

Investments, contracts and risk premium

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A murky problem: contracts have different aspects

- Market power and market design
 - According to EU competition authorities, “long-term” (more than one year) contracts with a dominant incumbent foreclose the market
 - According to economists, the same long term contracts limit the market power of the same dominant incumbents
- Corporate finance
 - Contracts change the risk profile and hence the incentive to invest

The two problems combine badly

- The law of unintended consequences applies
 - Forward contracts that are supposed to bring both
 - Reduction of market power and hence more investments
 - More certainty and hence more investments
 - Have in reality ambiguous consequences when there is effectively market power, even without foreclosure effects

- But contracts remain difficult to analyze even in the absence of market power, that is, in a purely financial context in their role of risk modifiers.

Neglect market power in the following; concentrate on risk

- The power industry faces an accumulation of risks of very different nature
 - The former fuel and demand risks
 - To which one adds the competition induced part of the demand risk
 - The regulatory risk (“reform of reforms”)
 - The carbon and renewable policy risks
 - Which add costs that enhance the demand risk: the question of carbon leakage in the EU (itself an issue of contracts)
- And the new technology risks (“factor 5” on carbon emissions in 2050 can only be achieved by a huge injection of technological progress)

Different types of difficulties

- Institutional (in the EU)
 - The focus on the foreclosure effect of “long term” contracts by EU competition authorities imposes constraints on the contracts and hence on risk measures (we neglect in the following)

- Technical: a focus on market failure with a possibly misleading neglect of risk in investments
 - In casual conversation “the industry is used to take risks”
 - But also in the literature

Properly treating risk in investment assessment is technically difficult

- Many invoke financial derivatives; BUT
 - They do not trade over sufficiently long maturities
 - They are not sufficiently liquid (and liquidity can evaporate in a couple of weeks as we know today)
 - and they do not span sufficient risks (incomplete markets)
- CAPM, APT and the like
 - But they require sufficiently long time period to estimate the betas in this continuously changing environment and these new markets
- Risk premia in corporate bonds
 - This involves a decomposition into subordinated trenches (the CDO approach!!!)
 - And interpolation and extrapolation of risk premium data

Trying to understand

- Motivation: back to basics

- The cost of capital to apply to a new plant is project specific; it is not the cost of capital of the mother company. We need to be able to differentiate specific cost of capital and explain where they come from
- The cost of capital to apply to a company that needs to massively invest in a dramatically changing environment is not necessarily the same as in the cost of capital of the utility before that investment process.
- Market design and contracts change the risk profile of the plant and hence the cost of capital

A modelling experiment

- Construct a stochastic equilibrium model (not an optimization model)
 - Where agents invest according to some risk aversion criterion (they use a CVaR which is related to the VaR)
 - In front of some risks that are explicitly represented (in this case risk fuel, organisation of the carbon market)
 - And where electricity prices are endogenous (e.g. self hedging of gas fuel cost when electricity prices are set by gas) and depend on both risk and the development of new capacities

