



Institute for
Fiscal Studies

Corporate taxes and the location of innovative activity

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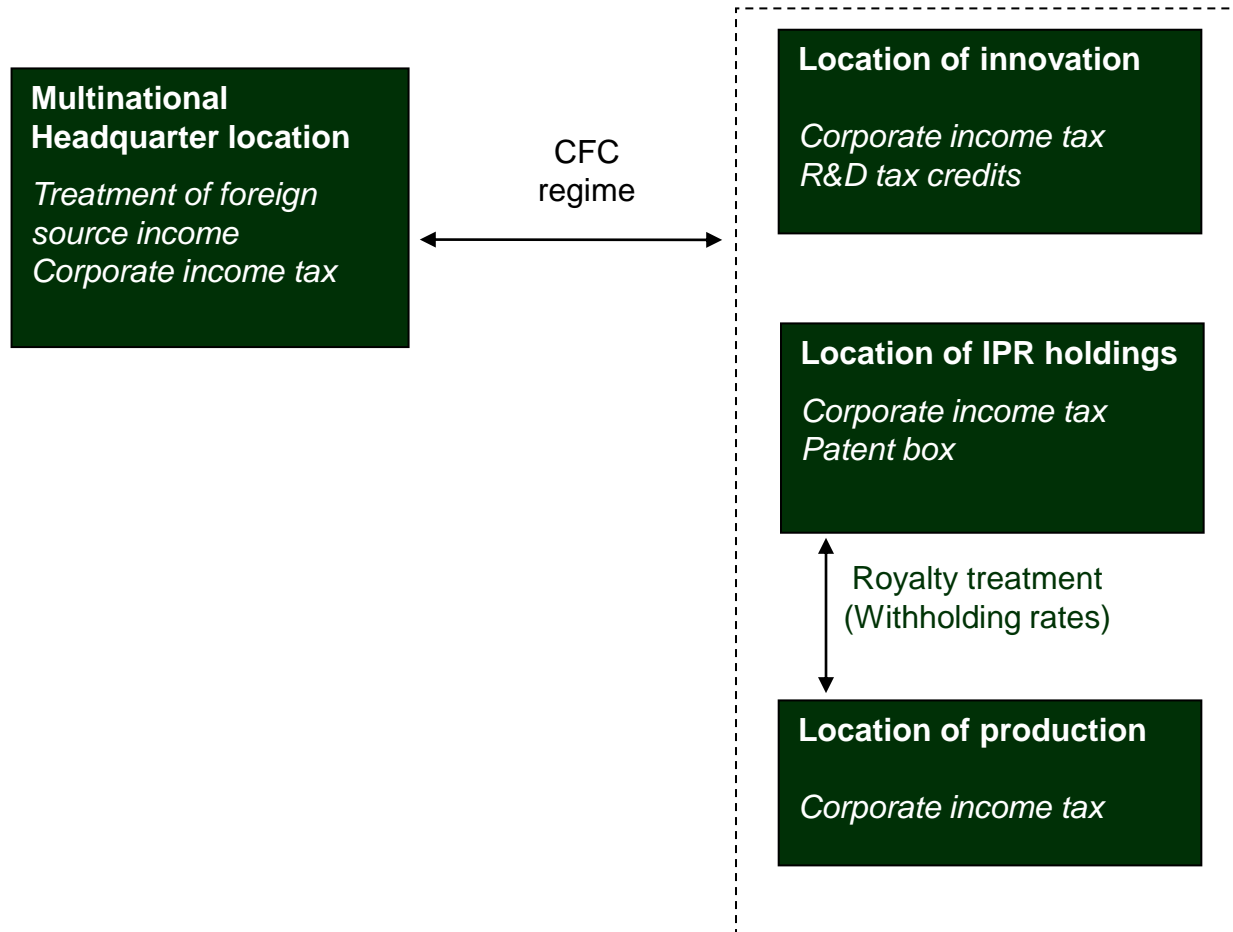
Motivation I – IP is important and mobile

