Le aliquote effettive sulle imprese quale strumento per le valutazioni di policy

- L'aliquota Marginale Effettiva e la Dinamica degli Investimenti in Italia-

MEF Dipartimento delle Finanze

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Outline

- Corporate sector firm-level dataset
- Investment model
- Results
- Policy Implications

Corporate sector firm-level dataset

- The Italian Department of finance built a firm-level database which includes all the available information on the Italian corporate sector in order to:

  - perform empirical analysis based on economic theories (investments, TFP, etc.);
  - improve the model currently used to assess (both *ex-ante* and *ex-post*) fiscal measure on the corporate sector;

Corporate sector firm-level dataset

- The dataset currently includes the following information for the time period 2003-2015:

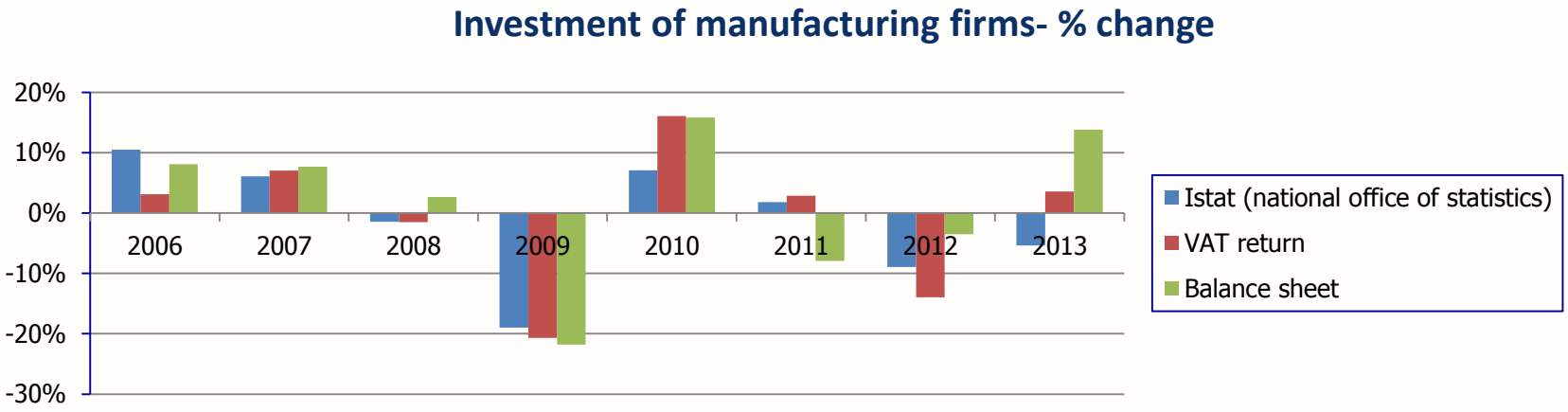
  - ✓ Balance sheet
  - ✓ Profit and loss account
  - ✓ CIT return
  - ✓ VAT returns
  - ✓ Other tax returns (IRAP, 770)

- Ongoing work of integrating the database with:

  - ✓ Ownership structure (MNEs)
  - ✓ «Spesometro» (report of the total amount of transactions performed per clients and suppliers)
  - ✓ Real estate database.

Corporate sector firm-level dataset

- We use two variables for investment (in tangible asset):
  - from VAT return under "purchases of depreciable goods" (preferred as it allows to keep more observations in the sample)
  - inferred from the balance sheet using the following equation (used to test robustness of the model): $I_t = K_t - K_{t-1} + \delta K_t$



- The dynamics of investment calculated from VAT returns and from the balance sheet are similar to the dynamic of investment calculated by ISTAT.

