



**Actuaries
Institute**

Profit Margins in Regulated Insurance Markets Insights Session 7 August 2012

Profit Margins Working Party
Actuaries Institute

A Preliminary Draft for Discussion

- The working party was given a very challenging assignment
- This Insights discussion is an internal update to:
 - Help martial our thoughts
 - Gather early feedback on the ideas
 - Identify questions and issues that need to be dealt with
- At this stage the ideas presented do not represent the views of either GIPC or the Actuaries Institute
- Whilst this will be a public document, we ask that you respect the draft nature of the findings

Terms of Reference

- Summarise and assess the input that economics makes to the question of appropriate profit margins
 - the measure of capital that supports the business, and
 - the required rate of return on that capital
- Propose a framework that actuaries can use to advise on an appropriate rate of return and profit margin within a regulated insurance market

Members of Working Party

- Darren Robb (chair)
- Adrian Gould
- Andrew Doughman
- David Whittle
- Mike Sherris
- Rick Shaw
- Stewart McCarthy
- Geoff Atkins
- Siddharth Parameswaran

Email comments and feedback to:
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Approach to price regulation

Pricing regulators often wish to provide a **sufficient** return for investors, but to prevent **excessive** returns

the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks ...

... and to maintain its credit and to attract capital

FPC v Hope Nat Gas Co. 1944

'The price that a regulator should approve in a regulated market is the price that would apply if the market was **competitive**'

Approach

- Theory of competitive prices
- Practical considerations and difficulties
- Regulatory perspective
- Develop a framework for actuaries to use

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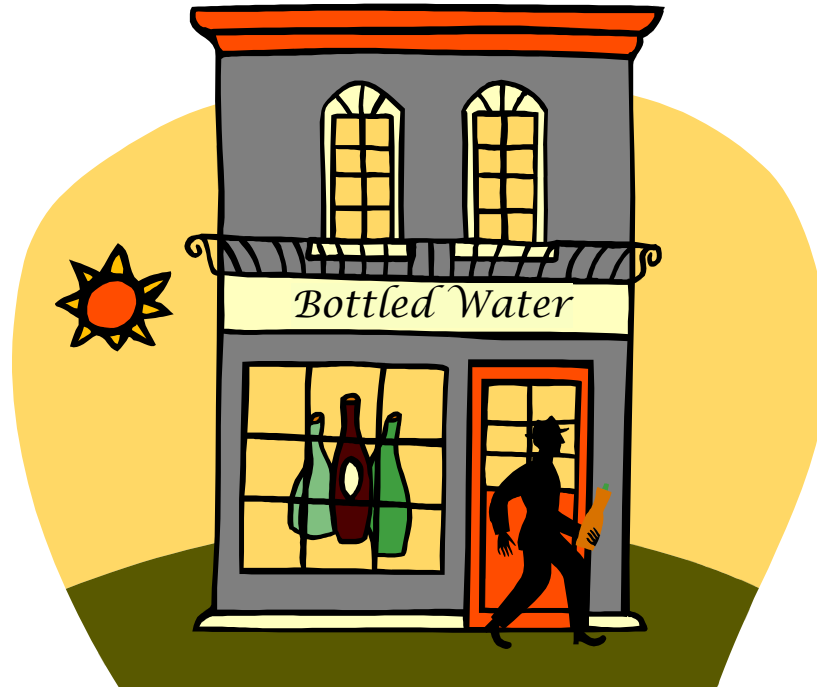
Theory of Competitive Prices