- 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



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

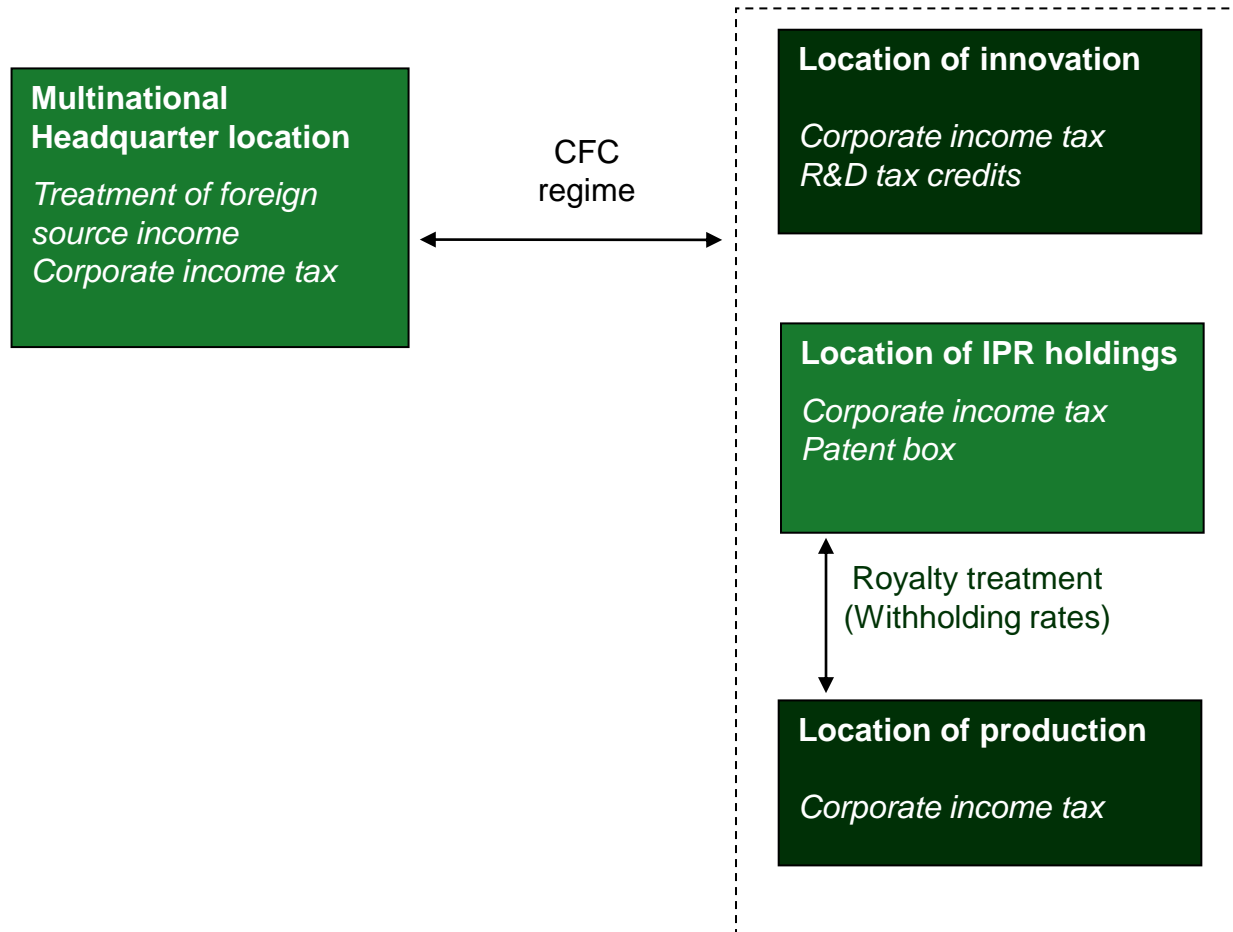
Patent Box as an innovation policy

