

The Assessment of Risk and Return in capital investment decisions



 **RiskEase Ltd**
Assess Risk with Ease

RiskEase Ltd

*Professional Software and Consulting services in
Investment Appraisal, Risk Analysis and Project Finance*

Website: www.riskease.com

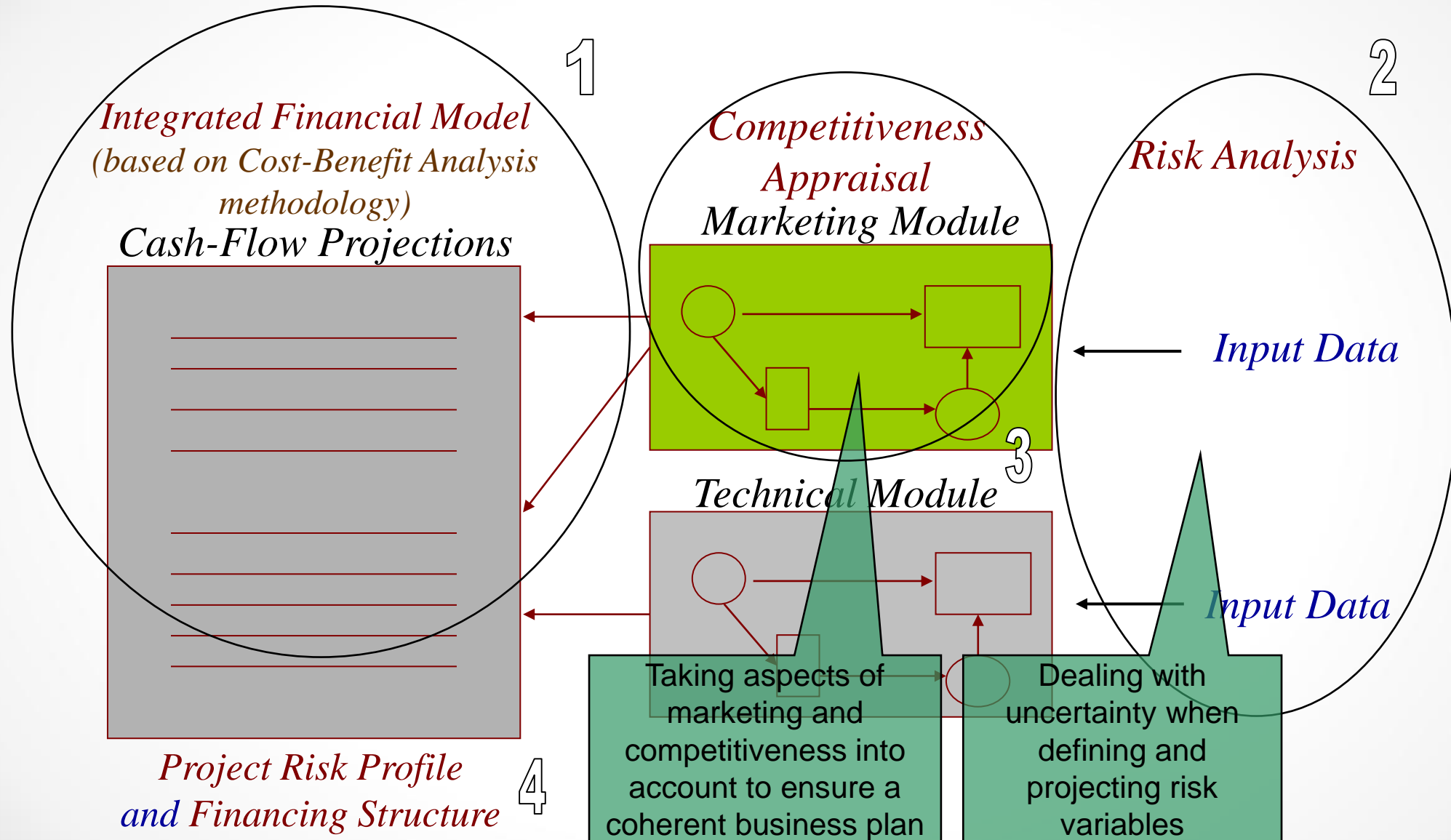
RiskEase Ltd ©

The RiskEase Total Package



Practical Expert Solutions
Enhancing Your Professional Competence

The evaluation of capital investment projects and the assessment of risk



Risk Analysis

Savvakis C. Savvides



using
RiskEase

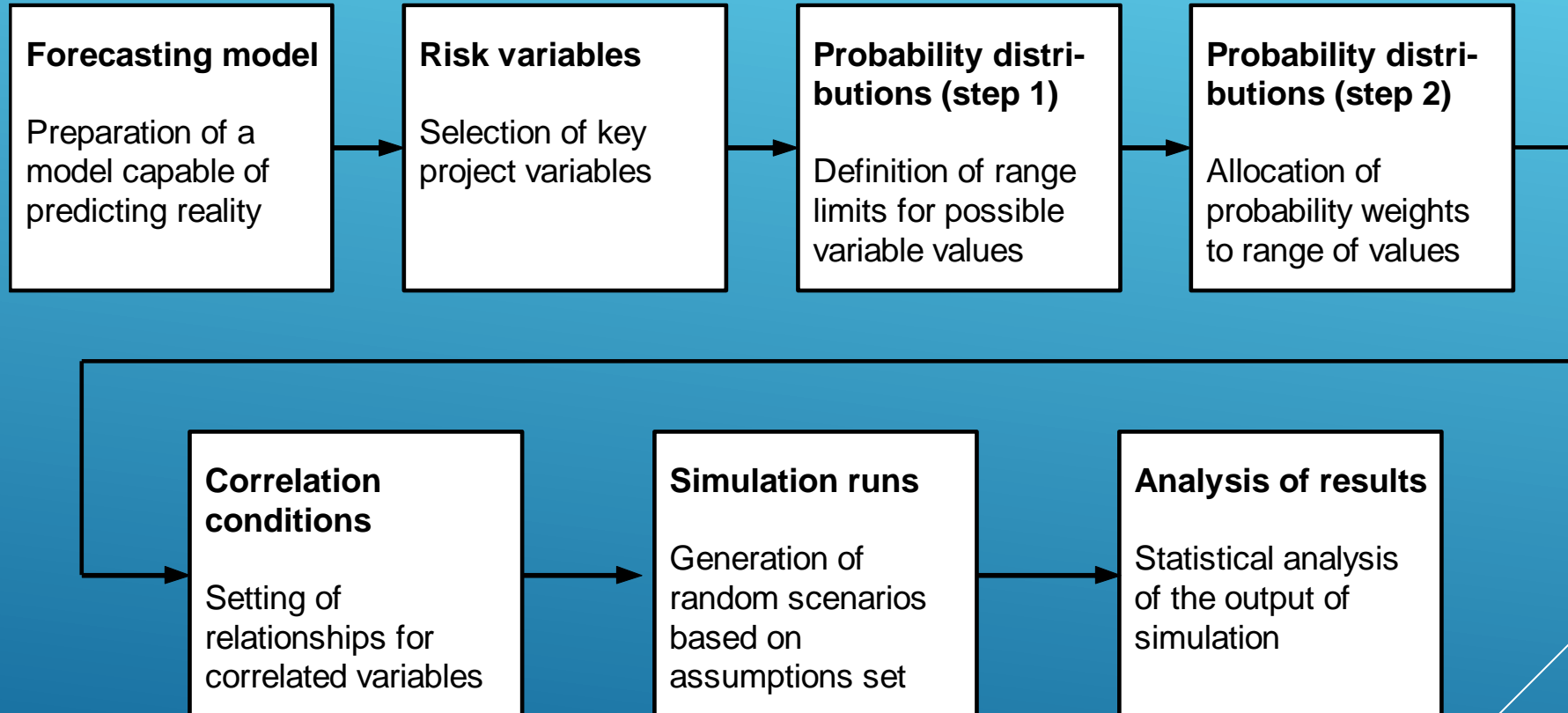
The Risk Analysis Process and RiskEase

- **RiskEase** was developed as a **companion** application of the widely popular paper by Savvakis C. Savvides **Risk Analysis in Investment Appraisal***.
- It was designed to allow the user to easily apply the risk analysis Monte Carlo Simulation methodology as it relates to the assessment of **project risk** in **capital investment projects**.
- The original software was called **RiskMaster**. (Initially in 1986 as a Lotus 1-2-3 Add-On and subsequently as **RiskMaster** for Windows as an Excel Add-In before it was renamed to **RiskEase**).
- The software follows the **same process as outlined in the academic paper** for applying risk analysis.
- The stages of this process are **executed sequentially** and one stage essentially has to be completed before proceeding to the next one.

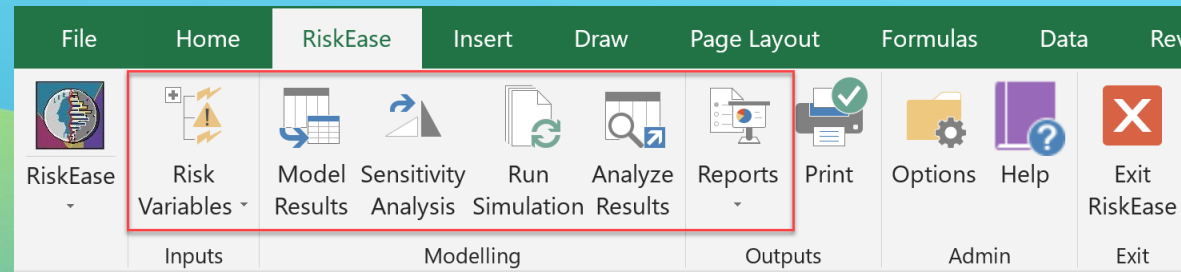
** (initially published as a **Harvard Institute for International Development DDP** - 276 October 1988. 44 pp. and subsequently in the **Project Appraisal Journal**, Vol. 9, No. 1, March 1994).*

