Mobile firms and corporate taxation: Neighbors matter most

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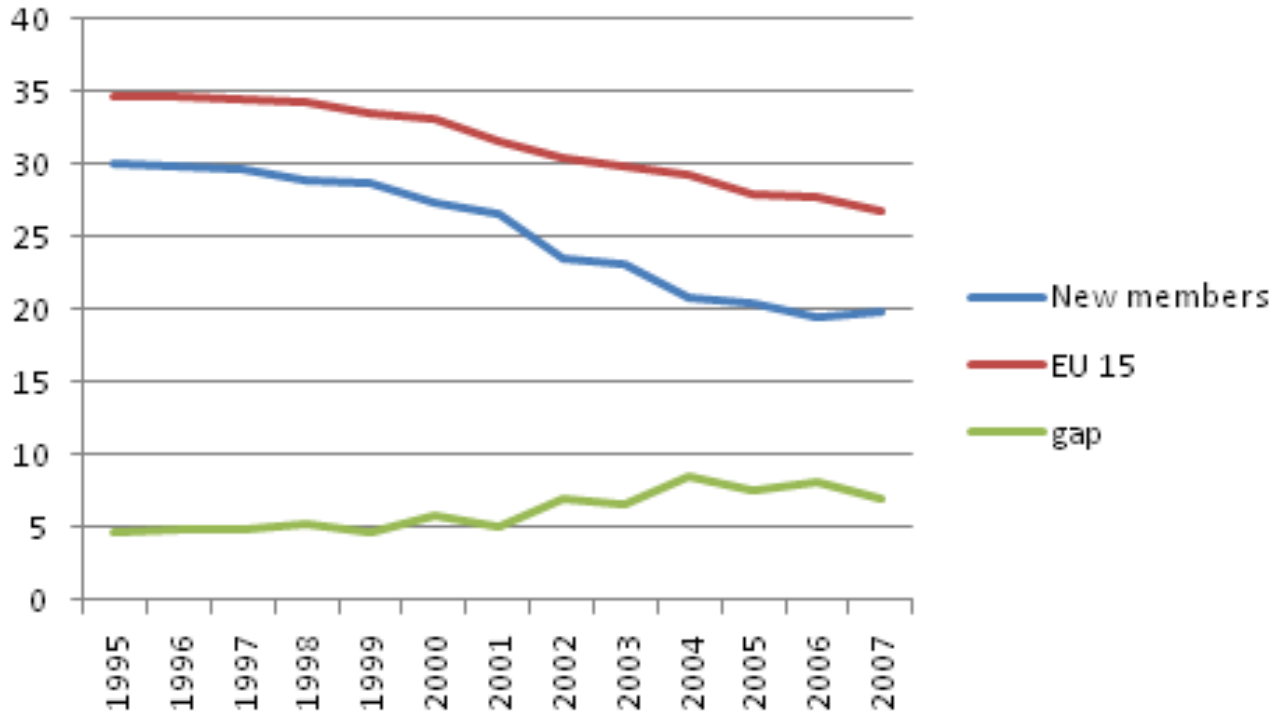

Figure 1: Evolution statutory corporate tax rates

1. Introduction: Tax Competition

- Declining trend in corporate tax rates suggests fiercer competition
  - Argument for more tax harmonization at European level (Monti, 2010)
  - Traditional theory predicts a suboptimal taxation rate, race to the bottom.
- Gap between old and new member states has been increasing
  - Does not provide evidence of 'race to the bottom'
- Move towards a more nuanced view on tax competition
  - New Economic Geography models (Baldwin & Krugman; 2004)
  - What is the effect on investment decisions of multinational companies (= most footloose)?

