## International Royalty Flows and Research and Development Responses to IP Box Regimes

Eric Ohrn

Grinnell College

IIEL and ITPF
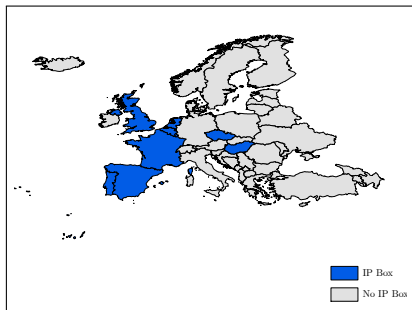Taxation of Intellectual Property in a Global Economy

March 11, 2016

## Introduction

**Objectives of IP Box Regimes**

1. Foster domestic innovation and the creation of high-value jobs

2. Reduce erosion of the tax base that occurs when mobile income is relocated to low-tax jurisdictions via transfer pricing and cost-sharing arrangements



IP Box
No IP Box

## Introduction
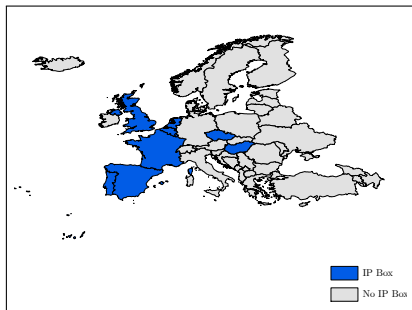
**Objectives of IP Box Regimes**

1. Foster domestic innovation
   and the creation of
   high-value jobs

2. Reduce erosion of the tax
   base that occurs when mobile
   income is relocated to
   low-tax jurisdictions via
   transfer pricing and
   cost-sharing arrangements



This project explores whether IP Box regimes accomplish these goals by examining the impact of IP Boxes on

▶ U.S. payments for the use of intellectual property made to foreign countries

▶ R&D expenditures in majority owned, U.S. foreign affiliates

## IP Box Characteristics

Table: IP Box Regimes Currently in Place

| Country | Implemented | IP Box % | Main Tax % |
|---|---|---|---|
| Belgium | 2007 | 6.8 | 33.99 |
| Cyprus | 2012 | 2.5 | 12.5 |
| France | 2000 | 16.76 | 35.41 |
| Hungary | 2003 | 9.5 | 19 |
| Liechtenstein | 2011 | 2.5 | 12.5 |
| Luxembourg | 2008 | 5.84 | 29.22 |
| Malta | 2010 | 0 | 35 |
| Netherlands | 2007 | 5 | 25 |
| Portugal | 2014 | 15 | 30 |
| Spain | 2008 | 12 | 30 |
| U.K. | 2013 | 10 | 21 |

Notes: Table taken from Evers, Miller, Spengel 2014. Main Tax % includes the corporate income tax rate and if applicable, surcharges, local income taxes, and other income taxes. When Estimating IP is coded as "Yes," income derived from exisiting IP (when the box is implemented) qualifies from the preferential; IP box tax rate. When IP income is defined as gross income, IP related expenses may be deducted at the Main Tax %. When IP income is defined as net, IP related income must be deducted at the IP box %.

## IP Box Characteristics

Table: IP Box Regimes Currently in Place

| Country | Implemented | IP Box % | Main Tax % | Exisiting IP |
|---------|-------------|----------|------------|--------------|
| Belgium | 2007 | 6.8 | 33.99 | No |
| Cyprus | 2012 | 2.5 | 12.5 | Yes |
| France | 2000 | 16.76 | 35.41 | Yes |
| Hungary | 2003 | 9.5 | 19 | Yes |
| Liechtenstein | 2011 | 2.5 | 12.5 | No |
| Luxembourg | 2008 | 5.84 | 29.22 | No |
| Malta | 2010 | 0 | 35 | No |
| Netherlands | 2007 | 5 | 25 | No |
| Portugal | 2014 | 15 | 30 | No |
| Spain | 2008 | 12 | 30 | Yes |
| U.K. | 2013 | 10 | 21 | Yes |

Notes: Table taken from Evers, Miller, Spengel 2014. Main Tax % includes the corporate income tax rate and if applicable, surcharges, local income taxes, and other income taxes. When Estimating IP is coded as "Yes," income derived from exisiting IP (when the box is implemented) qualifies from the preferential; IP box tax rate. When IP income is defined as gross income, IP related expenses may be deducted at the Main Tax %. When IP income is defined as net, IP related income must be deducted at the IP box %.

