Territoriality, Worldwide Principle and Competitiveness of Multinationals

A Firm-level Analysis of Tax Burdens

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CEPS/ETPF Conference on Business Taxation

Brussels, 27 April 2012

Territorial versus worldwide systems

Renewed interest in the adoption of territorial principle

- High, growing capital mobility & international competitive pressure
- Complexity of contemporary worldwide (WW) tax systems

1. UK moved to territorial system in 2009
   - International competitive pressure
   - Pressure from the Court of Justice (CJ)
2. Japan moved to territorial system in 2009
3. In the US, lively debate on moving to territorial system
   - J. Hines: move to a territorial system
   - Avi-Yonah: keep WW system but repeal deferral

The WW system

A WORLDWIDE SYSTEM

1. Distorts capital ownership neutrality: domestic multinationals operating in low-tax jurisdictions at a competitive disadvantage with respect to competitors headquartered in territorial jurisdictions
   - Multinationals headquartered in WW jurisdictions suffer a higher tax burden
2. Distorts decision on whether (and from which country) to repatriate profits
   - Evidence from the US 2004 Job Creation Act; Desai, Foley, and Hines (2001, 2002); Grubert (1998)
3. Complex system (foreign tax credits)

Policy question

Do firms headquartered in WW jurisdictions suffer a higher tax burden than firms headquartered in territorial jurisdictions?

More specifically,

1. Is the tax burden of multinationals headquartered in the US and in the UK larger than that of multinationals headquartered in territorial jurisdictions?
2. Which countries impose a higher burden?
3. Which features of the tax system determine a higher tax burden?
   - the corporate statutory tax rate?
   - the deductions on the tax base?
   - or the worldwide versus the territorial principle?
4. Is the territorial system more vulnerable to tax avoidance than the worldwide system?

How to tackle the policy question

- Look at the past (data on UK pre- and post-reform not yet available)
- Comparison of tax burden of multinationals headquartered in territorial jurisdictions with multinationals headquartered in worldwide jurisdictions
  - using consolidated accounting data
  - between 2003-2007
  - to estimate a marginal effective tax rate (METR)
  - and a marginal effective tax base (METB)
  - controlling for size, intangible assets and presence in tax havens

The sample

Derived from ORBIS

- Commercial database assembled by Bureau van Dijk Electronic Publishing
- Gathers accounting data from national and international providers of published corporate accounts
- Links accounting data of one company with its ownership structure

Overall, even if in an incomplete manner, possible to construct a dataset which gathers

1. Accounting information (P&L Account & Balance Sheet)
2. Taxes paid (item from P&L Account)
3. Ownership structure (Immediate and Global owner, subsidiaries, subsidiaries in tax havens)

It is the only dataset with all three items available!

The sample - ORBIS

`Advantages`

- Accounting data available for 8/10 years
- Comparability across countries
- Link with ownership structure
- Measure of tax paid available
- Consolidated and unconsolidated data available

`Disadvantages`

- Often, useful info only for larger firms
- Country-specific details lost
- Ownership is time-invariant
- Not clear what it includes and not available for all companies
- Only a few firms have both. Not possible to understand which subs included in consolidated accounts

The sample - countries covered

Table: Country distribution - worldwide countries in red

	Total (%)
Austria	24 (0.71)
Belgium	22 (0.65)
Denmark	34 (1.00)
Finland	61 (1.80)
France	200 (5.89)
Germany	210 (6.18)
Greece	25 (0.74)
Ireland	31 (0.91)
Netherlands	49 (1.44)
Norway	39 (1.15)
Spain	45 (1.33)
Sweden	85 (2.51)
Switzerland	60 (1.77)
United Kingdom	639 (18.86)
United States	1,865 (55.03)
Total	3,389 (100)

The sample - types of firm

Table: Country distribution by type of group

	MNCs with TH subs	MNCs without TH subs	Domestic groups
Austria	15 [63]	9 [37]	0
Belgium	15 [68]	6 [27]	1 [5]
Denmark	15 [44]	18 [53]	1 [3]
Finland	21 [34]	36 [59]	4 [7]
France	112 [56]	68 [34]	20 [10]
Germany	105 [50]	83 [40]	22 [10]
Greece	8 [32]	16 [64]	1 [4]
Ireland	9 [29]	20 [65]	2 [6]
Netherlands	34 [69]	12 [24]	3 [6]
Norway	10 [26]	28 [72]	1 [3]
Spain	20 [44]	24 [53]	1 [2]
Sweden	36 [42]	45 [53]	4 [5]
Switzerland	42 [70]	16 [27]	2 [3]
United Kingdom	242 [38]	255 [40]	142 [22]
United States	635 [34]	710 [38]	520 [28]
Total	1,319 (38.92)	1,346 (39.72)	724 (21.36)

