# Trade Mark Cluttering - Evidence from EU Enlargement

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# Agenda

# Infinite Name Spaces?

- Landes and Posner (1987) argue that the supply of names for trademarks is unlimited.
- Regulation of names for prescription drugs by FDA and EMA introduces scarcity.
- Competition for viable names is leading to multiple applications per drug - some parallels to the patent thickets problem. (Shapiro, 2001; Hall and Ziedonis, 2001)
- Only one name will be used, most of the remainder “clutter” the register.
- Not much is known about the importance of cluttering.
- **Research question**: Did the $2004$ expansion of the european trade mark system induce a jump in simultaneous applications?

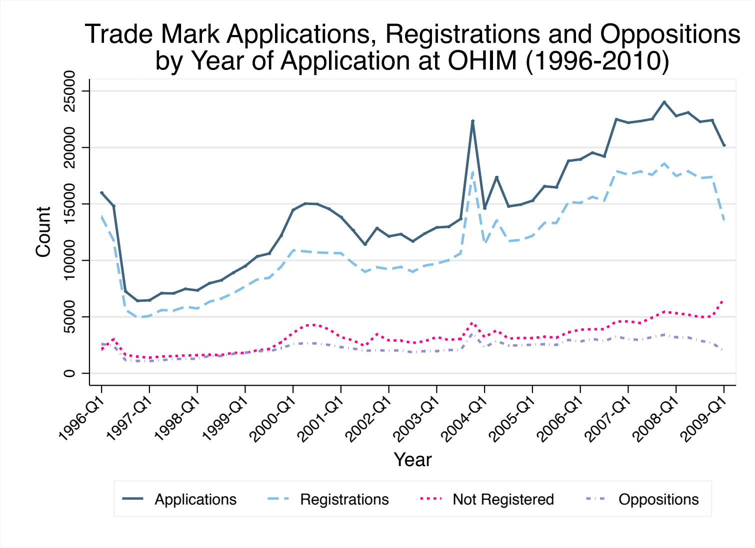



Figure : Demand for the Community Trade Mark

# Simultaneous applications and Extension of TM System

- Are there simultaneous applications leading to unused trade marks?

  A recent survey suggests the problem exists.

  (Kur et al., 2011).

- "..pharmaceutical manufacturers are routinely filing five to ten different trademarks for each trial drug in their pipelines."

  (Lallemand, 2011)

- Enlargement:
  On the 1.5.2004 Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia joined EU and thereby OHIM and EMA.

- As trade marks accumulate on the register it becomes harder to ensure a new mark is not opposed or rejected.

# The Naming Committee at EMA

- Losec (proton pump inhibitor) and Lasix (hypertension)
- FDA forces AstraZeneca to change Losec to Prilosec
- Prilosec was subsequently mistaken for Prozac by a pharmacist. The patient had a gastric ulcer!!

- The naming committee exists to prevent such mistakes.
- The naming committee works on the premise that mistakes can happen and will often be dangerous - it is very restrictive.

! Interestingly the opposition chambers at OHIM operate on the premise that in pharmaceuticals everybody is extremely attentive, due to high costs of error.

What drives simultaneous applications?

- Trade mark approval rates at EMA:

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|
| # Reviewed | 177 | 132 | 104 | 109 | 146 | 204 | 315 | 311 | 455 |
| % Accepted | 63% | 54% | 70% | 67% | 63% | 51% | 52% | 53% | 57% |

  Note the "break" after 2004.
- Ideally a pharmaceutical company would like to secure the same trademark worldwide.
- It faces at least USPTO, OHIM, FDA and EMA.
- Rejection of trademarks means a product launch is delayed $\rightarrow$ big reductions in share prices.

# Cost of simultaneous applications?

- Creating a set of names for a pharmaceutical product costs US $ 100,000 - US $ 700,000 (Kenagy and Stein, 2001) and sometimes even US $ 2.25 million (Wick, 2011).
- This is for: prescription simulation exercises, tests of name similarity, tests of implied claims conveyed by a name, tests of visual and verbal similarity, linguistic analysis.
- Important question that remains unanswered here: which proportion of these costs is due to cluttering?
- Creating names for other products costs US $ 9400 in 2004 prices (Kohli and LaBahn, 1997).

# Experiment?

- Medical name regulation imposes costs.
- The European Union is enlarged in 2004.
- Pharmaceutical firms face a large increase in costs of getting names approved after 2004.
- Can try to use this to estimate how much cluttering is going on.

But, need to answer additional questions:

- Is this an experiment?
- What are the potential outcomes?
- How does assignment work here?

# A model

- Firms make long run, uncertain R&D investments and short run marketing and regulatory compliance investments.
- R&D investments in period $t$ pay off in $t+2$, marketing and compliance investments are made in $t+1$.
- Firms invest to maximize profits.

