

Does Agency Funding Affect Decision-making: An Empirical Assessment Of The PTO's Granting Patterns

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PTO's Budgetary Process

- 1991 Agency Fully User-Fee Funded
 - ▣ No fee-setting authority
 - ▣ No automatic right to spend fees
- 85% of its patent operating budget from 3 fees

| Type of Fees | Percentage of PTO Budget | Cost to PTO |
|-----------------|--------------------------|------------------|
| Examination Fee | ~30% | Three Times Fees |
| Issuance Fee | ~20% | Minimum |
| Maintenance Fee | ~35% | Negligible |

PTO's Objectives

- Self-Interested Bureaucrat
 - ▣ Seeks to maximize budget because budgets are positively correlated with other goods that a bureaucrat values
- Benevolent but Resource Constrained Bureaucrat
 - ▣ Seeks to increase budget solely for the purpose of better accomplishing its mission

Will PTO Act upon this Incentive?

- Not necessarily
 - ▣ May sustain itself based on non-biased grant rate
- PTO may need additional \$ if otherwise desired grant rate below threshold grant rate required to break even
 - ▣ PTO may raise additional \$ through granting

Resource Constraint Triggered?

- Prediction: if external factors change so as to reduce, in the aggregate, incoming post-allowance fees relative to costs associated with examinations expected of agency, the PTO will be more likely to face sustainability concerns and thus more likely, all else equal, to distort granting practices

- Factors considered:
 - Patentees elect to pay their renewal fees at a lower rate
 - Aggregate examination costs increase
 - Aggregate incidence of small entity applicant rises
 - Patent examination demanded of the PTO increases
 - Quality of applications decrease

Differential Impact of Agency's Financial Incentives

- Not all patent grants generate equal revenue
 - ▣ Small versus Large Entity
 - ▣ Rate of Renewal
- Entity size
 - ▣ Large entity fees 2X small entity fees
- Renewal rates
 - ▣ Vary across technologies

Hypotheses

- *Following adoption of a near fully user-fee funded system and during times at which a benevolent PTO is resource constrained:*
 - *PTO will grant patents at incrementally higher rate to patent applicants with large entity status, relative to those with small entity status*
 - *PTO will grant patents at incrementally higher rate for patents within technology categories that generally have high maintenance rates relative to patents within categories that generally have low maintenance rates*