1. Introduction: Tax competition

- NEG Models
  - Clustering of economic activity creates agglomeration forces
    - Reduction of trade costs
    - Firms serve larger market
    - Cost advantages (more competition between suppliers)
  - However, also see dispersion forces
    - Fiercer competition between rivals
    - Rise in wages, land prices, office prices
  - Core and periphery regions differ in amount of agglomeration economies
  - Core regions is able to tax the agglomeration rent
    - Tax differential will emerge
    - Within limits: if tax rate is too high, dispersion forces dominate

1. Introduction: Tax competition

- Growing literature on strategic tax setting between countries
  - Modeling tax reaction functions
    (Crabbé & Vandenbussche, 2008; Davies & Voget, 2008; Exbrayat, 2010)
  - Role of distance (Crabbé & Vandenbussche,2008), EU membership (Davies & Voget) and agglomeration forces (Exbrayat, 2008)
- However, need to look at sensitivity of firms' investments to fiscal policy as well
  - Look at impact of host country tax rate on amount of FDI inflow

1. Introduction: Tax competition

- Literature on FDI and taxation spans 25 years
  - Usually aggregated data on US flows
  - Meta-study de Mooij & Ederveen (2003) reports a median semi tax elasticity of -3.3 (analyzing 25 studies)
- Suggests presence of strong tax competition to attract FDI
- Only recently including the effect of agglomeration economies
  - Crabbé & De Bruyne (2010), Bénassy-Quere et al. (2005), Brülhart et al. (2009)
- We will work within European context, using a micro approach and will include proxies that take geograhpical characteristics into account (distance to headquarters; agglomeration economies).

2. Data:Foreign Direct Investment

- FDI: Investments by MNE in affiliates or subsidiaries
  - Direct net transfers (equity/debt)
  - Reinvested earnings by affiliate
- Problem with aggregated FDI data
  - Often capture other financial flows (M&A)
  - Don’t distinguish between new capital investments and acquisition of existing assets
  - Using these in an investment equation is less straightforward
- We construct a firm level panel data set
  - Use Amadeus BvDEP to construct mother-daughter linked dataset
  - Look at Belgian parent and European affiliates
  - Following definition of FDI, retain firms with 10% ownership share

2. Data:Foreign Direct Investment

Variable	Affiliates	Headquarters
Total assets (x 1,000 euro)	129,103.5	738,234.3
	(2,380,253)	(1,500,368)
Number of employees	165.440	925.979
	(969.819)	(1,665.742)
Total sales (x 1,000 euro)	28,004.84	314,232.9
	(93,706.22)	(613,213.4)
Percentage of firms in manufacturing	30.32%	25.24%

Source: Amadeus and own calculations. Standard errors are in parentheses.

Table 1: Summary Statistics

2. Data: Taxation rate

- Problem of double taxation: bilateral tax treaties
  - Credit system (US, Ireland, UK, Italy, Greece)
    "taxes in host country are credited against taxes in home"
  - Exemption system (other EU countries)
    "profits of affiliates are only taxed in host country"

- Different tax schemes – different tax incentives?
  - Exemption system:
    - Daughter might face higher taxes and lower net return
    - Negative effect
  - Credit system:
    - Possible to be compensated by lower tax liability in home country

- Empirical evidence not conclusive, but we work within exemption system

2. Data: Taxation rate

- Problem of choosing taxation rates
  - Statutory tax rate
  - EMTR: Amount of capital
  - EATR: Location decision

- Tax treatment of FDI complex
  - STR might not capture full effects.
  - ETR used as proxy, more details (tax base)

- Problem of calculating taxation rates
  - Backward-looking ETR
    - Based on historical data
    - Less suitable (endogeneity problems)
  - Forward-looking ETR
    - Fictional investment
    - Not so straightforward to calculate

2. Data: Taxation rate

- EMTR most suited for this research
  - Investment as a continuous function
- Small subset of EATR and EMTR available
  - Calculations by Devereux, Griffith and Klemm (2002)
  - Most EU-15 countries
- Perform robustness check with EATR and STR