- **Result**: A regulatory change in period $T$ that is announced in period $T-1$ leads to increased trade mark applications per product for the cohort of R&D investments made in period $T-2$.
- **Result**: R&D investments made in period $T-1$ will adjust for the higher cost of compliance - i.e. fewer projects.

# Counterfactuals and Outcomes

- What would have been pharmaceutical firms' simultaneous application numbers, absent EU enlargement?
- Use Difference-in-Differences to construct counterfactual using firms not affected by pharmaceuticals.

$$A_i = \alpha + \beta T_i + \sum_{g=1}^{4} \gamma_g \cdot 1[G_i = g] + \sum_{g=1}^{3} \tau_g \cdot 1[G_i = g, T_i = 1] + \boldsymbol{X}'\boldsymbol{\theta} + \epsilon_i \ , \quad (1)$$

$A_i$ – Applications $\quad$ $T_i(=1)$ EU enlargement indicator

$G_i(=g)$ group indicator $\quad$ $\boldsymbol{X}$ covariates

Assn. Common trends for both types of firms - how likely?

- Pharmaceutical firms tend to be large - concentrated markets.
- Size is imperfectly observed here - have no matched firm data!

# Alternative: Apply the Rubin Causal Model

- ▷ Potential outcomes: number of names simultaneously applied for given level of regulation.
- ▷ Assignment not random, as firms do not randomly choose to become or stay in pharmaceuticals in 1996-1999.
- ▷ Is assignment unconfounded?

⇒ Imbens (2004): if treatment participation (being a pharmaceutical firm) is a separate decision from the outcome (how many names to apply for) then it may be.

⇒ It will be if treatment uptake depends on variables that do not affect outcomes, even if these variables are not observable!

- ▷ Note here that treatment uptake and outcomes are based on decisions taken several years apart.

# Who is Treated?

Trade marks may be registered in multiple Nice classes simultaneously:

- define *related* to Pharmaceuticals if more than 24% of applications in the class are also registered in class 5.
- define *unrelated* to Pharmaceuticals if less than 5% of applications in the class are also registered in class 5.

Table : **Groups in Sample**

| **Applications in Classes Related to Pharmaceuticals** | **Applications in Classes unrelated to Pharmaceuticals** No | Yes | Total |
|---|---|---|---|
| No | **71,226** | **395,991** | 467,217 |
| Yes | **76,201** | 54,806 | 131,007 |
| Total | 147,427 | 450,797 | 598,224 |

Note: EU Enlargement in 2004 did not have statistically significant effects on proportion of application events in **pharmaceuticals** and **artifacts**.

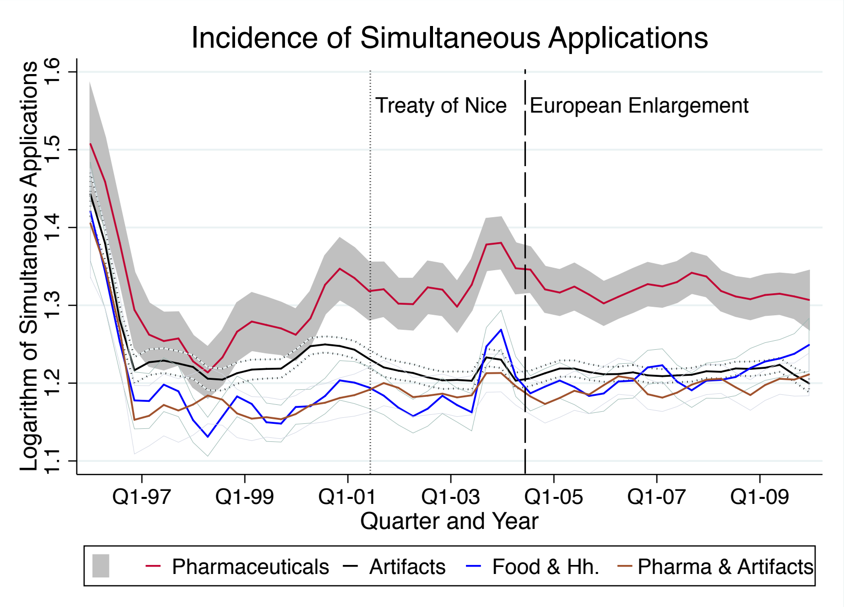
# Research Design

- I compare the number of simultaneous trade marks applied for in four sets of trade mark classes before and after $2004$:

Table : **Distribution of Trade Mark Applications**

| | Type of Industry | | |
|---|---|---|---|
| | **Artifacts** | **Food & Household** | **Pharmaceuticals** |
| Nice Classes | 6, 7, 9, 12, 16, 18 19, 25, 28, 33, 35, 36, 37, 38, 39, 41, 43 ,45 | 11, 20, 21, 29, 30, 31, 32, 42 | 1, 3, 5, 10, 13, 44 |
| Description | Metals, Machines, Scientific Apparatus, Vehicles, Leather, Building, Clothing, Games, ... | Lighting, Furniture, Household utensils Food, Coffee, Produce, Beer, | Chemicals, Laundry, Pharmaceuticals, Medical Apparatus, Firearms, Medical Services |
| N | 395,991 | 71,226 | 76,201 |

## Graphical Analysis - I



Data are $597,450$ application events - these are units of analysis.

