

Changing Behavior: Applicant Sensitivity to Patent Fees

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Outline

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Motivation

Fee Setting Authority

- *America Invents Act of 2011 (AIA)*
 - Gives PTO fee setting authority
 - PTO may use fees to influence the behavior of applicants
- A New Regulatory Tool for the Agency
 - Behavior may be influenced in at least two ways:
 - Direct regulation (promulgating rules)
 - Fee setting (akin to using the price system)
- Research question:
 - What is the relationship between changes in fees and the demand for certain applicant actions?

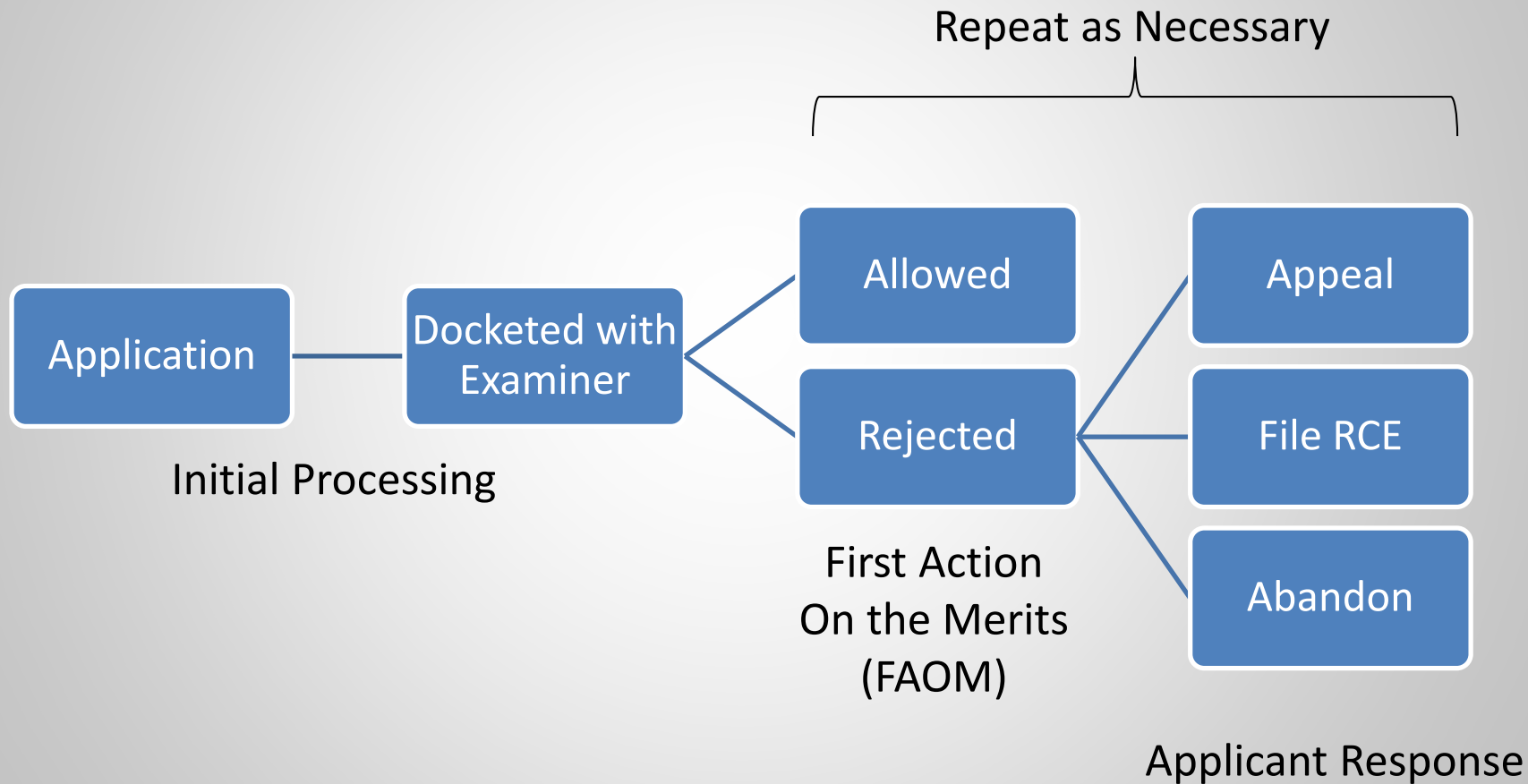
Motivation

Understanding Continuations

- Continuation practice in the US
 - Continuations, Continuations-in-part, Divisions
 - Prior academic study (Hegde, Mowery & Graham, 2009)
- Requests for Continued Examination (RCE)
 - Often used to **re-open examinations** after final rejection
 - Introduced in 1999; the use of RCEs has grown rapidly
- Common RCE criticisms (and *Continuations* generally)
 - Substantial cost driver at Agency, $C > R$ (USPTO, 2010)
 - May be used strategically (Graham and Mowery, 2004)
 - May yield low quality patents (Quillen & Webster, 2011)
 - May increase congestion, cause delay for incoming applicants (Mittra-Kahn et al, 2103)

Background

Examination Milestones



Background

Applicant Responses

- PTO “Final rejections” aren’t *final*, but they do terminate the immediate prior examination
- Applicant response required within 90 days
 - Up to three 30-day extensions of time can be purchased.
- Requests for continued examination (RCEs) are unique to USPTO
 - RCEs can be used to re-open an existing examination without filing a new application
- Applicants can also file an appeal internally with the Patent Trial and Appeal Board (PTAB)

Prior Literature

Elasticity Estimates

- No prior studies on demand response to Δ RCE fee
 - But several studies have shown a moderate behavioral response to changes in other patent-office fees