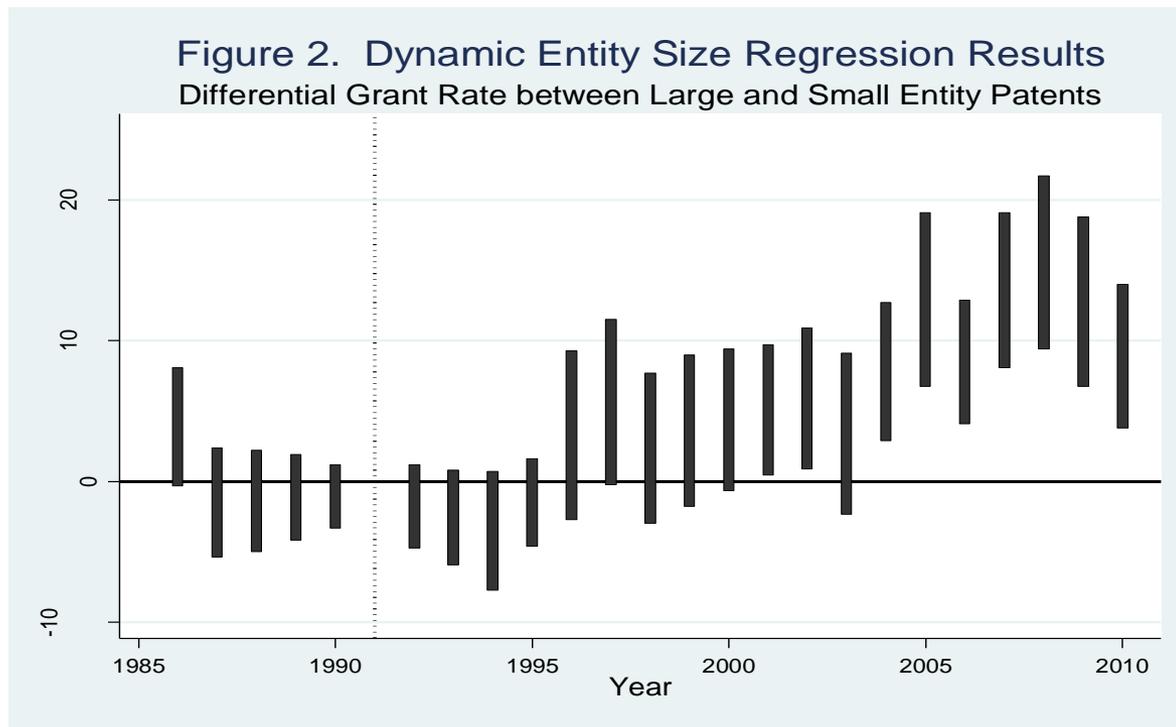
Methodology

- Variation in fee structure?
 - ▣ Policy variation:* 1991 reform (implementing current structure, leaving PTO fully funded by user fees)
 - ▣ Variations in conditions under which PTO would be sensitive to fee structure (i.e., variations in financial status)

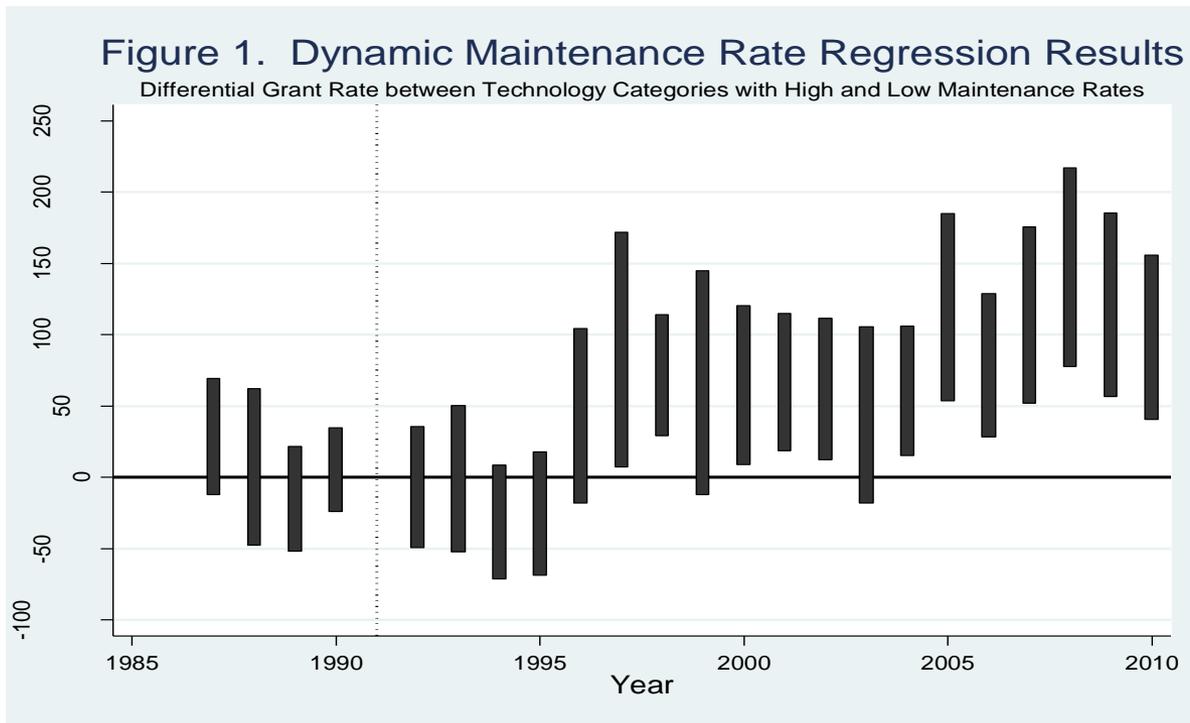
Methodology (cont'd)