- Microeconomics
- The “Traditional” approach (eg. IRR)
- Myers-Cohn model

Theory of Competitive Prices

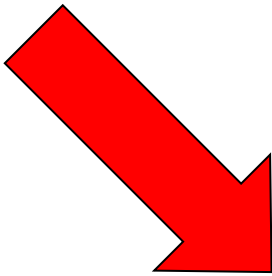
Insurance is difficult

Theory of Competitive Prices



Manufacturing Process

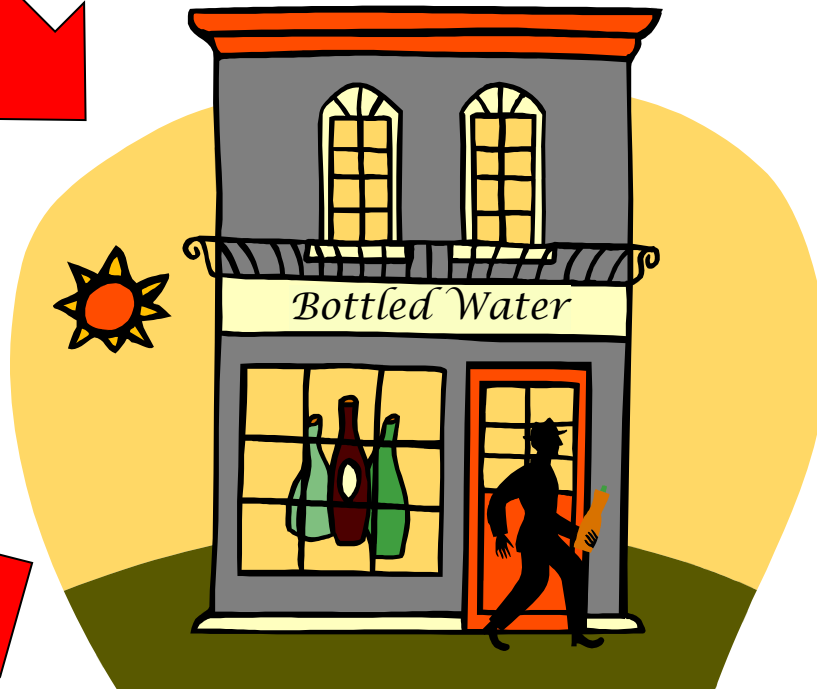
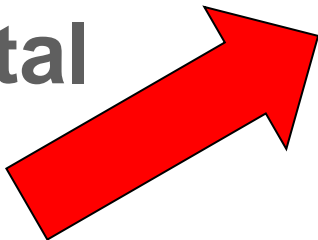
Supplies



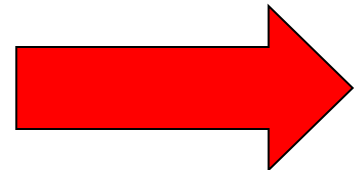
Labour



Capital



Consumers



Definitions

Supplies

- Any goods or services used in the production process

Labour

- Human time and effort

Definitions

Capital

- Initial assets required to allow the business to sell future goods or services
 - Inventory
 - Physical Property
 - Brand
 - Other Intangible Assets (Intellectual Property)

Wikipedia.org

Capital (economics)

From Wikipedia, the free encyclopedia

Not to be confused with [Financial capital](#).

In **economics**, **capital**, **capital goods**, or **real capital** are those already-produced [durable goods](#) that are used in production of goods or services. The capital goods are not significantly consumed, though they may [depreciate](#) in the [production process](#).

Financial capital

From Wikipedia, the free encyclopedia

For a city with an important role in the world economy, see [International financial centre](#).

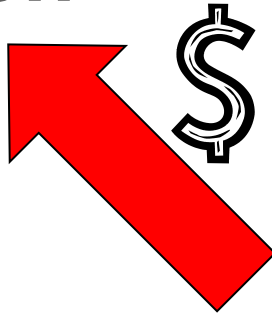


This article **may require [cleanup](#) to meet Wikipedia's [quality standards](#)**. No [cleanup reason](#) has been specified. [Improve this article](#) if you can; the [talk page](#) may contain suggestions.

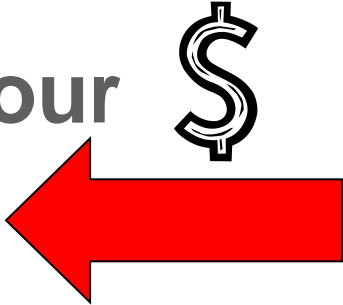
Financial capital can refer to money used by [entrepreneurs](#) and [businesses](#) to buy what they need to make their products or provide their services or to that sector of the economy based on its operation, i.e. retail, corporate, [investment banking](#), etc.