- Demand elasticity to changes in US application fees
 - Adams et al (1997) estimated -0.12
 - Landes and Posner (2004) estimated -0.03
 - Rossenfosse and Pottelsberghe (2012) estimated -0.30
- Demand elasticity to changes in renewal fees (EPO)
 - Harhoff et al (2009) estimated -0.30
 - Danguy and Pottelsberghe (2009) estimates range from -0.10 to -0.80

Methods

Duration Analysis

- **Duration analysis: Effect of fees on the time (elapsed) from mailing of final rejection to RCE**
 - Cox proportional hazard assumption not met
- Selected an Accelerated Failure Time (**AFT**) model
 - Required us to make parametric assumption
 - Shape of baseline hazard suggested log-logistic (AIC test)
 - Log-logistic hazard function
 - Estimate scale parameter gamma
- We control for unobserved heterogeneity with examiner-level random effects (*shared frailty*)

$$h(t) = \frac{\lambda^{\frac{1}{\gamma}} t^{1-\gamma}}{\gamma \left(1 + (\lambda t)^{\frac{1}{\gamma}}\right)}$$

Methods

Duration Analysis

- Dependent variable: Time (t) elapsed between mailing of final rejection and RCE filing.
- Explanatory variables of greatest interest
 - **RCE fee**; **Appeal fee**; and **Serialized Continuation fee**
- Results of AFT models allow us to predict the probability of RCE filing within 6 months at both the ***current fee***, and, **Δ *current fee*** (+10%)
 - We calculate the elasticity based on the predicted percentage change in the RCE-filing probability
 - Use bootstrapping to estimate the 95-percent confidence interval for each elasticity estimate

Methods

Data Sources

- USPTO Patent Application Location and Monitoring (PALM) system includes data on:
 - Application characteristics
 - Detailed history of patent examination for each application incl. examiner “office actions” and applicant responses
- Supplemented with information on examiner seniority & tenure from internal PTO records.
- Jan. 2005 – Feb. 2012 sample includes:
 - 1.07 million final rejections to large entities
 - 0.34 million final rejections to small entities