- Difference-in-difference / fixed-effects estimation
 - ▣ Treatment groups:
 - Large entities
 - High maintenance-rate technologies
 - ▣ Control groups
 - Small entities
 - Low maintenance-rate technologies
- Sustainability interaction

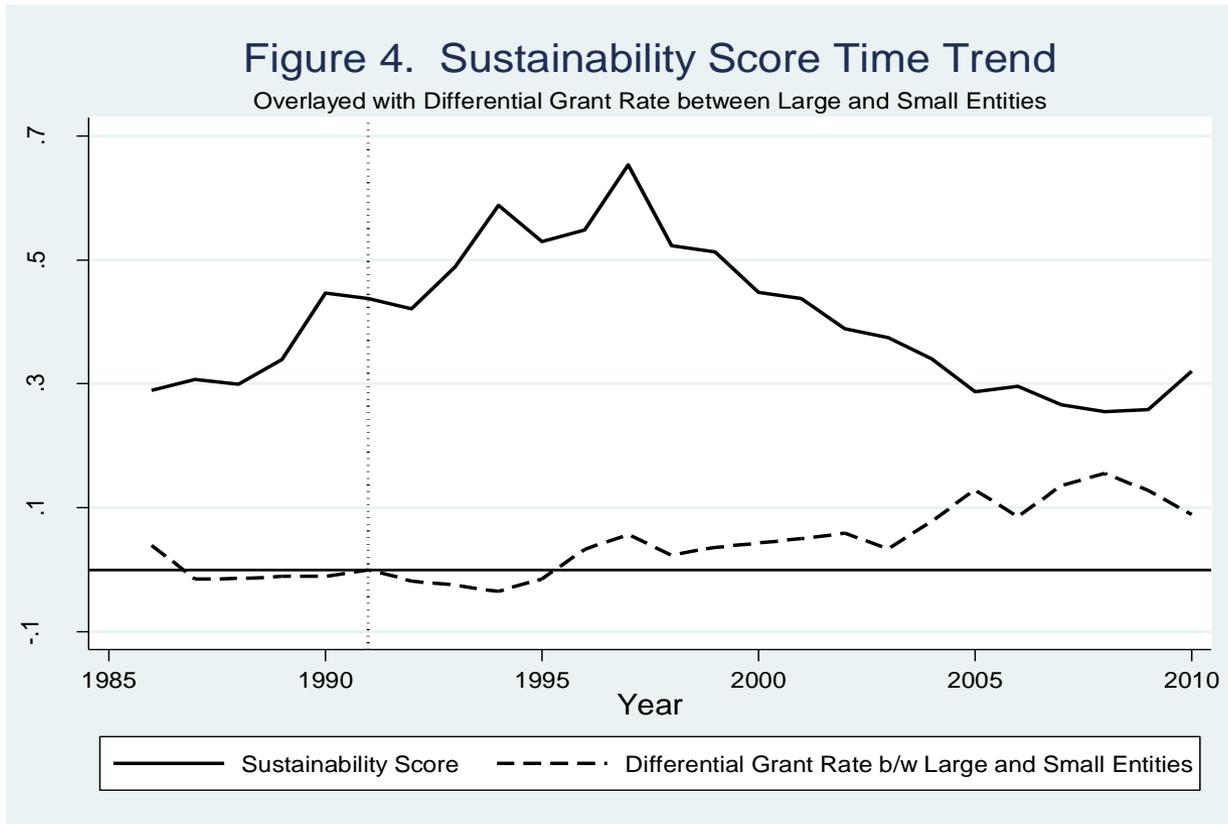
Our Results (cont'd)



Our Results (cont'd)



Our Results (cont'd)



Implications

- Social welfare implications regarding over granting
- Distortions across patent types
 - ▣ Across technologies
 - ▣ Entity size
 - Congressional action intended to promote innovation with respect to small firms and entrepreneurs may have the opposite effect
- Scholarly debate in administrative law regarding nature of government employees

Reducing PTO's Financial Incentives to Grant Patents

- Fund agency, at least partially, through tax revenue
- Change the PTO's fee schedule
 - ▣ Eliminate post-allowance fees altogether
- America Invents Act solve the problem?