## IP Box Characteristics

Table: IP Box Regimes Currently in Place

| Country | Implemented | IP Box % | Main Tax % | Exisiting IP | Income |
|---------|-------------|----------|------------|--------------|--------|
| Belgium | 2007 | 6.8 | 33.99 | No | Gross |
| Cyprus | 2012 | 2.5 | 12.5 | Yes | Net |
| France | 2000 | 16.76 | 35.41 | Yes | Net |
| Hungary | 2003 | 9.5 | 19 | Yes | Gross |
| Liechtenstein | 2011 | 2.5 | 12.5 | No | Net |
| Luxembourg | 2008 | 5.84 | 29.22 | No | Net |
| Malta | 2010 | 0 | 35 | No | Net |
| Netherlands | 2007 | 5 | 25 | No | Net |
| Portugal | 2014 | 15 | 30 | No | Gross |
| Spain | 2008 | 12 | 30 | Yes | Net |
| U.K. | 2013 | 10 | 21 | Yes | Net |

Notes: Table taken from Evers, Miller, Spengel 2014. Main Tax % includes the corporate income tax rate and if applicable, surcharges, local income taxes, and other income taxes. When Estimating IP is coded as "Yes," income derived from exisiting IP (when the box is implemented) qualifies from the preferential; IP box tax rate. When IP income is defined as gross income, IP related expenses may be deducted at the Main Tax %. When IP income is defined as net, IP related income must be deducted at the IP box %.

## IP Box Characteristics

**Treatment of Existing IP**

- ► "Existing IP Allowed": preferential IP tax rate applies to both income derived from new (post box) IP and existing (pre box) IP.

- ► "Existing IP Not Allowed": preferential IP tax rate applies to only newly developed (post box) IP.

## IP Box Characteristics

**Treatment of Existing IP**

- ▶ "Existing IP Allowed": preferential IP tax rate applies to both income derived from new (post box) IP and existing (pre box) IP.

- ▶ "Existing IP Not Allowed": preferential IP tax rate applies to only newly developed (post box) IP.

**Income Definition; Expense Allocation Rules**

- ▶ "Net Income": preferential IP tax rate applies to IP income net of IP costs.

- ▶ "Gross Income": preferential IP tax rate applies to only IP income. IP costs are deducted at the applicable pre-box tax rate.

Incentives Created by IP Box Characteristics

# Incentives Created by IP Box Characteristics

### Incentives for IP Payments

## Incentives Created by IP Box Characteristics

### Incentives for IP Payments

**There is a stronger incentive to increase IP payments to Existing IP Allowed boxes.**

1. There is more IP that can generate IP box income.
2. There is more IP with which to "justify" additional payments.

## Incentives Created by IP Box Characteristics

### Incentives for IP Payments

**There is a stronger incentive to increase IP payments to Existing IP Allowed boxes.**

1. There is more IP that can generate IP box income.
2. There is more IP with which to "justify" additional payments.

**There is no difference in IP Payment incentives between Gross vs. Net Income boxes.**

► Payments are taxed at the same rate in both types of boxes.

## Incentives Created by IP Box Characteristics

### Incentives for IP Payments

**There is a stronger incentive to increase IP payments to Existing IP Allowed boxes.**

1. There is more IP that can generate IP box income.
2. There is more IP with which to "justify" additional payments.

**There is no difference in IP Payment incentives between Gross vs. Net Income boxes.**

- ▶ Payments are taxed at the same rate in both types of boxes.

### Incentives for R&D

## Incentives Created by IP Box Characteristics

### Incentives for IP Payments

**There is a stronger incentive to increase IP payments to Existing IP Allowed boxes.**

1. There is more IP that can generate IP box income.
2. There is more IP with which to "justify" additional payments.

**There is no difference in IP Payment incentives between Gross vs. Net Income boxes.**

▶ Payments are taxed at the same rate in both types of boxes.

### Incentives for R&D

**There is a stronger incentive to increase R&D in Existing IP Not Allowed boxes.**

▶ To take advantage of the IP box, new IP must be generated.

## Incentives Created by IP Box Characteristics

### Incentives for IP Payments

**There is a stronger incentive to increase IP payments to Existing IP Allowed boxes.**

1. There is more IP that can generate IP box income.
2. There is more IP with which to "justify" additional payments.

**There is no difference in IP Payment incentives between Gross vs. Net Income boxes.**

▶ Payments are taxed at the same rate in both types of boxes.