THE RISK ANALYSIS PROCESS

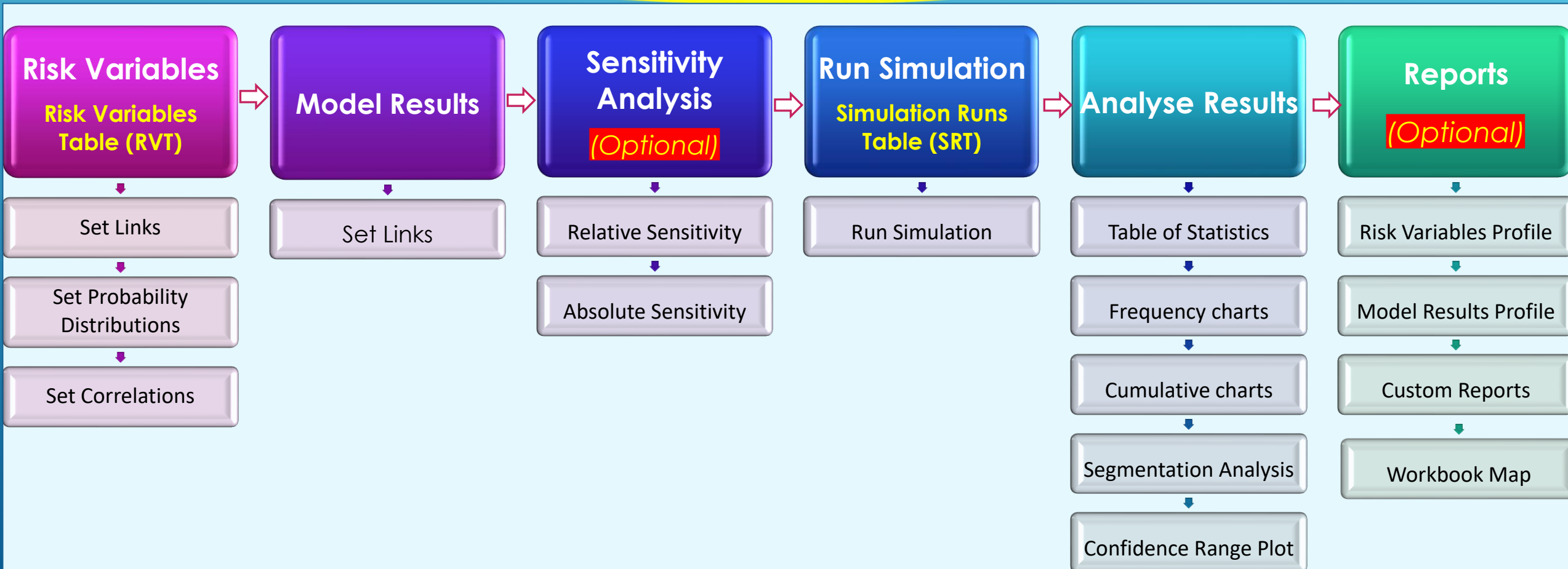
Risk Analysis in Investment Appraisal



RiskEase Menu



RiskEase - Risk Analysis Stages



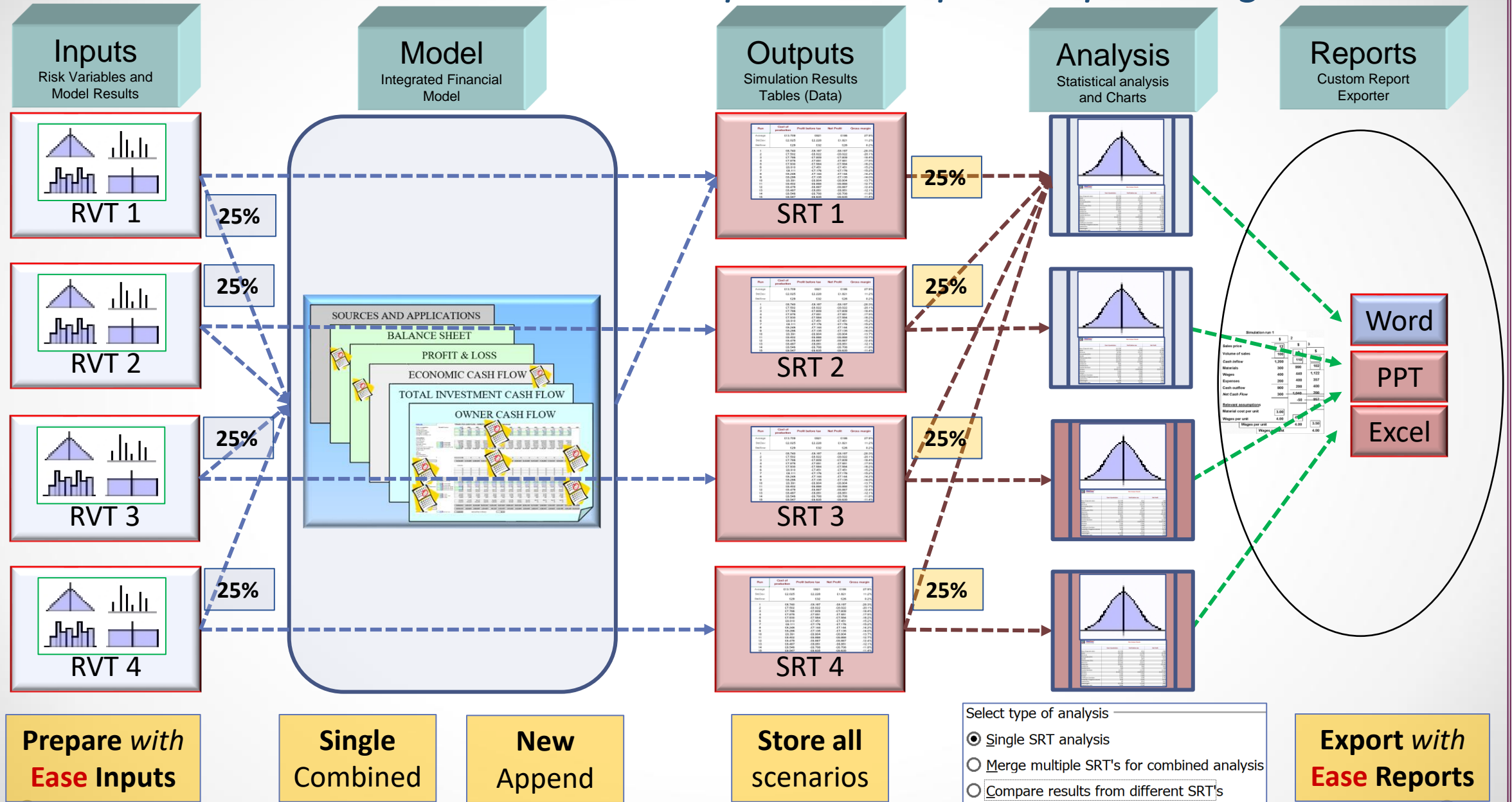
Applying Risk Analysis using RiskEase *Master Edition*



- Easy to use point-and-click interface
- Complete sensitivity analysis module
- Powerful user interface for editing probability distributions with real-time display
- Ability to bend, truncate and apply correlation conditions to probability distributions
- Capability to fit probability distributions to user provided data
- Probability distribution library
- Enhanced analysis module capable of comparing multiple simulation results
- Ability to use the software in “real options” situations
- Built-in report generator enabling the generation of professional reports
- Many other features such as the use of default distributions, new chart formatting options

Demo Video: https://youtu.be/ihr0_x8SwU

RiskEase Features and Unique Multi Input-Output Design



Other Features of RiskEase

- Correlation setting
 - Fit to user data
- Segmentation Analysis
(for both Frequency and Cumulative Probability Distributions)
- Investment Analysis functions
 - Truncation limits (lower and upper)
- Defining and using a default Probability Distribution
 - A Probability Distribution Library
- A quick and easy way to skew a Probability Distribution so as to match the base value.

and many more features which we hope you will discover and love.

RiskEase is about being very EASY to use
but with no compromises on FEATURES!

Software Tools



RiskEase Ltd

The Financial Model



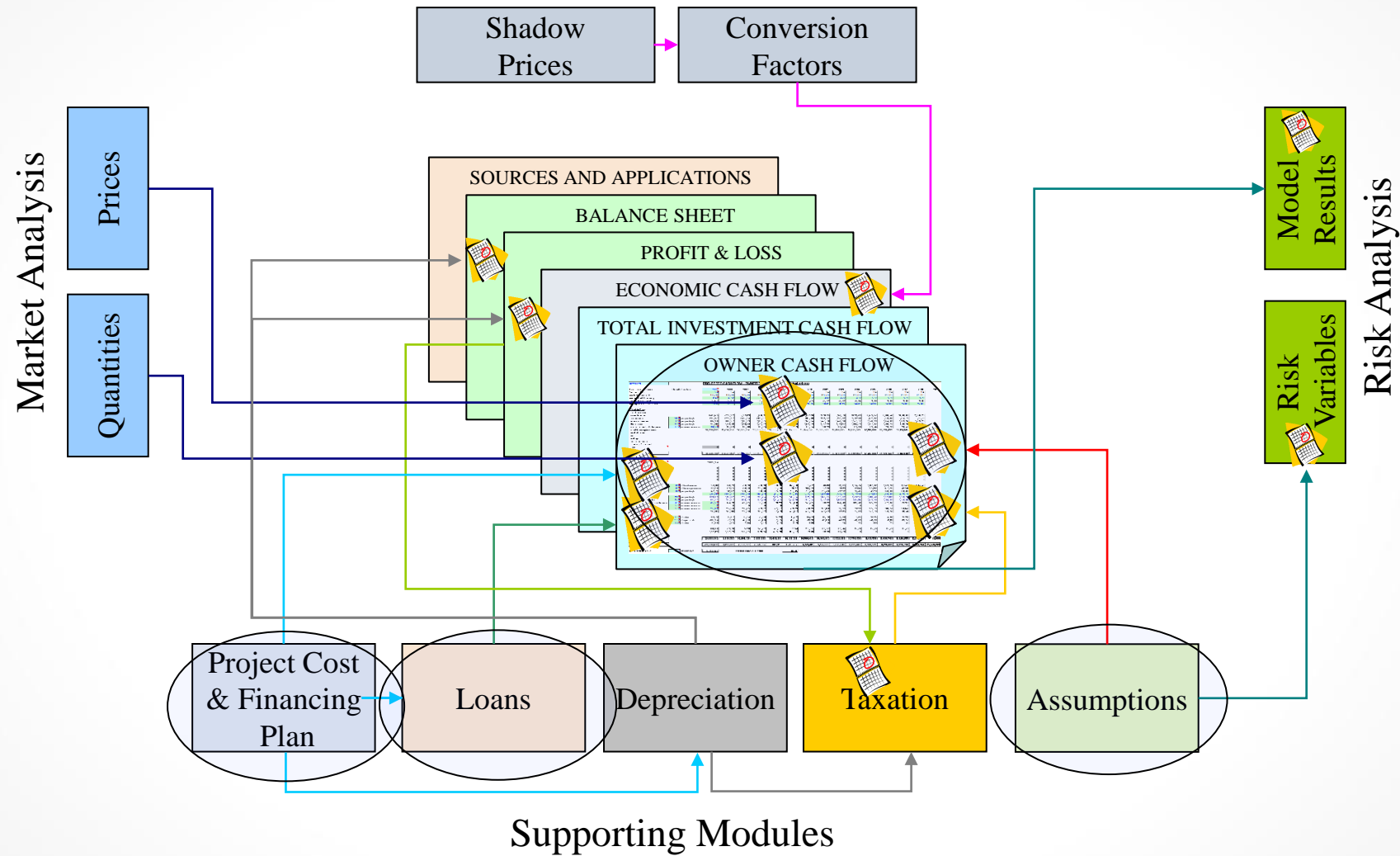
Savvakis C. Savvides

RiskEase

Integrated Financial Model

Savvakis C. Savvides ©

Economic Analysis



Index:



Integrated Financial Model

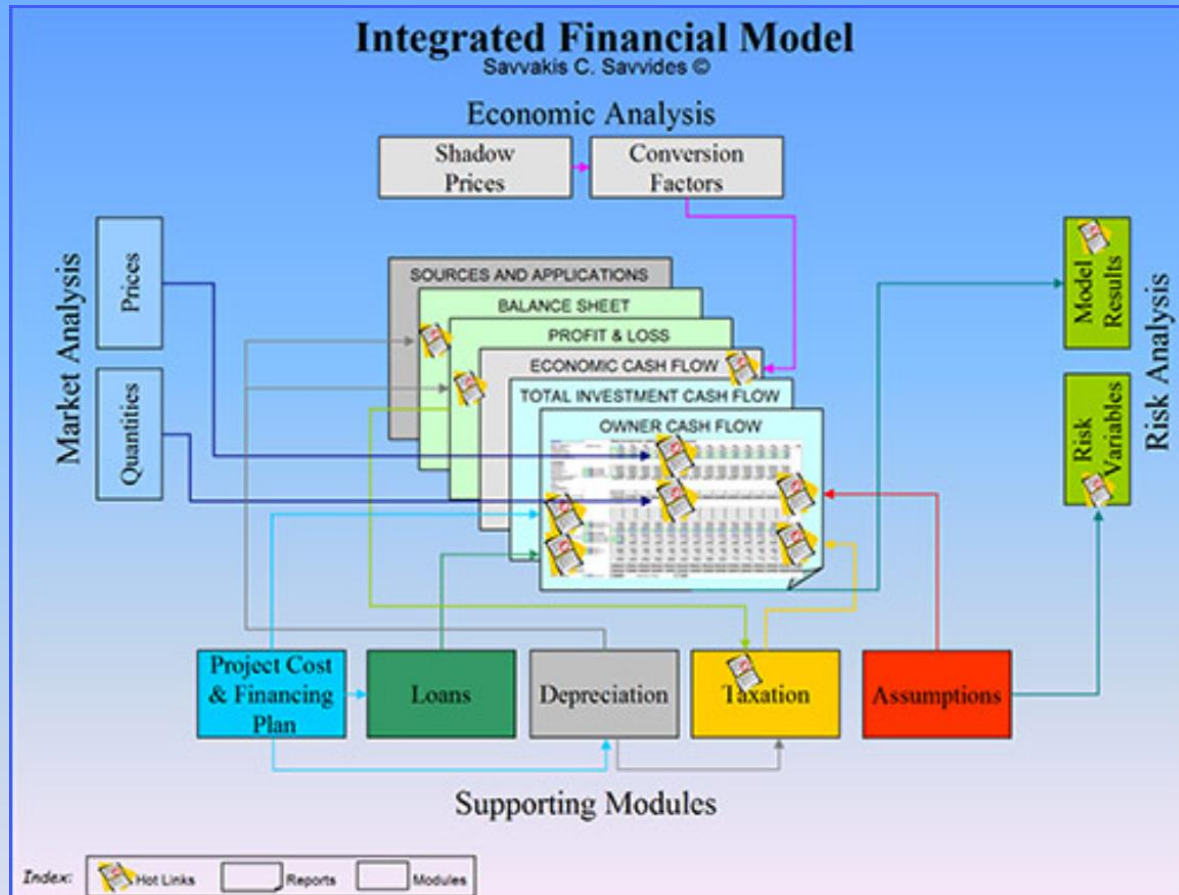
The Integrated Financial Model© by Savvakis C. Savvides was created and tested after many years of expertise of the author in corporate lending and project finance as well as from teaching investment appraisal and risk analysis and the development of related software.

The Integrated Financial Model is designed so that it offers the user the following benefits:

- To be set up easily and quickly.
- To be coherent and comprehensive.
- To be adaptable with very few changes.
- To be usable for any type or size of project.
- To be well and truly integrated.
- To be driven by a manageable number of important parameters and also to include and accommodate the easy use of a specially designed forecasting Excel Add-In which allows the easy and coherent projections of growth patterns.
- To be ready for Risk Analysis using Monte Carlo Simulation software (such as RiskEase).
- To produce reports of financial cash flow projections from the perspective of various stakeholders, including the owner of the project, the total investment perspective or even to be easily expandable so as application of economic analysis.
- The Model can also quickly be set up to be used for screening promising or even to discard poor and non-viable projects.
- Last, but not least, the model can be attached as a front end to very large and elaborate workbooks to make sense of their useful, but often not so well integrated, content of data.

Integrated Financial Model

RiskEase Total Edition



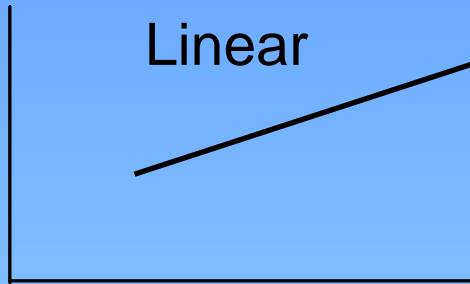
IFM is integrated with RiskEase in the **RiskEase Total Edition**. It is fully compatible and enhances the capabilities of RiskEase providing a means to a complete solution for professionals involved in investment appraisal and credit risk assessment.

The Integrated Financial Model is currently offered as a service to corporate clients and Universities together with the training programs that support it.