Methods

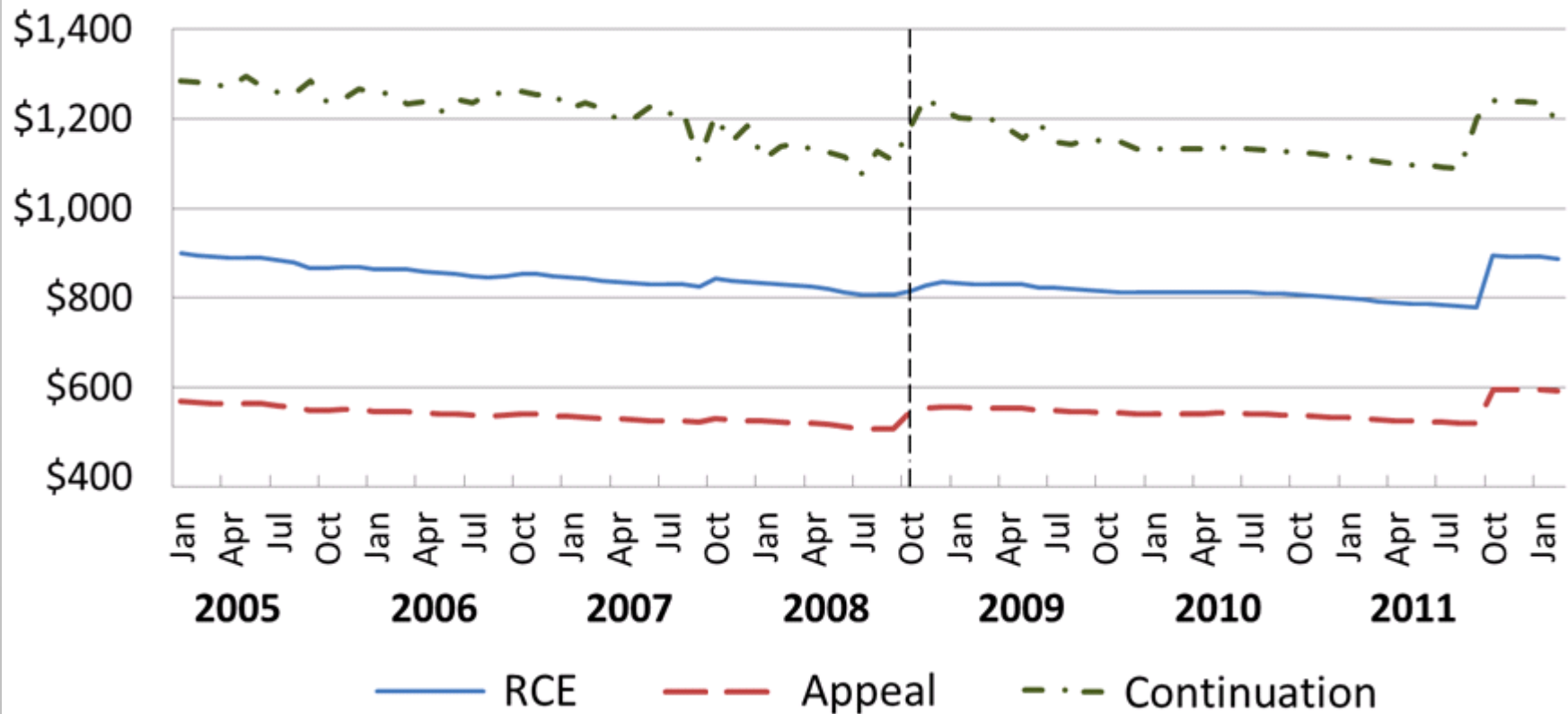
Control Variables

- To isolate Δ fee effect, we control for factors we expect to affect time elapsed from Rejection to RCE:
 - Application Characteristics
 - Technology center, prior final rejections, claims (log), examiner seniority, priority status, first-action pendency (log), number of previous RCEs
 - Environmental (*external*) Variables
 - Stocks of pending applications (log), numbers of examiners log), number of pending appeals (log), Δ in log GDP, allowance rate within TC in previous 6 months
 - Others
 - Year and month fixed effects, RCE policy control (2007)