- 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



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

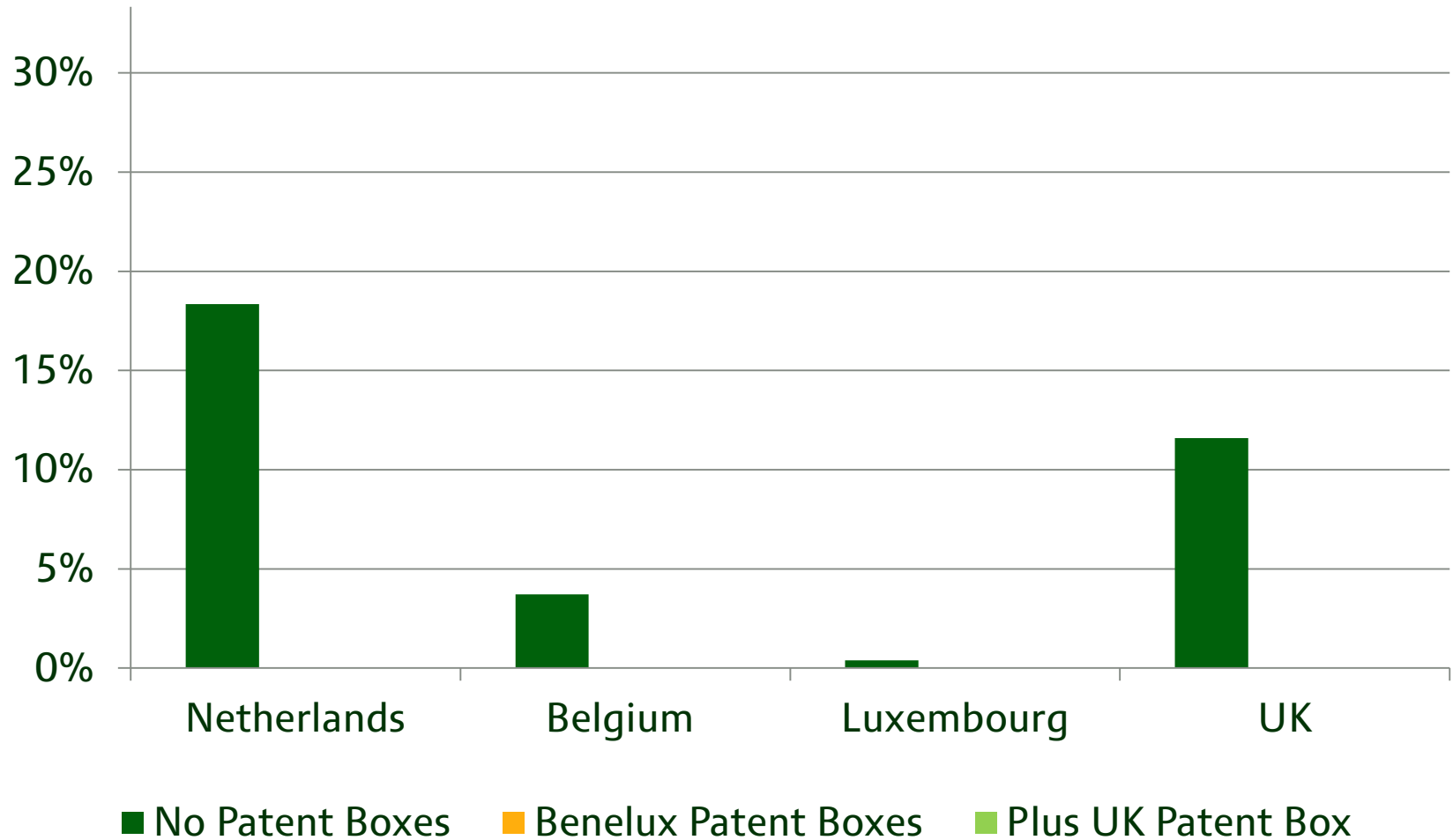
Summary of estimation results

- 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.