Projecting Growth

Projected Growth Patterns

Growth Pattern



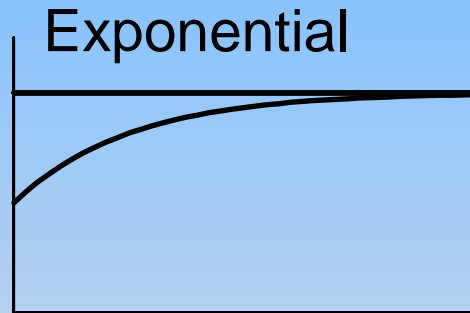
Formula

$$y = a + bx$$

Input parameters



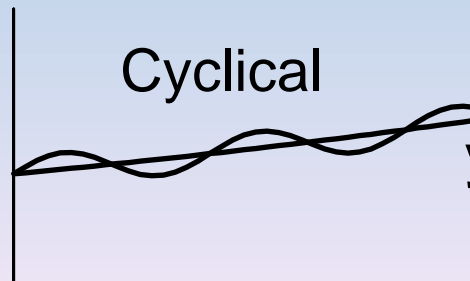
- Value Year 0
- Growth rate



$$y = a + (b-a) (1-e^{-x/t})$$



- Starting value
- Growth margin
- Time scale



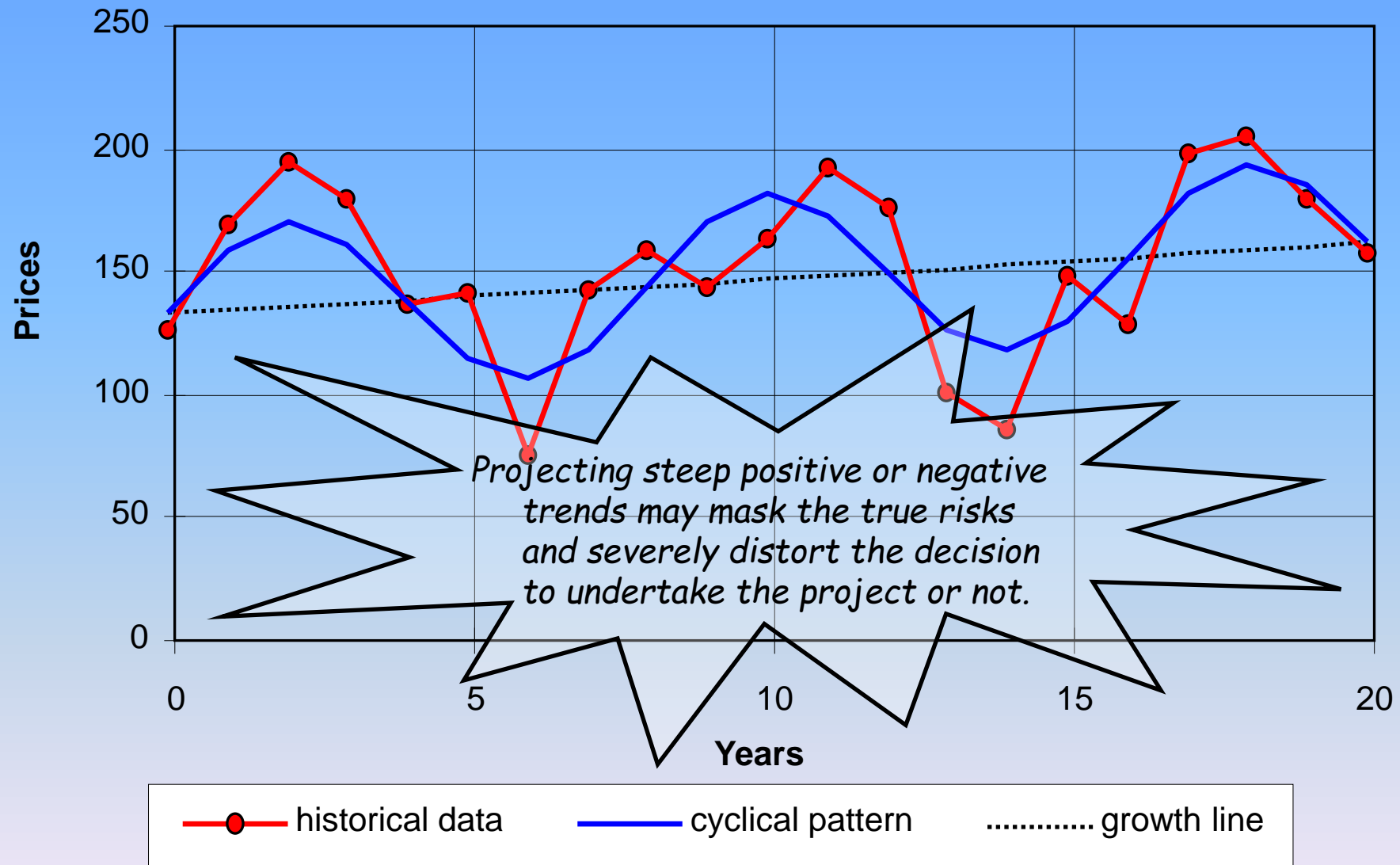
$$y = y_0(1+r)^x + \frac{1}{2} a \sin \frac{2\pi(x+b)}{T}$$



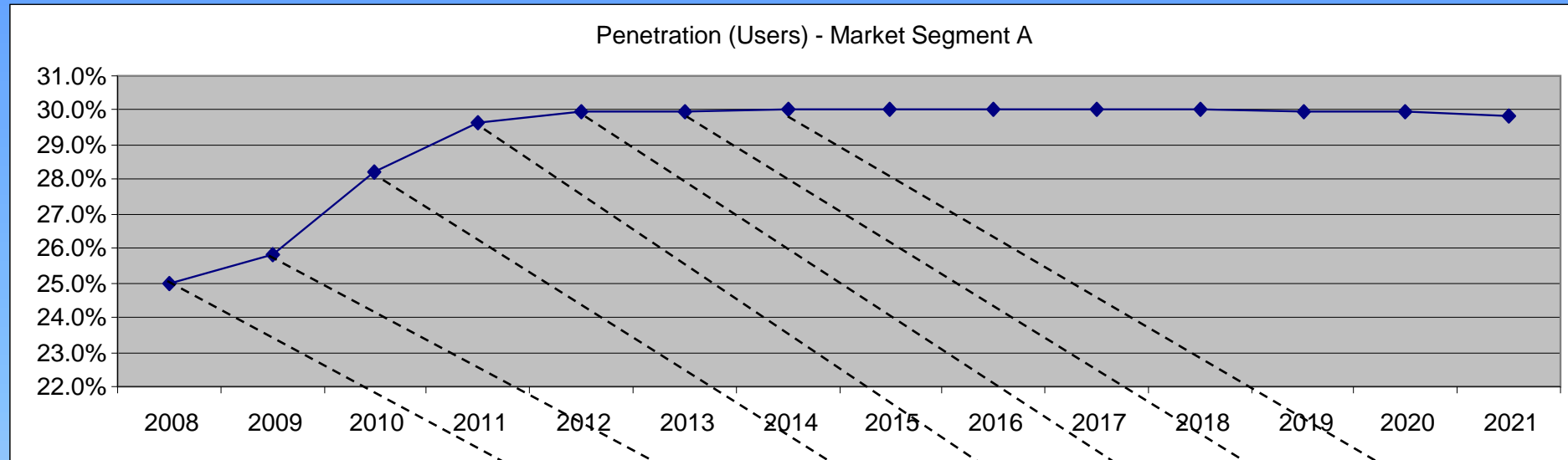
- Value Year 0
- Growth rate
- Amplitude
- Period
- Shift

Projecting trends from analysing historical data

Prices of fertilisers 20 years prior to introduction of the project



Market Penetration Growth Projections



Market Assumptions		Growth Factors	2008	2009	2010	2011	2012	2013	2014
Relevant Market (Potential Users)	2.00%	GDP per year	1,000,000	1,020,000	1,040,400	1,061,208	1,082,432	1,104,081	1,126,162
Market Penetration (Users)	IA function	Life Cycle	▲ 25%	▲ 26%	▲ 28%	▲ 30%	▲ 30%	▲ 30%	▲ 30%
Take Up (Usage)			5.0	5.0	5.0	5.0	5.0	5.0	5.0
Price	3.00%	INF per year	50.00	51.50	53.05	54.64	56.28	57.96	59.70
Total Market Segment A			62,500,000	67,823,014	77,940,771	85,935,688	91,216,366	95,975,346	100,849,960
Relevant Market (Potential Users)	2.00%	GDP per year	15,000	15,300	15,606	15,918	16,236	16,561	16,892
Market Penetration (Users)	IA function	Life Cycle	30%	33%	43%	49%	50%	50%	50%
Take Up (Usage)			15.0	15.0	15.0	15.0	15.0	15.0	15.0
Price	3.00%	INF per year	79.60	81.99	84.45	86.98	89.59	92.28	95.05
Total Market Segment B			5,373,000	6,263,991	8,496,864	10,087,692	10,865,299	11,456,184	12,041,101
Relevant Market (Potential Users)	2.00%	GDP per year	50,000	51,000	52,020	53,060	54,122	55,204	56,308
Market Penetration (Users)	IA function	Life Cycle	25%	27%	35%	39%	40%	40%	40%
Take Up (Usage)			30.0	30.0	30.0	30.0	30.0	30.0	30.0
Price	3.00%	INF per year	43.40	44.70	46.04	47.42	48.85	50.31	51.82
Total Market Segment C			16,275,000	18,786,309	24,959,931	29,387,633	31,602,986	33,314,145	35,014,107
Relevant Market (Potential Users)	2.00%	GDP per year	30,000	30,600	31,212	31,836	32,473	33,122	33,785
Market Penetration (Users)	IA function	Life Cycle	50%	53%	63%	69%	70%	70%	70%
Take Up (Usage)			50.0	50.0	50.0	50.0	50.0	50.0	50.0
Price	3.00%	INF per year	148.60	153.06	157.65	162.38	167.25	172.27	177.44
Total Market Segment D			111,450,000	124,794,627	154,953,875	177,242,433	189,535,970	199,638,023	209,804,837
Total Project Market - Volume			2,442,500	2,628,952	3,094,949	3,400,050	3,522,392	3,600,956	3,673,978
Total Project Market - Value			195,598,000	217,667,941	266,351,441	302,653,446	323,220,620	340,383,699	357,710,005

Projected Revenues

Cash Inflows

From Operations

2008

2009

2010

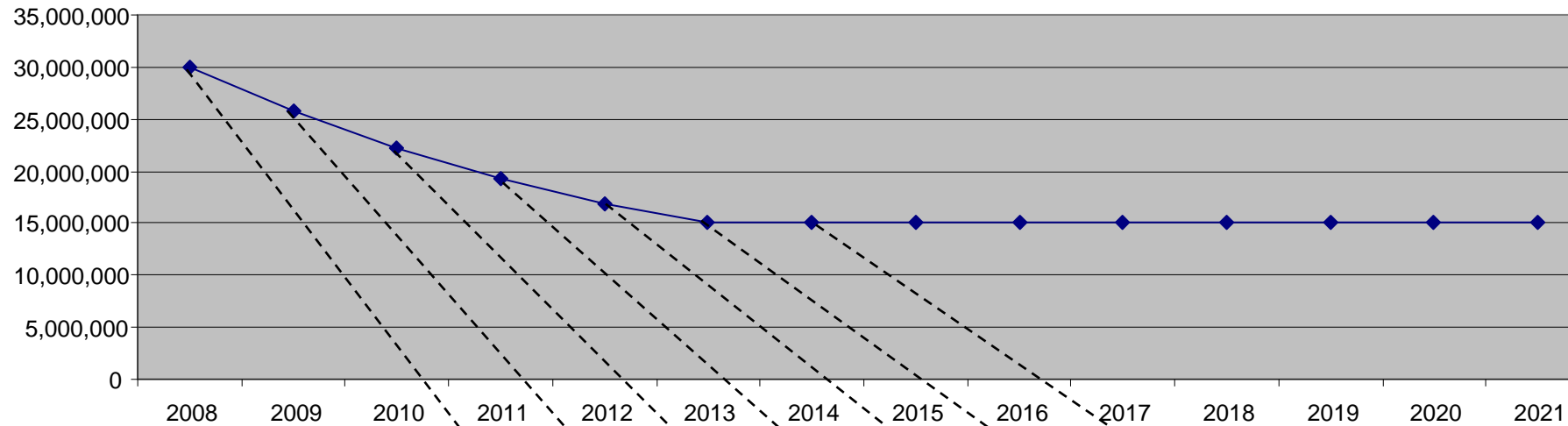
2011

2012

2013

2014

Advertising and Promotion



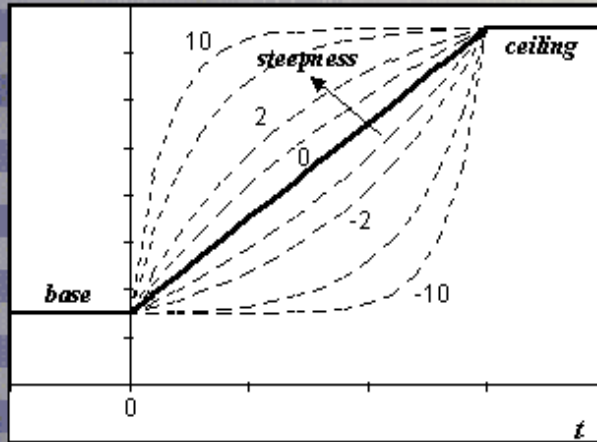
Operating expenditure

Payroll and Staff	3.00% growth per annum	75,000,000	77,250,000	79,567,500	81,954,525	84,413,161	86,945,556	89,553,922
Administration	2.00% growth per annum	10,000,000	10,200,000	10,404,000	10,612,080	10,824,322	11,040,808	11,261,624
Electricity and Fuel	3.00% growth per annum	7,500,000	7,725,000	7,956,750	8,195,453	8,441,316	8,694,556	8,955,392
Water	3.00% growth per annum	3,800,000	3,909,000	3,182,700	3,278,181	3,376,526	3,477,822	3,582,157
Postages and Telephone	3.00% growth per annum	1,000,000	1,030,000	1,060,900	1,092,727	1,125,509	1,159,274	1,194,052
Maintenance	1.00% of fixed investment	7,050,000	7,120,500	7,263,622	7,483,717	7,787,586	8,184,831	8,688,363
Sales and Distribution	2.50% growth per annum	25,000,000	25,625,000	26,265,625	26,922,266	27,595,328	28,285,205	28,992,335
Advertising and Promotion	IA function Growth Smooth	30,000,000	25,698,544	22,176,810	19,293,458	16,932,769	15,000,000	15,000,000
Corporate taxation		2,186,050	3,356,640	2,540,115	6,422,677	8,684,273	10,567,779	12,279,535
Accounts receivable (change)	8.3% of sales	16,299,833	1,839,162	4,056,958	3,025,167	1,713,931	1,430,257	1,443,859
Accounts payable (change)	16.7% of oper. costs	-26,789,342	-59,939	112,944	-806,177	-654,283	-695,841	-1,025,258
Cash reserves (change)	0.20% of sales	391,196	44,140	97,367	72,604	41,134	34,326	34,653
Loan repayments								
Loans - interest payments		15,187,500	26,362,496	23,104,303	19,626,183	15,913,290	11,949,776	7,718,726
Loan - principal payments		59,444,510	48,269,514	51,527,706	55,005,827	58,718,720	62,682,233	66,913,284
Total Cash Outflows		1,175,269,747	237,551,057	239,317,300	242,178,687	244,913,576	248,756,582	254,592,644
Net Cash Flow		-529,671,747	-19,883,116	27,034,140	60,474,759	78,307,045	91,627,117	103,117,361
Net Present Value	15.0% discount rate	105,408,062						
					Internal Rate of Return		17.4%	