### Incentives for R&D

**There is a stronger incentive to increase R&D in Existing IP Not Allowed boxes.**

▶ To take advantage of the IP box, new IP must be generated.

**There is also a stronger incentive to increase R&D when the IP box applies to Gross as opposed to net income.**

▶ R&D is taxed at the traditional rate that is high relative to the rate of the income generate by the R&D.

# Data Sources

## Data Sources

**U.S. Payments for the Use of IP** ▶ Descriptive Statistics

The U.S. BEA detailed data on international charges for the use of intellectual property.

- ▶ includes royalties, trademarks, franchise fees
- ▶ data are available for 31 countries during the years 1999–2014
- ▶ includes pre and post implementation data for 5 IP box countries ▶ more
- ▶ 2013: 77% of payments were made between related parties

## Data Sources

**U.S. Payments for the Use of IP** ▶ Descriptive Statistics

The U.S. BEA detailed data on international charges for the use of intellectual property.

- ▶ includes royalties, trademarks, franchise fees
- ▶ data are available for 31 countries during the years 1999–2014
- ▶ includes pre and post implementation data for 5 IP box countries ▶ more
- ▶ 2013: 77% of payments were made between related parties

**U.S. MNE foreign affiliate R&D** ▶ Descriptive Statistics

The BEA also collects data on the foreign R&D of U.S. MNEs.

- ▶ publicly available data are affiliate-country aggregates
- ▶ data are available for 115 countries during years 2004–2013
- ▶ includes pre and post implementation data for 5 IP box countries ▶ more

## Data Sources

**U.S. Payments for the Use of IP** ▶ Descriptive Statistics

The U.S. BEA detailed data on international charges for the use of intellectual property.

- ▶ includes royalties, trademarks, franchise fees
- ▶ data are available for 31 countries during the years 1999–2014
- ▶ includes pre and post implementation data for 5 IP box countries ▶ more
- ▶ 2013: 77% of payments were made between related parties

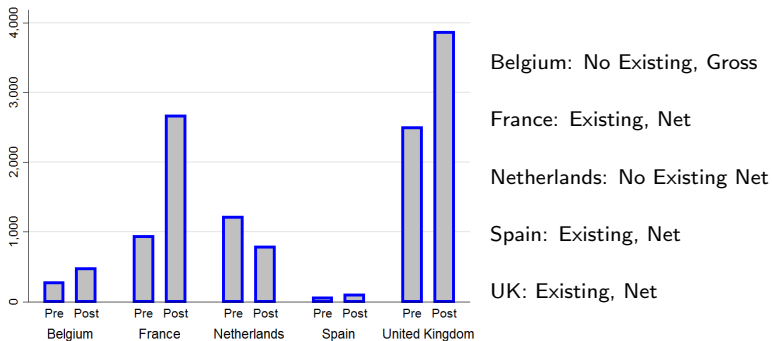**U.S. MNE foreign affiliate R&D** ▶ Descriptive Statistics

The BEA also collects data on the foreign R&D of U.S. MNEs.

- ▶ publicly available data are affiliate-country aggregates
- ▶ data are available for 115 countries during years 2004–2013
- ▶ includes pre and post implementation data for 5 IP box countries ▶ more

Data are matched to country GDP, population, corporate tax rates, and corporate tax systems for empirical analysis.

# U.S. Payments Response to IP Box Implementation

Figure: U.S. IP Payments, Pre and Post IP Box



Belgium: No Existing, Gross

France: Existing, Net

Netherlands: No Existing Net

Spain: Existing, Net

UK: Existing, Net

Notes: This figure present payments from the U.S. to foreign countries for IP before and after IP box implementation. The data are partitioned by IP box country.

