

# The Evolving Risk Profile of European Energy Utility Companies and the Energy Sector

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# Section 1

## Introduction



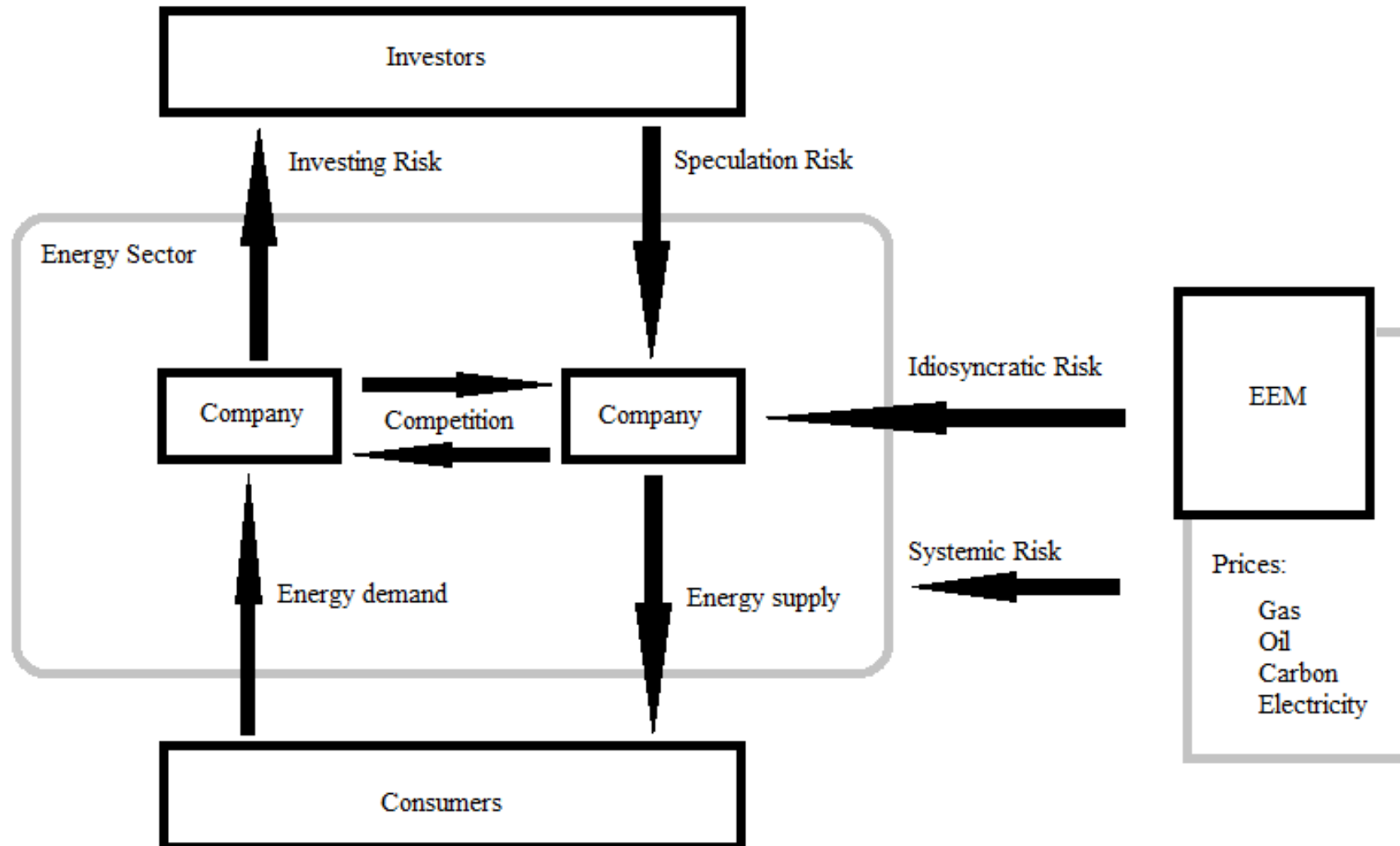
# Introduction

- Explores the evolving risk profile of the European energy sector (EES) and companies since the liberalisation of the European energy market (EEM).
- This paper aims to identify:
  - The change in *idiosyncratic risk* for energy utility companies since the liberalisation of the internal European energy market (EEM).
  - The change in *systemic risk* for the European energy sector (EES).