The sample - statutory rates

Table: Corporate Statutory Tax Rates (per cent)

	2003	2004	2005	2006	2007
Austria	34	34	25	25	25
Belgium	33.99	33.99	33.99	33.99	33.99
Denmark	30	30	28	28	25
Finland	29	29	26	26	26
France	35.43	35.43	34.93	34.43	34.43
Germany	40.66	39.35	39.35	39.35	39.35
Greece	35	35	32	29	25
Ireland	12.5	12.5	12.5	12.5	12.5
The Netherlands	34.5	34.5	31.5	29.6	25.5
Norway	28	28	28	28	28
Spain	40.3	40.3	40.3	40.3	38.01
Sweden	28	28	28	28	28
Switzerland	21.3	21.3	21.3	21.3	21.3
United Kingdom	30	30	30	30	30
United States	40.75	40.75	39.52	39.52	38.3

The data - classification of tax havens

Small tax havens	Large tax havens
Andorra (AD)	Hong Kong (HK)
Anguilla (AI)	Ireland (IE)
Antigua and Barbuda (AG)	Lebanon (LB)
Aruba (AW)	Liberia (LR)
Bahamas (BS)	Panama (PA)
Bahrain (BH)	Singapore (SG)
Barbados (BB)	Switzerland (CH)
Belize (BZ)	
Bermuda (BM)	
Cayman Islands (KY)	
Cyprus (CY)	
Dominica (DM)	
Gibraltar (GI)	
Grenada (GD)	
Iceland (IS)	
Jordan (JO)	
Liechtenstein (LI)	
Luxembourg (LU)	
Macau (MO)	
Mauritius (MU)	
Malta (MT)	
Marshall Islands (MH)	
Monaco (MC)	
Netherlands Antilles (AN)	
Saint Kitts and Nevis (KN)	
Saint Lucia (LC)	
Saint Vincent and the Grenadines (VC)	
Samoa (WS), Seychelles (SC)	
Vanuatu (VU), Virgin Islands (British) (VG)	

The data - patterns in the use of tax havens

1. Most popular low-tax jurisdictions are large countries: Switzerland, Singapore, Ireland, Hong Kong
2. Ultimate owners of all 15 countries are all present there
3. Switzerland prominent role among continental European countries. Most popular low-tax location for Austrian, German, Danish, Finnish, French, Dutch, and Swedish companies
4. Luxembourg favourite for Belgian companies
5. Ireland favourite destination of UK companies
6. Singapore is the prevailing choice for US multinationals
7. but US MNCs often locate also in Hong Kong, Switzerland, Ireland, Barbados, Bermuda, and the Cayman Islands
8. Bermuda, the Cayman Islands, and Barbados dominated by US companies
9. One fourth of the subsidiaries in the British Virgin Islands are UK-owned.

Tax burden - two measures

$$\texttt{Marginal effective tax rate (METR)} = \frac{\partial(\textit{tax bill})}{\partial(\textit{accounting profit})}$$

- Measures the increase in the tax bill for an additional unit of accounting profit

$$\texttt{Marginal effective tax base (METB)} = \frac{\partial(\textit{tax base})}{\partial(\textit{accounting profit})}$$

- Measures the increase in the tax base for an additional unit of accounting profit

Tax burden - description

$$\text{METR} = \frac{\partial(tax\ \ bill)}{\partial(accounting\ \ profit)}$$

- Tax bill - which tax measure?
  - ORBIS variable *taxation*
  - Income tax charged in the financial accounts
  - It should include deferred and current taxes
  - It should include all domestic and foreign income taxes
  - It should NOT include other taxes like VAT, sales taxes, excise taxes, and so forth

Tax burden - accounting profits

$$\text{METR} = \frac{\partial(tax\ \ bill)}{\partial(accounting\ \ profit)}$$

- Accounting profit - which measure?
  - ORBIS variable *P&L before Taxes*
  - Because more widely available than *Gross Profit* or *EBIT*
  - *P&L before tax* is net of royalties and interest payments
  - Even if there is shifting of profits to low-tax subs, this should not be a problem. With consolidated accounts, flows within the multinational group will be compensated with each other

Tax burden - tax base

$$\text{METB} = \frac{\partial(tax\ \ base)}{\partial(accounting\ \ profit)}$$

- tax base - which measure?
  - not available in ORBIS
  - derived empirically by multiplying *P&L before tax* by the corporate statutory tax rate of the country where the headquarters are located (more later)
  - only an approximation to the real tax base (more later)