# U.S. Payments Response by IP Box Characteristics

Figure: U.S. IP Payments, Pre and Post IP Box



Payments by Existing IP Treatment

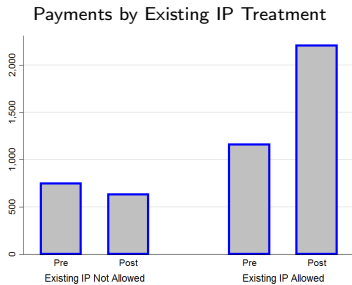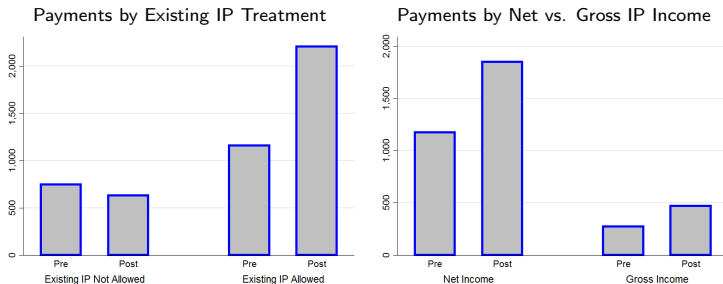# U.S. Payments Response by IP Box Characteristics

Figure: U.S. IP Payments, Pre and Post IP Box



Notes: This figure present payments from the U.S. to foreign countries for IP before and after IP box implementation. The left panel splits the data based on whether the preferred IP tax rate is applied to income derived from existing IP. The right panel splits the data based on whether the preferred IP tax rate is applied to net or gross income.

## U.S. Payment Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

## U.S. Payment Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

- ▶ The implementation of an Existing IP Not Allowed box does not have a statistically significant effect on payments for the use of IP from the U.S.

## U.S. Payment Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

- ▶ The implementation of an Existing IP Not Allowed box does not have a statistically significant effect on payments for the use of IP from the U.S.

- ▶ Countries that implement Existing IP Allowed boxes experience significantly higher increases in U.S. IP payments. Estimates suggest that the implementation of Existing IP Allowed boxes increases payments for the use of IP by between 16 and 21%.

## U.S. Payment Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

▶ The implementation of an Existing IP Not Allowed box does not have a statistically significant effect on payments for the use of IP from the U.S.

▶ Countries that implement Existing IP Allowed boxes experience significantly higher increases in U.S. IP payments. Estimates suggest that the implementation of Existing IP Allowed boxes increases payments for the use of IP by between 16 and 21%.

▶ Responses in payments for the use of IP do not vary depending on whether the IP box defines income as net or gross. ▶ Full Results

## U.S. Payment Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

▶ The implementation of an Existing IP Not Allowed box does not have a statistically significant effect on payments for the use of IP from the U.S.

▶ Countries that implement Existing IP Allowed boxes experience significantly higher increases in U.S. IP payments. Estimates suggest that the implementation of Existing IP Allowed boxes increases payments for the use of IP by between 16 and 21%.

▶ Responses in payments for the use of IP do not vary depending on whether the IP box defines income as net or gross. ▶ Full Results

**Interpretation**

## U.S. Payment Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

▶ The implementation of an Existing IP Not Allowed box does not have a statistically significant effect on payments for the use of IP from the U.S.

▶ Countries that implement Existing IP Allowed boxes experience significantly higher increases in U.S. IP payments. Estimates suggest that the implementation of Existing IP Allowed boxes increases payments for the use of IP by between 16 and 21%.

▶ Responses in payments for the use of IP do not vary depending on whether the IP box defines income as net or gross. ▶ Full Results

**Interpretation**

▶ On average, countries that implemented Existing IP Allowed boxes decreased their tax rates on IP income by 65%.

## U.S. Payment Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

- The implementation of an Existing IP Not Allowed box does not have a statistically significant effect on payments for the use of IP from the U.S.

- Countries that implement Existing IP Allowed boxes experience significantly higher increases in U.S. IP payments. Estimates suggest that the implementation of Existing IP Allowed boxes increases payments for the use of IP by between 16 and 21%.

- Responses in payments for the use of IP do not vary depending on whether the IP box defines income as net or gross.   ▶ Full Results

**Interpretation**

- On average, countries that implemented Existing IP Allowed boxes decreased their tax rates on IP income by 65%.

- When statutory rates are lower than 50%, in order for these countries to have revenue neutral IP boxes, their IP income would have to increase by MORE THAN 65% in response to the box.