# Definitions

- Energy Utility Company
  - A company's whose primary revenue is producing, or supplying natural gas or electricity to businesses and households.
- Market Risk
  - Specifically refers to the position of an equity or commodity stock (Dowd, 2005, p. 15).
- Idiosyncratic Risk
  - The portion of a stocks variance which is not attributable to overall stock market volatility (Bali et al., 2005: JoF).
- Systemic Risk
  - The risk from infrequent events that are highly correlated across a large number of assets (Das & Uppal, 2004: JoF).

# The European Energy System



# Liberalisation

- To allow the free movement of goods, persons, services and capital, leading to an increase in efficiency in the production, distribution, security, supply and competitiveness of the European economy. (Directive 96/92/EC, 1996; Directive 98/30/EC, 1998). Resulting in lower costs for the end consumer through market forces.
- Single Utility => Multi-Utilities (ECOTECH, 2001).
- Enron and California electricity crisis
  - Manipulated market to increase profits (Joskow & Kohn, 2002: EJ)
  - Blackouts
  - Underinvestment in energy utility companies

# Market Liberalisation

- Electricity liberalisation
  - Published 1996, implemented 1999.
- Natural Gas liberalisation
  - Published 1998, implemented 2000.
- Production and Distribution channel unbundled
  - Published in 2003.
    - Prevents predatory behaviour – reduces market dominance.
    - Level playing field for generation (Directive 2003/54/EC, 2003; Directive 2003/55/EC, 2003).
    - Implemented for Businesses (in 2004) and Households (in 2007) could choose energy suppliers.
- Unequal level of regulatory supervision for each member state, and between electricity and gas (Directive 2009/72/EC, 2009; Directive 2009/73/EC, 2009).



# Issues with the Energy Market

- Lack of liquidity and transparency.
  - Hinders resource allocation, risk hedging and new entries.
- Liquidity and risk hedging issues can cause increased price volatility for energy utility companies which can affect:
  - Future earnings
  - Reliable supply of electricity and gas

# Research Hypothesis

- Market liberalisation increased market risk for the EES and European utility companies.
- Broken down into two distinct hypothesis:
  - $H_1$  – *European energy market liberalisation resulted in an increase in idiosyncratic risk for European energy utility companies.*
  - $H_2$  – *European energy market liberalisation resulted in an increase in systemic risk for the European energy sector.*



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# Section 2

## Literature Review



# Literature Review

- Liberalisation.
  - Government adopts a less interventionist role.
  - Reduced buffer effects, risk can't be transferred to end user.  
(Nwaeze, 2000, p.49, JoRE).
- Volatility may be a result of speculative investors (Vivian & Wohar, 2011).
  - Fossil fuel investment (excluding hedge funds) increased from \$6bn to \$320bn from 2000-2009 (Economist, 2010).
  - Restricts ability to raise new capital (Nwaeze, 2000, p.50, FoRE).

- Small and large utilities experienced larger negative returns suggesting vulnerability to market inefficiencies (Nwaeze, 2002:JoRE).
- Price fluctuations in oil and gas directly affect company returns (Boyer & Fillion (2007, p.433, EE).
  - Expected for oil and gas companies but not for utility companies.
  - Price spike in industry returns could lead to price spike for end consumers (Ramos & Viega, 2010:EnE).
  - Indicated that market and sector are linked, therefore the possibility of contagion risk (Ramos & Viega, 2010: EnE).

- *Energy systemic risk* – using market manipulation to falsely inflate energy price (Diaz-Rainey *et al.*, 2011: JoFRC).
  - Nwaeze (2002: JoRE) found increased earnings variability around electricity power industry reforms.
- In 1993 Utility companies hedge between 0 and 97.5% of annual production (Haulshalter, 2000, JoF).
  - Hedging greater for firms with access to public debt.
  - Greater for low financial flexibility, measured by debt outstanding and cash holdings.

# Dataset for Pilot Study

- 24 Energy utility companies
  - Primary revenue from production of supply of electricity and gas.
  - European.
  - Trading before and after liberalisation.
- STOXX 600 Utilities.
- STOXX TMI (Total Market Index).