Estimation model

Consider the regression:

$$y_{i,t} = \left(\frac{Taxation}{Tot\ assets}\right)_{i,t} = \beta_0 + \beta_1 \left(\frac{Taxation}{P\&L}\right)_{i,t-1} + \tag{1}$$
$$\beta_2 \underbrace{\left(\frac{P\&L}{Tot\ assets}\right)_{i,t}}_{x_{i,t}} + \beta_3 \underbrace{\left(\frac{P\&L}{Tot\ assets}\right)_{i,t}}_{x_{i,t}} * dWW_{i,t} +$$
$$\beta_4 \left(\frac{Intangibles}{Tot\ assets}\right)_{i,t} + \beta_5 \left(\frac{Intangibles}{Tot\ assets}\right)_{i,t} * dWW_{i,t} +$$
$$\beta_6 log(no\ employees) + \beta_7 log(no\ employees) * dWW_{i,t} + \epsilon_{i,t}$$

Consider the derivative of (1) with respect to $x_{i,t}$

$$\frac{\partial y_{i,t}}{\partial x_{i,t}} = \frac{\partial(\frac{Taxation}{Tot\ \ assets})_{i,t}}{\partial(\frac{P\&L}{Tot\ \ assets})_{i,t}} = \underbrace{\frac{\partial Taxation}{\partial P\&L}}_{METR} = \beta_2 + \beta_3 * dWW_{i,t} \tag{2}$$

$$METR = \begin{cases} \beta_2 & \text{if } dWW = 0, \\ \beta_2 + \beta_3 & \text{if } dWW = 1 \end{cases}$$

- For an additional \$ of consolidated accounting profit, the METR increases by β_2 for companies headquartered in territorial countries and $\beta_2 + \beta_3$ for those headquartered in worldwide jurisdictions.
- If $\beta_3 \neq 0$ (significantly), the tax burden of companies headquartered in worldwide jurisdictions will be different from the tax burden of companies headquartered in territorial jurisdictions.

Results - METR

DIFF-GMM regressions (Arellano, Bond (1991)) - Dep. var: Tax bill/Tot assets

	(1) All	(2) MNCs	(3) All	(4) MNCs
Lag(Tax bill/Tot assets)	0.079***	0.090***	0.082***	0.089***
	(0.019)	(0.020)	(0.019)	(0.020)
P&L/Tot assets (if gain) (β_2)	16.607***	17.338***	16.511***	17.474***
	(4.618)	(4.457)	(4.615)	(4.448)
* dWW (β_3)	19.191***	16.736***		
	(5.122)	(5.049)		
* dUS			18.815***	16.223***
			(5.167)	(5.096)
* dUK			12.039**	12.310**
			(5.728)	(5.968)
* dIE			-1.749	-0.852
			(11.433)	(11.466)
Making loss dummy	1.549***	1.091**	1.582***	1.116**
	(0.558)	(0.500)	(0.558)	(0.500)
Intangibles/Tot assets	-2.287	-1.463	-2.300	-1.467
	(2.664)	(2.419)	(2.665)	(2.416)
* dWW	3.177	2.612	2.914	2.452
	(2.875)	(2.622)	(2.857)	(2.611)
Log(no. employees)	-1.118***	-1.013***	-1.149***	-1.023***
	(0.386)	(0.366)	(0.387)	(0.366)
* dWW	1.551***	1.518***	1.367***	1.430***
	(0.510)	(0.484)	(0.499)	(0.481)
Observations	12,876	10,452	12,876	10,452
Number of firms	3,389	2,665	3,389	2,665

Controlling for statutory corporate tax rates - METB

It is possible to control for the statutory rates if equation (1) is transformed as follows:

$$y_{i,t} = \left(\frac{Taxation}{Tot\ assets}\right)_{i,t} = \alpha_0 + \alpha_1\left(\frac{Taxation}{P\&L}\right)_{i,t-1} + \tag{3}$$
$$\alpha_2 \underbrace{\left(\frac{P\&L * \tau}{Tot\ assets}\right)_{i,t}}_{z_{i,t}} + \alpha_3 \underbrace{\left(\frac{P\&L * \tau}{Tot\ assets}\right)_{i,t}}_{z_{i,t}} * dWW_{i,t} +$$
$$\alpha_4\left(\frac{Intangibles}{Tot\ assets}\right)_{i,t} + \alpha_5\left(\frac{Intangibles}{Tot\ assets}\right)_{i,t} * dWW_{i,t} +$$
$$\alpha_6 log(no\ employees) + \alpha_7 log(no\ employees) * dWW_{i,t} + \epsilon_{i,t}$$