## U.S. Payment Empirical Results and Interpretation

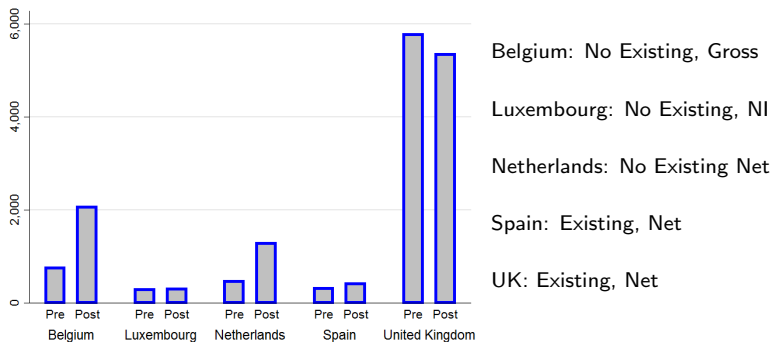**Results** from panel fixed-effects regressions indicate:

- ▶ The implementation of an Existing IP Not Allowed box does not have a statistically significant effect on payments for the use of IP from the U.S.

- ▶ Countries that implement Existing IP Allowed boxes experience significantly higher increases in U.S. IP payments. Estimates suggest that the implementation of Existing IP Allowed boxes increases payments for the use of IP by between 16 and 21%.

- ▶ Responses in payments for the use of IP do not vary depending on whether the IP box defines income as net or gross. ▶ Full Results

**Interpretation**

- ▶ On average, countries that implemented Existing IP Allowed boxes decreased their tax rates on IP income by 65%.

- ▶ When statutory rates are lower than 50%, in order for these countries to have revenue neutral IP boxes, their IP income would have to increase by MORE THAN 65% in response to the box.

- ▶ Empirical estimates suggest the international IP income response did not achieve revenue neutrality.

# U.S. MNE Affiliate R&D Response to IP Box Implementation

Figure: U.S. Affiliate R&D, Pre and Post IP Box



Belgium: No Existing, Gross

Luxembourg: No Existing, NI

Netherlands: No Existing Net

Spain: Existing, Net

UK: Existing, Net

Notes: This figure present R&D by U.S. foreign affiliates before and after IP box implementation. The data are partitioned the data by IP box country.

# U.S. MNE Affiliate R&D Response to IP Box Characteristics

Figure: U.S. Affiliate R&D, Pre and Post IP Box



R&D by Existing IP Treatment

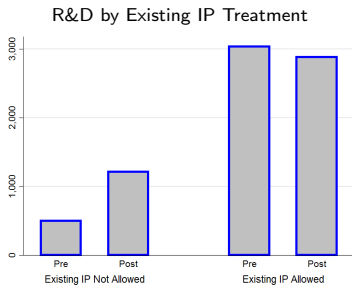# U.S. MNE Affiliate R&D Response to IP Box Characteristics

Figure: U.S. Affiliate R&D, Pre and Post IP Box
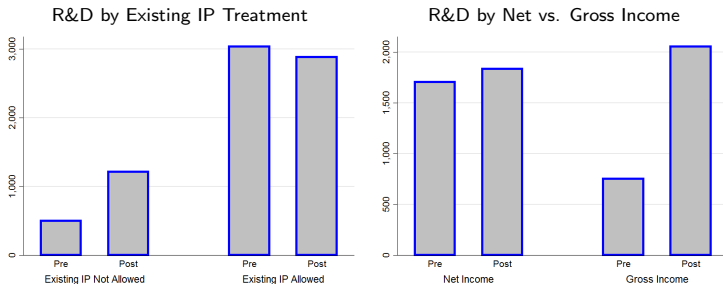


Notes: This figure present R&D by U.S. foreign affiliates pre and post IP box implementation. The left panel splits the data based on whether the preferred IP tax rate is applied to income derived from existing IP. The right panel splits the data based on whether the preferred IP tax rate is applied to net or gross income.

## R&D Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

## R&D Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

▶ The implementation of an Existing IP Allowed box does not have a statistically significant effect on R&D expenditures by U.S. affiliates.

## R&D Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

- The implementation of an Existing IP Allowed box does not have a statistically significant effect on R&D expenditures by U.S. affiliates.

- Countries that implement Existing IP Not Allowed boxes see significantly higher increases in U.S. affiliate R&D. Estimates suggest that the implementation of Existing IP Not Allowed boxes increase U.S. R&D by between 46 and 48%.

## R&D Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

▶ The implementation of an Existing IP Allowed box does not have a statistically significant effect on R&D expenditures by U.S. affiliates.

▶ Countries that implement Existing IP Not Allowed boxes see significantly higher increases in U.S. affiliate R&D. Estimates suggest that the implementation of Existing IP Not Allowed boxes increase U.S. R&D by between 46 and 48%.

