

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

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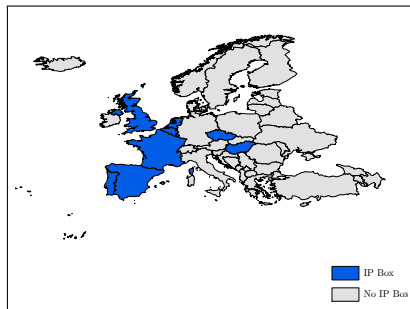
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Introduction

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 existing 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 %.

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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

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IP Box Characteristics

Table: IP Box Regimes In Place 2015

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.

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 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 when Existing IP is Not Allowed.

- ▶ 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 generated by the R&D.

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.

Empirical Design

Panel Fixed Effects / Triple-Differences Empirical Design

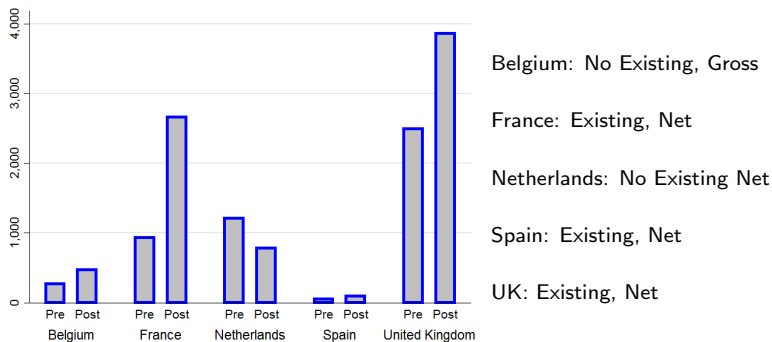
$$\text{Outcome}_{jt} = \beta_0 + \beta_1 IP_{jt} + \beta_2 [IP_{jt} \times \text{Characteristic}_j] + \sum_{s=3}^n \beta_s \text{Control}_s + \eta_i + \gamma_t + \epsilon_{it}.$$

- ▶ β_1 : percent change in outcome changes for an IP box that does not exhibit the Characteristic of interest
- ▶ β_2 additional percent change in outcome for an IP Box that exhibits the Characteristic
- ▶ $\beta_1 + \beta_2$ percent change in outcome for an IP box that exhibits the Characteristic

Identification Concern: implementaion of IP Box regimes that exhibit the Characteristic do not coincide with other shocks to the outcome variable

U.S. Payments Response to IP Box Implementation

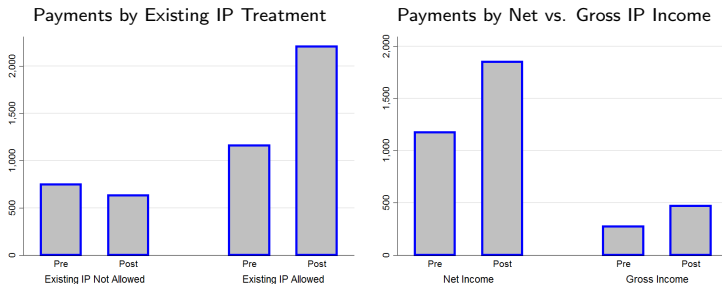
Figure: U.S. IP Payments, Pre and Post IP Box



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



Notes: This figure presents 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.

Table: US Payments for the Use of Foreign Intellectual Property

Dependent Variable:	Log Payments				
Specification	(1)	(2)	(3)	(4)	(5)
IP Box	-0.262 (0.199)	-0.370 (0.225)	-0.445* (0.227)	-0.353 (0.231)	-0.433* (0.222)
Tax Diff	0.003 (0.011)	0.001 (0.011)	0.001 (0.015)	0.005 (0.010)	0.008 (0.013)
1[Territorial]	-0.142 (0.147)	-0.185 (0.148)	-0.219 (0.129)	-0.132 (0.147)	-0.151 (0.134)
Existing x IP Box		0.587** (0.277)	0.612** (0.244)		
Gross x IP Box				0.336 (0.230)	0.390* (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%.

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U.S. Payment Empirical Results and Interpretation

Results from panel fixed-effects regressions indicate:

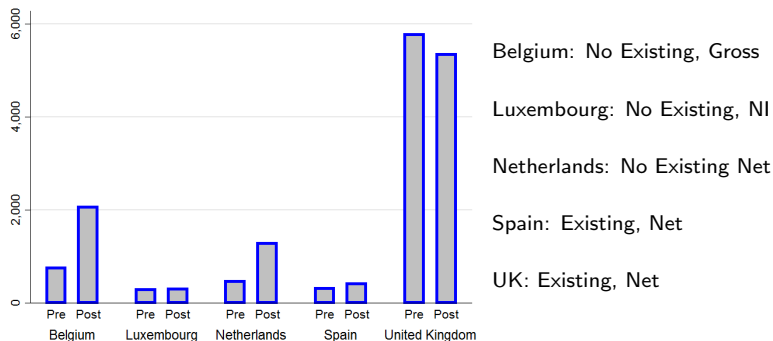
- ▶ The implementation of an Existing IP Not Allowed box does not have a statistically significant effect on payments for the use of IP from the U.S.
- ▶ Countries that implement Existing IP Allowed boxes experience significantly higher increases in U.S. IP payments. Estimates suggest that the implementation 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.

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

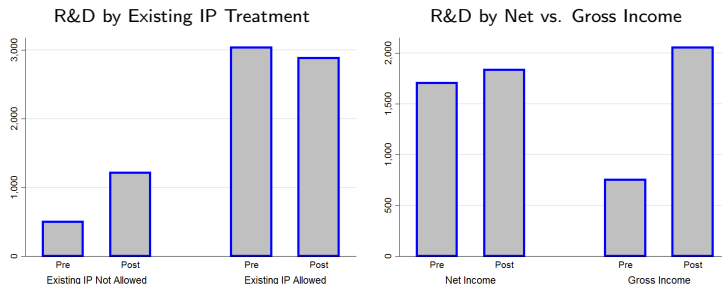
Figure: U.S. Affiliate R&D, Pre and Post IP Box



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



Notes: This figure presents 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.

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)
1[Territorial]	0.013	0.032	0.016	0.019	-0.008
	(0.066)	(0.063)	(0.082)	(0.065)	(0.082)
Existing x IP Box		-0.586***	-0.682***		
		(0.202)	(0.195)		
Gross x 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 x 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

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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%.

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

- ▶ 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 During	Changed
Belgium	No	Gross	✓	✓	✓	✓
France	Yes	Net	✓	✓	✓	
Hungary	Yes	Gross			✓	
Luxembourg	No	Net			✓	✓
Netherlands	No	Net	✓	✓	✓	✓
Spain	Yes	Net	✓	✓	✓	✓
U.K.	Yes	Net	✓	✓	✓	✓

Notes: Table 9 describes the tax regimes that are used to estimate the royalty payment and R&D response to IP Boxes and IP box characteristics.

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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
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 10 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.

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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
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 11 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.

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