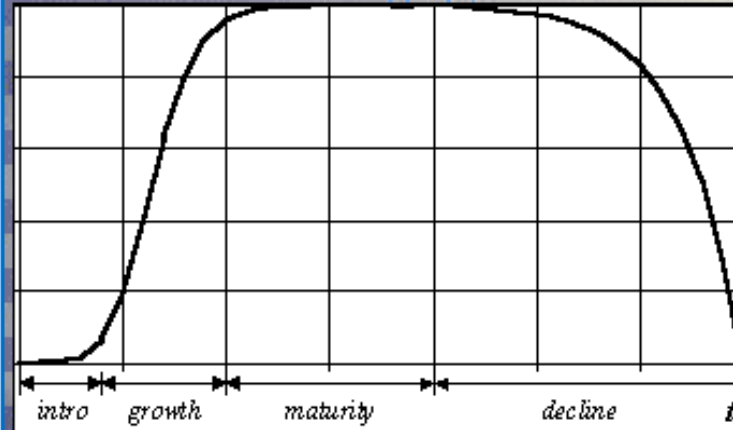
Investment Analysis Toolpak

Excel Functions

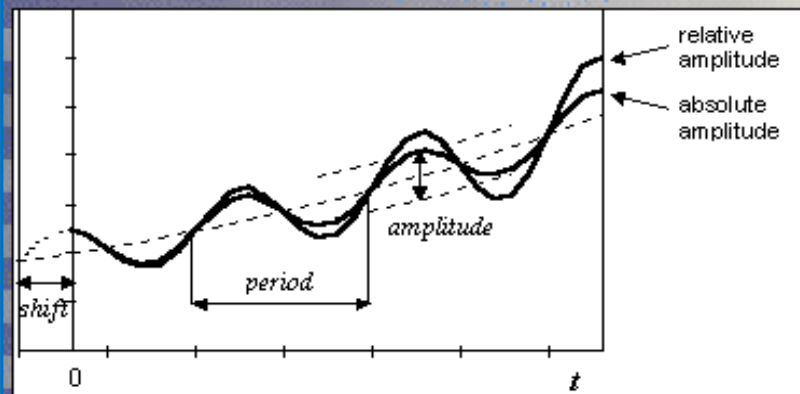
GROWTH.SMOOTH (t, base, ceiling, duration, steepness)



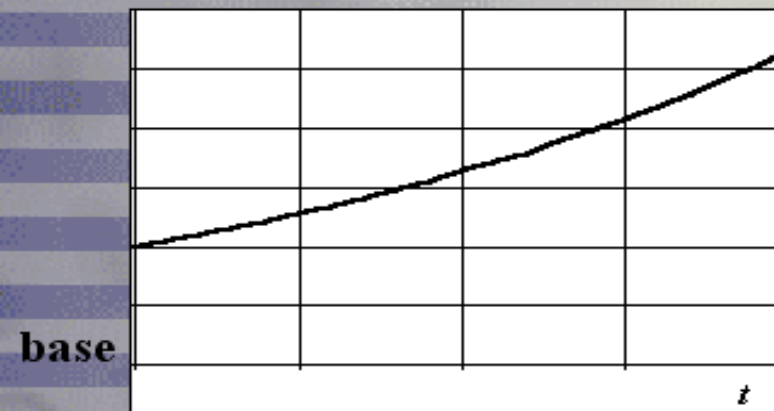
LIFECYCLE (t, base, ceiling, intro, growth, maturity, decline)



CYCLICAL (t, base, growth_rate, amplitude, period, shift)



GROWTH.EXP (t, base, growth_rate)



Growth Projections Template

File Home RiskEase Insert Page Layout Formulas Data

Utilities

Risk variables

Autoname

Arrange

Select prob. distr.

Edit prob. distr.

Set correlations

Investment Analysis Functions

RiskEase Utilities

Sample Files

Integrated Financial Model

Contact RiskEase Ltd.

GrowthSmooth

GrowthExp

Cyclical

LifeCycle

Insert Growth Projection template

Page Layout Formulas Data Review View Developer Add-ins Help Power Pivot Tell me what you want to do

Insert Tools

Delete

Refresh

Options

Close


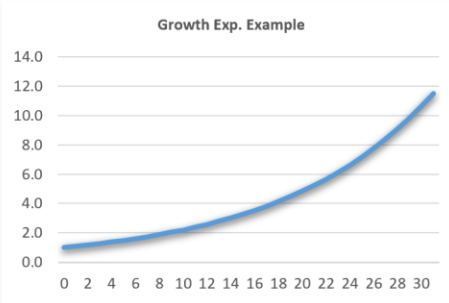
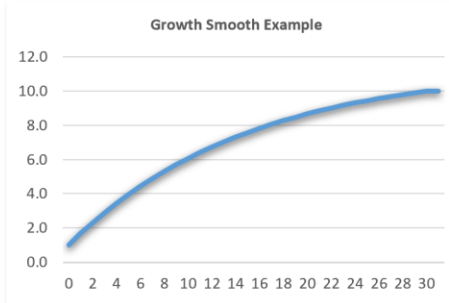
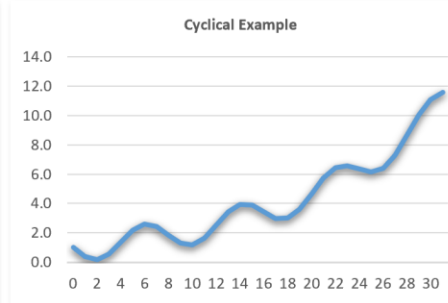
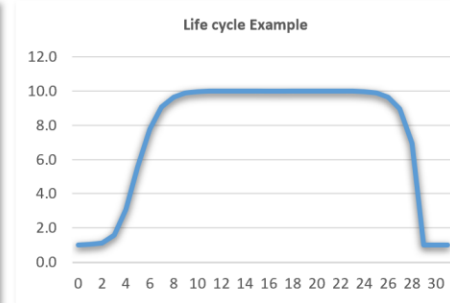
Help

ED off

Sheet: GrowthProjections

Admin

'Growth Exp. Example

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	 RiskEase TM	Investment Analysis Toolpak - Excel functions for projecting growth patterns in financial models to be used in Risk Analysis													
2	RISK ANALYSIS SOFTWARE	Disclaimer													
3	GROWTH PROJECTIONS (Using Invest.xlam add-in)														
4	Growth Smooth		Base	Ceiling	Duration	Steepness				0	1	2	3	4	5
5	Growth Exp.		Base	Growth rate											
6	Cyclical		Base	Growth rate	Amplitude	Period	Shift								
7	Life cycle		Base	Ceiling	Intro	Growth	Maturity	Decline	2021	2022	2023	2024	2025	2026	
8	Growth Exp. Example	Growth Exp.	1.0	8.2%					1.0	1.1	1.2	1.3	1.4	1.5	
9	Growth Smooth Example	Growth Smooth	1.0	10.0	30.0	2.0			1.0	1.7	2.3	2.9	3.4	4.0	
10	Cyclical Example	Cyclical	1.0	8.0%	2.0	8.0	4.0		1.0	0.4	0.2	0.6	1.4	2.2	
11	Life cycle Example	Life cycle	1.0	10.0	3.0	5.0	16.0	5.0	1.0	1.1	1.1	1.6	3.1	5.5	
12															
13															
14															
15	   														
16															
17															
18															
19															
20															
21															
22															
23															

Disclaimer IFM CF-Owner CF-Project PL BS SAF Plan Loans Depr Tax Assumptions DSCR Chart GrowthProjections

Reports with Ease

RExport

RiskEase Report and Export utility

Selection **Current item** **Capture** **Preview/story board** **Exit**

Select all Deselect all Defer Copy Define range Refresh Delete Screen Region Import No preview Small preview Large preview Hide gallery

Word PowerPoint Excel

Available items

- Excel
 - Example2-Solution-AR_Chart4.xlsx
 - Example 2
 - RVT1
 - SA-Table1
 - SA-Table1-Chart1
 - SA-Table1 (2)
 - SA Chart-Profit-Loss1
 - SRT1
 - AR_Sheet1
 - AR_Chart1
 - AR_Chart3
 - AR_Chart4
 - AR_Chart5
 - RV Profile1
 - MR Profile1
- PowerPoint

Selected items: 14

- Example 2
- RVT1
- SA-Table1
- SA-Table1-Chart1
- SA-Table1 (2)
- SA Chart-Profit-Loss1
- SRT1
- AR_Sheet1
- AR_Chart1
- AR_Chart3
- AR_Chart4
- AR_Chart5
- RV Profile1
- MR Profile1

Gallery

Example2-Solution-AR_Chart4.xlsx

Example 2
Range: A1:L24

RVT1
Range: A1:Q28

SA-Table1
Range: A1:F10

SA-Table1-Chart1

SA-Table1 (2)

SA Chart-Profit-Loss1

Preview

Example2-Solution-AR_Chart4.xlsx

SA-Table1-Chart1

SA-Table1 (2)

SA Chart-Profit-Loss1

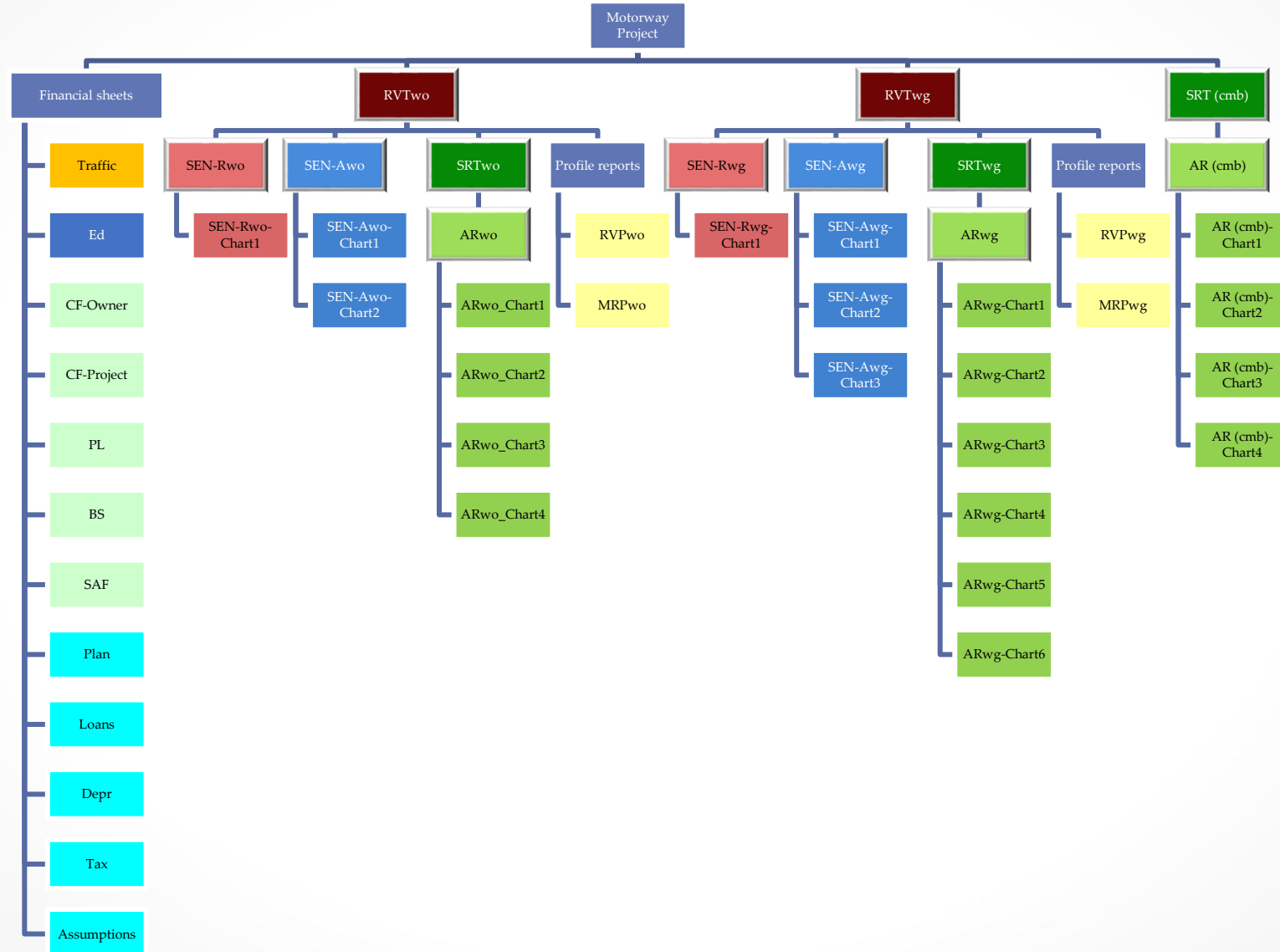
Easily export Reports to Word, PowerPoint or Excel.