▶ While implementation of a Net Income IP box does not affect R&D expenditure, implementing a Gross Income IP box increases U.S. R&D expenditure by between 46 and 49%. <span>▶ Full Results</span>

## R&D Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

▶ The implementation of an Existing IP Allowed box does not have a statistically significant effect on R&D expenditures by U.S. affiliates.

▶ Countries that implement Existing IP Not Allowed boxes see significantly higher increases in U.S. affiliate R&D. Estimates suggest that the implementation of Existing IP Not Allowed boxes increase U.S. R&D by between 46 and 48%.

▶ While implementation of a Net Income IP box does not affect R&D expenditure, implementing a Gross Income IP box increases U.S. R&D expenditure by between 46 and 49%. ▶ Full Results

**Real Activity?**

## R&D Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

- ▶ The implementation of an Existing IP Allowed box does not have a statistically significant effect on R&D expenditures by U.S. affiliates.

- ▶ Countries that implement Existing IP Not Allowed boxes see significantly higher increases in U.S. affiliate R&D. Estimates suggest that the implementation of Existing IP Not Allowed boxes increase U.S. R&D by between 46 and 48%.

- ▶ While implementation of a Net Income IP box does not affect R&D expenditure, implementing a Gross Income IP box increases U.S. R&D expenditure by between 46 and 49%. ▶ Full Results

**Real Activity?**

- ▶ While IP payments may result from either (1) more IP or (2) reallocation of profits through income shifting, R&D is more likely to represent real activity.

## R&D Empirical Results and Interpretation

**Results** from panel fixed-effects regressions indicate:

▶ The implementation of an Existing IP Allowed box does not have a statistically significant effect on R&D expenditures by U.S. affiliates.

▶ Countries that implement Existing IP Not Allowed boxes see significantly higher increases in U.S. affiliate R&D. Estimates suggest that the implementation of Existing IP Not Allowed boxes increase U.S. R&D by between 46 and 48%.

▶ While implementation of a Net Income IP box does not affect R&D expenditure, implementing a Gross Income IP box increases U.S. R&D expenditure by between 46 and 49%. ▶ Full Results

**Real Activity?**

▶ While IP payments may result from either (1) more IP or (2) reallocation of profits through income shifting, R&D is more likely to represent real activity.

▶ Payments to affiliates for R&D would not garner the tax advantages of the IP box (especially not the Gross Income box).

## Can and Do IP Boxes Achieve their objectives?

**A summary of results**

## Can and Do IP Boxes Achieve their objectives?

**A summary of results**

▶ The average IP box does not have a statistically significant effect on U.S. payments for the use of IP or U.S. MNE affiliate R&D.

## Can and Do IP Boxes Achieve their objectives?

**A summary of results**

- ▶ The average IP box does not have a statistically significant effect on U.S. payments for the use of IP or U.S. MNE affiliate R&D.

- ▶ **Existing IP Allowed box:** Positive impact on payments for the use of IP. However, these types of regimes stimulate less R&D.

## Can and Do IP Boxes Achieve their objectives?

**A summary of results**

▶ The average IP box does not have a statistically significant effect on U.S. payments for the use of IP or U.S. MNE affiliate R&D.

▶ **Existing IP Allowed box:** Positive impact on payments for the use of IP. However, these types of regimes stimulate less R&D.

▶ **Gross Income IP box:** Stimulate more R&D than those that use the net income definition. This distinction does not affect IP payments.

## Can and Do IP Boxes Achieve their objectives?

**A summary of results**

▶ The average IP box does not have a statistically significant effect on U.S. payments for the use of IP or U.S. MNE affiliate R&D.

▶ **Existing IP Allowed box:** Positive impact on payments for the use of IP. However, these types of regimes stimulate less R&D.

▶ **Gross Income IP box:** Stimulate more R&D than those that use the net income definition. This distinction does not affect IP payments.

**Can an IP box both stimulate domestic innovation and limit base erosion?**

▶ The IP box that achieves both goals counts **Existing IP Income** and applies to **Gross IP Income**.

## Can and Do IP Boxes Achieve their objectives?

**A summary of results**

▶ The average IP box does not have a statistically significant effect on U.S. payments for the use of IP or U.S. MNE affiliate R&D.

▶ **Existing IP Allowed box:** Positive impact on payments for the use of IP. However, these types of regimes stimulate less R&D.

▶ **Gross Income IP box:** Stimulate more R&D than those that use the net income definition. This distinction does not affect IP payments.

