Capital Structure, Investment, and Regulation: The England and Wales Water Sector

Vicenç Esteve Guasch
University of East Anglia – School of Economics and Centre for Competition Policy

8CRI – Florence June 2019

Motivation

- Water privatization: a never-ending debate
- England and Wales, the paradigmatic case, recent criticism
  - "Water privatization looks little more than an organised rip-off"
  - "The scandal of privatised water is going to blow: Water firms promised efficiency. Instead they have brought **unsustainable debt** that the public will have to redeem"
  - "it had been too easy for companies and their shareholders to make money by **gearing up** […], rather than by improving operating efficiency, innovating and delivering for customers"

Motivation

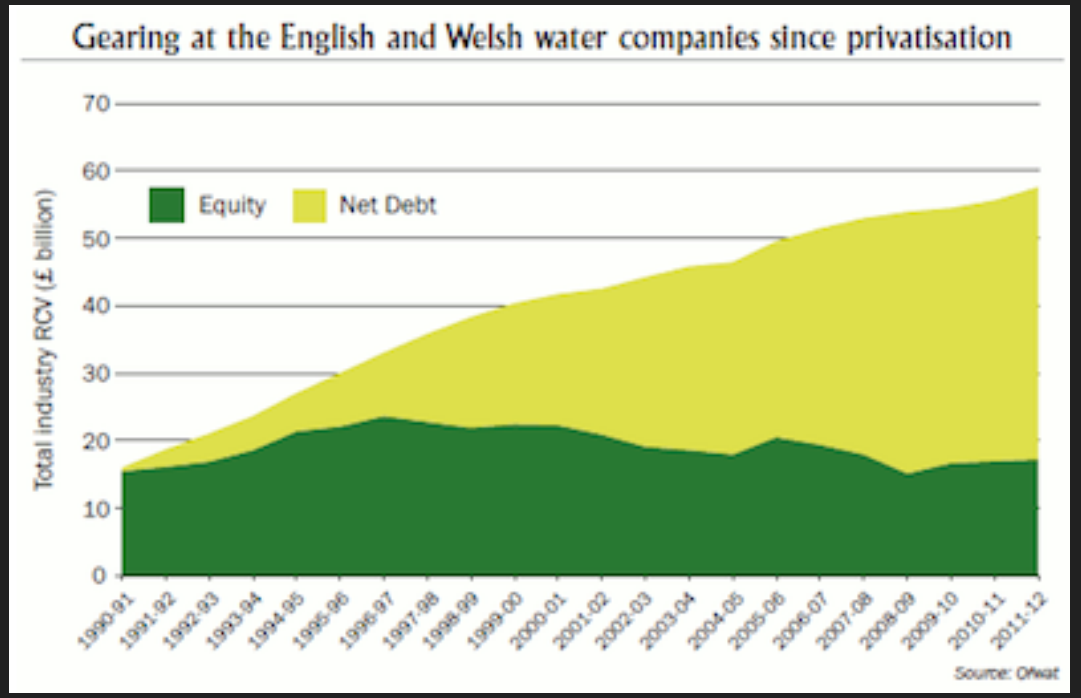
- Water privatization: a never-ending debate
- England and Wales, the paradigmatic case, recent criticism
  - "Water privatization looks little more than an organised rip-off"
    - Financial Times, September 10, 2017.
  - "The scandal of privatised water is going to blow: Water firms promised efficiency. Instead they have brought **unsustainable debt** that the public will have to redeem"
    - The Spectator, September 16, 2017.
  - "it had been too easy for companies and their shareholders to make money by **gearing up** […], rather than by improving operating efficiency, innovating and delivering for customers"
    - Cathryn Ross, Ofwat Chief Executive, October 17, 2017.

Motivation (cont'd)

- The high levels of leverage in the sector could compromise future investment

  (Department of Trade and Industry, 2004)

- No debt at privatization (1989) – Average gearing >70% in 2009.
- The ability to invest is crucial
  - One of the main reasons for privatizing the sector
  - Future challenges: Climate change, population growth



Source: Ofwat

Capital Structure and Regulation

- Stylized fact: Regulated sectors are systematically more leveraged than other sectors
- Firms can issue debt to strategically influence the regulator (e.g. Taggart, 1981; Dasgupta & Nanda, 1994)
- A benchmark model by Spiegel & Spulber (1994) or Spiegel (1994):
  - In equilibrium, the regulated firm issues debt to increase the regulated price
  - Simultaneously, the investment level is higher than without debt
    - Regulatory opportunism, the ability of the regulator to reduce prices *ex post*, is reduced

Capital Structure and Regulation: Empirical Evidence

- Based on benchmark model two testable hypothesis can be made
  - H1: Higher gearing leads to higher regulated prices
  - H2: Higher gearing leads to higher investment rates
- Cambini & Rondi (2011): Evidence supporting H1 and H2 in a panel of European telecoms
- Bortolotti *et al*. (2011): Evidence supporting H1 (H2 not tested) in a panel of European utilities
  - This phenomenon [high gearing in utilities sectors] has raised concerns among policymakers about the financial stability of regulated utilities and their ability to finance future investments. […] High leverage is a natural response of regulated firms to the inability of regulators to make long-term commitments to prices" (Bortolotti et al., 2011: 555)