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# Section 3

## Methodology





# Methodology

- Jensen's Alpha
  - The active return on an investment, and measures idiosyncratic risk (Jensen, 1967, JoF).

$$J\alpha_{jt} = r_{jt} + \beta_{jt}[r_{mt} - r_{ft}]$$

- Beta
  - Covariance between stock and the market, and measures systemic risk (Jensen, 1967, JoF; Mankiw and Shapiro, 1986, RoES).

$$\beta_{mjt} = \frac{\text{cov}(\tilde{r}_{jt}, \tilde{r}_{mt})}{\sigma^2(\tilde{r}_{mt})}$$

- Value at Risk
  - Predicts the likelihood that we will get an outcome no worse than VaR from 'normal' market movements, over a given time period (Linsmeier & Pearson, 2000, p.48, FAJ).

$$\alpha VaR = -(\mu_r - \sigma_r z_\alpha)$$



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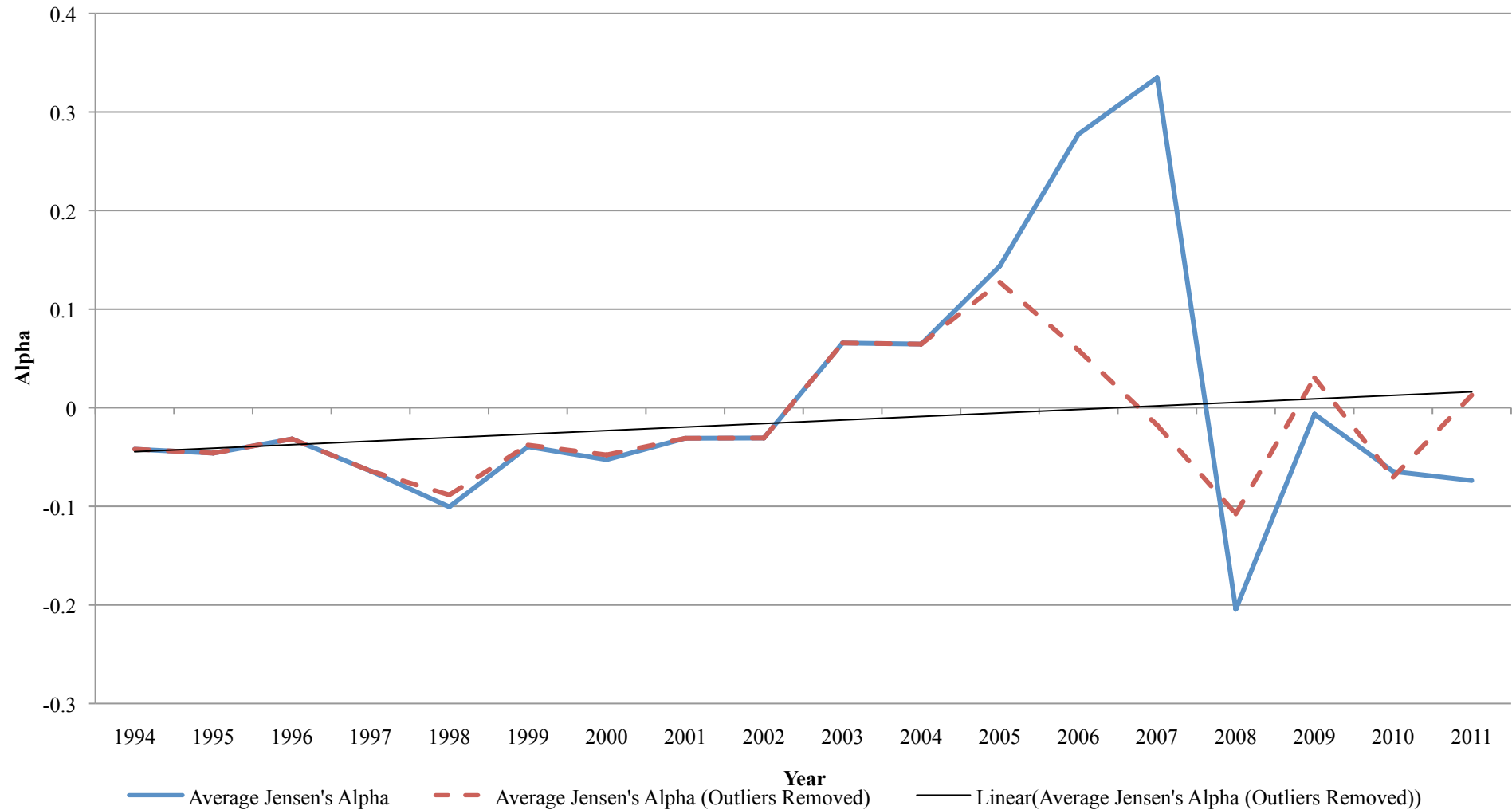
# Section 4