Investment Model – Literature review

- **The Neoclassical Model** of Hall-Jorgenson (AER, 1967), King-Fullerton (NBER, 1984) and Devereux-Griffith (IFS,1998):
  - *The user cost theory of capital is based on a neoclassical investment model in which investment decisions are made to maximise the net present value of the firm (e.g. Hall an Jorgenson, 1967).*
  - *Empirical implementations of neoclassical models have been generally disappointing: while lags of outputs are highly correlated with investment, user cost provided very limited additional explanatory power.*
  - *Many observers have argued that tax policy likely does not significantly affect investment, harkening back to the accelerationist debate*
- **The Accelerator Baseline Model (Demand Approach)**
  - *The model assumes that firms' desired capital-output ratio is roughly constant:* $I_t = b\, E_t (Y_{t+1} - Y_t)$ *where b is the desired capital-output ratio.*
  - *Firms do not observe future output with certainty, so the term* Y_{t+1} *must be interpreted as an expectation* $E_t\, Y_{t+1} = Y_t$

Investment Model
- Tax-adjusted user cost of capital -

- The Italian tax regime is applied to the micro forward looking approach originally developed by Devereux and Griffith (1998), following Bresciani-Giannini (2003) and Caiumi et al. (2008).

- We compute Tax-Adjusted Cost of Capital (TAUC), EATR and EMTR, from 2004 to 2013, considering not only CIT, but also PIT on interest returns, tax on dividends and capital gains (qualified and not qualified).

- These indicators were computed for different sources of finance (new equity and debt) taking into account various tax reforms (tax rates, interest deductibility, ACE, accelerated depreciation etc.).

- A firm-specific METR and TAUC were computed by weighting for the actual financial structure of each company.

Investment Model
– Devereux & Griffith Model -

- The cost of capital is the minimum pre-tax real rate of return required in order to undertake an investment.
- The METR is the difference between the pre tax and the after tax rate of return scaled down by the pre-tax economic rent when the economic rent is zero.
- The EATR is the ratio between the present value of taxes and the present value of the income stream.
- D&G demonstrate the METR is the special case of EATR for the marginal investment.
- Investment is adversely affected by corporate taxation through the user cost of capital. Tax effects are not separable from other components included in the user cost.

Investment Model –two specifications-

- On a panel of 14.000 manufacturing firms over the period 2004-2013, we estimate two types of investment equations (see Bond et al, 2003), using a difference GMM estimator:

- The Euler-equation specification including demand control variables:

$$\frac{I_{i,t}}{K_{i,t-1}} = \beta_1 \frac{I_{i,t-1}}{K_{i,t-2}} + \beta_2 METR_{i,t-1} + X'_{it}\,\beta_3 + a_i + d_t + \varepsilon_{it}$$

- The error-correction specification including lags of output :

$$\frac{I_{i,t}}{K_{i,t-1}} = \beta_1 \frac{I_{i,t-1}}{K_{i,t-2}} + \beta_2 TAUC_{it} + \beta_3 \Delta y_{it} + \beta_4 \Delta y_{i,t-1} + \beta_5 \frac{CF_{i,t}}{K_{i,t-1}} + \beta_6 \frac{CF_{i,t-1}}{K_{i,t-2}} + \beta_7 (k_{i,t-2} - y_{i,t-2}) + a_i + d_t + \varepsilon_{it}$$

Results: The Euler-equation model

Dependent variable: I_t/K_{t-1}	(1)	(2)	(3)	(4)	(5)
I_{t-1}/K_{t-2}	0.511***	0.470***	0.565***	0.568***	0.519***
	(0.104)	(0.0600)	(0.102)	(0.0645)	(0.0656)
$METR_{t-1}$		-0.0828***	-0.0659*	-0.181***	-0.173***
		(0.0239)	(0.0357)	(0.0246)	(0.0262)
$(Equity/Total\ liabilities)_{t-1}$		0.407***	0.421***	0.427***	0.416***
		(0.0217)	(0.0253)	(0.0231)	(0.0234)
$Cash\ Flow_{t-1}/\ K_{t-2}$			0.0116		
			(0.00712)		
ROI_{t-1}				0.487***	0.479***
				(0.0354)	(0.0354)
$Orders\ (by\ subsector)_{t-1}$					0.000806***
					(0.000104)
Observations	96,915	96,915	96,915	96,915	90,986
Number of id	13,845	13,845	13,845	13,845	13,354
Number of Instruments	9	13	15	14	15
AR3 Test (p-value)	0.237	0.239	0.216	0.209	0.278
Hansen Test (p-value)	0.695	0.906	0.822	0.360	0.723

- Investments are negatively affected by marginal effective tax rate while the profitability has a positive effect. The estimated long-run elasticity is between 0.15 and 0.42.
- The coefficient of the equity to total liabilities ratio is positive and highly significant (less-leveraged firms can invest more).