Empirical analysis

- Hypothesis
  - H1: Higher gearing leads to higher regulated prices
  - H2: Higher gearing leads to higher investment rates
- Granger-causality test:
  - $P_{i,t} = \alpha_1 P_{i,t-1} + \alpha_2 P_{i,t-2} + \beta_1 G_{i,t-1} + \beta_2 G_{i,t-2} + \mu_i + \delta_t + \epsilon_{i,t}$ (1)
  - $G_{i,t} = \delta_1 G_{i,t-1} + \delta_2 G_{i,t-2} + \gamma_1 P_{i,t-1} + \gamma_2 P_{i,t-2} + \mu_i + \delta_t + \varepsilon_{i,t}$ (2)
- Arellano and Bond GMM estimation.
- Data set: 20 (out of 21) E&W water companies for the period 1997-2009 (260 obs.)

Table 2: Price caps - Gearing GMM estimations

	Price Cap (Sys)	Price Cap (Diff)
L.Price_Cap	1.197***	0.985***
	(0.0570)	(0.0952)
L2.Price_Cap	-0.163***	-0.101**
	(0.0553)	(0.0507)
L.Gearing	-0.0428**	-0.0884***
	(0.0188)	(0.0251)
L2.Gearing	0.00816	-0.0146
	(0.0194)	(0.0236)
Obs.	220	200
Arellano-Bond test for AR(1)	0.000227	0.000769
Arellano-Bond test for AR(2)	0.554	0.161
Sargan test(p-value)	0.319	0.217
H0: L1.Gearing=L2.Gearing=0(p-value)	0.0669	0.00195
H0: L1.Gearing+L2.Gearing=0(p-value)	0.105	0.00734

Standard errors in parentheses

GMM Dynamic Panel Data Estimation. All regressions include time dummies.

Two different models are estimated, system GMM (Sys) and diffenrece GMM (diff).

In the former, the lagged differences are used as instruments for the level variables.

In the latter, also lagged variables in levels are used a instruments for the differenced variables.

$^{+}$ $p < 0.20$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Gearing - Price caps GMM estimations

	Gearing (Sys)	Gearing (Diff)
L.Gearing	0.805***	0.723***
	(0.0728)	(0.118)
L2.Gearing	-0.0310	-0.0822
	(0.0698)	(0.0828)
L.Price_Cap	-0.0388	-0.551^{+}
	(0.209)	(0.404)
L2.Price_Cap	0.0949	0.228
	(0.266)	(0.292)
Obs.	220	200
Arellano-Bond test for AR(1)	0.000553	0.00105
Arellano-Bond test for AR(2)	0.968	0.934
Sargan test(p-value)	0.708	0.596
H0: L1.Price_Cap=L2.Price_Cap=0(p-value)	0.742	0.373
H0: L1.Price_Cap+L2.Price_Cap=0(p-value)	0.482	0.237

Standard errors in parentheses

GMM Dynamic Panel Data Estimation. All regressions include time dummies.

Two different models are estimated, system GMM (Sys) and diffenrece GMM (diff).

In the former, the lagged differences are used as instruments for the level variables.

In the latter, also lagged variables in levels are used a instruments for the differenced variables.

$^{+}$ $p < 0.20$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Investment rates - Gearing GMM estimations

	Invest_r (Sys)	Invest_r (Diff)
L.Invest_r	0.595***	0.349***
	(0.0456)	(0.0632)
L2.Invest_r	-0.0254	-0.223**
	(0.101)	(0.0967)
L.Gearing	-0.0139	-0.0201
	(0.0207)	(0.0253)
L2.Gearing	-0.00139	-0.000999
	(0.0244)	(0.0206)
Obs.	220	200
Arellano-Bond test for AR(1)	0.000828	0.000767
Arellano-Bond test for AR(2)	0.0339	0.460
Sargan test(p-value)	0.244	0.176
H0: L1.Gearing=L2.Gearing=0(p-value)	0.219	0.574
H0: L1.Gearing+L2.Gearing=0(p-value)	0.134	0.302

Standard errors in parentheses

Table 6: Gearing - Investment rates GMM estimations

	Gearing (Sys)	Gearing (Diff)
L.Gearing	0.809***	0.602***
	(0.0550)	(0.0710)
L2.Gearing	0.0327	-0.0789+
	(0.0558)	(0.0601)
L.Invest_r	0.453**	0.253
	(0.218)	(0.225)
L2.Invest_r	-0.0270	0.00929
	(0.173)	(0.205)
Obs.	220	200
Arellano-Bond test for AR(1)	0.000853	0.00121
Arellano-Bond test for AR(2)	0.607	0.739
Sargan test(p-value)	0.424	0.121
H0: L1.Invest_r=L2.Invest_r=0(p-value)	0.110	0.525
H0: L1.Invest_r+L2.Invest_r=0(p-value)	0.0821	0.425

