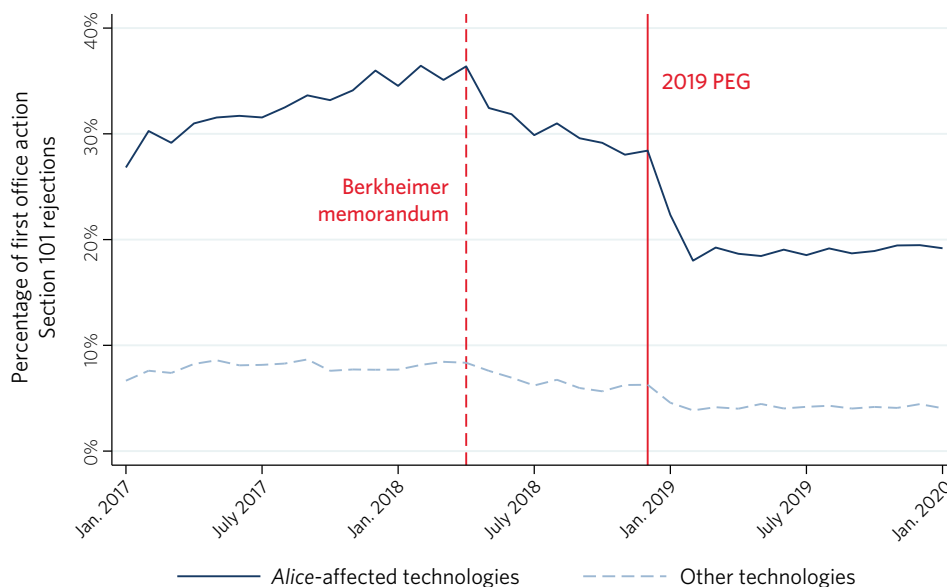
One of the ways the USPTO adjusts to major changes in the U.S. patent system is to issue examination guidance documents. These documents assist examiners by interpreting the law and by setting policy guidelines on how to apply legal concepts in the examination process. For patent subject matter eligibility related to *Alice*, the USPTO provided Preliminary Examination Instructions on June 25, 2014, and issued a more substantive 2014 Interim Guidance on Patent Subject Matter Eligibility in December of that year. These documents attempted to align patent examination practice with established law. However, the *Alice*-induced increase in first office action Section 101 rejections persisted until the USPTO's April 2018 memorandum titled "Change in Examination Procedure Pertaining to Subject Matter Eligibility, Recent Subject Matter Eligibility Decision (*Berkheimer*

v. HP, Inc.)"¹³ (the Berkheimer memorandum) and the USPTO's subsequent January 2019 Revised Patent Subject Matter Eligibility Guidance (2019 PEG).¹⁴

Figure 3 shows the recent trend in the percentage of first office action Section 101 rejections for patent applications in *Alice*-affected technologies and in other technologies from 2017 through 2019. The first vertical bar (dashed red line) marks the date of the April 2018 Berkheimer memorandum and the second vertical bar (solid red line) marks the date of the 2019 PEG.¹⁵

In early 2017, the percentage of first office actions including a Section 101 rejection for *Alice*-affected technologies was trending upward. The Berkheimer memorandum changed the direction of this trend. Prior to the release of the Berkheimer memorandum, examiners had been instructed to conclude that an element (or combination of elements) was a well-understood, routine, conventional activity when the examiner could readily conclude that the element was widely prevalent or in common use in the relevant industry.

Figure 3: The probability of receiving a first office action with a Section 101 rejection in *Alice*-affected technologies and in other technologies, Jan. 2017 - Jan. 2020.



Note: Patent applications included in this figure are restricted to those filed before January 2019 to minimize any influence of applicant drafting and filing decisions in response to the 2019 PEG.

13 Berkheimer v. HP Inc., 881 F.3d 1360 (Fed. Cir. 2018).

14 References to all the USPTO Section 101 guidance documents are available at www.uspto.gov/PatentEligibility.

15 Figure 3 is not a continuation of Figure 1. The figures use two different samples of patent applications and cannot be compared.

The examiner, however, was not required to support this conclusion with any factual evidence. Following the Berkheimer memorandum, the new guidance required examiners to make a factual determination as to whether claim elements were common and routinely used. For *Alice*-affected technologies, the Berkheimer memorandum induced a statistically significant drop in the rate of first office action Section 101 rejections.