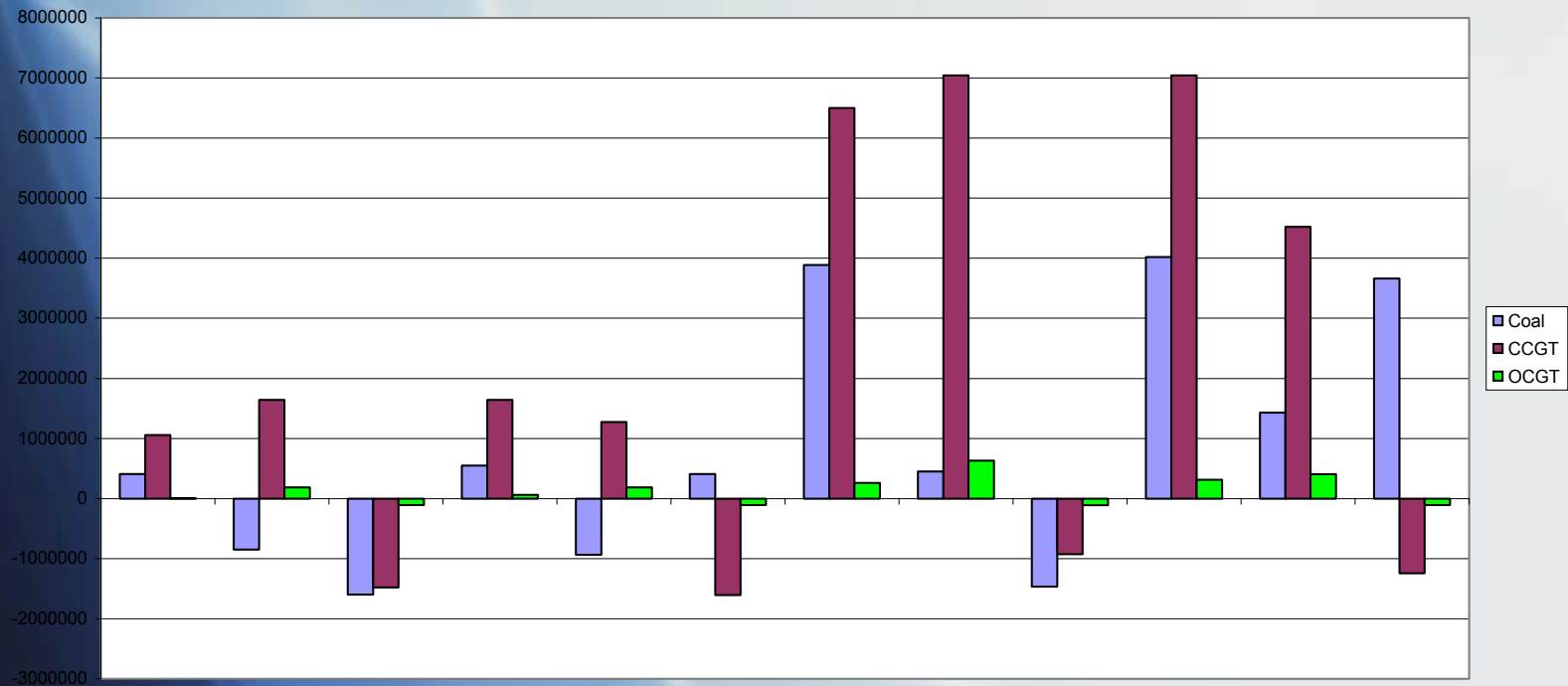
- And try to infer something interesting

Basic assumptions

- A stylized (economic like), computable (and hence extendable) model
 - Three technologies (ex ante)
 - Two price fuel evolutions (ex post)
 - Two organizations of the electricity market: CM and EO (ex ante)
 - Six organisations of the carbon market (ex post)
 - The ETS in the new EU legislative package
 - No market power
 - Invest (ex ante) before uncertainty is resolved (ex post)
 - According to a CVAR
- Derive risk premium from the model

Identical risk aversion (CVaR parameter) for plants of different risk exposure

Profit by scenario: CMRA-1000



Risk premia by technology

	Coal	CCGT	GT
EORA 250	0.041069	0.072697	0.07406
EORA 1000	0.038937	0.059529	
CMRA 250	0.016537	0.018444	0.019223
CMRA 1000	0.016031	0.019179	0.019897

Conclusion of the experiment

- Market design matters in the presence of risk
 - Here a comparison of energy only and capacity markets: risk aversion enhances the impact of market failure
- Market failure affects peak plants in a deterministic environment but also base plants in case of risk
- Different plants have different costs of capital that depend on their risk exposure that differ by market design
- Forcing a single cost of capital does not seem good (confirming finance theory)

Can one extend to contracts

- In principle: contracts and plants are part of the same portfolio
 - Contracts transfer risk to the consumer and hence modify the distribution of the revenue of the generators
- But one needs to understand the reaction of the consumer
 - In fact behaviours with respect to risk differ: EII (e.g. steel, aluminium), others (e.g. car manufacturing), service, household
- Some contracts can be associated to full costs of certain units (e.g. Exeltium in France) (context of carbon leakage)
- These are easy to model on the generator side but the reaction of the consuming side is unknown

In short and to conclude: questions

- Can one still really use standard corporate finance (e.g. straight CAPM) to assess new plants today?
- One can certainly assess (at least to some extent) the risk premium of a mix of contractual clauses when the basis of risk premium on the market does not change
- But the evolving nature of these risk premium in the current risky environment causes problem
- And we know so little about demand reaction!
- Which brings us back to fundamental questions on combining restructuring with other risky policies