2. Data: Taxation rate

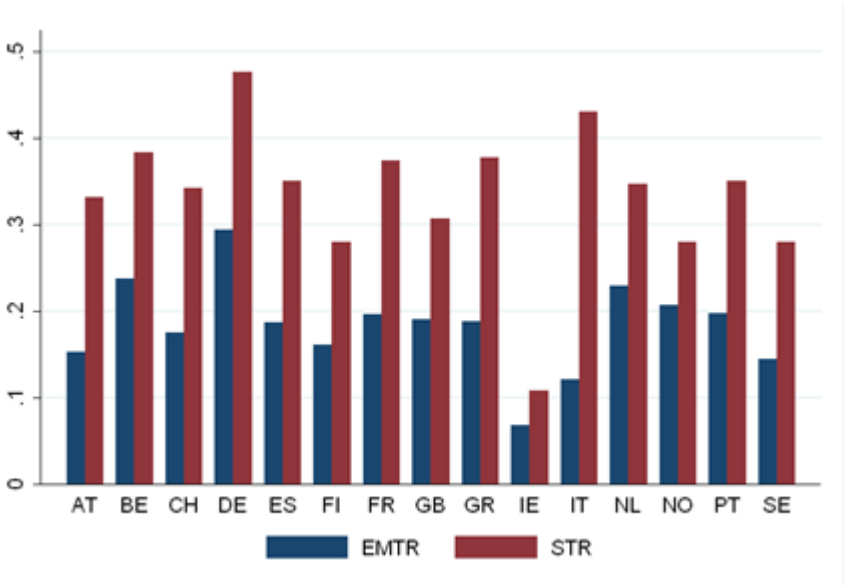

Figure 2: Average EMTR and STR (1995-2005)

2. Data

Country	Affiliates	Percent	Cum.
Austria	33	1.70	1.70
Switzerland	33	1.70	3.39
Germany	258	13.26	16.66
Spain	110	5.66	22.31
Finland	11	0.57	22.88
France	619	31.83	54.70
United Kingdom	375	19.28	73.98
Greece	12	0.62	74.60
Ireland	32	1.65	76.25
Italy	77	3.96	80.21
Netherlands	301	15.48	95.68
Norway	21	1.08	96.76
Portugal	22	1.13	97.89
Sweden	41	2.11	100.00

Table 2: List of host countries

3. Model and Results

- Tax rates reduce after tax rate of return and reduce incentive to invest

- With perfectly mobile capital after-tax rate of return to capital should be equal in equilibrium:

$$MP_k(1-t) = MP*_{k*}(1-t*)$$

- Continuous investment process
  - Change in assets seen as inbound FDI host country (Cummins & Hubbard , 1994; Desai, Foley and Hines, 2002)

- Look at log assets affiliate and host country tax rate

3. Model and Results

- Does sensitivity depend on location?
  - Desai, Foley & Hines (2002); Crabbé & Vandenbussche (2008)
  - Include interaction term with tax measure
- Does agglomeration dampen sensitivity?
  - Use GDP/capita as proxy for agglomeration
  - Again, include interaction
- Include country and group fixed effects, GDP controls and assets of HQ firm
- Estimate the following equation:

$$\log TA_{it}^{jn} = \alpha_n + \beta_1 TAX_t^j + \beta_2 X_t^j TAX_t^j + \beta_3 X_t^j + \beta_4 Y_{it}^n + \epsilon_{it}^n$$

3. Model and Results

Note: agglomeration within NEG context is defined for discrete, profitable investment projects

- Marginal tax rate less suited
- Though we look at continuous investments, part of data may be discrete projects
- Perform robustness test with more suited tax measures, like EATR and STR

