Decoupling: Impact on the Risk of Public Utility Stocks

Richard A. Michelfelder, Ph. D.
Clinical Associate Professor of Finance
Rutgers University
School of Business – Camden

Managing Consultant
AUS Consultants

Society of Utility Regulatory and Financial Analysts
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Today's Discussion

- Introduction
- Impact of Decoupling on Risk
- Two Empirical Tests:
  - The Predictive Risk Premium Model™
  - Differences in Systematic Risk
- Conclusion

(Benefitted by input from Pauline Ahern, Frank Hanley, Dylan DAscendis, and Selby Jones III of AUS Consultants.)

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Introduction

- Ratemaking mechanisms that decouple revenues from commodity sales volume sweeping the US.
- Started in CA in early 80's to take away disincentive to promoting energy end-use efficiency.
- Currently being implemented for gas utilities and the call for water utilities (outside CA and NY) started at NARUC Water Committee meeting in February 2011
- Reduces risk – is it enough to decrease the cost of capital?

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Decoupling Reduces Volatility of Cash Flow

Operating CF (OCF) = Revenues(R) – Cost(C)

Volatility of OCF is the variance of OCF:

$$Var(R-C) = Var(R) + Var(C) + Cov(R,C)$$

Decoupling Reduces Volatility of Cash Flow

$$Var(R-C) = Var(R) + Var(C) + Cov(R,C)$$

With Decoupling, Volatility is Lower:

$$Var(R-C) = Var(C)$$

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Decoupling Lowers Systematic Risk

Systematic risk is defined as:

$$\beta_i = \rho_{i,m} \frac{\sigma_i}{\sigma_m}$$

where $\rho_{i,m}$: the correlation coefficient of the individual stock (i) and market (m) return, and,

σ_i and σ_m : standard deviation of the individual stock and market returns respectively.

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Decoupling Lowers Systematic Risk

Defining variables with superscript "D," with decoupling,

σ^{D}_{i} and $\rho^{D}_{i.m}$ are lower therefore systematic risk is lower with decoupling and defined as:

$$\beta^{D}_{i} = \rho^{D}_{i,m} \frac{\sigma^{D}_{i}}{\sigma_{m}}$$

Therefore, $\beta^{D}_{i} = \rho^{D}_{i,m} \frac{\sigma^{D}_{i}}{\sigma_{m}}$ is less than $\beta_i = \rho_{i,m} \frac{\sigma_i}{\sigma_m}$

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Predictive Risk Premium Model™

- Model generalized by Michelfelder and Pilotte (2011) under second review at the *Journal of Economics and Business*.

- Public utility application to common equity cost of capital analysis in Ahern, Hanley, and Michelfelder (2011) under second review at the *Journal of Regulatory Economics*.

- Exhaustive public utility applications study planned.

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The Predictive Risk Premium Model™

Predictive Risk Premium Model has two stages:

1) Predicted equity risk premium depends upon predicted volatility

2) Predicted volatility depends on:
   - previous volatility
   - previous prediction error

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The Predictive Risk Premium Model™

Technically:

Predicted RP = a (Predicted σ^2)

Predicted $\sigma^2 = b_0 + b_1$ (Previous σ^2)+ b_2 (Previous Prediction Error)^2

where a, b_1, b_2 are slopes and b_0 is a constant

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Test for Change in Risk Premium After Decoupling

Predicted RP = a (Predicted σ^2) + *D_{rp} (decoupling)*

Predicted $\sigma^2 = b_0 + b_1$ (Previous σ^2)+ b_2 (Previous Prediction Error)^2

where a, b_1, b_2 are slopes and b_0 is a constant

D_{rp} is the change in the predicted RP after decoupling

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Test for Change in Volatility of Risk Premium after Decoupling

Predicted RP = a (Predicted σ^2)

Predicted $\sigma^2 = b_0 + b_1$ (Previous σ^2)+ b_2 (Previous Prediction Error)^2 + *D_v (decoupling)*

where a, b_1, b_2 are slopes and b_0 is a constant

D_v is the change in volatility in risk premium after decoupling

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Differences in Systematic Risk

Differences in the means of annual betas before and after implementation of decoupling

Data and Sample

PRPM™ Data: Monthly holding period returns minus Ibbotson yield on US Long Treasury Bonds for PRPM

Beta Data: U. Chicago's Center for Research in Regulated Industries (known as "CRSP") yearly betas for beta difference

Public utilities sample: all electric, electric and gas, gas, and water company stocks where 95%+ of revenues decoupled

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Companies

Company	Eff. Decoupling Date	Beginning of Measurement Period	Total # of Months
ED	10/31/07	07/30/04	78
LG	11/29/02	09/30/04	196
PCG	01/31/83	01/31/55	672
EIX	01/31/83	01/31/55	672
CWT	07/31/08	01/31/06	60
CHG	07/31/09	07/31/06	54
CMS	05/28/10	05/31/07	44
SJI	01/29/93	01/31/75	432
DGAS	01/31/00	01/31/89	264
HE	12/31/10	12/31/07	37
NJR	01/31/94	01/31/77	408
AWR	11/28/08	05/30/04	82
POR	12/31/10	12/31/07	38
IDA	03/30/07	05/30/03	92

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Results of PRPM™ Decoupling Tests

No differences in expected risk premium

No differences in expected volatility of risk premium

Results of Differences in Systematic Risk

- Mean pre-decoupling beta: 0.67
- Mean post-decoupling beta: 0.59
- Although lower, difference not statistically significant
- 7 of 11 mean pre/post betas for individual companies not statistically significant
  - Of those significant 3 are higher and 1 is lower

Conclusion: No differences in systematic risk

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Conclusions

- Theoretically and practically, decoupling reduces investment risk of public utility stocks.

- The impact of decoupling on stock returns, risk, and cost of capital cannot be isolated nor measured (to date) due to the myriad of other risk drivers impacting the investment risk of stocks.

- Utility executives have revealed their preference for decoupling, which says more about the impact of decoupling on risk and cost of capital than theoretical or empirical tests.