where τ is the statutory tax rate in country of headquarter

Consider the derivative of (3) with respect to $z_{i,t}$

$$\frac{\partial y_{i,t}}{\partial z_{i,t}} = \frac{\partial(\frac{Taxation}{Tot\ \ assets})_{i,t}}{\partial(\frac{P\&L*\tau}{Tot\ \ assets})_{i,t}} = \frac{\partial Taxation}{\partial P\&L*\tau} = \frac{\partial(t*tax\ \ base)}{\partial(P\&L*\tau)} \tag{4}$$

t - average weighted corporate tax rate of the corporate group. We approximate t with τ and

$$\frac{\partial y_{i,t}}{\partial z_{i,t}} = \frac{\partial(t*tax\ \ base)}{\partial(P\&L*\tau)} = \frac{\partial(tax\ \ base)}{\partial(P\&L)} = \alpha_2 + \alpha_3 * dWW_{i,t} \tag{5}$$

$$METB = \begin{cases} \alpha_2 & \text{if } dWW = 0, \\ \alpha_2 + \alpha_3 & \text{if } dWW = 1 \end{cases}$$

- For an additional \$ of consolidated accounting profit, the tax base increases by α_2 for companies headquartered in territorial countries and $\alpha_2 + \alpha_3$ for those headquartered in worldwide jurisdictions.
- If $\alpha_3 \neq 0$ (significantly), the reaction of the tax base of companies headquartered in worldwide jurisdictions will be different from that of companies headquartered in territorial jurisdictions.

DIFF-GMM regressions (Arellano, Bond (1991)) - Dep. var: Tax bill/Tot assets

	(1) All	(2) MNCs	(3) All	(4) MNCs
Lag(Tax/Tot assets)	0.073***	0.080***	0.075***	0.082***
	(0.018)	(0.019)	(0.018)	(0.019)
(P&L/Tot assets)*τ (if gain) (α_2)	83.465***	80.390***	81.780***	80.662***
	(10.440)	(10.368)	(10.450)	(10.387)
* dWW (α_3)	-1.569	-2.813		
	(11.402)	(11.592)		
* dUS			-8.856	-9.801
			(11.684)	(11.879)
* dUK			20.751	14.291
			(18.743)	(20.875)
* dIE			1.064	-13.395
			(51.973)	(52.274)
Making loss dummy	1.451***	1.152**	1.628***	1.336**
	(0.544)	(0.534)	(0.544)	(0.532)
Intangibles/Tot assets	2.414	2.460	1.528	1.886
	(2.076)	(1.911)	(2.051)	(1.895)
* dWW	-2.067	-1.845	-1.727	-1.735
	(2.098)	(1.931)	(2.085)	(1.916)
Log(no. employees)	0.020	-0.031	0.003	-0.004
	(0.363)	(0.331)	(0.361)	(0.329)
* dWW	0.012	0.162	-0.393	-0.130
	(0.457)	(0.426)	(0.452)	(0.425)
Observations	12,876	10,452	12,876	10,452
Number of firms	3,389	2,665	3,389	2,665

Issues in measuring t

Does the approximation of t (weighted average group tax rate) with τ (statutory rate in country of headquarter) lead to biases?

- No information on all jurisdictions where the MNC is located, only consolidated accounts.
- Therefore, t is approximated with τ.
- t includes local rates (source: PwC). For example,
  - For the US, t includes an average of state rates
  - For Germany, it includes an average rate of local business tax (Gewerbesteuer)
- If $t < \tau$ the results will underestimate the increase in the tax base following a \$ increase in accounting profit. The lower t with respect to τ, the larger the downward bias.
- If $t > \tau$ the results overestimate the increase in the tax base following a \$ increase in accounting profit. The higher t with respect to τ, the larger the upward bias.