**Can an IP box both stimulate domestic innovation and limit base erosion?**

▶ The IP box that achieves both goals counts **Existing IP Income** and applies to **Gross IP Income**.

▶ This type of IP Box is also the most costly.

Thank you.

I look forward to your questions and feedback.

## Regimes Included in Empirical Analyses

Table: IP Box Regimes included in Royalty Payment and R&D Data

| Country | Existing | Gross | Royalty Payments | | R&D | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | Included | Changed During | Included | Changed During |
| Belgium | No | Gross | ✓ | ✓ | ✓ | ✓ |
| France | Yes | Net | ✓ | ✓ | ✓ | |
| Hungary | Yes | Gross | | | ✓ | |
| Luxembourg | No | Net | | | ✓ | ✓ |
| Netherlands | No | Net | ✓ | ✓ | ✓ | ✓ |
| Spain | Yes | Net | ✓ | ✓ | ✓ | ✓ |
| U.K. | Yes | Net | ✓ | ✓ | ✓ | ✓ |

Notes: Table 4 describes the tax regimes that are used to estimate the royalty payment and R&D response to Ip Boxes and IP box characteristics.

▸ back

## IP Payment Descriptive Statistics

Table: Descriptive Statistics, US IP Payments Sample

|  | Obs. | Mean | Std Dev | Min | Max |
|---|---|---|---|---|---|
| Payments | 420 | 858.44 | 1,699.10 | 0.00 | 12,406.00 |
| Corpt Tax Rate | 420 | 29.13 | 7.66 | 0.00 | 52.30 |
| $\mathbb{1}$[Territorial] | 420 | 0.82 | 0.38 | 0.00 | 1.00 |
| GDP per capita | 420 | 27.10 | 22.65 | 0.45 | 102.83 |
| Population | 420 | 14,259.15 | 32,143.41 | 6.45 | 136,427.00 |
| IP Box | 420 | 0.09 | 0.29 | 0.00 | 1.00 |

Notes: Table 5 provides descriptive statistics for variables used in the US payments analysis. Payments and Population are reported in millions. GDP per capita is reported in thousands.

▶ back

## R&D Descriptive Statistics

Table: Descriptive Statistics, US MNE Foreign Affiliate R&D Sample

|  | Obs. | Mean | Std Dev | Min | Max |
|---|---|---|---|---|---|
| R&D | 844 | 419.99 | 1,069.05 | 0.00 | 8,272.00 |
| Corp Tax Rate | 844 | 25.42 | 8.95 | 0.00 | 55.00 |
| $\mathbb{1}$[Territorial] | 844 | 0.93 | 0.26 | 0.00 | 1.00 |
| GDP per capita | 844 | 19.21 | 21.82 | 0.24 | 157.09 |
| Population | 844 | 5,832.37 | 19,354.47 | 3.65 | 135,738.00 |
| IP Box | 844 | 0.06 | 0.23 | 0.00 | 1.00 |
|  |  |  |  |  |  |
| Capital Expenditure | 698 | 2,024.66 | 4,092.84 | 0.00 | 33,841.00 |
| Employees | 815 | 115.48 | 241.69 | 0.00 | 1,419.40 |

Notes: Table 6 provides descriptive statistics for variables used in the US MNE foreign affiliate R&D analysis. R&D, Population, and Capital Expenditure are reported in millions. GDP per capita and Employees are reported in thousands.

Table: US Payments for the Use of Foreign Intellectual Property

| Dependent Variable: | | | Log Payments | | |
|---|---|---|---|---|---|
| Specification | (1) | (2) | (3) | (4) | (5) |
| IP Box | -0.262 | -0.370 | -0.445* | -0.353 | -0.433* |
| | (0.199) | (0.225) | (0.227) | (0.231) | (0.222) |
| Tax Diff | 0.003 | 0.001 | 0.001 | 0.005 | 0.008 |
| | (0.011) | (0.011) | (0.015) | (0.010) | (0.013) |
| $\mathbb{1}$[Territorial] | -0.142 | -0.185 | -0.219 | -0.132 | -0.151 |
| | (0.147) | (0.148) | (0.129) | (0.147) | (0.134) |
| Existing x IP Box | | 0.587** | 0.612** | | |
| | | (0.277) | (0.244) | | |
| Gross x IP Box | | | | 0.336 | 0.390* |
| | | | | (0.230) | (0.219) |
| OECD Only | | | ✓ | | ✓ |
| Country, Year FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| R-Squared | 0.466 | 0.477 | 0.545 | 0.471 | 0.537 |
| Countries | 31 | 31 | 17 | 31 | 17 |
| Countries x Years | 420 | 420 | 243 | 420 | 243 |