Cashflows

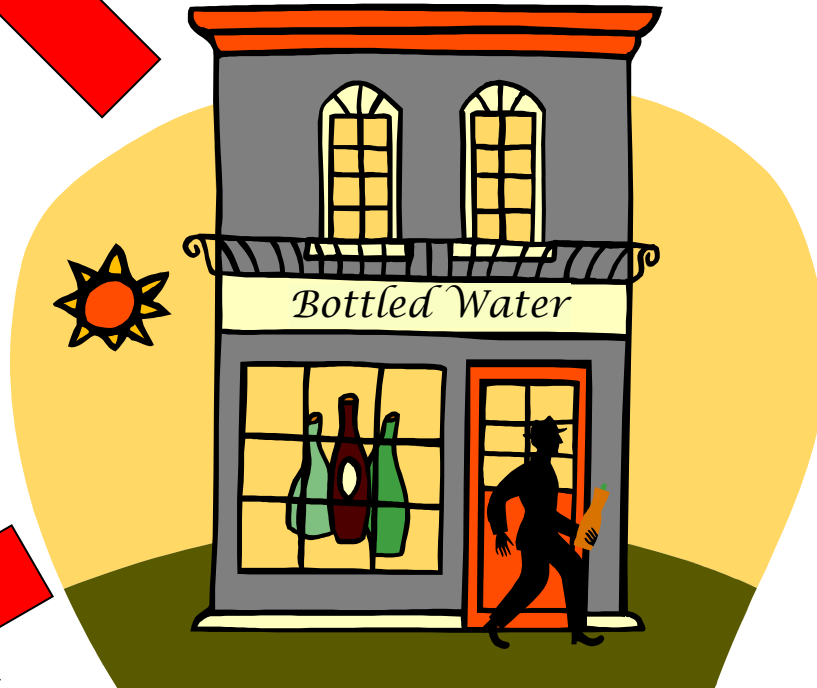
**Production
Costs**



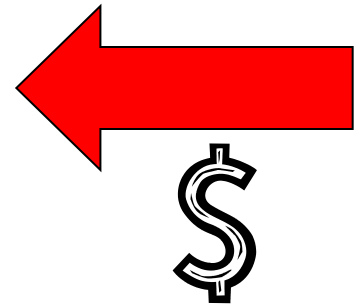
Labour



**Economic
Capital**



Consumers



Microeconomics

- The study of **Markets** where **Goods** or **Services** are **Sold** by **Producers** to **Consumers**

Microeconomics is the appropriate field of study for examining the price of goods or services in markets

- Part of neoclassical economics, contrasted with macroeconomics

Microeconomics

- What does it mean for competitive prices?

Price = Opportunity Cost
of all Inputs

Competitive Markets

- Price = Opportunity Cost of all Inputs

$$\begin{aligned}\text{Price} &= \text{Production Costs} \\ &+ \text{Wages} \\ &+ \text{Normal Profit}\end{aligned}$$

Normal Profit

Economic Capital X % Cost of Capital

{
Inventory
Physical Property
Brand
Other Intangibles
}

X Opportunity
cost for
same risk

Recycling Scheme

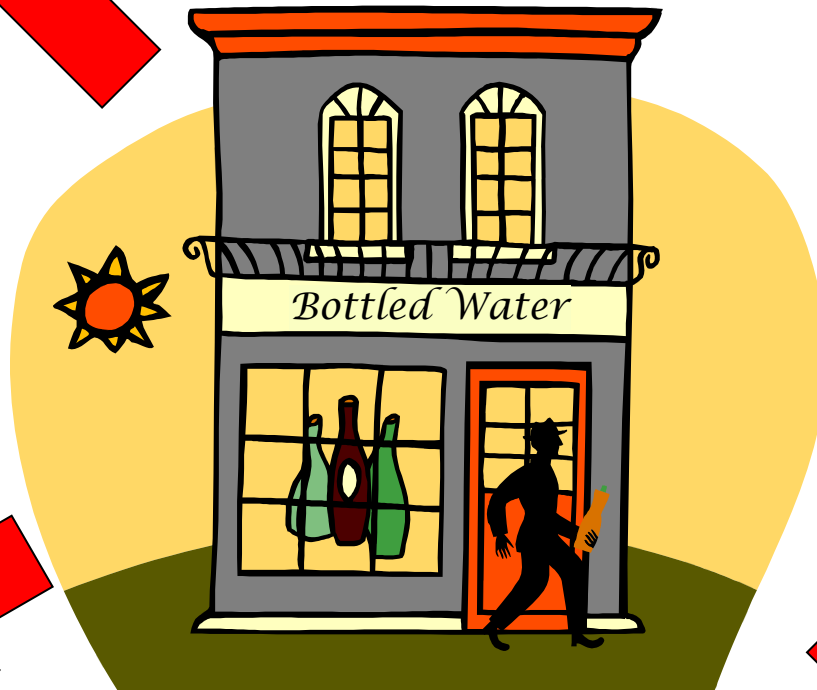
- Assume the Federal Government announces a plastic bottle recycling scheme with a refund for every empty bottle returned
- Compulsory participation for all manufacturers