Issues in measuring t

- If the approximation error is random, no large bias
- If the approximation error not random but affects one group (WW jurisdictions) systematically more than the other, results might be biased
- Are groups headquartered in territorial jurisdictions more likely to feature $t < \tau$?
- If this is true, underestimation of α_2
- This might affect the comparison with worldwide jurisdictions (introducing noise which could explain insignificant results)

Effect of tax avoidance

- Territorial jurisdictions seem to be more vulnerable to profit shifting to low-tax countries
- In terms of our analysis: does profit shifting lower the tax burden (METR and tax base)?
- We use presence in tax havens to proxy for avoidance/profit shifting activities
  - Use number of subsidiaries in tax havens
  - Simple presence does not vary enough
  - Only first-level subsidiaries present (directly owned by ultimate owner)
- Interact METR and METB of territorial countries with presence in tax havens
- Interact METR and METB of WW countries with presence in tax havens
- Compare the two: if difference is significant, we can conclude that tax haven presence (tax avoidance) lowers the tax burden in one group more than in the other

DIFF-GMM regressions (Arellano, Bond (1991)) - Dep. var: Tax bill/tot.assets

	(1) All	(2) MNCs	(3) All	(4) MNCs
Lag(Tax/Tot assets)	0.074***	0.083***	0.071***	0.082***
	(0.010)	(0.011)	(0.010)	(0.010)
P&L/tot.assets (if gain) (β_2)	21.419***	21.728***	21.470***	21.890***
	(3.536)	(3.427)	(3.531)	(3.420)
* No. tax haven subs	-0.711**	-0.844***	-0.785***	-0.881***
	(0.297)	(0.303)	(0.294)	(0.299)
* dWW (β_3)	14.778***	13.070***		
	(4.147)	(4.095)		
* dWW * TH subs	0.433	0.672**	0.586*	0.746**
	(0.313)	(0.321)	(0.307)	(0.314)
* dUS			15.173***	13.348***
			(4.131)	(4.078)
* dUK			7.724*	7.482*
			(4.194)	(4.207)
* dIE			-4.607	-2.745
			(11.080)	(11.339)
Making loss dummy	2.378***	1.832***	2.360***	1.805***
	(0.562)	(0.529)	(0.564)	(0.528)
Loss dummy * TH subs	-0.601***	-0.429**	-0.601***	-0.409**
	(0.175)	(0.167)	(0.177)	(0.168)
Intangibles/Tot assets	0.796	0.678	0.749	0.686
	(0.833)	(0.843)	(0.810)	(0.823)
Intangibles/Tot assets * TH subs	-0.358***	-0.346***	-0.380***	-0.378***
	(0.078)	(0.079)	(0.080)	(0.079)
Observations	12,876	10,452	12,876	10,452
Number of companies	3,389	2,665	3,389	2,665

DIFF-GMM regressions (Arellano, Bond (1991)) - Dep. var: Tax bill/Tot assets

	(1) All	(2) MNCs	(3) All	(4) MNCs
Lag(Tax/Tot. Assets)	0.073***	0.083***	0.076***	0.082***
	(0.010)	(0.009)	(0.010)	(0.010)
(P&L/Tot assets)*τ (α_2)	84.023***	83.255***	83.539***	83.897***
	(9.084)	(8.995)	(9.115)	(8.985)
* TH subs	-2.384***	-3.154***	-2.341***	-3.149***
	(0.834)	(0.891)	(0.829)	(0.886)
* dWW (α_3)	-2.720	-6.405		
	(10.437)	(10.517)		
* dWW * TH subs	2.144**	3.097***	1.990**	3.025***
	(0.889)	(0.944)	(0.881)	(0.939)
* dUS			-7.511	-11.315
			(10.497)	(10.442)
* dUK			7.071	-3.137
			(10.741)	(10.947)
* dIE			10.960	-4.004
			(50.084)	(53.262)
Making loss dummy	2.088***	1.705***	2.216***	1.829***
	(0.565)	(0.552)	(0.568)	(0.554)
* TH subs	-0.561***	-0.396**	-0.560***	-0.388**
	(0.170)	(0.167)	(0.166)	(0.166)
Intangibles/Tot assets	1.040	1.217	0.606	0.865
	(0.815)	(0.816)	(0.788)	(0.792)
* TH subs	-0.326***	-0.376***	-0.329***	-0.393***
	(0.068)	(0.066)	(0.068)	(0.067)
Observations	12,876	10,452	12,876	10,452
Number of companies	3,389	2,665	3,389	2,665

Conclusion

1. Companies in WW jurisdictions display a higher METR
2. The effect can be fully explained by the presence of the UK and the US
   - On average, companies headquartered in the United States display the highest METR (between 33.7 and 36.7 per cent)
   - On average, UK companies display the second highest METR (between 28.6 and 29.8 per cent).
   - On average, corporate groups headquartered in territorial jurisdictions feature a METR of between 16.5 and 21.9 per cent
3. When comparing METBs, no difference across countries
   - A higher burden mainly consequence of high statutory rates
4. Territorial jurisdictions more vulnerable to tax avoidance
   - The analysis produces evidence consistent with tax haven subsidiaries lowering METR and METB more in territorial jurisdictions.

THANK YOU!