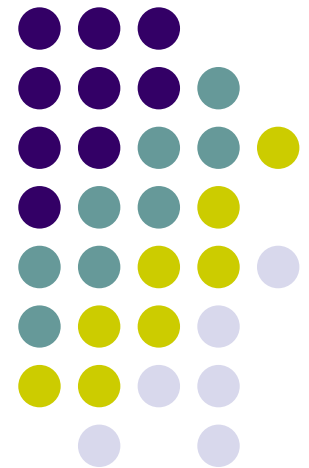
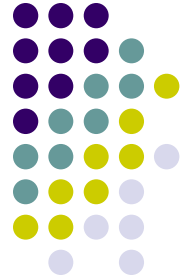


Distributor Diversity: Issues and Options for IRM3

Larry Kaufmann, *Partner*
Pacific Economics Group

Toronto, Ontario
November 9, 2007





Introduction

IRM3 will apply to nearly 90 Ontario distributors that differ in important ways

Company size

Customer and volume growth

Customer/population density

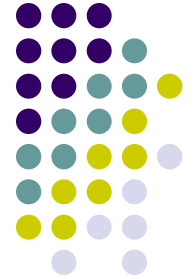
Capital investment needs (e.g system age, replacement cycles)

Ownership

Efficiency at the Outset of IRM3

These diverse conditions can impact companies' cost and revenue growth differently





Introduction (Con't)

These sources of diversity can be handled in design of IRM3 plans

Different X factors

Tailored productivity factors

Individual companies

Groups of companies

Tailored consumer dividends

Individual companies

Groups of companies



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Introduction (Con't)

Different inflation factors

Economy-wide inflation factor

Industry specific inflation factor

Capital investment mechanisms

Earnings sharing mechanisms

Off-ramps

This presentation will discuss some options for dealing with distributor diversity issues



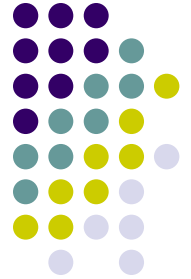


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Basics of X Factor Calibration

In index-based PBR plans, maximum allowed rates are adjusted by a price cap index (PCI) that contains an inflation factor, X factor and Z factor

In a typical North American price cap filing, the PCI conforms to the competitive market paradigm

Logic: If an industry earns a competitive return, *% change Prices = % change Unit Cost*

> > > PCI is calibrated to track the industry's unit cost trend

% change Unit Cost = % change Input Prices - % change TFP

TFP = Total Factor Productivity





Basics of X Factor Calibration (Con't)

Explains key considerations in North American index-based PBR proceedings

What is TFP trend of industry?

Does inflation measure track industry input price trend?

Importantly, actual form of X factor – and required TFP information- depends on the selected inflation measure



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Basics of X Factor Calibration (Con't)

Three kinds of inflation measures are consistent with the paradigm and used in approved indexing plans

Economy-Wide

Industry-Specific

Peer Price



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Basics of X Factor Calibration (Con't)

Economy-wide inflation measures use measures of aggregate inflation in the economy for inflation factor P

Examples:

GDP-IPI

GDPPI

CPI

Precedents:

IRM2

Boston Gas

Bay State Gas

Berkshire Gas

Union Gas

Central Maine Power

Southern California Edison





Basics of X Factor Calibration (Con't)

Advantages:

- Simplicity

- Familiarity of inflation measures

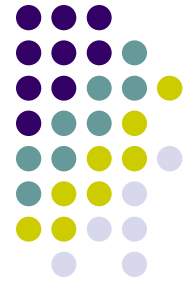
Disadvantages:

- Economy-wide inflation may not be a good measure of input price inflation for the utility industry

- Could lead to unreasonable “input price differentials”

- More complexity in X factor formula





Basics of X Factor Calibration (Con't)

