The impact of international patent systems: Evidence from accession to the European Patent Convention

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(based on joint work with Christian Helmers)

Why our paper?

- Growth in worldwide patenting post 2000
  - Fink et al. (WIPO) – due to increase in multiple filings
  - Several patent offices working on harmonization to reduce workloads
  - Regional patent systems could lower cost
- TRIPS - all WTO members should operate some kind of patent system
  - encourages regional/global systems as a cost-saver
- What should we expect from the introduction of the European unitary patent?
  - Look at the consequences of joining a regional patent system (EPC) for patenting, when the existing systems remain in place

European Patent Convention

- Created in 1977 with 7 countries (now 38)
- Single application to the EPO
  - Application designates states in which it may be validated.
  - After grant, must be validated in every state in which coverage is desired.
  - Enforcement is national – invalidation at EPO through opposition and at national courts.
  - In principle, lower cost than applying at each national office.

Accession to the EPO

- Pre 2000: Belgium, France, Germany, Luxembourg, Netherlands, Switzerland, UK, Sweden, Italy, Austria, Liechtenstein, Greece, Spain, Denmark, Monaco, Portugal, Ireland, Finland, Cyprus
  - average 2005 GDP = $33.8K
- 2000-2008 (our sample): Turkey, Bulgaria, Czech Republic, Estonia, Slovakia, Slovenia, Hungary, Romania, Poland, Iceland, Lithuania, Latvia, Malta, Croatia, Norway
  - average 2005 GDP = $18.7K,
  - without Iceland and Norway, = $14.6K
- Post 2008: FYROM, San Marino, Albania, Serbia

Effects of joining the EPC

- Residents in the country – cheaper to obtain coverage abroad (in Europe)
- Non-residents that already apply to the EPO – cheaper to get coverage in the country
- Full costs difficult to compute.
  - table of fees at the Nat offices around 100 euros for validation, and then 100 euros a year
  - EPO cost substantially higher
  - but there are also legal and translation fees…..

Predictions

1. **domestic** entities file fewer patents with national office and more with EPO
2. more **domestic** entities obtain patent protection domestically
3. fewer **foreign** entities apply for patent protection with the national office - validate EPO patent instead
4. more **foreign** entities obtain patent protection in the country

➔ Changes the **intensive** & **extensive margin**

Empirical analysis

- Impact of accession on aggregate patent filings
  - At the EPO
  - At national office
  - By residents in the country
  - By non-residents
- Impact of accession on individual firms in the country (not in this presentation)

Data

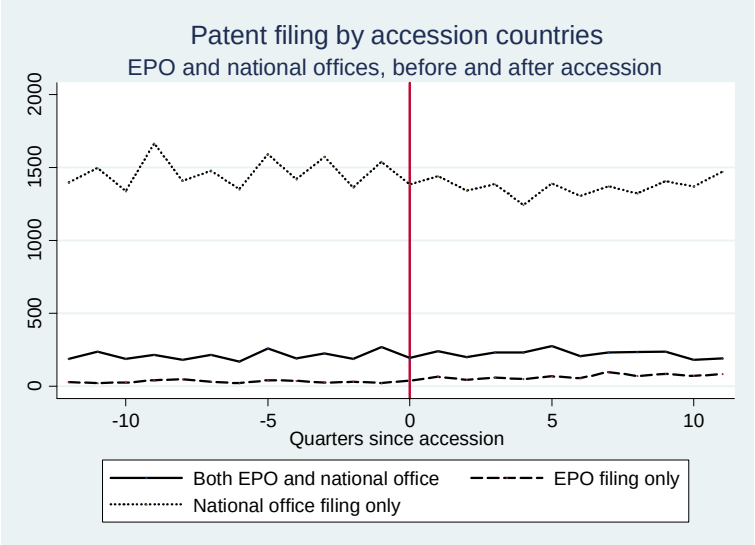
- Patent data from Patstat (April 2014):
  - Applications filed at the EPO, national patent offices, and via the PCT route at WIPO
  - Designation (filed within 6 months of the EPO search report) identifies countries where patent is expected to be validated, but only 44% are actually validated in designated states, so
  - also collect validation information, and focus on patents applied for prior to 2008

