Corporate taxes and the location of innovative activity

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Motivation I – IP is important and mobile

• Intangible capital accounts for growing share of inputs
  – OECD described growing significance intellectual property & its simultaneous use by many different parts of a firm as “one of the most important commercial developments in recent decades.”
  – since the mid 1990s UK investment in intangible (knowledge) assets has been greater than that in fixed capital and is now about 50% higher

• The income from IP is highly mobile
  – A tax lawyer quoted in the New York Times noted:
    “…most of the assets that are going to be reallocated as part of a global repositioning are intellectual property…that is where most of the profit is.”
  – A front page story in the Wall Street Journal described how Microsoft saved at least $500m in taxes by licensing its intellectual from an Irish subsidiary
Motivation II – IP and policy

• Many governments want to encourage the creation and use of intangible capital to boost productivity - tax policy is one instrument that governments can use

• Intellectual property has been in policy spot light
  – Controlled Foreign Companies (CFC) regimes
  – Patent Boxes

• Number of important questions:
  – how does tax policy affect the level and location of innovation?
  – are the benefits of innovation contingent on activity being geographically located in the country?
  – how to tax mobile income?
Location and taxes

Multinational Headquarter location
- Treatment of foreign source income
- Corporate income tax

Location of innovation
- Corporate income tax
- R&D tax credits

Location of IPR holdings
- Corporate income tax
- Patent box

Location of production
- Corporate income tax

CFC regime

Royalty treatment (Withholding rates)
Policy: Patent Boxes

- Substantially reduced rate of corporation tax for the income derived from patents

- Recently introduced by a number of European countries
  - Belgium 6.8% (full rate, 34%); Netherlands 10% (full rate, 25%); Luxembourg 5.9% (full rate, 39%)
  - UK to introduce in 2013, 10% (full rate, 24% in 2013) at a cost of £1.1bn
Patent Box as an innovation policy

- Original stated aim of UK policy: “strengthen the incentives to invest in innovative industries and ensure the UK remains an attractive location for innovation”

- Poorly targeted - targets income from ideas, not the activity that generates new ideas

- Research can be located separately from income
  - unclear that attracting IP will also attract innovative activities

- Large deadweight cost / significant revenue cost / implementation difficulties / benefits accrue to a small number of firms / distorts the decision to invest in patentable technologies
Patent Box as a preferential rate for mobile income

• Preferential rate on an important form of more mobile activities
  – Mirrlees review: “In principle, it would be efficient to tax rents from relatively immobile activities at a higher rate than rents from more mobile activities”
  – allow higher rates to persist on less mobile activities

• How responsive is the location of intellectual property to corporate taxes?
Location and taxes

- **Multinational Headquarter location**
  - Treatment of foreign source income
  - Corporate income tax

- **Location of innovation**
  - Corporate income tax
  - R&D tax credits

- **Location of IPR holdings**
  - Corporate income tax
  - Patent box

- **Location of production**
  - Corporate income tax

- **CFC regime**

- Royalty treatment (Withholding rates)
Impact of tax on location of intellectual property

- Griffith, Miller and O’Connell (2011) - provide empirical evidence on how responsive the location of IP is to corporate tax

- Model the impact of corporate taxes on innovative European multinationals’ choices over where to hold patent applications

- Allow heterogeneity (observed and unobserved) in where patents are located and how responsive such choices are to tax
  - important for predicted patterns of movements across countries

- Simulate the effect of Patent Box
Data

- Multinational firms ownership structure
  - European parent firms and their European and US subsidiaries
  - consider location of patent applications (EPO, 1985-2005)

- Tax data
  - statutory corporate tax rates
  - CFC regime operated in home country
Summary of estimation results

- Firms respond to taxes when choosing where to hold IPR
- Important to account for:
  - interactions between tax jurisdictions
  - observed and unobserved heterogeneity in responsiveness
  - unobserved country effects
- Size of effect:
  - Own tax elasticities: a ten percentage point fall in the tax rate would increase the share of patent holdings by between 7%-15%
  - Range of cross tax elasticities between pairs of countries, e.g. 10% increase in the Belgium tax rate leads to a 0.5% increase in the share of patents in the UK while the same increase in the French tax rate increase the UK share by 2.6% points.
Counterfactual policy analysis: Patent Boxes

- What is the likely affect of Patent Boxes?
  - how do we expect the location of patents to change when favourable tax regimes are introduced?
  - what effect will this have on tax revenue?

- Don’t observe firms actual behaviour – policies are too recent
Effect of Patent Boxes: share of new patent applications

- Netherlands
- Belgium
- Luxembourg
- UK

- No Patent Boxes
- Benelux Patent Boxes
- Plus UK Patent Box
Effect of Patent Boxes: share of new patent applications

- Netherlands: 30%
- Belgium: 5%
- Luxembourg: 1%
- UK: 10%

- No Patent Boxes
- Benelux Patent Boxes
- Plus UK Patent Box
Effect of Patent Boxes: share of new patent applications

- Netherlands
  - No Patent Boxes: 30%
  - Benelux Patent Boxes: 27%
  - Plus UK Patent Box: 25%
- Belgium
  - No Patent Boxes: 5%
  - Benelux Patent Boxes: 10%
  - Plus UK Patent Box: 15%
- Luxembourg
  - No Patent Boxes: 1%
  - Benelux Patent Boxes: 2%
  - Plus UK Patent Box: 3%
- UK
  - No Patent Boxes: 10%
  - Benelux Patent Boxes: 9%
  - Plus UK Patent Box: 12%
Tax revenue (indexed to 100 before Patent Boxes)
Government Tax Competition

• We find indicative evidence that tax competition could erode any benefits

• Theoretical results on preferential rates are predicated on underlying assumptions
  – isolate tax competition in one part of the tax system, or
  – leads to no tax on mobile income and lower all revenues for all governments

• Going forward – model government behavior to consider strategic government tax setting
  – write down government’s maximisation problem and find optimal policy
Summary and concluding comments

- Governments are grappling with questions of how to tax innovation and the associated income
  - the mobility of income raises additional challenges

- A number of European governments have introduced Patent Boxes

- Patent Boxes are poorly targeted at innovation; the effect of the location of real innovative activities is unclear (but important)

- We find that the location of firms’ patent applications respond to corporate taxes. Patent Boxes attract patent income but also lead to a reduction in government revenues.