Notes: The dependent variable in all specifications is the log of U.S. payments for the use of foreign intellectual property. Observations are at the foreign country-year level. Specifications (3) and (5) limit the analysis to OECD countries. All specifications include country and year fixed effects as well as controls for foreign affiliate GDP per capita and population. Standard errors are clustered at the country level.

*** indicates statistical significance at the 1% level, ** at 5%, and * at 10%. ▸ back

Table: US MNE Research & Development in Foreign Affiliates

| Dependent Variable: | Log Research and Development | | | | |
|---|---|---|---|---|---|
| Specification | (1) | (2) | (3) | (4) | (5) |
| IP Box | 0.264* | 0.485** | 0.463** | 0.142 | 0.134 |
| | (0.153) | (0.195) | (0.180) | (0.150) | (0.175) |
| Tax Diff | -0.001 | -0.001 | 0.001 | -0.001 | 0.007 |
| | (0.002) | (0.002) | (0.009) | (0.002) | (0.009) |
| $\mathbb{1}$[Territorial] | 0.013 | 0.032 | 0.016 | 0.019 | -0.008 |
| | (0.066) | (0.063) | (0.082) | (0.065) | (0.082) |
| Existing × IP Box | | -0.586*** | -0.682*** | | |
| | | (0.202) | (0.195) | | |
| Gross × IP Box | | | | 0.616*** | 0.597*** |
| | | | | (0.153) | (0.176) |
| European Only | | | ✓ | | ✓ |
| Country, Year FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| R-Squared | 0.466 | 0.491 | 0.411 | 0.485 | 0.399 |
| Countries | 116 | 116 | 32 | 116 | 32 |
| Countries × Years | 844 | 844 | 280 | 844 | 280 |

Notes: The dependent variable in all specifications is the log of U.S. MNE research and development taking place at foreign affiliates. Observations are at the foreign country-year level. Specifications (3) and (5) limit the analysis to OECD countries. All specifications include country and year fixed effects as well as controls for foreign affiliate GDP per capita and population. Standard errors are clustered at the country level. *** indicates statistical significance at the 1% level, ** at 5%, and * at 10%. ▶ back

Table: U.S. MNE Foreign Affiliate Investment and Employment

| Dependent Variable: | Log Capital Expenditure | | | Log Employment | | |
|---|---|---|---|---|---|---|
| Specification | (1) | (2) | (3) | (4) | (5) | (6) |
| IP Box | -0.09 | -0.17 | -0.12 | -0.03 | -0.03 | -0.03 |
| | (0.10) | (0.12) | (0.12) | (0.03) | (0.04) | (0.03) |
| Tax Diff | -0.01 | -0.01 | -0.01 | -0.00 | -0.00 | -0.00 |
| | (0.01) | (0.01) | (0.01) | (0.00) | (0.00) | (0.00) |
| $\mathbb{1}$[Territorial] | -0.08 | -0.09 | -0.08 | 0.06** | 0.06** | 0.06** |
| | (0.12) | (0.12) | (0.12) | (0.03) | (0.03) | (0.03) |
| Existing x IP Box | | 0.25* | | | 0.00 | |
| | | (0.15) | | | (0.04) | |
| Gross x IP Box | | | 0.14 | | | 0.03 |
| | | | (0.12) | | | (0.03) |
| Country, Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| R-Squared | 0.288 | 0.291 | 0.289 | 0.694 | 0.694 | 0.694 |
| Countries | 112 | 112 | 112 | 116 | 116 | 116 |
| Countries x Years | 698 | 698 | 698 | 815 | 815 | 815 |

Notes: The dependent variable in Specifications (1)–(3) is the log of U.S. MNE capital expenditure taking place at foreign affiliates. The dependent variable in Specifications (4)–(6) is the log of U.S. MNE employment taking place at foreign affiliates. Observations are at the foreign country-year level. All specifications include country and year fixed effects as well as controls for foreign affiliate GDP per capita and population. Standard errors are clustered at the country level. *** indicates statistical significance at the 1% level, ** at 5%, and * at 10%.