Table 2: Accession states and dates

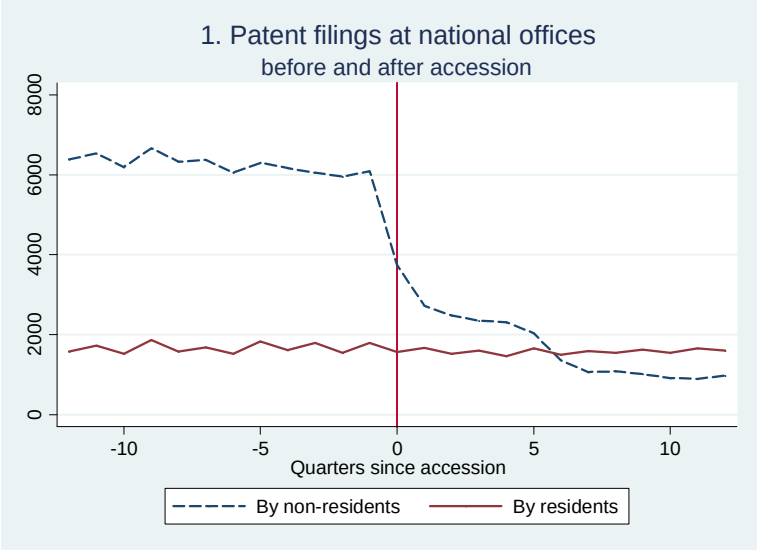
Country	*EPC Extension Date*	*EPC Accession Date*	*EU Accession Year*
Bulgaria		1 July 2002	2007
Croatia		1 January 2008	2013
Czech Republic		1 July 2002	2004
Estonia		1 July 2002	2004
Hungary		1 January 2003	2004
Lithuania	5 July 1994	1 December 2004	2004
Latvia	1 May 1995	1 July 2002	2004
Iceland		1 November 2004	
Norway		1 January 2008	
Poland		1 March 2004	2004
Romania	15 October 1996	1 March 2003	2007
Slovenia	1 March 1994	1 December 2002	2004
Slovakia		1 July 2002	2004
Turkey		1 November 2000	

Note: grey shaded areas indicate country is European Union (EU) member

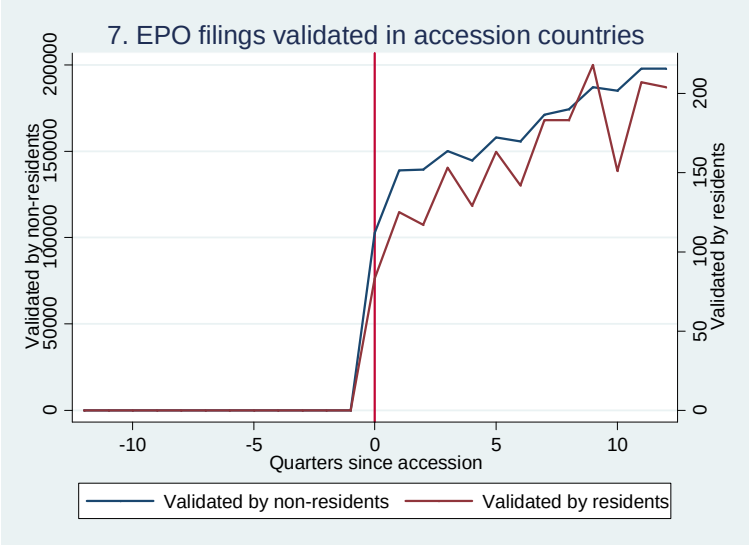
Patent filings by residents



Patent filings at national offices



EPO validations in accession countries



Regression analysis - aggregates

$$\log(p_{it} + 1) = \beta_{EPC} + \gamma_{EPC} s + \alpha_i + \delta_t + \varepsilon_{it}$$