Results

Descriptive Results on Fees

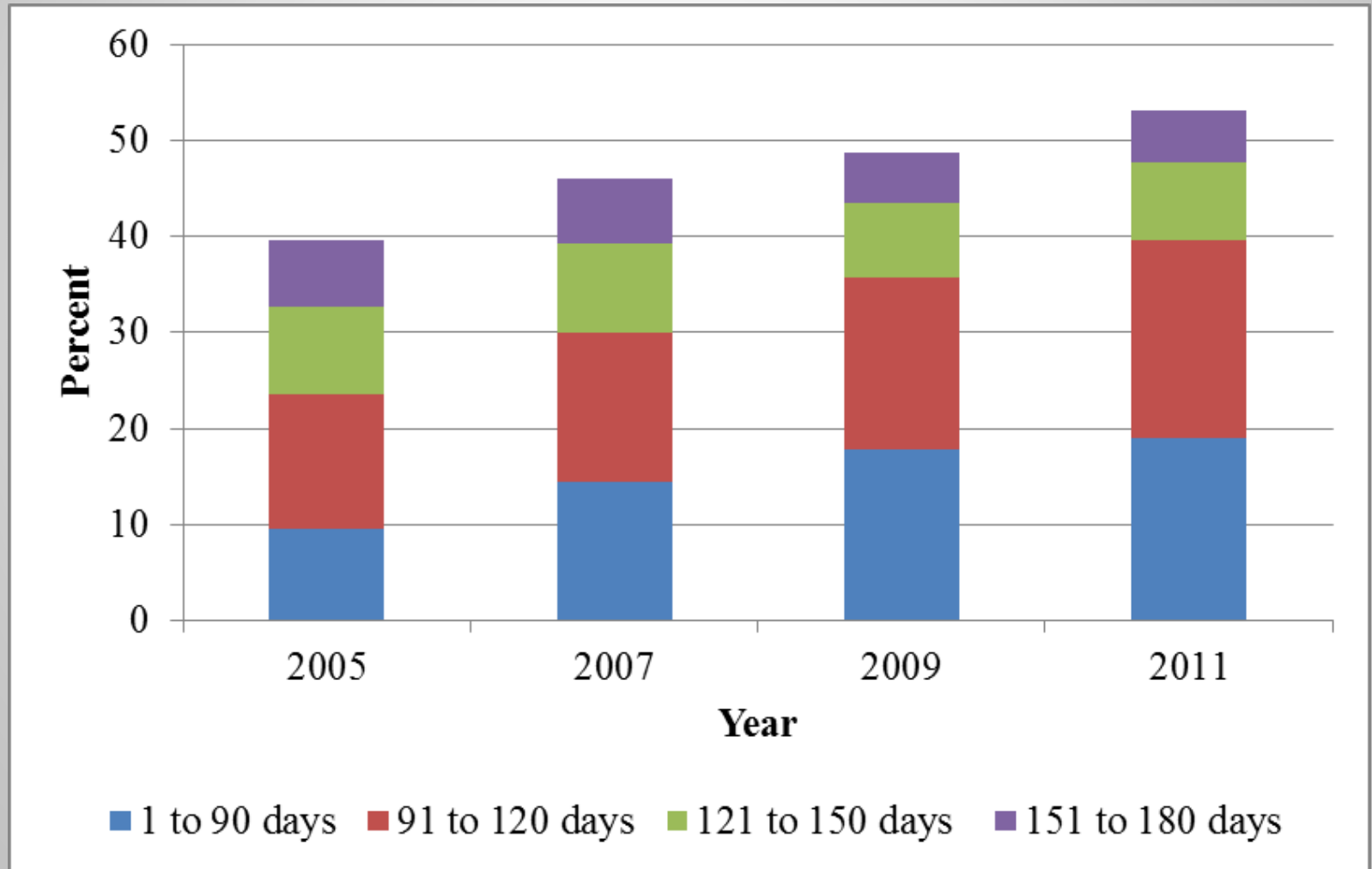
Median (real) Fees for Filing RCE, Appeal, and Serialized Continuation, Jan. 2005 - Feb. 2012