Primary DiD Regression Coefficients

| | (1) | (2) |
|---|---------------------|-----------------------|
| Panel A: Differential Impact of Fee Reform across Patent Categories with Varying Maintenance Rates (unit of observation: Category / Year) | | |
| REFORM* MAINTAIN _i | 58.96*** (19.16) | 170.41*** (47.16) |
| REFORM*MAINTAIN _i *SUSTAINABILITY | - | -290.18*** (92.37) |
| number of observations | 887 | 887 |
| Panel B: Differential Impact of Fee Reform between Patents with Large and Small Entity Status (unit of observation: Category / Year/ Entity Size) | | |
| REFORM* LARGE _i | 6.44*** (1.16) | 21.92*** (4.36) |
| REFORM*LARGE _i *SUSTAINABILITY | - | -40.82*** (8.44) |
| number of observations | 1843 | 1843 |

4 Year Renewal Rates

- Highest Renewal Rates
 - ▣ Semiconductor Devices 93.4
 - ▣ Computer Peripherals 93
 - ▣ Information Storage 92.6
 - ▣ Genetics 91.9
- Lowest Renewal Rates
 - ▣ Amusement Devices 69.6
 - ▣ Furniture, House Fixtures 71.1
 - ▣ Apparel & Textile 74.6
 - ▣ Receptacles 74.6

Robustness Checks

- The inclusion of control variables capturing the intensity of usage of requests for continued examinations (RCE's) and their predecessors (i.e., continuing prosecution applications, or CPA's), to alleviate concerns that some patent types are better able to secure ultimate allowances through greater usage of these mechanisms;
- the systematic, one-by-one exclusion of each technology category from the regression specification (along with the exclusion of each patent class and broad (6-level) category) to demonstrate that no single technology (broadly or narrowly defined) is driving the results.
- alternative constructions of the PTO grant rate (and the use of natural logs of all such rates),
- the inclusion of various category-year-specific control variables,
- the simultaneous (as opposed to separate) treatment of maintenance rate, entity-size and examination cost stories,
- the specification of the 1991 reform variable as a post-reform linear trend variable, along with the subsequent inclusion of technology category-specific linear time trends,

Robustness Checks (cont'd)

- the classification of technology categories based on (1) the PTO Classification System and (2) the broad 6-category classification scheme alternatively introduced by Hall, Jaffe and Trajtenberg,
- the estimation of a “triple-differences” empirical specification that explores whether the divergence in patent grant rates across high- and low-maintenance-rate categories is itself stronger for large (relative to small) entities within those categories,
- the use of a more flexible randomization-inference approach to the determination of the statistical significance of the estimates,
- the specification of the fee reform based on the percentage of the agency’s funding attributable to user fees, and
- less parametric specifications of those factors, such as category-specific maintenance rates, that are treated linearly in the main regressions.

Large v. Small Entity Categories

- Smallest Incidence of Small Entities
 - Semiconductor Devices 6.9
 - Computer Peripherals 10.1
 - Information Storage 10.3
 - Resins 11.1
- Largest Incidence of Small Entities
 - Furniture, House Fixtures 63.8
 - Amusement Devices 59
 - Apparel & Textile 53.8
 - Receptacles 53.1

Primary DiD Regression Coefficients

Panel B: Differential Impact of Fee Reform between Patents with Large and Small Entity Status (unit of observation: Category / Year/ Entity Size)