Industry-Specific Inflation Measures

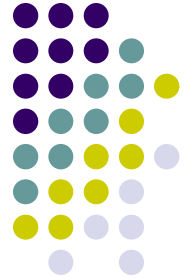
Inflation measure tailored to reflect inflation in input prices used in utility industry

Inflation is a weighted average in input price *subindexes*

$$\begin{aligned} \text{e.g. inflation} = & 0.20 \times \text{growth PLabor} + \\ & 0.20 \times \text{growth POther O\&M} + \\ & 0.60 \times \text{growth PCapital} \end{aligned}$$

Information on industry input price inflation available from both public (e.g. BLS for labor prices) and private (e.g. DRI) sources





Basics of X Factor Calibration (Con't)

Precedents

Ontario Power Distributors IRM1
PacifiCorp-CA (bundled power)
Southern California Gas
San Diego Gas and Electric – gas distribution
San Diego Gas and Electric – electric distribution





Basics of X Factor Calibration (Con't)

Advantages:

Designed to be a good measure of input price inflation for the utility industry

Reduces business risk (input price volatility or uncertainty of future input price trends)

Eliminates need for input price differential

Disadvantages:

Lack of familiarity

Complexity





Basics of X Factor Calibration (Con't)

Peer Price Inflation Measures

Inflation based directly on change in prices for “peer utilities”

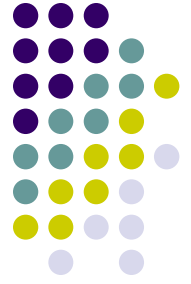
>>> direct application of competitive market paradigm

Precedent

National Grid - MA



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Basics of X Factor Calibration (Con't)

Advantages:

Potentially simple

Could eliminate need for X factor completely

>>trend in output prices already reflects industry productivity

Could reflect local conditions and reduce risk

Disadvantages:

Data may not be available

Selection of peer group may be controversial

May not reflect appropriate rate trends all utilities in Province





Basics of X Factor Calibration (Con't)

Most X-factors in approved *North American* price cap plans are *calibrated* to track industry total factor productivity TFP trend

Total Factor Productivity

TFP = Output/Input

TFP Growth = Changes in Output Quantity minus Changes in Input Quantity

Output quantity and input quantity often measured with indexing methods

Index-based TFP estimates also develop estimates of industry input price measures

TFP can also be estimated econometrically





Basics of X Factor Calibration (Con't)

Cost of Service Review: R=C

$$\underbrace{\% \Delta R^{Industry}}_{\text{Revenue}} = \underbrace{\% \Delta Y^{Industry}}_{\text{Output Quantity}} + \underbrace{\% \Delta P^{Industry}}_{\text{Output Price}}$$

$$\underbrace{\% \Delta C^{Industry}}_{\text{Cost}} = \underbrace{\% \Delta X^{Industry}}_{\text{Input Quantity}} + \underbrace{\% \Delta W^{Industry}}_{\text{Input Price}}$$

$$\% \Delta R^{Industry} = \% \Delta C^{Industry}$$

$$\Rightarrow \% \Delta P^I = \% \Delta W^I - (\% \Delta Y^I - \% \Delta X^I)$$

↑
Inflation factor
(P)

↑
X factor
(X)





Basics of X Factor Calibration (Con't)

What if economy-wide inflation factor is used?

Same logic as for industry

$$\Rightarrow \% \Delta P^{Economy} = \% \Delta W^{Economy} - \% TFP^{Economy}$$

Add and subtract $\% \Delta P^{Economy}$ from previous indexing equation

$$\Rightarrow \% \Delta P^I = \% \Delta P^E - \% \Delta P^E + \% \Delta W^I - \% \Delta TFP^I$$





Basics of X Factor Calibration (Con't)

Substitute $\% \Delta P^E = \% \Delta W^E - \% TFP^E$ into one $\% \Delta P^E$

$$\Rightarrow \% \Delta P^I = \% \Delta P^E - (\% \Delta W^E - \% \Delta TFP^E) + \% \Delta W^I - \% \Delta TFP^I$$