p_{it} = number of patent applications from country i at time t (quarter of the year)

s = quarter since accession to the EPC

1. A dummy post-accession
2. A separate trend post-accession
3. Country and time dummies

952 obs = 68 quarters (1995-2011)*14 countries

Aggregate results

	EPO apps by residents	Residents at national offices	Non-residents at national offices
Post-accession dummy	0.01 (0.12)	**-0.29 (0.12)**	**-1.54 (0.27)**
Post-accession trend	0.04 (0.02)	0.04 (0.03)	**-0.06 (0.03)**

Robust standard errors clustered on country.

Result: resident applicant behavior barely changes, while non-resident applications at national offices decline substantially.

Results for predictions

1. **domestic** entities file fewer patents with national office and more with EPO
   - Very weak increase in EPO filings observed
2. more **domestic** entities obtain patent protection domestically
   - No increase visible
3. fewer **foreign** entities apply for patent protection with the national office - validate EPO patent instead
   - Foreign entities essentially cease filing at national offices
4. more **foreign** entities obtain patent protection in the country
   - About 20 times as many validations as applications at the national offices before accession, and rising
5. a new puzzle:
   - In some cases residents file both EPO and national patents for the same invention both before (as expected) and after (unexpected) accession.

The Unitary Patent

- What does all this imply for the Unitary Patent?
  - The UP leaves the two other routes to a patent in place: EPO and national office
  - Some results of a survey of patent users and stakeholder meetings
    - Benefits and costs
    - Takeup as a function of fee levels

Benefits and costs of switching to UP

Benefits

- Lower transacation costs
- Low or no publication and patent transfer fees at NPOs
- Easier to use for financing or licensing
- Litigation
  - One-stop shop
  - More certainty
  - Lower cost due to competition among lawyers?

Costs

- Loss of renewal flexibility
- Language complexity
- Litigation costs might be higher overall
- Invalidity risk greater – if lost, lose in all jurisdictions
- Small local firms with national patents worry about MNE entry in their market

Results of a 2013 survey of current EPO patentholders by Europe Economics

Percentage of patents that would have been registered as UP in the last 5 years:

Scenario 1: Renewal fee equal to the sum of the current renewal fees for Germany, France and UK	62% (13,765)
Scenario 2: Renewal fee equal to the sum of the current renewal fees for Germany, France, UK, Netherlands, Sweden and Belgium	19% (4,222)
Scenario 3: Renewal fee equal to the sum of the current renewal fees for, Germany, France, UK, Netherlands, Sweden, Belgium, Austria, Ireland and Denmark	12% (2,662)
Scenario 4: Renewal fee equal to the sum of the current renewal fees for, Germany, France, UK, Netherlands, Sweden, Belgium Austria, Ireland, Denmark, Poland, Finland and Czech Republic	9% (1,957)

The potential use of the UP is sensitive to the level that the centralised renewal fees will have. Current proposals (7 May 2015) call for fees around the level of 4 country validation.

Simple stylized model

V_j = value of patent in country j, $j = 0,1,....,J$

C_j = cost of filing/renewal/legal in country j

0 = domestic country

patent in j if $V_j - C_j > 0$; except that may choose EPO if

$$\sum_{j=1}^{J} V_j - C_{EPO} > \sum_{j=1}^{J} (V_j - C_j) \Leftrightarrow \sum_{j=1}^{J} C_j > C_{EPO}$$

after accession, if value and fees remain unchanged, will patent at EPO if

$$V_0 + \sum_{j=1}^{J} V_j - C_{EPO} > (V_0 - C_0) + \sum_{j=1}^{J} (V_j - C_j) \Leftrightarrow C_0 + \sum_{j=1}^{J} C_j > C_{EPO}$$

$\Longrightarrow$Assuming validation in 6 or more countries, EPO patenting clearly more likely after accession.