Easily create custom Reports in Word, PowerPoint or Excel with drag-and drop.

Gather and Preview objects (tables, sheets, charts and images) from many sources.

REMaps

RiskEase Workbook Map utility



A complete package for the assessment of risk and return and for providing expert project finance solutions

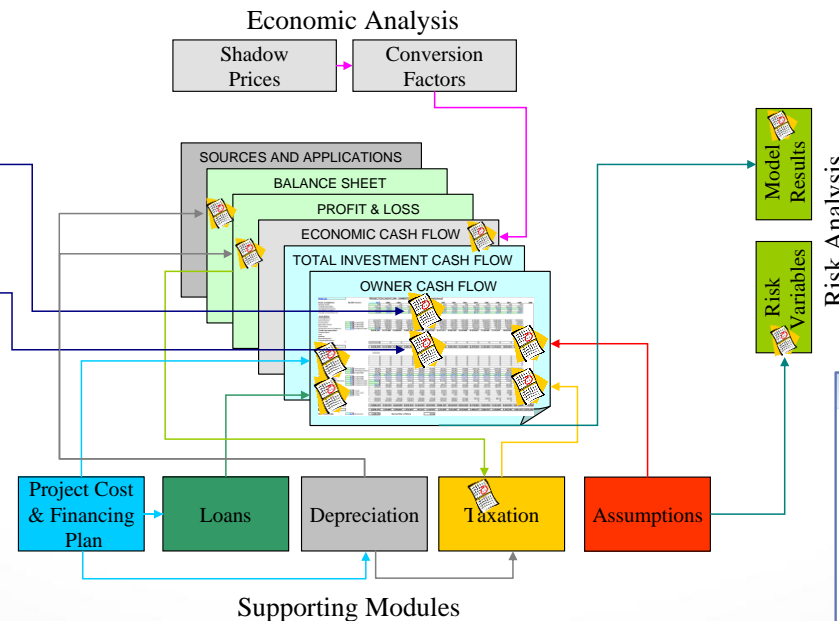
Investment Analysis ToolPak

Forecasting Excel Add-In		
Growth Pattern	Formula	Input parameters
Linear	$y = a + bx$	- Value Year 0 - Growth rate
Exponential	$y = a + (b-a) (1-e^{-x/t})$	- Starting value - Growth margin - Time scale
Cyclical	$y = y_0(1+r)^x + \frac{1}{2} a \sin \frac{2\pi(x+b)}{T}$	

- Training
- Case-studies
- Expert advice







Integrated Financial Model



RiskEase – Risk Analysis Software

Risk Analysis Excel AddIn

Risk Variables		Model Results		Sensitivity Analysis	Run Simulation		Analyze Results	
<u>Select/Edit Probability Distributions</u>		<u>User spreadsheet model</u>			<u>Simulation scenarios</u>		<u>Statistical analysis</u>	
<u>See Correlations</u>		<u>Base case</u>			<u>1</u>	<u>2</u>	<u>3</u>	<u>...</u>
		<u>Price</u>	<u>10.0</u>	<u>9.0</u>	<u>11.5</u>	<u>8.5</u>	<u>Expected Value</u>	<u>55</u>
		<u>Quantity</u>	<u>100</u>	<u>130</u>	<u>80</u>	<u>90</u>	<u>Standard Deviation</u>	<u>16.7</u>
		<u>Cash Inflow</u>	<u>1000</u>	<u>1170</u>	<u>920</u>	<u>765</u>	<u>Minimum</u>	<u>40</u>
		<u>Cost per unit</u>	<u>7.5</u>	<u>7.0</u>	<u>8.5</u>	<u>5.5</u>	<u>Maximum</u>	<u>73</u>
<u>See Links</u>		<u>Variable Costs</u>	<u>750</u>	<u>910</u>	<u>680</u>	<u>495</u>	<u>Prob. Of Negative Outcome</u>	<u>0%</u>
		<u>Rent</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>		
		<u>Cash Outflow</u>	<u>950</u>	<u>1110</u>	<u>880</u>	<u>695</u>		
		<u>Net Cash Flow</u>	<u>50</u>	<u>60</u>	<u>40</u>	<u>70</u>		
<u>Risk Variables Table (RVT)</u>					<u>Simulation Runs Table (SRT)</u>			

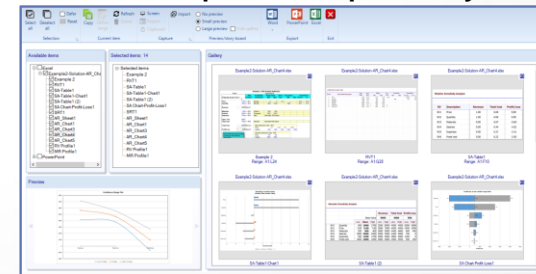
REMaps

RiskEase Workbook Map utility



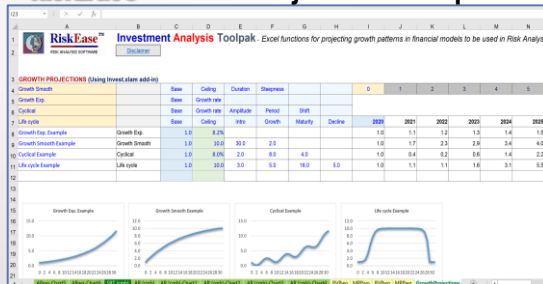
RExport

RiskEase Report and Export utility



REGrowth

RiskEase Growth Projections Template



Cost-Benefit Analysis

Training



RiskEase Ltd

COST-BENEFIT ANALYSIS FOR INVESTMENT DECISIONS

Jenkins G. P, C. Y. K Kuo and A.C. Harberger, “Cost-Benefit Analysis for Investment Decisions”, 2011

- **THE FINANCIAL APPRAISAL OF PROJECTS**

- Construction of Financial Cash Flows: Concepts and Principles
- The Investment and Operating Phases
- Cessation of Project Operations and Residual Values
- Format for the Pro-Forma Cash Flow Statement
- Use of Consistent Prices in the Cash Flow Forecast
- Expected Nominal interest and Exchange Rate
- Incorporating Inflation in the Financial Analysis
- **Analyses of Investment Decisions from Alternative Viewpoints**
- The Banker’s Point of View
- The Owner’s Point of View
- The Economy’s Point of View
- Relationship between Different Points of View – **Stakeholder Analysis**

- **DISCOUNTING AND ALTERNATIVE INVESTMENT CRITERIA**

- Time Dimension of a Project
- Time Value of Money
- Discounting
- Alternative Investment Criteria
- Net Present Value and Internal Rate of Return Criteria
- Debt Service Coverage Ratios

- **SCALE, TIMING, LENGTH AND INTER-DEPENDENCIES IN PROJECT SELECTION**

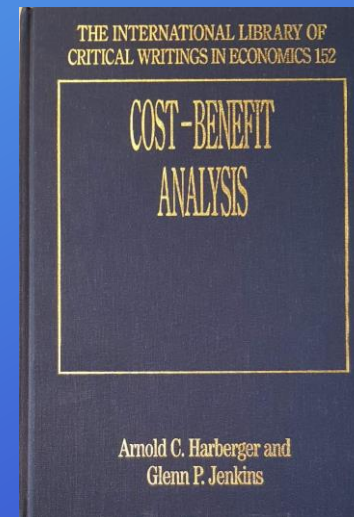
- Determination of Scale in Project Selection
- Timing of Investments
- Adjusting for Different Lengths of Life
- Projects with Interdependent and Separable Components

COST-BENEFIT ANALYSIS FOR INVESTMENT DECISIONS

Jenkins G. P, C. Y. K Kuo and A.C. Harberger, “Cost-Benefit Analysis for Investment Decisions”, 2011

- **THE ECONOMIC ANALYSIS OF PROJECTS**

- Objectives for Economic Investment Appraisal
- Postulates Underlying the Economic Evaluation Methodology
- Applying the Postulates to Determine Economic Evaluation of Non-Tradable Goods and Services in an Undistorted Market
- Analysing Economic Costs and Benefits in an Existing Market (in the absence of a new project)
- Analysing the Economic Benefits of an Output Produced by a Project
- Analysing the Economic Cost of an Input Demanded by a Project
- Applying the Postulates to Determine Economic Evaluation of Non-Tradable Goods and Services in Distorted Markets
- Sales Taxes Levied on Output of Project
- Subsidies on Production
- Environmental Externalities
- Other Distortions
- The Economic Opportunity Cost of Capital
- The Economic Opportunity Cost of Labour




Project and Business Financing post graduate course

← → ↺ 🏠 🔒

https://moodle.ciim.ac.cy/course/view.php?id=890

🔍 ⭐️ ✅ ⚙️ ☆️ 📁 👤

☰

 CYPRUS INTERNATIONAL INSTITUTE OF MANAGEMENT

English (en) ▾

🔔 🗨️ Savvakis Savvides 👤 ▾

⚙️ ▾

🎓 FB415 - 23/03/2016 - 05/04/2016 (N)(Savvakis Savvides)

👤 Participants

🏆 Badges

✅ Competencies

📊 Grades

🏠 Home

📊 Dashboard

📅 Calendar

📁 Private files

🔍 Content bank

🎓 My courses

🎓 FB415 - 23/03/2016 - 05/04/2016 (N)(Savvakis Savvides)

🎓 FB415 - 06/03/2015-12/03/2015 (N)(Savvakis Savvides)


Project and Business Financing (FB415) - 23/03/2016 - 05/04/2016 (N)(Savvakis Savvides)

Home / My courses / FB415 - 23/03/2016 - 05/04/2016 (N)(Savvakis Savvides) Turn editing on

Welcome message

Program Director: Savvakis C. Savvides 2014-2016
Cyprus International Institute of Management

Lecturer



Name: Savvakis C Savvides

Former Head of the Project Financing Division of the Cyprus Development Bank and a regular visiting lecturer on the HIID Program on Investment Appraisal and Management at Harvard University and currently a Senior Lecturer on the Program in Investment Appraisal and Risk Analysis at Queen's University, Canada.

Contact Professor

Dear students,

I welcome you to the course on Project and Business Financing. In this course, we will be working together on gaining an understanding of the methodologies applied in project and business finance. The approach taken is to focus on giving you a taste of the real issues you may encounter in a project and business finance scenario. I encourage you to start reading the chapters in the recommended textbook for this course, "Project Financing and Asset-Based Financial Engineering" by John D. Finnerty as well as the other recommended readings. Because the subject is such, that one cannot gain a true appreciation of the issues involved just from reading a textbook, the course is designed to also give you a limited hands-on experience by working through some examples which have been inspired from real life cases. Hence, during the program you will be involved in projecting cash flows and doing risk analysis on your laptops as well as evaluating the project risks and the project finance issues arising from the extracted risk profile of these examples. Therefore, please bring to class your laptops with Excel 2003 or later installed.

I wish you a productive and pleasant studying. Looking forward to seeing you all soon.

Best regards

Savvakis C Savvides

Search forums

🔍

Advanced search ?

Latest announcements

[Add a new topic...](#)
6 Jun, 20:05
Savvakis Savvides

[Your assignment submissions](#)
9 May, 09:25
Savvakis Savvides

[Correction of Interest During Construction](#)
8 May, 01:28
Savvakis Savvides

[Clarifications on your assignment](#)
[Older topics ...](#)

Upcoming events

There are no upcoming events
[Go to calendar...](#)

Recent activity

Activity since Thursday, 29 July 2021, 6:31 PM

Program on Project and Business Financing

Savvakis C Savvides

Cyprus International Institute of Management

March 2015



Project And Business Financing: Course Outline I

What is Project Financing?