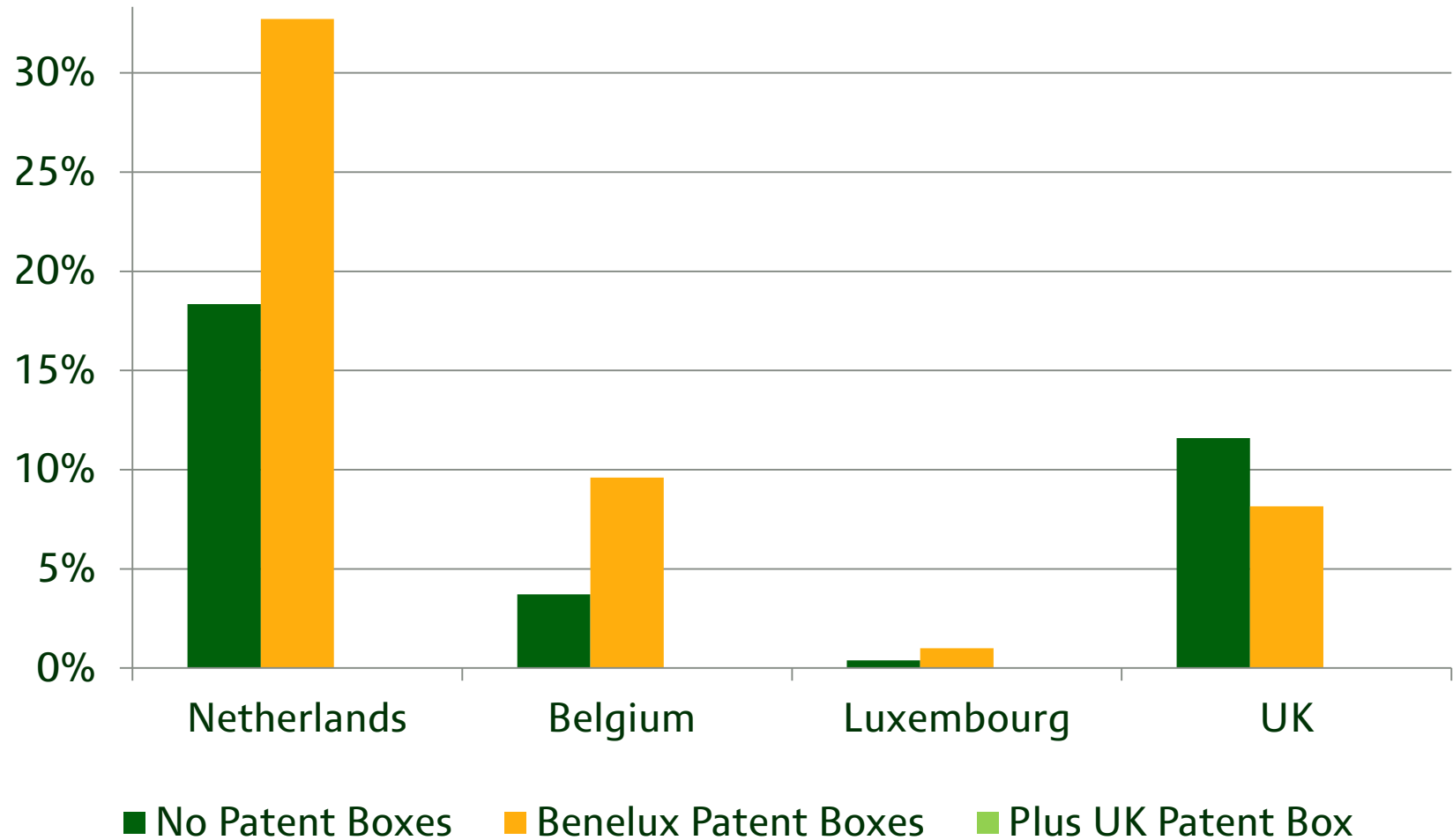
Counterfactual policy analysis: Patent Boxes