Cashflows

**Production
Costs**

Labour

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Consumers

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Competitive Markets

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X Opportunity
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Allocated Capital

- Assume the Federal Government is so concerned about the requirement to refund all bottles, it requires manufacturers to hold additional money in a fund to cover future recycling refunds for bottles already sold
- There is a net opportunity cost of holding these funds
- Lets call this fund 'Allocated Capital'
- This is an example of 'Financial Capital'. It is not strictly 'Economic Capital' as it doesn't relate to *future* sales

Cashflows

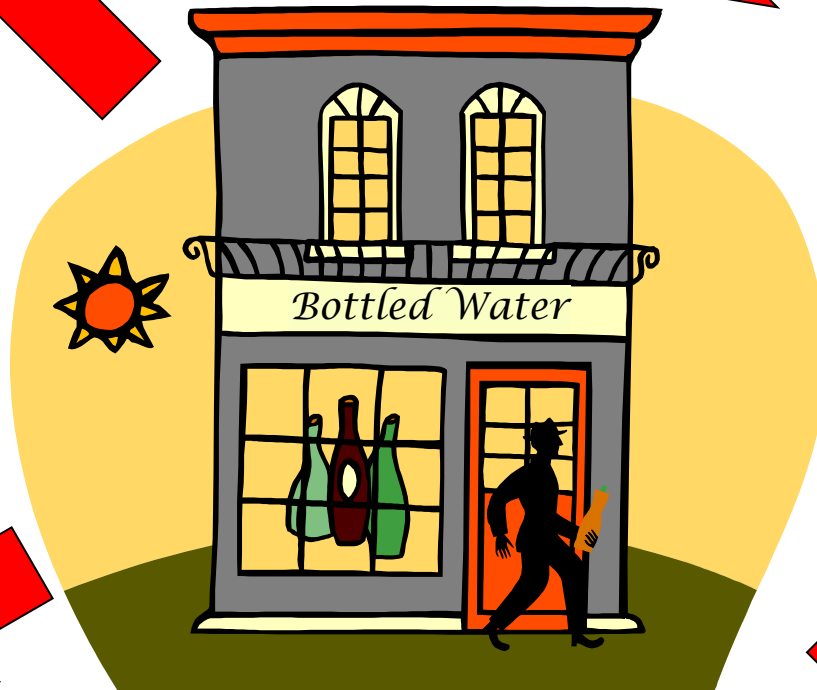
**Production
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Competitive Markets

- Price = Opportunity Cost of all Inputs

$$\begin{aligned} \text{Price} = & \text{Production Costs} \\ & + \text{Wages} \\ & + \text{Recycling Refunds} \\ & + \text{Net Opportunity Cost of} \\ & \quad \text{holding Allocated Capital} \\ & + \text{Normal Profit} \end{aligned}$$

Normal Profit

Economic Capital X % Cost of Capital

{
Inventory
Physical Property
Brand
Other Intangibles
}

X Opportunity
cost for
same risk

Insurance Company

- Assume an insurance company collects premium, pays claims and expenses
- They must also hold additional funds to cover risk on future payments for policies already sold – lets call these funds 'allocated capital'
- There is a net opportunity cost of holding funds as allocated capital

Insurance Company

**Production
Costs**

**Allocated
Capital**

Labour

Consumers

**Economic
Capital**



Microeconomics

- The study of Markets where Goods or Services are Sold by Producers to Consumers

Microeconomics is the appropriate field of study for examining the price of insurance

Competitive Markets

- Price = Opportunity Cost of all Inputs

$$\begin{aligned} \text{Price} = & \text{Production Costs} \\ & + \text{Wages} \\ & + \text{Claim Payments} \\ & + \text{Net Opportunity Cost of} \\ & \quad \text{holding Allocated Capital} \\ & + \text{Normal Profit} \end{aligned}$$

Normal Profit

Economic Capital X % Cost of Capital

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Inventory
Physical Property
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X

Opportunity
cost for
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Summary of Microeconomics

- Microeconomics is the appropriate field of study to examine competitive prices for insurance products
- It provides a theoretically sound framework for prices and normal profit of insurance sold within competitive markets
- How does this fit with our traditional approach to pricing?