Standard errors in parentheses

Results summary

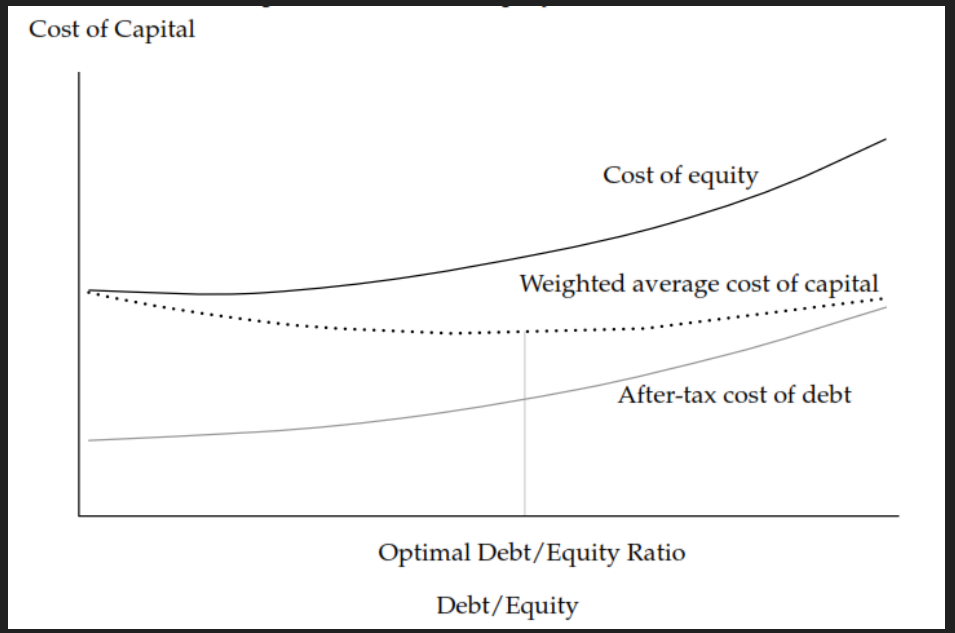
- Both H1 and H2 are rejected
  - **Result 1:** Higher gearing has lead to **lower** regulated prices, rather than higher prices
  - **Result 2:** Higher gearing has not lead to higher investment rates

1- Higher gearing → Lower prices

- The regulatory regime
  - Price cap inventive regulation (5-year price reviews)
  - In practice, prices include a "fair" return on the asset base (and thus investment) $\rightarrow \widehat{WACC}$
  - The sector is highly capital intensive: The return on capital accounts for ~ 40% of the bill

- → The cost of capital has been reduced with gearing

$$WACC = \frac{Debt}{Debt + Equity} r_{Debt} + \frac{Equity}{Debt + Equity} r_{Equity}$$



2- Do we have an under-investment problem?

- Investment under monopoly regulation
  - Rate of return regulation → Over-investment (Averch -Johnson)
  - Incentive regulation → Under-investment (Regulatory opportunism)
- But we have both!

- If $\widehat{WACC} > WACC$ → Gold plating
  - As long as the remunerated cost of capital is higher than the actual one, the incentive is to invest as much as you can.
  - $\widehat{WACC} > WACC$ systematically

- Gold-plating effect dominates

Conclusions: gearing up for…?

1. Increase regulatory commitment?
   - The ability of the regulator to reduce prices is indeed restricted
   - Unfortunately, this is not a mechanism that reduces under-investment
   - Risk transfer to consumers / taxpayers
2. Arbitrage the $\widehat{WACC}$
   - "There is no doubt, with the benefit of hindsight, that it had been too easy for companies and their shareholders to make money by **gearing up and outperforming the WACC**, rather than by improving operating efficiency, innovating and delivering for customers" (Ofwat Chief Ex., 2017)
   - 1% of the WACC represents ~ £450 millions: much more than any reasonable productivity increase could achieve.

Forthcoming

- Panel of European Water Companies
- Theoretical model

References

Bortolotti, B., Cambini, C., Rondi, L., & Spiegel, Y. (2011). Capital structure and regulation: do ownership and regulatory independence matter?. *Journal of Economics & Management Strategy*, *20*(2), 517-564.

Cambini, C., & Rondi, L. (2011). Capital structure and investment in regulated network utilities: evidence from EU telecoms. *Industrial and Corporate Change*, *21*(1), 31-71.

Dasgupta, S., & Nanda, V. (1993). Bargaining and brinkmanship: Capital structure choice by regulated firms. *International Journal of Industrial Organization*, *11*(4), 475-497.

Spiegel, Y., & Spulber, D. F. (1994). The capital structure of a regulated firm. *The RAND journal of economics*, 424-440.

Spiegel, Y. (1994). The capital structure and investment of regulated firms under alternative regulatory regimes. *Journal of Regulatory Economics*, *6*(3), 297-319.

Taggart, R. A. (1981). Rate-of-Return Regulation and Utility Capital Structure Decisions. *The Journal of Finance*, *36*(2), 383-393.