The 2019 PEG caused a further, and much larger, decrease in the percentage of first office action Section 101 rejections in *Alice*-affected technologies. One of the USPTO's goals with the 2019 PEG was to clarify the legal distinctions between claims directed solely to abstract ideas and claims that included abstract ideas but integrated those abstract ideas into a practical application. The 2019 PEG synthesized the law, and added clarity and structure to the decision-making process when implementing the *Alice* standard in two important ways. First, the guidance clarified that abstract ideas are grouped as mathematical concepts, certain methods of organizing human activity, and mental processes. Second, the guidance explained that

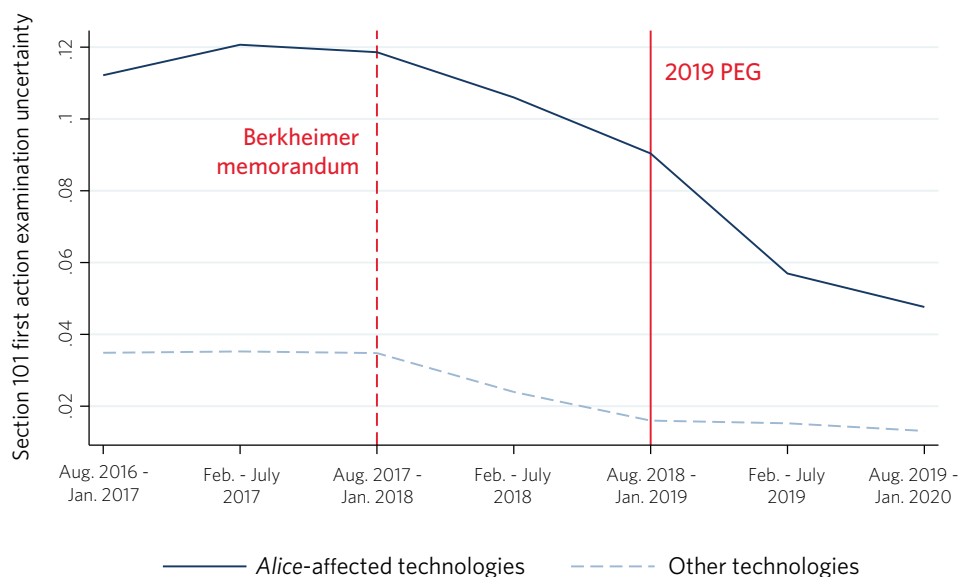
a claim that recites an abstract idea is not “directed to” the abstract idea if the claim as a whole integrates the abstract idea into a practical application.¹⁶

In Figure 3, the impact of the 2019 PEG on the percentage of first office action Section 101 rejections is illustrated by the steep drop in the solid blue line following the issuance of the 2019 PEG. More sophisticated statistical modeling shows this change was statistically significant and large in magnitude. After one year, the 2019 PEG reduced the chances of receiving a first office action rejection for patent-ineligible subject matter by 25% for *Alice*-affected technologies.

USPTO examiner guidance decreased uncertainty in patent examination

Uncertainty in the first action stage of patent examination started to decrease following the release of the Berkheimer memorandum. Like Figure 2, Figure 4 plots examiner decision-related variability for patent applications in *Alice*-affected technologies and in other technologies. The vertical bars mark the

Figure 4: Variation in examiner first office action Section 101 rejection rates in *Alice*-affected technologies and in other technologies, Aug. 2016 - Jan. 2020.



Note: The dashed vertical bar is drawn at the beginning of the time interval that contains the April 2018 Berkheimer memorandum, which is January 2018 because the variance is calculated over six month periods. Patent applications included in this figure are restricted to those filed before January 2019 to minimize any influence of applicant drafting and filing decisions in response to the 2019 PEG.

16 Substantial information and training material related to the 2019 PEG can be accessed on the USPTO website. See www.uspto.gov/patent/laws-and-regulations/examination-policy/subject-matter-eligibility.

publication dates of the April 2018 Berkheimer memorandum and the 2019 PEG. For *Alice*-affected technologies, the figure shows that the variability in first office action Section 101 rejection rates started to decrease after the issuance of the Berkheimer memorandum. Although not as steep, a similar drop is apparent in the control group of other technologies. The memorandum, therefore, appears to have had no statistically distinct effect on examination uncertainty in *Alice*-affected technologies as compared to other technologies.