## Empirical Results

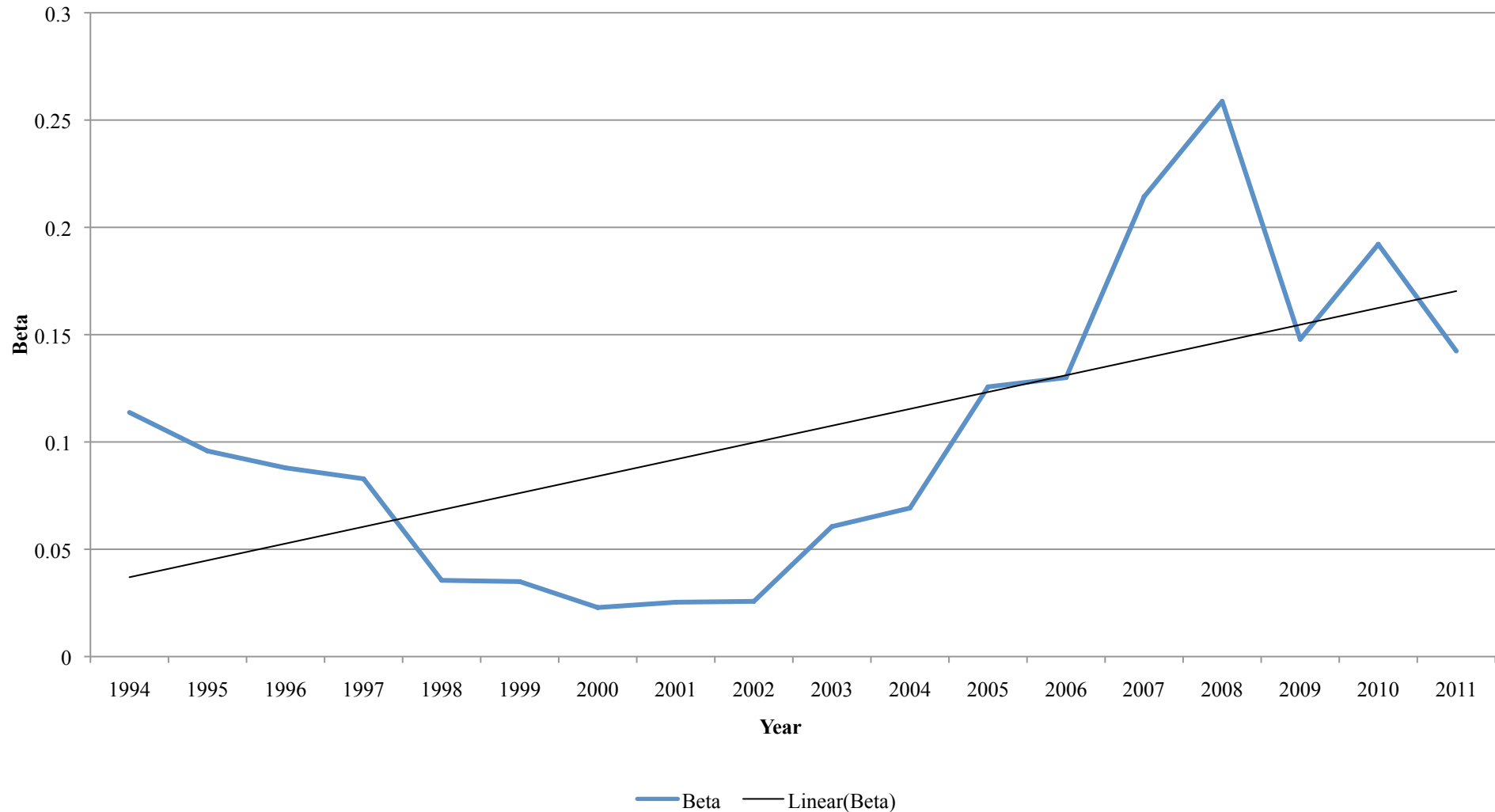




# Jensen's Alpha

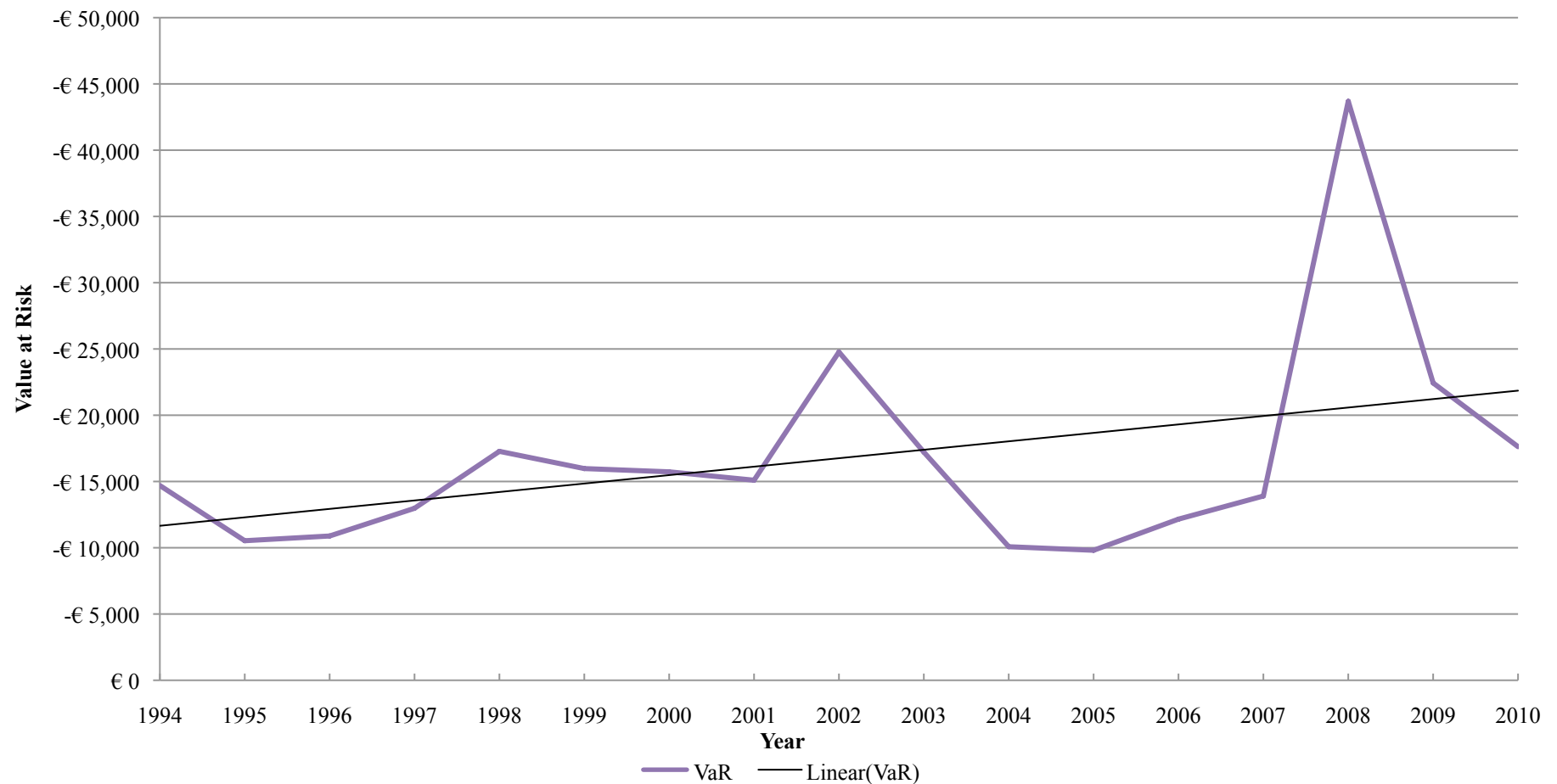


# Energy Utility Company's Average Beta



# Value at Risk

Portfolio of €1,000,000





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# Section 5. Conclusions



# Conclusions

- There has in fact been an increase in risk for individual energy utility companies and indices.
- Price return graphs show increased price return volatility around liberalisation.
- Jensen's alpha appears to show increased idiosyncratic risk around liberalisation.
- Beta has little correlation with the market around liberalisation, but in recent years has become more correlated.
- Value at risk has increased around liberalisation events.



# Limitations

- Volatility may not be due to liberalisation and may be seen in other sectors.
  - A benchmark of volatility in other sectors may be needed.
- Energy utility companies appear to follow oil prices, evidence of speculation and little hedging.
  - Measure co-integration between the sector and oil prices.
- Beta is a rough guide to liberalisation.
  - Use more sophisticated measures such as GARCH analysis, incorporating an index of liberalisation and a ratio of energy sector/company volatility relative to other sector's volatility.

# Final comments

- Market liberalisation has had an effect on both idiosyncratic and systemic risk for energy utility companies and requires investigating if we are to ensure a stable supply of energy for European consumers.

Thank you for your time.

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