Traditional Approach

- The traditional approach to pricing used by general insurance actuaries in Australia is:

$$\begin{aligned}\text{Premium} &= \text{PV (Expected Claims)} \\ &+ \text{PV (Expenses)} \\ &+ \text{Profit Margin}\end{aligned}$$

Cashflows discounted at the risk-free rate

- Where Profit Margin is conceptually based on:

Amount of Capital x Return on Capital

(often using an underwriting period model eg. the IRR method, and allowing for expected investment earnings on both technical liabilities and on shareholders funds)

Amount of Capital

- In the microeconomics framework, the amount of capital is the sum of Economic Capital and Allocated Capital
- Or in terms more common within the insurance industry:

Capital = Financial Capital
plus Non-Financial Capital

Return on Capital

- In the microeconomics framework, the return on capital is
 1. the Opportunity Cost of Allocated Capital
 2. plus the Normal Profit on Economic Capital
- The opportunity cost is always defined as the best alternative use
- The best alternative use of allocated capital is to return it to the shareholder, so we use the insurer's % cost of capital

$$\text{Return on Capital} = \text{WACC}$$

Competitive Prices

- The microeconomics framework fits easily into the existing traditional approach, by telling us what to use for the **amount of capital** and the **rate of return on capital**
- An alternative approach often referred to in regulatory circles is known as the Myers-Cohn model
- Myers-Cohn is used extensively in the United States

Myers-Cohn Model

- A model for setting “fair” insurance premiums is known as the Myers-Cohn model

In the usual terminology, Myers-Cohn formula is:

$$\begin{aligned} \text{Premium} = & \text{PV (Expected Claims)} \\ & + \text{PV (Expenses)} \\ & + \text{PV (taxes)} \end{aligned}$$

Cashflows discounted at a % risk-adjusted rate

- The original Myers-Cohn model can be adjusted to allow for frictional costs
- While the Myers-Cohn model doesn't explicitly state assumptions for the amount of capital or return on capital, it has been shown to provide a solution to these questions

Two Models

Myers-Cohn

- Considers:
 - Revenue
 - Expenses
 - Claims
 - Allowance for Risk in Claims

Microeconomics

- Considers:
 - Revenue
 - Expenses
 - Claims
 - Net Opportunity Cost of holding Allocated Capital
 - Normal profit on Economic Capital

Two Models

Myers-Cohn

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Microeconomics

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 - Net Opportunity Cost of holding Allocated Capital
 - **Normal profit on Economic Capital**

Two Models

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Microeconomics

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Two Models

Myers-Cohn

- Considers:
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 - **Allowance for Risk in Claims**

Risk in Claims

Microeconomics

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 - **Net Opportunity Cost of holding Allocated Capital**
 - Normal profit on Economic Capital