- 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

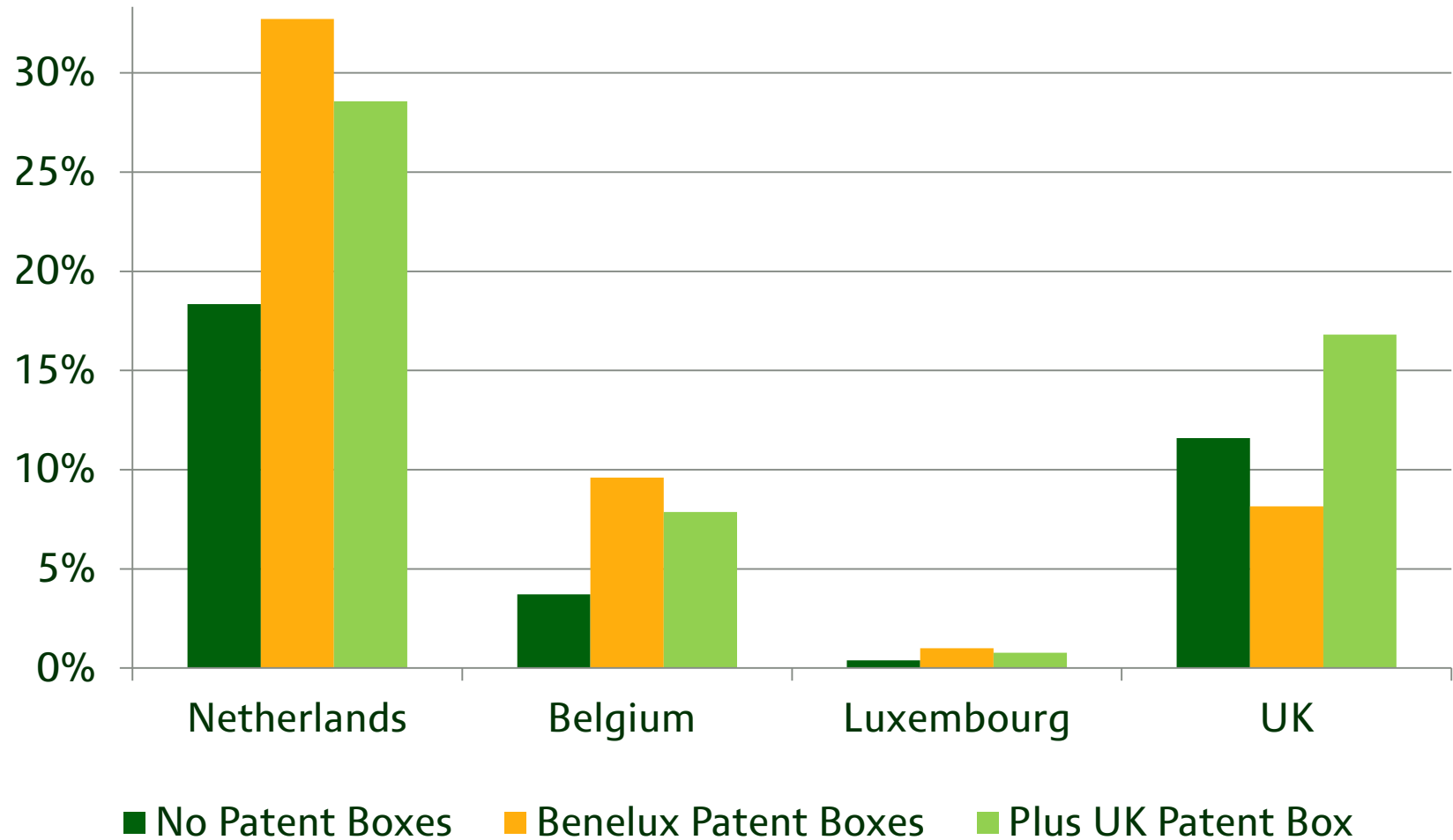
Effect of Patent Boxes: share of new patent applications