**Descriptive Statistics**

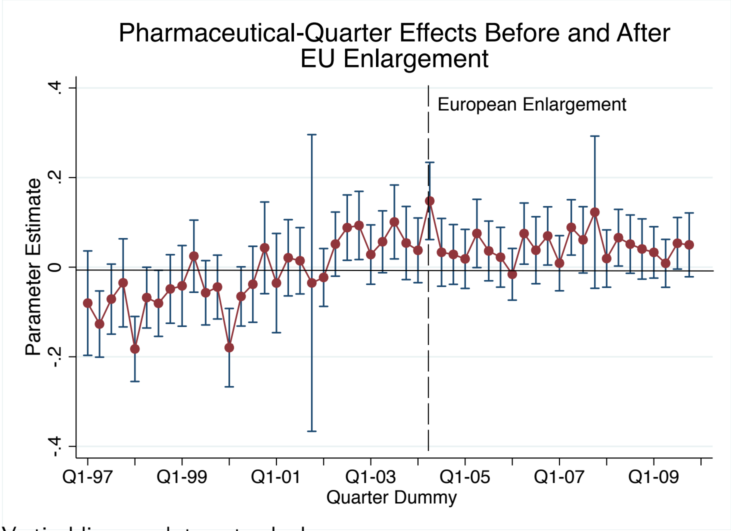
| Variable | Mean | S.D. | O.C. Mean | Min. | Max. |
|---|---|---|---|---|---|
| Simultaneous Applications Count | 1.200 | 1.317 | 1.194 | 1 | 634 |
| Fee Dummy | 0.426 | - | 0.426 | 0 | 1 |
| Anticipation Dummy | 0.197 | - | 0.197 | 0 | 1 |
| Expansion Dummy | 0.549 | - | 0.549 | 0 | 1 |
| Pharmaceutical Dummy | 0.127 | - | 0.127 | 0 | 1 |
| Food & Household Dummy | 0.092 | - | 0.092 | 0 | 1 |
| Pharmaceuticals & Artifacts | 0.119 | - | 0.119 | 0 | 1 |
| Seniority Dummy | 0.074 | - | 0.074 | 0 | 1 |
| Breadth | 2.738 | 2.400 | 2.738 | 0 | 45 |
| Opposition rate | 0.170 | 0.134 | 0.170 | 0 | 1 |
| Opposition rate $\times$ Food & Hh. | 0.026 | 0.076 | 0.026 | 0 | 1 |
| Opposition rate $\times$ Pharma. | 0.019 | 0.100 | 0.019 | 0 | 1 |
| Opposition rt. $\times$ Pharma & Atfs. | 0.019 | 0.058 | 0.019 | 0 | 1 |
| Pre-existing TM Mark stock | 2.980 | 16.945 | 2.977 | 0 | 349 |

# Table 3: Results from Difference-in-Differences Models

| | Base | Outliers | Quarter dummies | Time Trend |
|---|---|---|---|---|
| Expansion dummy | -0.014 | -0.040** | -0.028* | -0.026* |
| | (0.029) | (0.013) | (0.012) | (0.013) |
| Pharma dummy | 0.004 | 0.009 | 0.005 | -0.042 |
| | (0.018) | (0.016) | (0.018) | (0.131) |
| Food & Hh dummy | -0.033* | 0.016 | -0.034* | -0.217* |
| | (0.015) | (0.016) | (0.015) | (0.091) |
| Pharma & Artifacts dummy | 0.024† | 0.018† | 0.024† | 0.097 |
| | (0.013) | (0.011) | (0.013) | (0.097) |
| Anticipation × Pharma | 0.059*** | 0.061*** | 0.058*** | **0.054**** |
| | (0.014) | (0.013) | (0.014) | (0.020) |
| Expansion × Pharma | 0.043*** | 0.043*** | 0.043*** | **0.034** |
| | (0.013) | (0.012) | (0.013) | (0.028) |
| Expansion × Food & Household | 0.018* | 0.020** | 0.018* | -0.017 |
| | (0.008) | (0.007) | (0.008) | (0.019) |
| Expansion × Pharma & Artifact | 0.016* | 0.021** | 0.016* | 0.030 |
| | (0.008) | (0.007) | (0.008) | (0.021) |
| R-squared | 0.220 | 0.114 | 0.220 | 0.220 |
| N | 597450 | 597339 | 597450 | 597450 |

† $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Robust standard errors in parentheses

# Robustness - Stability over time




Note: Vertical lines mark two standard errors.