- The Project (Risk and Return) and the Cart (the Financing)
- Project Financing is Cash Flow Financing
- Different Perspectives and Stakeholder Analysis

Cash Flow and Financial Modelling in Project Finance

- Development of Cash Flow Statements
- Integrated Financial Modelling and Projecting Cash Flow

Risk Analysis and Key Project Risk Categories

- What is Risk?
- Modelling and Forecasting Risk
- Risk Analysis using Monte Carlo Simulation
- Project Risk Categories and the Project Risk Profile

The Assessment of Project Competitiveness

- The Project Relevant Market
- A Framework for Assessing Project Competitiveness
- The Project's Competitive Strategy

Project And Business Financing: Course Outline II

The Arrangement of Finance

- Project Finance and Risk Reduction
- Managing and Sharing Project Risk through Contracting
- Cash Flow Waterfall/Cascade
- Security Arrangement and Loan Documentation
- Syndicated Lending

Public Private Partnerships (PPP) and Megaprojects

- Project Finance and the Public Interest
- Stages of a Public Private Partnership
- Megaprojects and Risk

Project Finance Cases and Examples

- Hotel, Golf Resort, Marina, Satellite Telephony, Mall, Road

Project And Business Financing *Program Readings*

- [Andreou Savvides-Paphos-Holiday-Complex-Case-Study](#)
- [Armstrong-Syndicated-Loans-Bank-of-Canada](#)
- [Bain-Transportation](#)
- [Finnerty-Chapter5-Analyzing-Project-Viability](#)
- [Finnerty-Chapter6-Designing-Security-Arrangements](#)
- [Glenday-Risk-Sharing-Contracts-in-Project-Appraisal](#)
- [Integrated-Project-Appraisal-Spreadsheet-Example](#)
- [Jenkins-CBA-Chapter03-Financial Appraisal](#)
- [Jenkins-CBA-Chapter06-Risk](#)
- [Jenkins-CBA-Cost-benefit analysis for investment decisions](#)
- [Jenkins-Evaluation-of-Stakeholder-Impacts](#)
- [RiskEase-Investment-Analysis-Toolpak-Manual](#)
- [Savvides-Corporate-Lending-and-the-Assessment-of-Credit-Risk](#)
- [Savvides-Market-Analysis-and-the-Assessment-of-Competitiveness](#)
- [Savvides-Risk-Analysis-in-Investment-Appraisal](#)
- [Yescombe-Chapter-1-What-are-PPPs](#)
- [Yescombe-Chapter-8-Project-Finance-and-PPPs](#)

Program in Investment Appraisal and Project Finance

1. Cost Benefit Analysis Methodology and Cash Flow Projections

- Development of **cash flows** for new **Project** or existing **Business**
- Different **cash flow perspectives**
- Scale, timing, inflation and residual value decisions
- **Project Return** - Uses and limitations of different **investment criteria**
- **Credit Risk Assessment** and evaluation of **debt service** capability

2. Competitiveness Appraisal

- Assessing and modelling market competitiveness
- **Integrated Financial Model** and **Modelling Tools**

3. Risk Analysis

- Risk assessment techniques
- Defining and quantifying **risk variables**
- Monte Carlo Simulation using **RiskEase**

4. Project Risk Profile and Project Financing

- **Project financing** concepts and **structuring of finance**
- **Public Sector Projects** and **Public-Private Partnerships**

Useful Links

Affiliations:

[Program in Investment Appraisal and Risk \(PIAR\) at Queen's University](#)

[John Deutsch International \(JDInt'l\) at Queen's University](#)

Risk Analysis Software:

[RiskEase Demo Video](#) [RiskEase Trailer Video](#) [RiskEase Website](#)

[Risk Management Tools](#) [Business Risk Analysis Solution Providers](#)

Our partners:



Publications:

[SSRN Author Page - Savvakis C. Savvides](#)

[EconPapers - Savvakis C. Savvides](#)

[Research Papers in Economics - Savvakis C. Savvides](#)

Project Finance Expertise



A huge library of real projects
and Case-studies available

On-the-field expertise

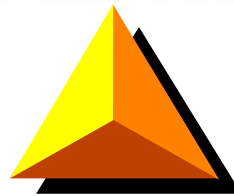
Theory and practice at the top level

Over 35 years of expertise in project finance and corporate lending



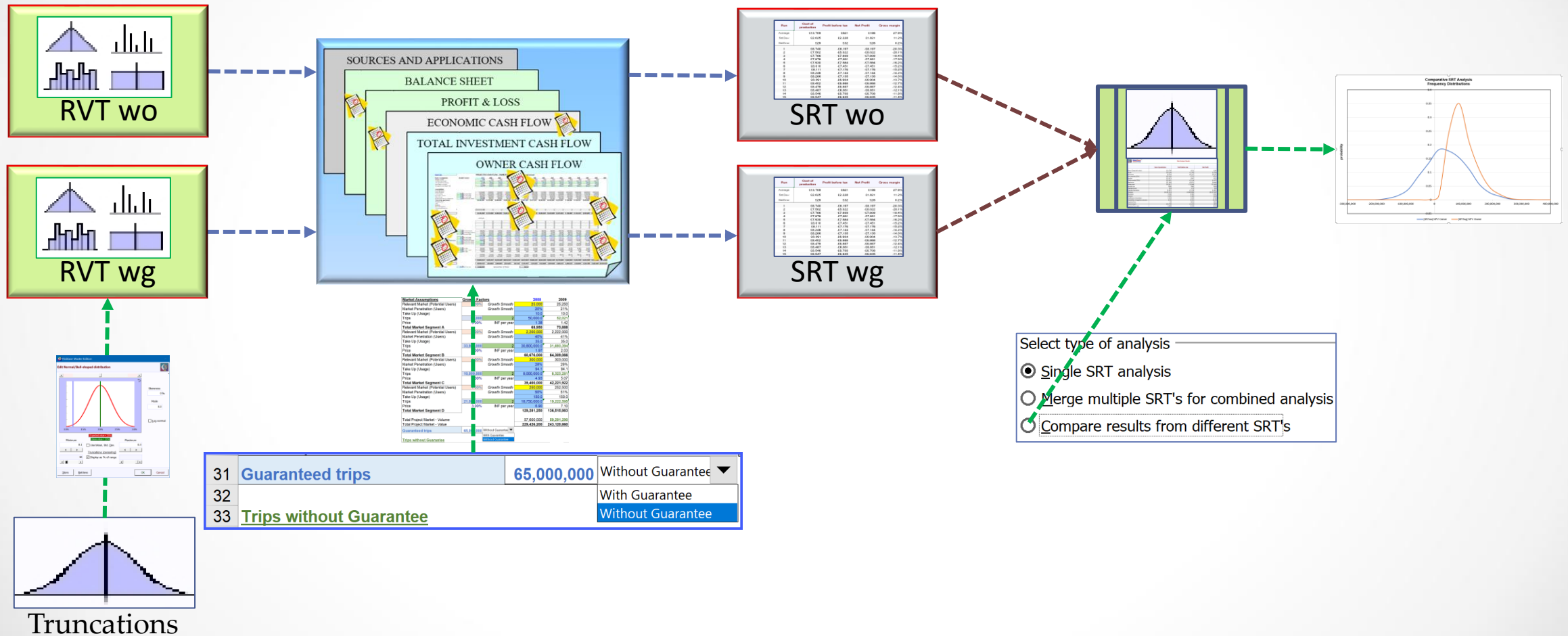
©

Evaluating and assessing project risk



Specialising in professional financial software tools and training for the assessment of risk and return and in providing practical solutions in capital investment decisions in corporate lending and project finance.

The versatile design of the software allows the use of **RiskEase** to **Evaluate** and **Price** contracts and guarantees



Market Assumptions	2008	2009
Revenue Market (Potential Users)	100,000	100,000
Market Penetration (Users)	25%	25%
Time to (Users)	100,000	100,000
Price	\$10,000	\$10,000
NPV per year	\$10,000	\$10,000
Total Market Segment A	\$10,000	\$10,000
Revenue Market (Potential Users)	100,000	100,000
Market Penetration (Users)	25%	25%
Time to (Users)	100,000	100,000
Price	\$10,000	\$10,000
NPV per year	\$10,000	\$10,000
Total Market Segment B	\$10,000	\$10,000
Revenue Market (Potential Users)	100,000	100,000
Market Penetration (Users)	25%	25%
Time to (Users)	100,000	100,000
Price	\$10,000	\$10,000
NPV per year	\$10,000	\$10,000
Total Market Segment C	\$10,000	\$10,000
Revenue Market (Potential Users)	100,000	100,000
Market Penetration (Users)	25%	25%
Time to (Users)	100,000	100,000
Price	\$10,000	\$10,000
NPV per year	\$10,000	\$10,000
Total Market Segment D	\$10,000	\$10,000
Revenue Market (Potential Users)	100,000	100,000
Market Penetration (Users)	25%	25%
Time to (Users)	100,000	100,000
Price	\$10,000	\$10,000
NPV per year	\$10,000	\$10,000
Total Project Market - Volume	\$10,000	\$10,000
Total Project Market - Value	\$10,000	\$10,000

31	Guaranteed trips	65,000,000	Without Guarantee
32			With Guarantee
33	Trips without Guarantee		Without Guarantee

Motorway Project - Evaluation of a Public Sector Guarantee using RiskEase

Calculates Without (wo) and With (wg) the Guarantee and updates the projections accordingly in the CF-Owner

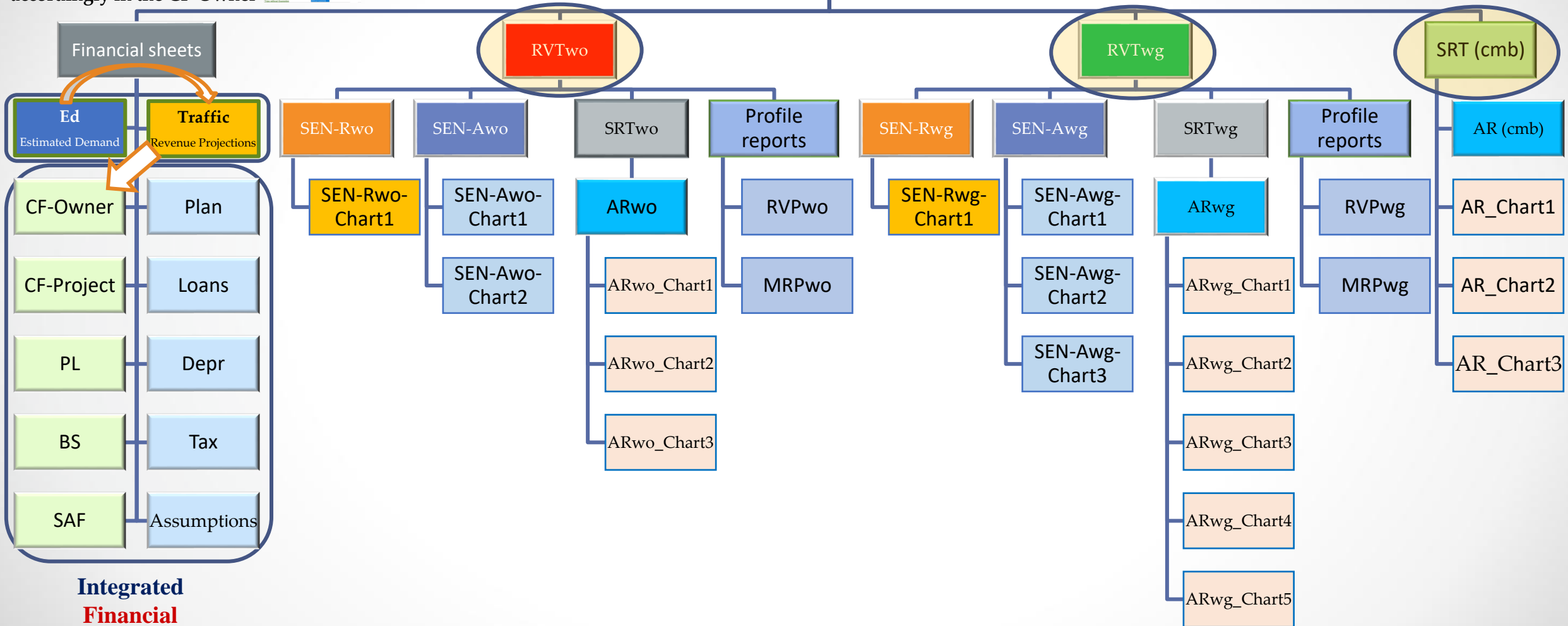


Simulation Risk Variables and Traffic set to be calculated **Without** the Guarantee (wo)

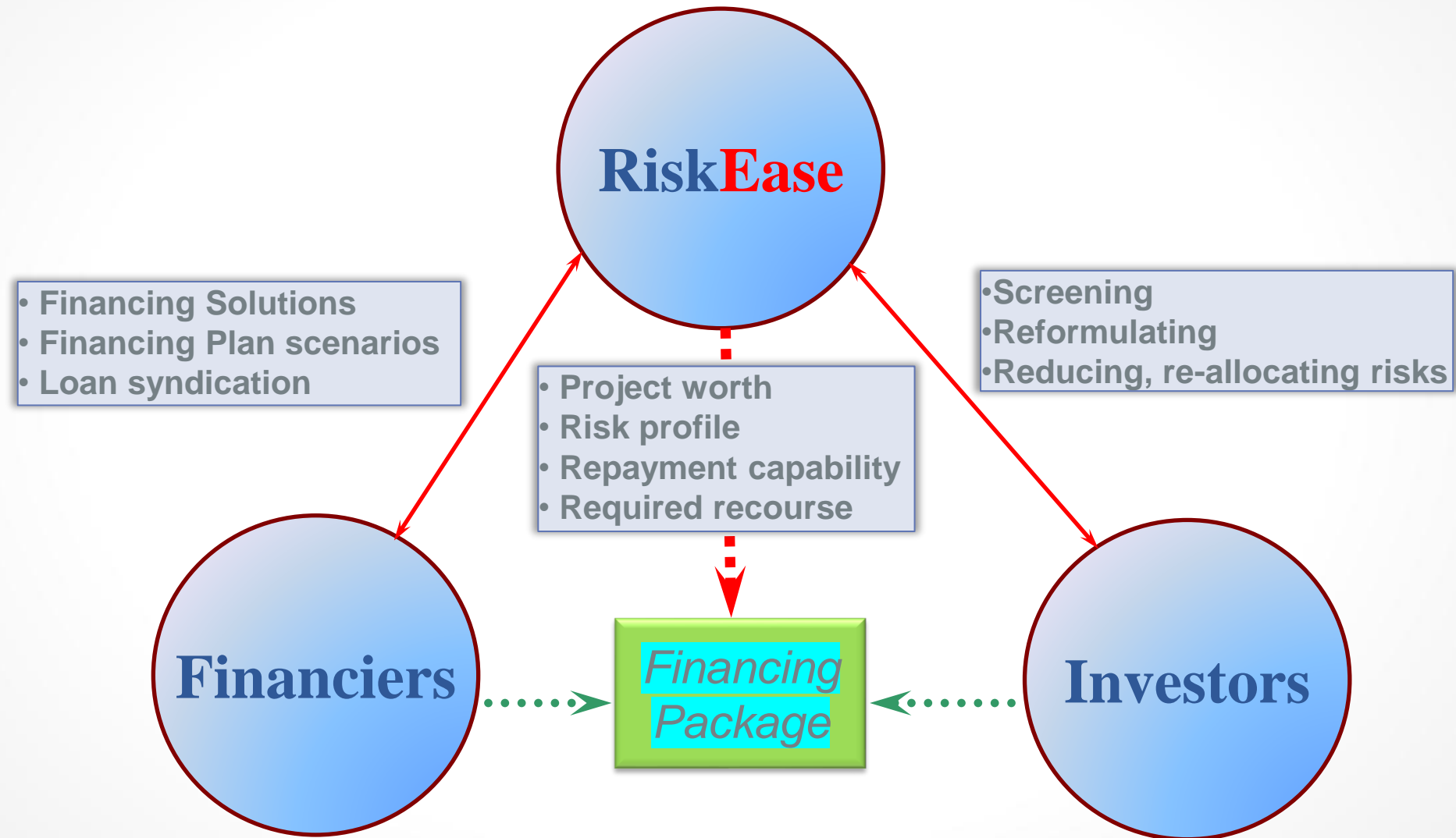
Motorway Project

Simulation Risk Variables and Traffic set to be calculated **With** the Guarantee (wg)