Results

Descriptive Results on RCE Filings

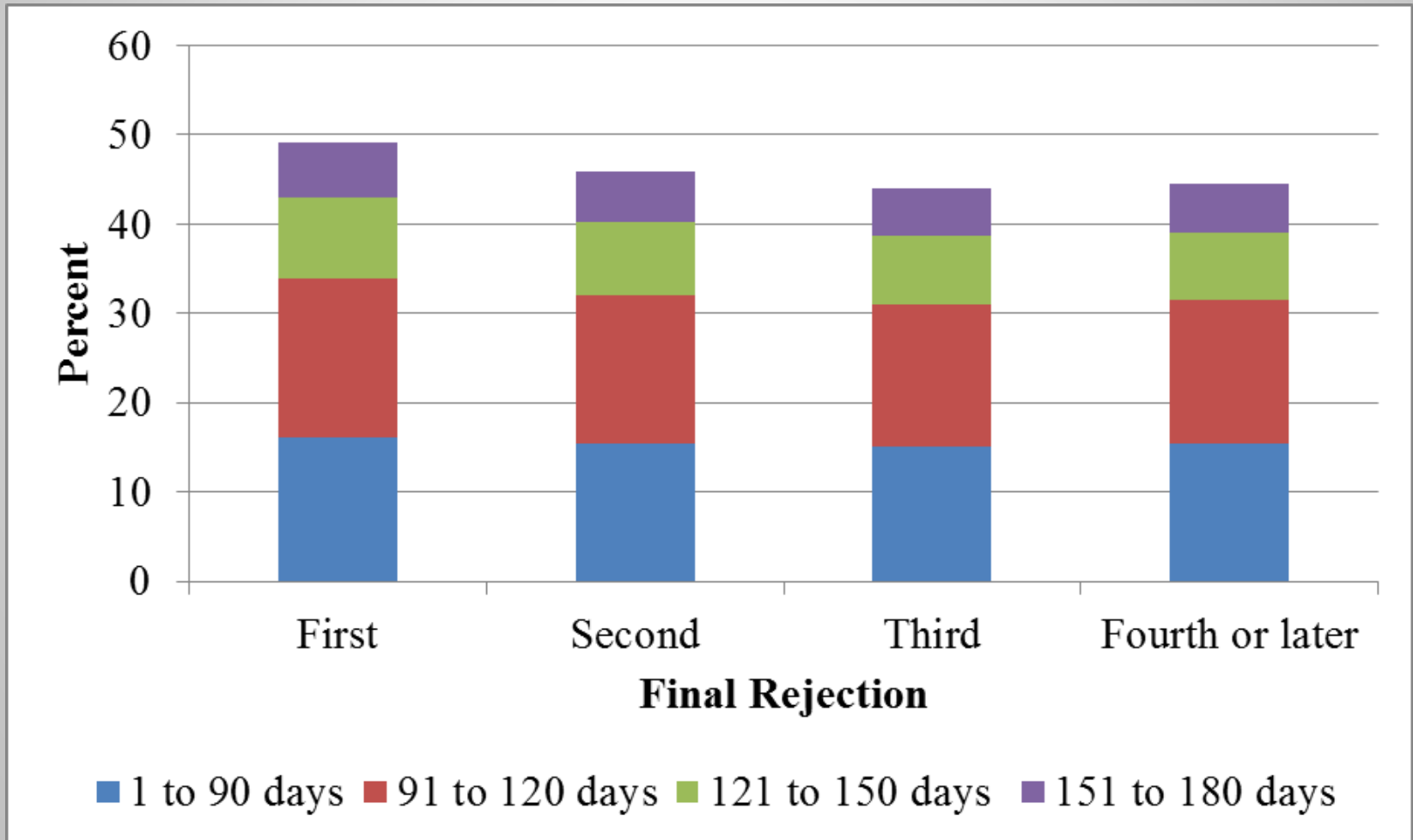
Likelihood of RCE Filing by Year, Large Entities