Simplify

$$\% \Delta P^I = \% \Delta P^E - \{ (\% \Delta TFP^I - \% \Delta TFP^E) + (\% \Delta W^E - \% \Delta W^I) \}$$

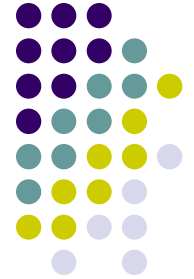
\uparrow \uparrow \uparrow

P TFP differential + Inflation differential

\uparrow \uparrow

X





Basics of X Factor Calibration (Con't)

Econometric techniques can also be used to decompose TFP growth into its various components

Time trend/technological change

Realization of economies of scale

Changes in business conditions

Changes in customer density

Changes in undergrounding

System age and investment requirements

Changes in the efficiency of operations





Basics of X Factor Calibration (Con't)

Estimated impact of various “TFP drivers” can be used to project TFP growth going forward given estimates of expected quantitative changes in those TFP drivers

Precedents

Ontario Gas IR

Victoria gas rate review (PFP)

PEG also presented TFP decomposition evidence for the power distribution industry in Victoria





Basics of X Factor Calibration (Con't)

X-factors may also contain “stretch factor” aka “consumer dividend”

Basic Idea: Set X above industry TFP trend as benefit-sharing mechanism

Adds a third term to X factor formula, in addition to productivity and inflation differentials

In principle, value of consumer dividend can differ among companies to reflect differences in efficiency at outset of PBR plan and hence potential for TFP gains under the plan





Basics of X Factor Calibration (Con't)

Consumer Dividend Precedents

<u>Company</u>	<u>Industry</u>	<u>Value</u>
Boston Gas	Gas D	0.5%
Boston Gas-update	Gas D	0.3%
Bay State Gas	Gas D	0.4%
Union Gas	Gas D	0.5%
San Diego G&E	Gas D	0.55%
Union Gas	Gas D	0.5%
SoCalGas	Gas D	0.5%
Southern CalEdison	Elec D	0.5%
San Diego G&E	Elec D	0.55%
Ontario Distributors	Elec D	0.25%





Basics of X Factor Calibration (Con't)

Implications

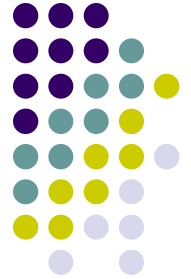
Value for X factor depends on inflation factor

Value for X factor can be tailored to individual company conditions, and expected changes in values of those conditions over term of PBR plan

Value of X factor can incorporate different consumer dividends to reflect differences in company efficiency at outset of plan



Distributor Diversity and Productivity Factors



Use TFP decomposition to quantify impact of *changes in* different drivers of TFP *growth*

Output growth and economies of scale

Business condition variables

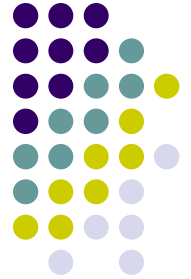
- Changes in customer density

- Changes in undergrounding

- Proxies for system age/capital investment needs



Distributor Diversity and Productivity Factors (Con't)



Econometric methods needed to quantify these TFP drivers

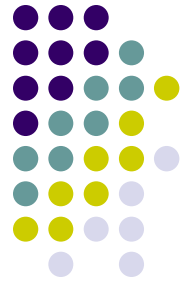
Some options for quantifying TFP drivers, and developing tailored productivity factors, in IRM3

Ontario power distribution database

US power distribution database



Distributor Diversity and Productivity Factors (Con't)



Econometric methods can in principle be used to develop tailored productivity factors for *each* distributor

Econometric methods can also be used to develop productivity factors for a *group* of distributors that are expected to have similar changes in TFP drivers over term of PBR plan