**Cost To
Company**

Myers-Cohn Model

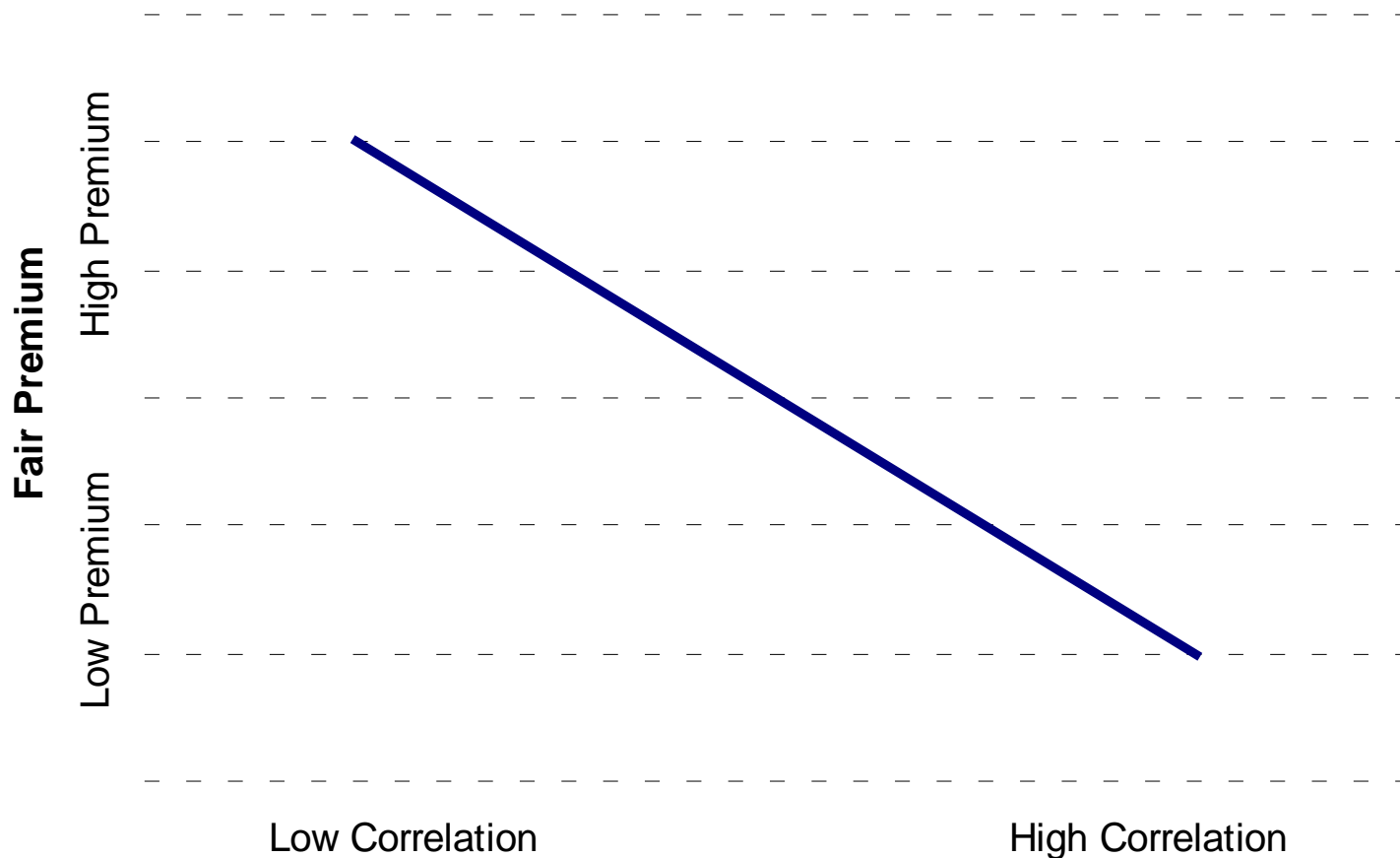
- The Myers-Cohn model accounts for risk by discounting the cost of claims at a risk-adjusted rate:
 - High Risk = High Discount Rate
 - Low Risk = Low Discount Rate
- Premiums are calculated using the risk-adjusted discounted cost of claims
- Risk is often defined as correlation with stock market returns

Myers-Cohn Model



Myers-Cohn Model

- Myers-Cohn model produces an inverse relationship between premium and correlation with the market



Capital

Myers-Cohn

- Amount of Capital is financial capital only
- Investment return earned on assets in which capital is held (based on risk profile and corresponding return expectations)
- Compensation for double taxation, and any other frictional costs

Microeconomics

- Includes both financial and non-financial capital
- Weighted average cost of capital for the insurer

Our View

Myers-Cohn may not be the most appropriate model for regulatory use

The amount of capital should include both Financial and Non-Financial Capital

The required return on capital should be the insurer's WACC

A worked example

$$\frac{\text{Profit on Financial Capital} + \text{Non-Financial Capital}}{\text{Value of Financial Capital} + \text{Non-Financial Capital}} = \boxed{\text{WACC}}$$

A worked example

- If we assume that Financial Capital is two-thirds the size of the combined Financial and Non-Financial Capital

$$\frac{\text{Profit on Financial Capital} + \text{Non-Financial Capital}}{\text{Value of Financial Capital} + \text{Non-Financial Capital}} = 1.5 \times \boxed{\text{WACC}}$$

$$\boxed{\text{ROE} = 1.5 \times \text{WACC}}$$

This is the format that we often
express insurance ROE

Remaining Difficulties

- How to estimate Economic Capital?
 - What is "Inventory"?
 - Brand and Other Intangibles are hard to measure
- Regulatory perspective – is this different to the theoretical competitive price?

Next Steps

- Discussion within the profession of new approach
- Feedback and input from the profession
- Investigate and assess approaches for estimating intangibles
- Propose framework for converting ROE / WACC to profit margins (eg. IRR model)
- Publication at GI Seminar November 2012