The 2019 PEG, however, had a much larger, statistically significant effect on examination uncertainty, particularly in *Alice*-affected technologies. In Figure 4, the solid blue line shows a notable drop following the issuance of the 2019 PEG. After one year, the 2019 PEG decreased uncertainty about patent subject matter eligibility determinations in the first action stage of patent examination by 44% for *Alice*-affected technologies.

The evidence suggests that the 2019 PEG provided clarity and structure to the decision-making process.

The evidence suggests that the 2019 PEG provided clarity and structure to the decision-making process, thereby reducing the degree of variability observed across examiners in subject matter eligibility determinations. For patent applicants, this finding indicates a more consistent and predictable examination process.

Appendix: Definitions and measures

To reduce the complexity of disentangling examiner and applicant behavior, this report focuses on the first decision on patentability made by the examiner, which is referred to as the first office action.¹⁷ Moreover, to minimize any influence of applicant choices about whether to file for patent protection, change drafting strategies, or make other adjustments in response to the *Alice* decision or the USPTO 2019 PEG, this report considers only patent applications filed before the relevant event. For evaluating the effect of *Alice*, patent applications must have been filed with the USPTO before June 19, 2014. Similarly, for evaluating the effect of the 2019 PEG, patent applications must have been filed with the USPTO before January 7, 2019. At the time of each of these events, the composition of the patent applications under review at the USPTO was different. For this reason, it would not be appropriate to compare the sample of applications shown in Figure 1 with those in Figure 3.

To identify *Alice*-affected technologies, we use information compiled by the USPTO's Office of Patent Legal Administration (OPLA) on patent litigation cases from the U.S. Court of Appeals for the Federal Circuit and the U.S. Supreme Court that involved patent subject matter eligibility.¹⁸ OPLA documents the patents in-suit, as well as the relevant judicial exception for each case reviewed. The United States Patent Classifications (USPCs) of the patent applications litigated for "abstract ideas" form the set of *Alice*-affected technologies.¹⁹ Our control set of technologies (called "other technologies" in our figures) includes all USPCs that were never involved in patent litigation for Section 101 issues according to OPLA's records.

The percentage of first office action Section 101 rejections is computed by dividing the total number of first office action decisions containing a Section 101 rejection by the total number of first office actions and then multiplying by 100 for each time period by technology category (*Alice*-affected technologies or other

technologies). For example, if there were 1,000 first office actions in *Alice*-affected technologies in April 2013 and 300 of these first office actions contained a rejection for patent subject matter eligibility, the percentage of first office action Section 101 rejections in April 2013 for *Alice*-affected technologies would be 30% (300 divided by 1,000 and multiplied by 100).

Our second patent examination outcome metric, called "Section 101 first action examination uncertainty," captures the variation across examiners in the proportion of rejections for patent-ineligible subject matter. This metric is calculated using data for each examiner within specific technologies at the first action stage of patent examination. To compute this measure, we calculated the rate of first office action rejections for subject matter eligibility for each examiner in a USPC technology and for a specified time period. That rate is defined as the number of first office actions containing a rejection for patent subject matter eligibility divided by the overall number of first office actions by that examiner in the USPC and time period. The variance was computed across those examiner rates in each USPC using a half-year time periods (January–June; July–December for *Alice*, and Feb.–July; Aug.–Jan. for the Berkheimer memorandum and 2019 PEG). The Section 101 first action examination uncertainty metric for each interval of time is an average of the variance across the USPCs in the *Alice*-affected technologies and likewise, an average of the variance across USPCs in the control technologies.

17 See www.uspto.gov/web/offices/pac/mpep/mpep-0700.html, particularly Sections 706 and 707.

18 See www.uspto.gov/sites/default/files/documents/ieg_sme crt_dec.xlsx.

19 The U.S. Patent Classification schema is now dormant and is no longer reported by the USPTO.

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ACKNOWLEDGMENTS:

We wish to thank Jesse Frumkin and Asrat Tesfayesus for their contributions to the technical working paper underlying this report. We also thank Teresa Verigan for excellent graphic design and John Ward for valuable work on the text. Others within USPTO who provided thoughtful and helpful comments include Michael W. Kim, Patricia Mallari, Mary Critharis, Courtney Stopp, Allan Woodworth, Amy Nelson, Thomas Krause, and other colleagues from PTAB, OPIA, CFO, OPLA, and Patent Operations. Finally, we would like to thank Qiang Lu and Scott Beliveau of the USPTO Office of the Chief Information Officer, Enterprise Advanced Analytics Branch, for providing the data on office actions.

SUPPLEMENTARY MATERIAL:

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