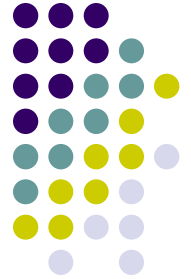
Possibilities

Cohorts identified in PEG's comparative cost work

Cohorts based on other TFP drivers (e.g. system age, past investment spending patterns)



Distributor Diversity and Consumer Dividends (Con't)



Econometric methods can also in principle be used to develop tailored consumer dividends for each distributor

Econometric methods can be used to benchmark the total cost efficiency of distributors

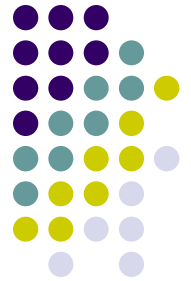
Such benchmarking measures can be developed in conjunction with the total cost econometric models that are needed to quantify TFP drivers

Econometric benchmarking with Ontario data

Econometric benchmarking with US data



Distributor Diversity and Consumer Dividends (Con't)



Better cost performers have lower consumer dividends

Worse cost performers have higher consumer dividends

Tailored consumer dividends can be developed by company
e.g. dividend set to move each distributor to 75% percentile efficiency by a target date

Precedents for O&M benchmarking:

UK power distribution

Queensland power distribution



Distributor Diversity and Consumer Dividends (Con't)



Tailored consumer dividends can be developed for cohorts of companies that are identified to have similar efficiency levels

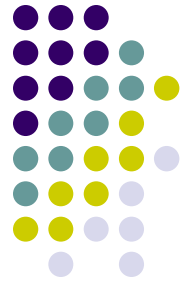
Precedent

New Zealand “thresholds” for power distribution



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Distributor Diversity and Inflation Factors (Con't)



Different inflation measures can in principle be used for different companies

>> industry specific inflation or GDP-IPI

Industry specific measure may be more appropriate for companies with more uncertainty in input price trends due to

- expected worker retirement

- labour shortages

- construction cost pressures

Industry specific measures also better reflect changes in materials prices, exchange rates, and interest rates





Capital Investment Mechanisms

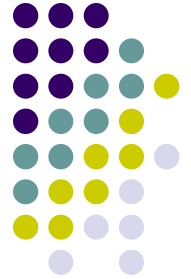
Capital investment needs may vary among companies

Wednesday's meeting discussed options for recovering capital investment

Tailored X factor can in principle reflect diversity in capital investment needs



Capital Investment Mechanisms (Con't)



Specific criteria may need to be satisfied for some companies to be allowed to use other capital investment mechanisms

Examples

Asset condition plan filed (part of CI proposal)

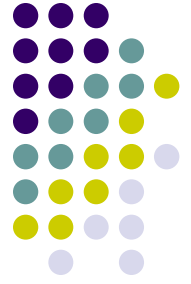
Projected change in rate base $> K$

Projected ROE $< r$

Others?



Earnings sharing mechanisms and Offramps



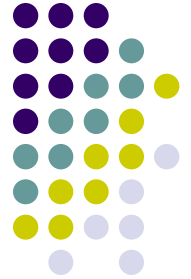
Earnings sharing mechanisms (ESMs) can be a “backstop” approach to dealing with diversity

>>> if not possible to craft an IR framework that reflects diversity in all company circumstances, ESMs can provide protection against extremely low or extremely high earnings

Offramps would allow a company to abandon PBR for a cost of service review in case of extreme earnings outcomes

However, ESMs and offramps would increase administrative burdens and regulatory costs





Menus and Modules

Another way to allow for diversity is to offer menus of options to distributors

Menu approach considered but rejected in IRM1 because the bases for the options were not well defined

But some menus of options can be constructed rigorously so that they are in principle neutral for ratepayers

Company choices from menus can then reflect diversity in conditions without disadvantaging customers





Next Steps

Stakeholder feedback

Expand/revise list of available distributor diversity issues?

Expand/revise list of available options for dealing with diversity?

Further or more detailed analysis of options that are worth exploring?