# What do the estimated effects imply?

- Note that I observe:

$$\bar{n}_j = \frac{Om_j + NM_j}{N + O} = \frac{\lambda A m_j + (1-\lambda) A M_j}{A} = \lambda m_j + (1-\lambda) M_j \tag{2}$$

- I assume that the probability of passing name review in each country $(\rho)$ is identical and use the table provided by Lallemand (2011) to calculate this probability.
- I assume that $\lambda, \rho$ do not change 2004.
- Combining this with sample values of $n_l, n_h, m_l, m_h$ and the estimate of $\tau_p$ and a cost of US \$ 25,000 per name it is possible to work out that between 2001 and 2004 per year US \$ 17.7 million was spent on inventing surplus names.
- This is likely a very conservative lower bound on the true costs.

# Are these effects reliable?

- ▷ Covariate balance (Imbens and Wooldridge, 2009)?
- ▷ Alternative is to use matching and bias adjusted matching (Abadie et al., 2004).
- ▷ To mimic DID I match on covariates and the average of the dependent variable before expansion (Abadie and Imbens, 2011).
- ▷ PATT or PATE? - DID estimates PATT.

## Table 4: Covariate Balance Before EU Enlargement

| **Variable** | **Treated** Pharmaceuticals | (sd) | **Controls** Artifacts | (sd) | **Norm. Diff.** |
|---|---|---|---|---|---|
| Breadth | 1.74 | 1.00 | 2.68 | 1.73 | **-0.489** |
| Opposition rate | 0.20 | 0.09 | 0.14 | 0.08 | **0.776** |
| Registration rate | 0.78 | 0.14 | 0.71 | 0.21 | **0.395** |
| Past applications | 1.00 | 1.01 | 0.74 | 2.48 | 0.195 |
| New combination dummy | 0.50 | 0.50 | 0.69 | 0.46 | **-0.377** |
| Seniorities | 8.56 | 31.46 | 2.20 | 13.64 | **0.275** |
| Age (days) | 543.99 | 2507.11 | 346.78 | 1801.60 | 0.072 |
| No seniorities dummy | 0.93 | 0.26 | 0.95 | 0.23 | -0.075 |

Nomalized differences calculated using pstest in STATA.

Note: Imbens and Wooldridge (2009) and Imbens and Rubin (2011) suggest that the normalized differences should not be greater than a quarter.

Matching conditioning on 2004

Table 5: Results from Matching Estimators

| Number of matches | PATT | PATT Robust, Bias adjusted | PATE | PATE Robust, Bias adjusted |
|---|---|---|---|---|
| 1 | 0.1806*** | 0.1879*** | 0.0862*** | 0.0242 |
| | (0.0441) | (0.0429) | (0.0289) | (0.0258) |
| | 53.21% | | 57.60% | |
| 4 | 0.1417*** | 0.1675*** | 0.1002*** | 0.0356 |
| | (0.0378) | (0.0352) | (0.0268) | (0.0233) |
| | 45.00% | | 50.72% | |

N=21162

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parenthes

Matching conditioning on 2001 & 2004

Table 6: Results from Matching Estimators

| Number of matches | PATT | Robust, Bias adjusted | PATE | Robust, Bias adjusted |
|---|---|---|---|---|
| 1 | 0.1676*** | 0.1796*** | 0.1059*** | 0.0340 |
| | (0.0444) | (0.0404) | (0.0303) | (0.0269) |
| | 52.58% | | 56.96% | |
| 4 | 0.1383*** | 0.1529*** | 0.1138*** | 0.0754*** |
| | (0.0379) | (0.0363) | (0.0286) | (0.0261) |
| | 43.90% | | 49.20% | |

N=21162

† $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Standard errors in parenthes

What do I find?

- Simple graphical evidence is not favourable to a big jump in cluttering.
- Simple estimation results (DiD) suggest there was a substantial jump in cluttering.
- Estimating time period specific treatment effects also suggests a jump, also some evidence of a jump before 2004, anticipating expansion.
- Once a time trend is included the (DiD) treatment effect falls and is no longer significant, the trend is also not significant. Results are ambivalent here.
- Results from a matching estimator suggest significant effects of enlargement on simultaneous applications.
  These effects are **four** times larger than those obtained from DID.

## Conclusion

- If group membership is exogenous to expansion then results show either (i) that $2004$ there was a significant increase in simultaneous applications, or (ii) that there is a positive time trend in simultaneous applications.
  Both of these results suggest something is going on.
- The matching estimator shows that effects are quite significant.
- Extension to comparison with US or Germany - DDD?
- Other control groups - different types of pharmaceutical firms
- Control for rate of conversion (applications to registrations)
- Control for reassignments

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