Results

Descriptive Results on RCE Filings

Likelihood of RCE Filing by Final Rejection Count, Large Entities

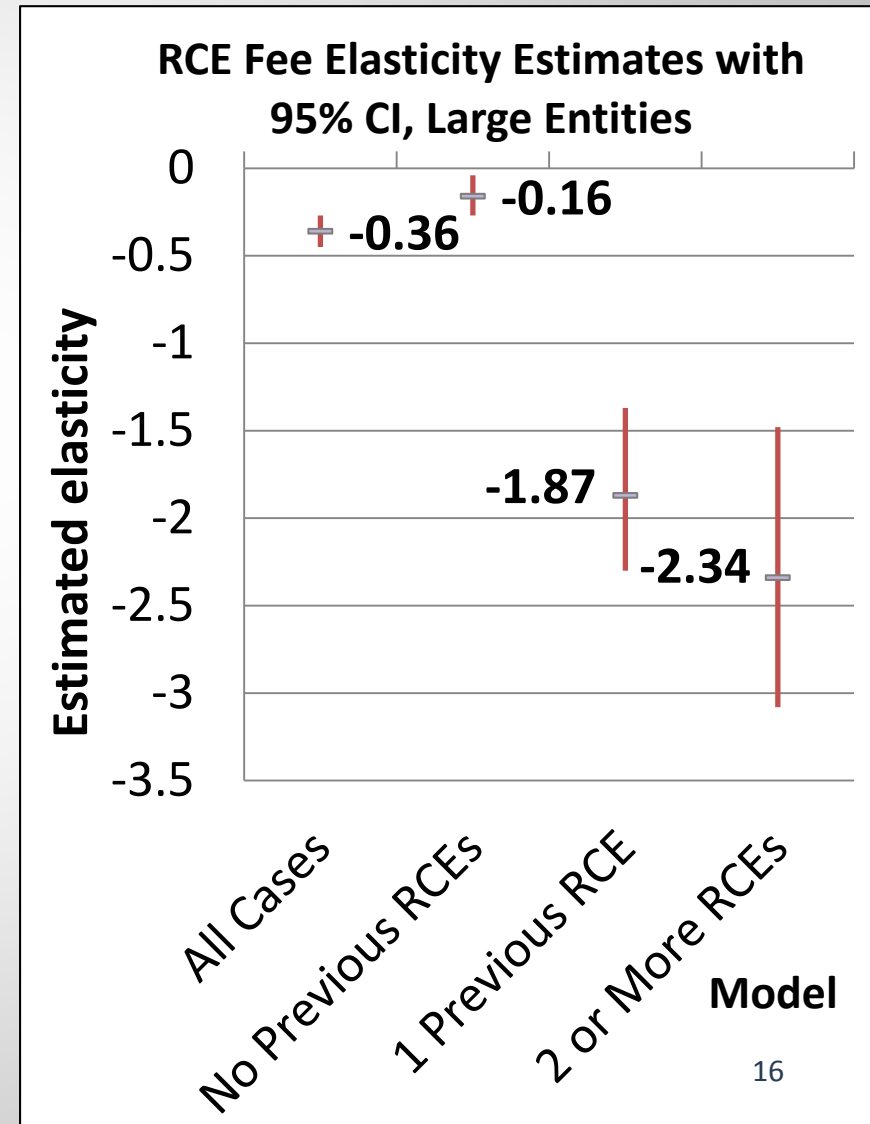


Results

RCE Fee Elasticity Estimates

Main results on Δ RCE Fee

- Negative relationship between Δ RCE Fee and time elapsed to RCE filing
- RCE filing behavior relatively insensitive (inelastic > -1.0) to the Δ RCE fee with 0 prior RCEs
- Behavior becomes more sensitive (elastic < -1.0) with 1+ prior RCEs