Results: The error-correction model

Dependent Variable: I_t/K_{t-1}	(1)	(2)	(3)
I_{t-1}/K_{t-2}	0.0568	0.0481	-0.00223
	(0.109)	(0.0718)	(0.0682)
Δy_t	0.245***	0.242***	0.248***
	(0.0262)	(0.0259)	(0.0264)
Δy_{t-1}	0.292***	0.297***	0.310***
	(0.0345)	(0.0294)	(0.0296)
$\Delta TAUC_t$		-0.326***	
		(0.0182)	
$(k - y)_{t-2}$	-0.289***	-0.293***	-0.305***
	(0.0349)	(0.0304)	(0.0306)
Cash $Flow_t/ K_{t-1}$	0.00490	0.00363	0.00342
	(0.00415)	(0.00363)	(0.00368)
Cash $Flow_{t-1}/ K_{t-2}$	-0.00417**	-0.00462**	-0.00408**
	(0.00194)	(0.00204)	(0.00185)
$\Delta METR_t$			-0.612***
			(0.0342)
Observations	96,838	96,838	96,838
Number of id	13,834	13,834	13,834
Number of Instruments	17	19	19
AR3 Test (p-value)	0.682	0.582	0.713
Hansen Test (p-value)	0.667	0.864	0.620

- The negative effect of corporate taxation on taxation is confirmed by the error-correction specification.
- The hypothesis of the error-correction model is also confirmed: a capital stock above its desired level is associated with lower future investment.

Policy Implications

- The analysis shows that corporate taxation is an important factor in determining investment behaviour. This result is confirmed by various specifications of the model.
- The model provides empirical evidence that investment is adversely affected by corporate taxation through the user cost of capital.
- The empirical results are obtained by introducing the tax adjusted user cost and the METR in standard investment equations (see Schwellnus, 2008 and Vartia, 2008).
- Demand side policy is strongly relevant, but supply side does matter.
- The model can be used to evaluate the effect of fiscal measures in two steps: first evaluating the effect of the provision on the METR and then indirectly computing the effect on investment behavior using the estimated coefficient.
- Concerning our dataset, a natural extension is to investigate the impact of tax policy on the TFP in Italy.

Annexes

Robustness Check: The Euler-equation: preliminary evidence (balance sheet data)

	(1)	(2)	(3)	(4)	(5)
Dependent variable: I_t/K_{t-1}					
I_{t-1}/K_{t-2}	0.0911***	0.0950***	0.0794***	0.0887***	0.0861***
	(0.0100)	(0.0100)	(0.0125)	(0.00995)	(0.0101)
$METR_{t-1}$		-0.108**	-0.130**	-0.262***	-0.256***
		(0.0527)	(0.0555)	(0.0529)	(0.0535)
$(Equity/Total\ liabilities)_{t-1}$		0.459***	0.450***	0.427***	0.422***
		(0.0390)	(0.0401)	(0.0383)	(0.0389)
$Cash\ Flow_{t-1}/\ K_{t-2}$			0.0204**		
			(0.00991)		
ROI_{t-1}				0.507***	0.507***
				(0.0522)	(0.0529)
$Orders\ (by\ subsector)_{t-1}$					0.000774***
					(0.000182)
Observations	28,357	28,357	28,357	28,357	27,299
Number of id	4,051	4,051	4,051	4,051	3,903
Number of Instruments	14	17	19	19	20
AR2 Test (p-value)	0.965	0.891	0.768	0.424	0.533
Hansen Test (p-value)	0.344	0.274	0.278	0.106	0.112

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