Simulations **Without** and **With** the Guarantee are combined and compared



RiskEase can be a driver and catalyst for the assessment of risk and in the financing of economically viable projects

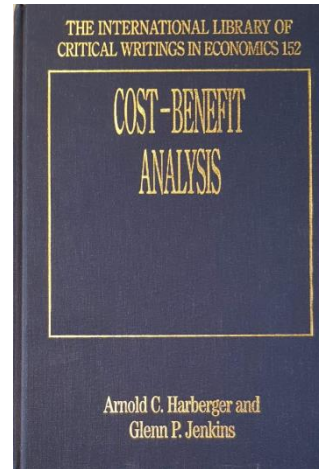


Our approach is unique in that we offer
a complete and immediately applicable practical solution

Easy to use
state-of-the-art software

Mastering and advancing
the methodology

On-the-field
expertise in project financing



Mall and Golf Resorts

Ferries and Cruise Ships

Ports and marinas

Telecommunications

Hotels and resorts

Motorways and Toll Roads



Risk**Ease** relevance rests on a deeper and wider understanding of **risk**
and **return** and how it affects and shapes a **project finance structure**



RiskEase brings together the tools,
training and expertise to *assess risk*
and return in capital investment
decisions and to *excel* in *Project and*
Business Financing

Marketing Analysis and the Assessment of Competitiveness

Savvakis C. Savvides



A market analysis should reveal:

- what are the **fundamental needs** that the project aims to satisfy,
- what are the key **choice factors** on which consumers decide which product or service to buy,
- what **customer groups** is the product or service of the project likely to appeal to and why,
- which are the main **suppliers/competitors** currently providing products and services which aim to satisfy this market need.

Conventional methods for assessing competitive strategy

PEST ANALYSIS

Political <ul style="list-style-type: none"> • Current and Future legislation • International Legislation • Regulatory Bodies and Processes • Government and trading policies • Funding, grants and initiatives • Ecological and Environmental • International/home market pressure-groups and Other conflicts 	Economical <ul style="list-style-type: none"> • Home and overseas economy, economic trends, taxation • Seasonality issues, market/trade cycles • Distribution trends and Customer/end-user drivers • International trade and monetary issues • Interest and Exchange Rates
Social <ul style="list-style-type: none"> • Demographics and regional characteristics • Consumer attitudes and opinions • Lifestyle and trends • Buying access and trends • Consumer buying patterns • Brand, company, technology image • Advertising and Media views • Health issues, Ethnic/religious and ethical factors 	Technological <ul style="list-style-type: none"> • Competing technology development • Research funding and replacement technologies, Maturity of technology • Manufacturing and distribution capacity • Information and communications • Consumer buying mechanisms • Innovation potential, technology access, licensing, patents and intellectual property issues

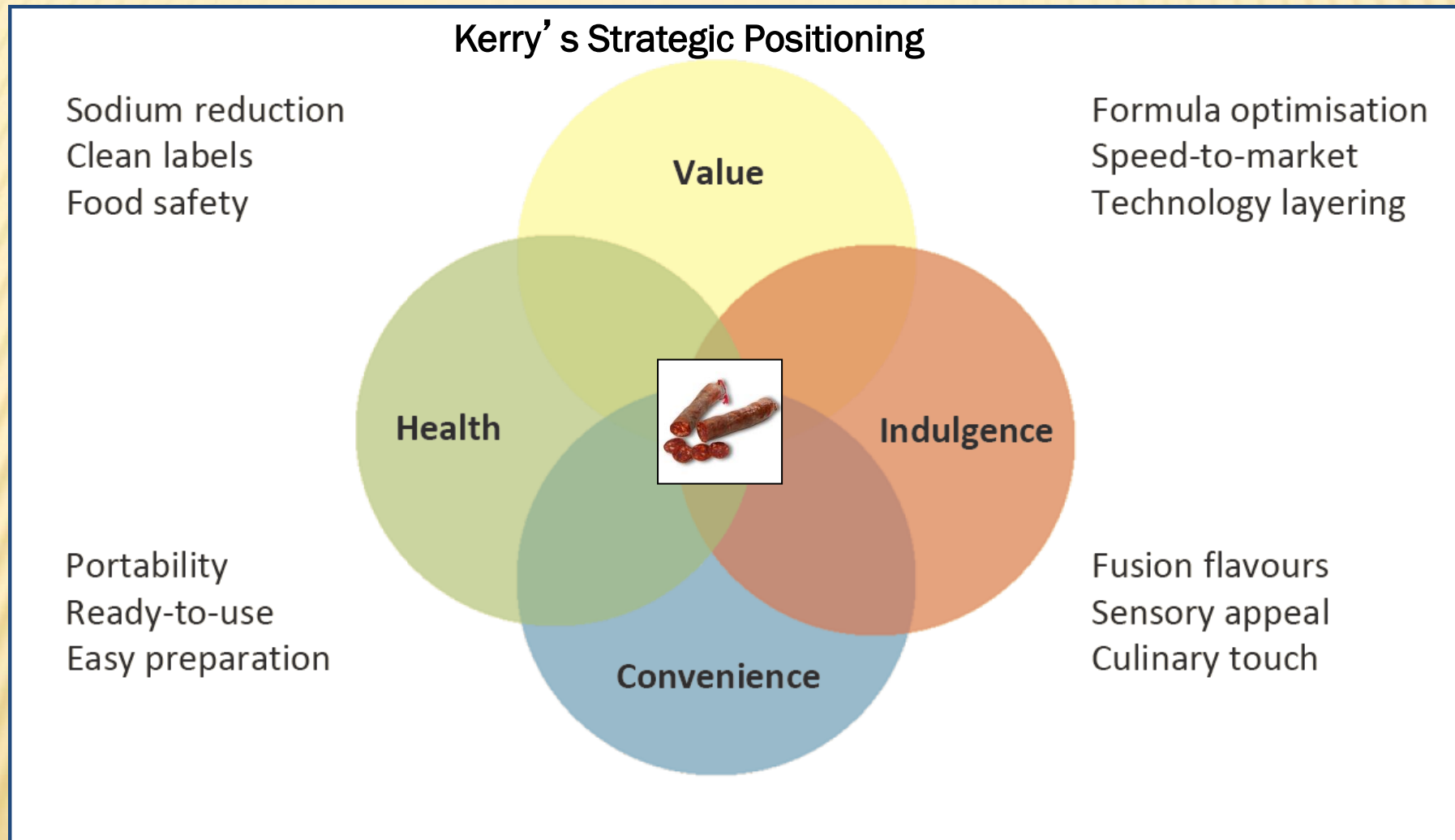
SWOT ANALYSIS

STRENGTHS <ul style="list-style-type: none"> • Differentiated Products from competitors because of their unique flavour • High quality in products • Healthy and natural nutrition products • 60 years since they established their business • Broad product portfolio 	WEAKNESSES <ul style="list-style-type: none"> • Limited working staff • Small company business
OPPORTUNITIES <ul style="list-style-type: none"> • Moving into a new market offers improved profits • In the UK they regularly use sausages. 	THREATS <ul style="list-style-type: none"> • Price wars with competitors • Competitors have superior access to channels of distribution • Taxation is introduced on products. • Small company in an oversaturated market

FIVE FORCES INDUSTRY ANALYSIS



Typical Outcome of Competitive Strategy Analysis



Source: Goodbody Conference, "Kerry Group in Changing Times"

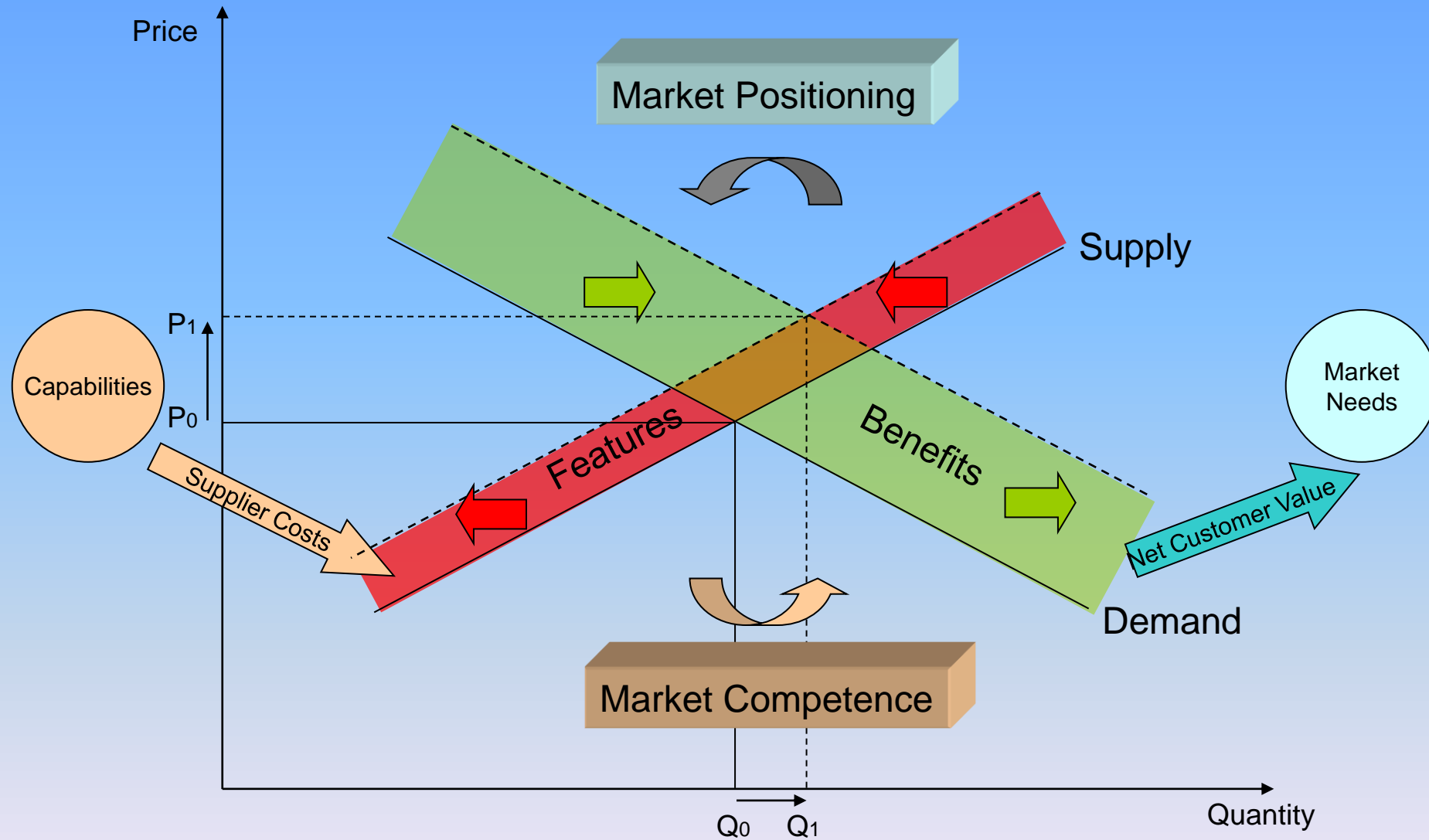
http://www.kerrygroup.com/investor_index.asp, Oct. 2010

A successful project is one that matches
Resources and Capabilities to Market Needs



A Market based Framework for assessing Project Competitiveness in Cost Benefit Analysis