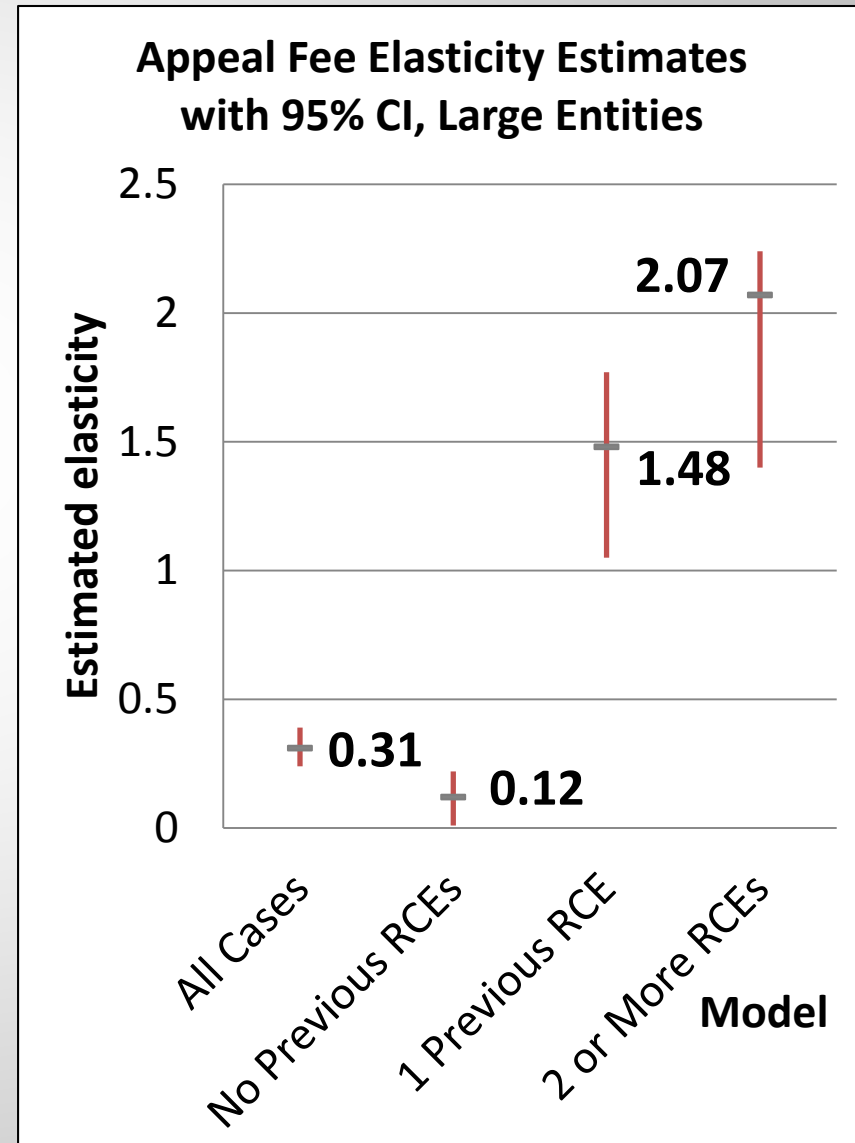


Results

Appeal Fee Elasticity Estimates

Main results on Δ Appeal Fee

- Appeals and RCEs appear to be substitutes for each other
 - Cross-price elasticity +
 - Applicants “shift” to RCEs
- RCE filing behavior relatively insensitive to Δ Appeal fee when no previous RCEs
- Filing RCEs becomes more sensitive to Δ Appeal fee with 1+ prior RCEs