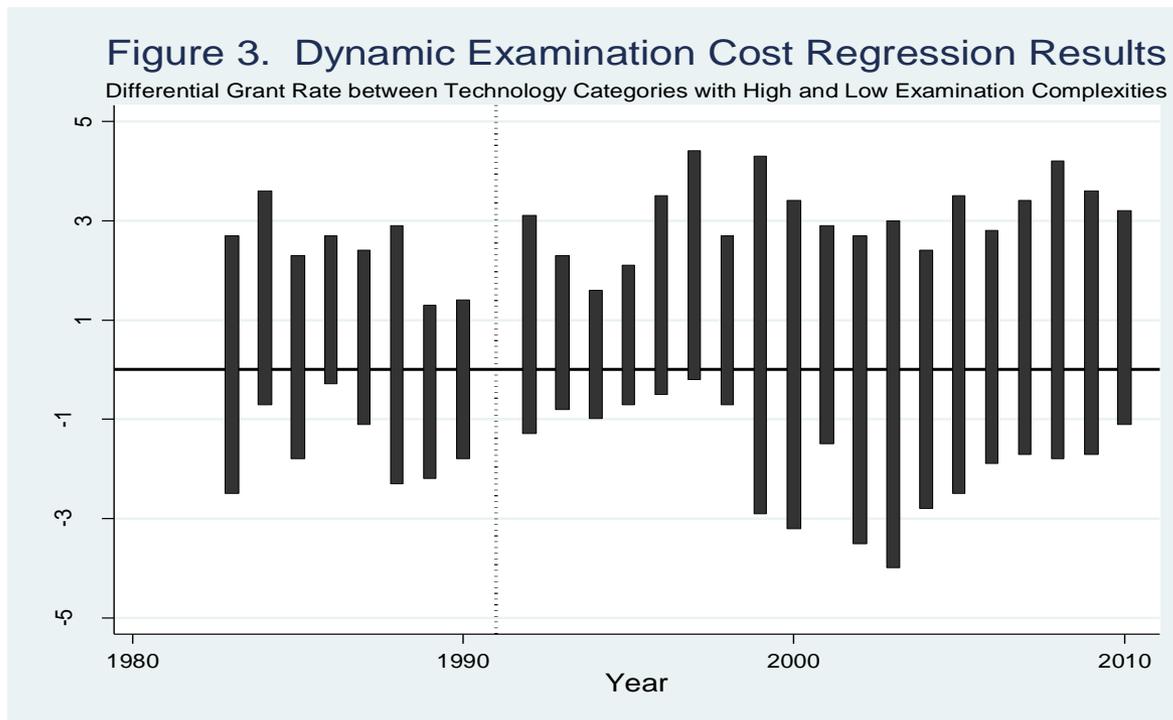
| | (1) | (2) | (3) | (4) |
|---|-------------------|---------------------|--------------------|--------------------|
| REFORM* LARGE _i | 6.44*** (1.16) | 21.92*** (4.36) | 12.20*** (2.37) | 17.39*** (4.33) |
| REFORM*LARGE _i *SUSTAINABILITY | - | -40.82*** (8.44) | - | -19.24** (9.46) |
| REFORM*LARGE _i *DIVERSION | - | - | -9.27*** (1.77) | -5.88*** (1.87) |
| number of observations | 1843 | 1843 | 1843 | 1843 |

Primary DiD Regression Coefficients

Panel A: Differential Impact of Fee Reform across Patent Categories with Varying Maintenance Rates (unit of observation: Category / Year)

| | (1) | (2) | (3) | (4) |
|--|---------------------|-----------------------|----------------------|----------------------|
| REFORM* MAINTAIN _i | 58.96*** (19.16) | 170.41*** (47.16) | 104.50** (26.83) | 125.78*** (45.67) |
| REFORM*MAINTAIN _i *SUSTAINABILITY | - | -290.18*** (92.37) | - | -77.68 (126.20) |
| REFORM*MAINTAIN _i *DIVERSION | - | - | -70.29*** (18.38) | -57.09** (23.83) |
| number of observations | 887 | 887 | 887 | 887 |

Our Results (con't)



Our Results

- PTO granting bias manifests with respect to patent types that it stands to profit the most from granting
 - ▣ Large entities relative to small entities
 - ▣ Categories with high renewal rates relative to low renewal rates
- PTO granting bias manifests to greater degree when the agency is more likely to be bound by financial sustainability constraints