	Dependent variable: log total assets affiliate							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EMTR	-0.0516	0.125	-22.20***	-19.12***	-8,990	-4,449	-68.57***	-57.85**
	(0.474)	(0.496)	(6,257)	(6,461)	(17.24)	(16.86)	(25.28)	(26.50)
Log GDP	1.276**	1.490**	1.600***	1.646***	0.101	1,321	0.262	1,413
	(0.589)	(0.582)	(0.547)	(0.566)	(0.883)	(0.964)	(0.858)	(0.957)
Log assets HQ		0.129***		0.134***		0.128***		0.133***
		(0.0367)		(0.0379)		(0.0365)		(0.0377)
Log distance			-1.161***	-1.113***			-1.282***	-1.220***
			(0.205)	(0.213)			(0.228)	(0.243)
Interaction distance and EMTR			3.349***	2.911***			3.943***	3.434***
			(0.956)	(0.988)			(1,072)	(1,140)
Log GDP/CAP					1,384	0.188	1,523	0.207
					(0.996)	(1,077)	(1,046)	(1,124)
Interaction GDP/CAP and EMTR					0.320	0.165	1.526**	1,270
					(0.625)	(0.612)	(0.758)	(0.783)
Constant	-3,548	-7,278	0.898	-1,511	-27.80	-10.43	-24.23	-3,544
	(5,920)	(5,840)	(5,743)	(5,805)	(20.10)	(21.14)	(21.17)	(22.18)
Observations	8238	7772	8224	7761	8238	7772	8224	7761

Heteroskedasticity robust standard errors adjusted for year country clusters in parentheses. Group and parent fixed effects and year dummies are included in all regressions. *, **, *** reports significance at the 10%, 5%, 1% level.

Table 3 : Investment and EMTR

3. Model and Results

- When HQ grows, group grows as a whole

- Tax sensitivity decreases with distance
  - Average sensitivity of -2
  - Tax competition is fiercer the closer one is to Belgian HQ
  - Tax effect is offset by distance effect at roughly 750 km

- Last columns suggests agglomeration forces
  - Investments in more prosperous countries are less tax sensitive

3. Model and Results: Effect on Investment and Employment

Using average investment in foreign affiliates, semi-tax elasticity and technical ratio total assets-employees (676.000 euro) we translate change in assets into change in employment for Belgian economy

EMTR	Assets (mln euros)	Employment
25	1.389	2.056
21	6.948	10.279
16	13.896	20.557

Table 3 : Effect on Total Assets en Employment for the Belgian Economy

A 1 percent point change in EMTR corresponds with 2056 jobs. Going to the EU15 average of 16% corresponds with 13.896 million euro of investment and 20.557 jobs, effect on domestic firms not taken into account

3. Model and Results: Effect on Investment and Employment

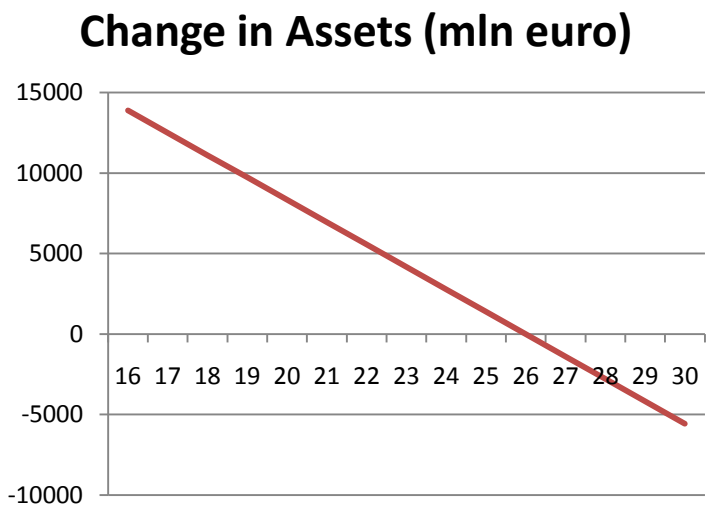

Figure 3a and 3b: Effect on Total Assets and Employment for the Belgian Economy

4. Robustness Checks

- Use taxation rates more applicable in NEG context
  - Discrete investment vs marginal investment
  - Some investments we observe may be discrete investment projects
  - Use STR and EATR
- STR fails to pick up effect
  - Does not seem to pick up effective tax burden firms face
- EATR reconfirms earlier results
  - Closely linked to EATR, or
  - Changes in assets contain discrete investment projects