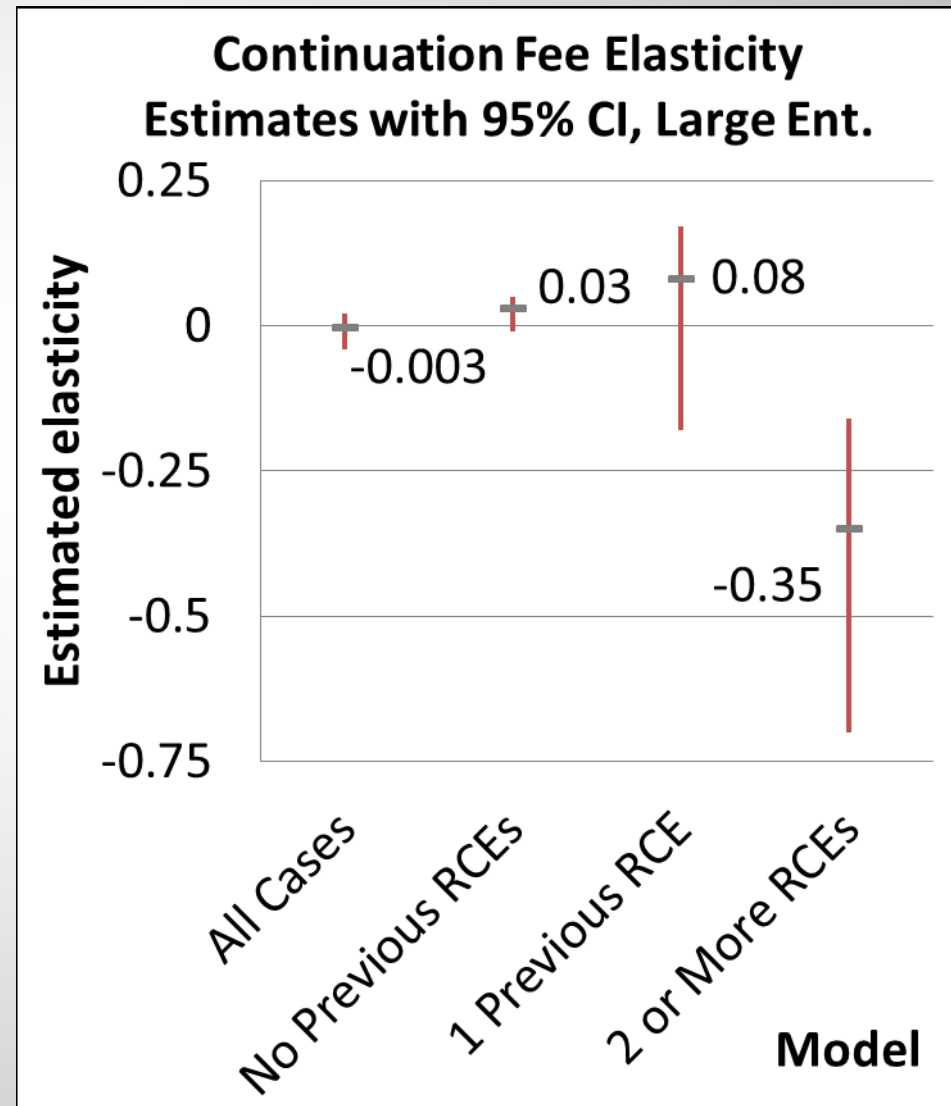


Results

Continuation Fee Elasticity Estimates

Main results on Δ Serialized Continuation (SC) Fees

- Some evidence that RCEs and serialized continuations are substitutes with 0 prior RCEs (Cross-price elasticity +), but RCE filing still not very sensitive to Δ in SC Fees
- For cases with 2+ prior RCEs, the two types of continuation appear to be complements (Cross-price elasticity -)
 - Intensive users?



Summary

- Bringing the tools of economics to the thorny questions of patent administration can yield important new insights
 - Patent administration cannot be “guess work”
 - Innovation is too important in Industrialized and Developing World
 - Reduced government budgets make precision more important
 - Economics offers a robust set of tools to aid policy makers in understanding how changes in inter-related, and complex processes, can be expected to effect outcomes
- Our analysis uncovers valuable predictions about how patent applicants alter filing behavior in response to fee changes
 - Offers policy makers insights into how the fee system may be employed to support desired outcomes