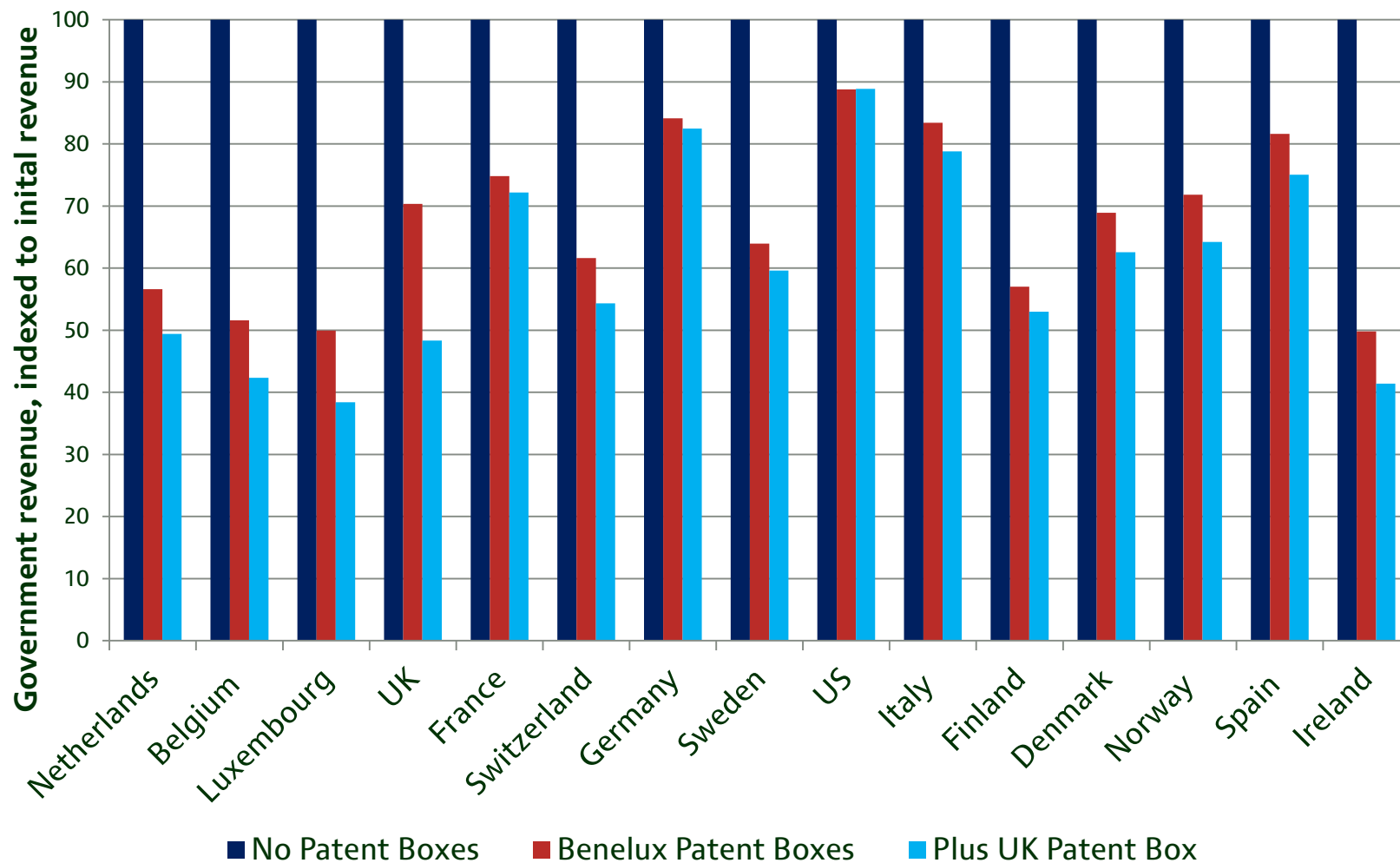
Effect of Patent Boxes: share of new patent applications



Effect of Patent Boxes: share of new patent applications



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.