	Dependent variable: log total assets affiliate							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
STR	0.202	0.259	-2.677	-3.244	-15.59	-11.25	-31.12	-28.41
	(0.679)	(0.683)	(4.464)	(4.747)	(13.68)	(14.09)	(23.6)	(25)
Log GDP	1.894***	2.060***	2.032***	2.194***	1.26	2.188***	1.453	2.508***
	(0.434)	(0.454)	(0.461)	(0.495)	(0.772)	(0.826)	(0.88)	(0.922)
Log assets HQ		0.117***		0.124***		0.117***		0.125***
		(0.0359)		(0.0371)		(0.0358)		(0.0371)
Log distance			-0.637**	-0.700**			-0.778**	-0.851**
			.265)	(0.285)			(0.33)	(0.357)
Interaction distance and STR			0.461	0.532			0.849	0.951
			(0.679)	(0.73)			(0.867)	(0.939)
Log GDP/CAP					0.423	-0.446	0.254	-0.811
					(0.862)	(0.936)	(0.984)	(1.046)
Interaction GDP/CAP and STR					0.574	0.421	0.944	0.823
					(0.509)	(0.523)	(0.74)	(0.773)
Constant	-9.798**	-12.92***	-7.031	-9.707**	-14.23	-2.404	-6.515	9.605
	(4.369)	(4.561)	(4.561)	(4.797)	(17.4)	(18.86)	(20.34)	(21.69)
Observations	8966	8455	8867	8367	8966	8455	8867	8367

Heteroskedasticity robust standard errors adjusted for year country clusters in parentheses. Group and parent fixed effects and year dummies are included in all regressions. *, **, *** reports significance at the 10%, 5%, 1% level.

Table 4: Investment and STR

	Dependent variable: log total assets affiliate							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EATR	0.14	0.378	-17.51**	-15.92**	-36.71	-26.35	-83.94**	-73.11*
	(0.957)	(0.978)	(7.827)	(7.968)	(27.74)	(27.05)	(37.82)	(39.38)
Log GDP	1.221**	1.422**	1.599***	1.651***	-0.164	1.1	0.424	1.588
	(0.595)	(0.59)	(0.555)	(0.575)	(0.924)	(0.999)	(0.923)	(1.003)
Log assets HQ		0.129***		0.134***		0.128***		0.133***
		(0.0366)		(0.0379)		(0.0364)		(0.0378)
Log distance			-1.195***	-1.180***			-1.360***	-1.349***
			(0.327)	(0.339)			(0.383)	(0.403)
Interaction distance and EATR			2.712**	2.499**			3.340**	3.144**
			(1.201)	(1.234)			(1.421)	(1.484)
Log GDP/CAP					1.439	0.187	1.073	-0.25
					(0.965)	(1.059)	(1.018)	(1.103)
Interaction GDP/CAP					1.325	0.966	2.248*	1.918
					(1.015)	(0.991)	(1.194)	(1.228)
Constant	-3.042	-6.672	1.016	-1.252	-26.2	-7.973	-13.3	7.676
	(5.941)	(5.859)	(5.811)	(5.844)	(19.3)	(20.69)	(20.88)	(22.12)
Observations	8238	7772	8224	7761	8238	7772	8224	7761

Heteroskedasticity robust standard errors adjusted for year country clusters in parentheses. Group and parent fixed effects and year dummies are included in all regressions. *, **, *** reports significance at the 10%, 5%, 1% level.

Table 5 : Investment and EATR

5. Conclusion

- Average semi-tax elasticity of -2
  - Sensitivity decreases with distance
- Agglomeration effects have dampening effect on tax elasticity
- Results holds using a marginal and an average effective taxation rate