Turning Product Features into Customer Benefits

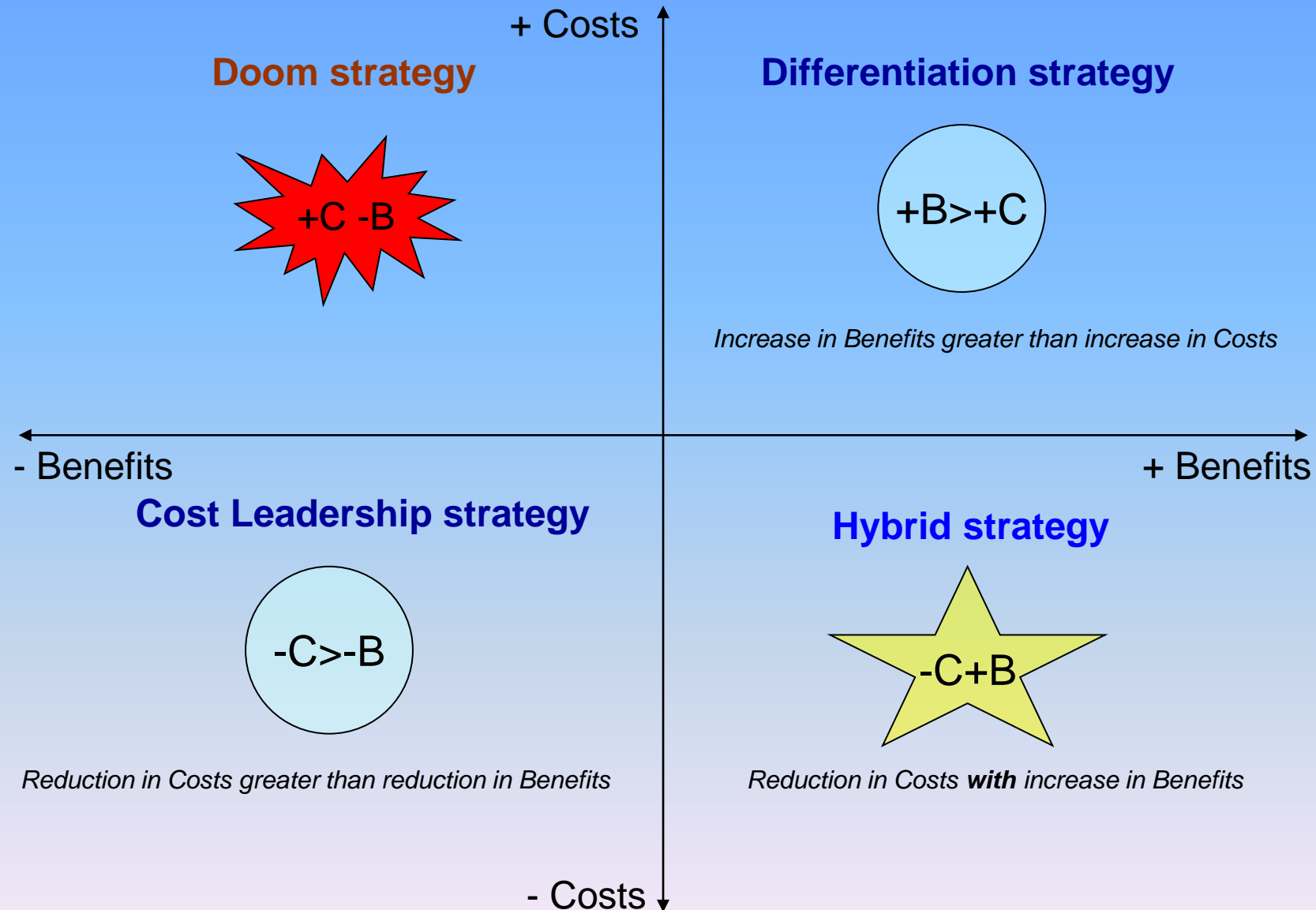


Projected Cash Flows

BASE FINANCIAL MODEL			PROJECTED CASH FLOW - OWNER'S PERSPECTIVE																											
Market Assumptions			Growth Factors		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022											
Relevant Market (Potential Users)	2.00%	GDP per year	1,000,000		1,020,000		1,040,400		1,061,208		1,082,432		1,104,081		1,126,162		1,148,686		1,171,659		1,195,093		1,218,994		1,243,374		1,268,242		1,293,607	
Market Penetration (Users)	IA function	Life Cycle	25%		26%		28%		30%		30%		30%		30%		30%		30%		30%		30%		30%		30%		30%	
Take Up (Usage)			5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0	
Price	3.00%	INF per year	50.00		51.50		53.05		54.64		56.28		57.96		59.70		61.49		63.34		65.24		67.20		69.21		71.29		73.43	
Total Market Segment A			62,500,000		67,823,014		77,940,771		85,935,688		91,216,366		95,975,346		100,849,960		105,954,957		111,316,002		116,946,512		122,855,382		129,036,581		135,421,528		141,683,675	
Relevant Market (Potential Users)	2.00%	GDP per year	15,000		15,300		15,606		15,918		16,236		16,561		16,892		17,230		17,575		17,926		18,285		18,651		19,024		19,404	
Market Penetration (Users)	IA function	Life Cycle	30%		33%		43%		49%		50%		50%		50%		50%		50%		50%		50%		50%		50%		49%	
Take Up (Usage)			15.0		15.0		15.0		15.0		15.0		15.0		15.0		15.0		15.0		15.0		15.0		15.0		15.0		15.0	
Price	3.00%	INF per year	79.60		81.99		84.45		86.98		89.59		92.28		95.05		97.90		100.83		103.86		106.98		110.19		113.49		116.90	
Total Market Segment B			6,373,000		6,263,991		8,496,864		10,087,692		10,865,299		11,456,184		12,041,101		12,650,950		13,291,009		13,962,938		14,666,992		15,399,031		16,136,870		16,784,273	
Relevant Market (Potential Users)	2.00%	GDP per year	50,000		51,000		52,000		53,000		54,122		55,204		56,305		57,434		58,583		59,755		60,950		62,169		63,412		64,680	
Market Penetration (Users)	IA function	Life Cycle	25%		27%		35%		39%		40%		40%		40%		40%		40%		40%		40%		40%		40%		39%	
Take Up (Usage)			30.0		30.0		30.0		30.0		30.0		30.0		30.0		30.0		30.0		30.0		30.0		30.0		30.0		30.0	
Price	3.00%	INF per year	43.40		44.70		46.04		47.42		48.85		50.31		51.82		53.38		54.98		56.63		58.33		60.08		61.88		63.73	
Total Market Segment C			16,275,000		18,786,309		24,959,931		29,387,633		31,602,966		33,314,145		34,914,107		36,717,375		38,648,601		40,602,595		42,650,350		44,780,894		46,934,077		48,847,891	
Relevant Market (Potential Users)	2.00%	GDP per year	30,000		30,600		31,212		31,836		32,471		33,122		33,785		34,461		35,150		35,853		36,570		37,301		38,047		38,808	
Market Penetration (Users)	IA function	Life Cycle	50%		53%		63%		69%		70%		70%		70%		70%		70%		70%		70%		70%		70%		69%	
Take Up (Usage)			50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0	
Price	3.00%	INF per year	148.60		153.06		157.65		162.39		167.25		172.21		177.34		182.76		188.24		193.89		199.71		205.70		211.87		218.22	
Total Market Segment D			111,450,000		124,794,627		154,953,875		177,242,463		189,635,976		199,638,023		208,837,978		220,428,055		231,550,731		243,291,298		255,571,084		268,377,147		281,442,382		293,578,543	
Total Project Market - Volume			2,442,500		2,628,952		3,094,949		3,400,950		3,522,392		3,600,900		3,678,978		3,757,505		3,836,342		3,915,501		3,995,001		4,074,836		4,155,001		4,235,501	
Total Project Market - Value			195,598,000		217,667,941		266,351,441		302,653,446		323,220,620		340,383,699		357,710,005		375,821,337		394,836,342		414,803,342		435,743,808		457,593,654		479,934,857		500,894,382	
Cash Inflows																														
From Operations			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022													
Revenues			195,598,000	217,667,941	266,351,441	302,653,446	323,220,620	340,383,699	357,710,005	375,821,337	394,836,342	414,803,342	435,743,808	457,593,654	479,934,857	500,894,382														
Other Income																														
Total from operations			195,598,000	217,667,941	266,351,441	302,653,446	323,220,620	340,383,699	357,710,005	375,821,337	394,836,342	414,803,342	435,743,808	457,593,654	479,934,857	500,894,382														
Residual values																														
Land																	302,517,945													
Buildings																	233,325,011													
Electromechanical																	16,091,380													
Furnishings/Equipment																	2,562,552													
Loans			450,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Total Cash Inflows			645,598,000	217,667,941	266,351,441	302,653,446	323,220,620	340,383,699	357,710,005	375,821,337	394,836,342	414,803,342	435,743,808	457,593,654	479,934,857	500,894,382	554,496,888													
Cash Outflows																														
Capital Investment																														
Land			200,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Buildings			250,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Electromechanical			200,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Furnishings & Equipment			55,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Preliminary and preoperational			45,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Operating expenditure																														
Payroll and Staff			75,000,000	77,250,000	79,567,500	81,954,525	84,413,161	86,945,556	89,553,922	92,240,540	95,007,756	97,857,989	100,793,728	103,817,540	106,932,067	110,140,029														
Administration			10,000,000	10,200,000	10,404,000	10,612,080	10,824,322	11,040,808	11,261,624	11,488,857	11,716,594	11,950,926	12,189,944	12,433,743	12,682,418	12,936,066														
Electricity and Fuel			7,500,000	7,725,000	7,956,750	8,195,453	8,441,316	8,694,556	8,955,392	9,224,054	9,500,776	9,785,799	10,079,373	10,381,754	10,693,207	11,014,003														
Water			3,000,000	3,090,000	3,182,700	3,278,181	3,376,526	3,477,822	3,582,157	3,689,622	3,800,310	3,914,320	4,031,749	4,152,702	4,277,283	4,405,601														
Postages and Telephone			1,000,000	1,030,000	1,060,900	1,092,727	1,125,509	1,159,274	1,194,052	1,229,874	1,266,770	1,304,773	1,343,916	1,384,234	1,425,761	1,468,534														
Maintenance			7,050,000	7,120,500	7,263,622	7,483,717	7,787,586	8,184,831	8,688,363	9,315,101	10,086,920	11,031,916	12,186,098	13,595,644	15,319,912	17,435,489														
Sales and Distribution			25,000,000	25,625,000	26,265,625	26,922,266	27,595,322	28,285,205	28,992,335	29,717,144	30,460,072	31,221,574	32,002,114	32,802,166	33,622,221	34,462,776														
Advertising and Promotion			30,000,000	25,698,544	22,176,810	19,293,458	16,932,769	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000														
Corporate taxation			2,186,050	3,356,640	2,540,115	6,422,677	8,684,273	10,567,779	12,279,535	14,074,798	15,802,906	17,276,796	18,814,880	20,405,779	26,934,369	28,339,359														
Accounts receivable (change)			16,299,833	1,839,162	4,056,958	3,025,167	1,713,931	1,430,257	1,443,859	1,509,278	1,584,584	1,663,917	1,745,039	1,820,820	1,861,767	1,746,627	-41,741,198													
Accounts payable (change)			-26,789,342	-59,939	112,944	-806,177	-654,283	-695,841	-1,025,258	-1,078,435	-1,110,686	-1,116,998	-1,182,952	-1,255,293	-2,152,279	-1,385,770	39,200,309													
Cash reserves (change)			391,196	44,140	97,367	72,604	41,134	34,326	34,653	36,223	38,030	39,934	41,881	43,700	44,682	41,919	-1,001,789													
Loan repayments																														
Loans - interest payments			15,187,500	26,362,496	23,104,303	19,626,183	15,913,290	11,949,776	7,718,726	3,202,079	0	0	0	0	0	0	0													
Loan - principal payments			59,444,510	48,269,514	51,527,706	55,005,827	58,718,720	62,682,233	66,913,284	47,438,206	0	0	0	0	0	0	0													
Total Cash Outflows			1,175,269,747	237,551,057	239,317,300	242,178,687	244,913,576	248,756,582	254,592,644	237,085,340	193,154,032	199,930,945	207,045,771	214,582,789	226,641,407	235,604,632	-3,542,678													
Net Cash Flow			-529,671,747	-19,883,116	27,034,140	60,474,759	78,307,045	91,627,117	103,117,361	138,735,997	201,682,310	214,872,397	228,698,037	243,010,865	253,293,450	265,289,749	558,039,566													
Net Present Value			105,408,062	Internal Rate of Return												17.4%														

The Project's Competitive Strategy

The Project's Competitive Strategy Matrix



Checklist of questions to test the robustness of the projections

- ✓ What is the market need the projects aims to satisfy?
- ✓ What is the project relevant market?
- ✓ What is the market size?
- ✓ How is the market segmented?
- ✓ Who are the project's prime competitors?
- ✓ Which are the project capabilities?
- ✓ What is the target market of the project?
- ✓ What is the market performance gap the project will fill?
- ✓ How is the project positioned in the market?
- ✓ What is the competitive advantage of the project?
- ✓ Is the competitive advantage sustainable?
- ✓ Will the project generate net customer value and a market expansion?
- ✓ Do the cash flow projections accurately reflect the marketing analysis findings and the selected competitive strategy for the project?

Conclusions (and things to remember):

- You do not **build a project** and then **look for a market**.
- You first identify a **performance gap in the market** for which you can attain a competitive advantage and then formulate the project around this.
- For any competitive strategy selected it is imperative to identify the **key success factors** and critically assess whether the project as formulated and with the resources and capabilities it has at its disposal can satisfy these.
- The capital investment and operational **business plan** change with the selection of a particular **target market** and **competitive strategy**.
- The underlying business plan as expressed in the projected cash flows should remain **coherent and consistent** during a Monte Carlo Simulation.



*The strategic appraisal of the project must
answer two fundamental questions:*

- What is the project's competitive advantage?
- Is it sustainable over the life of the project?

Risk Analysis in Investment Appraisal

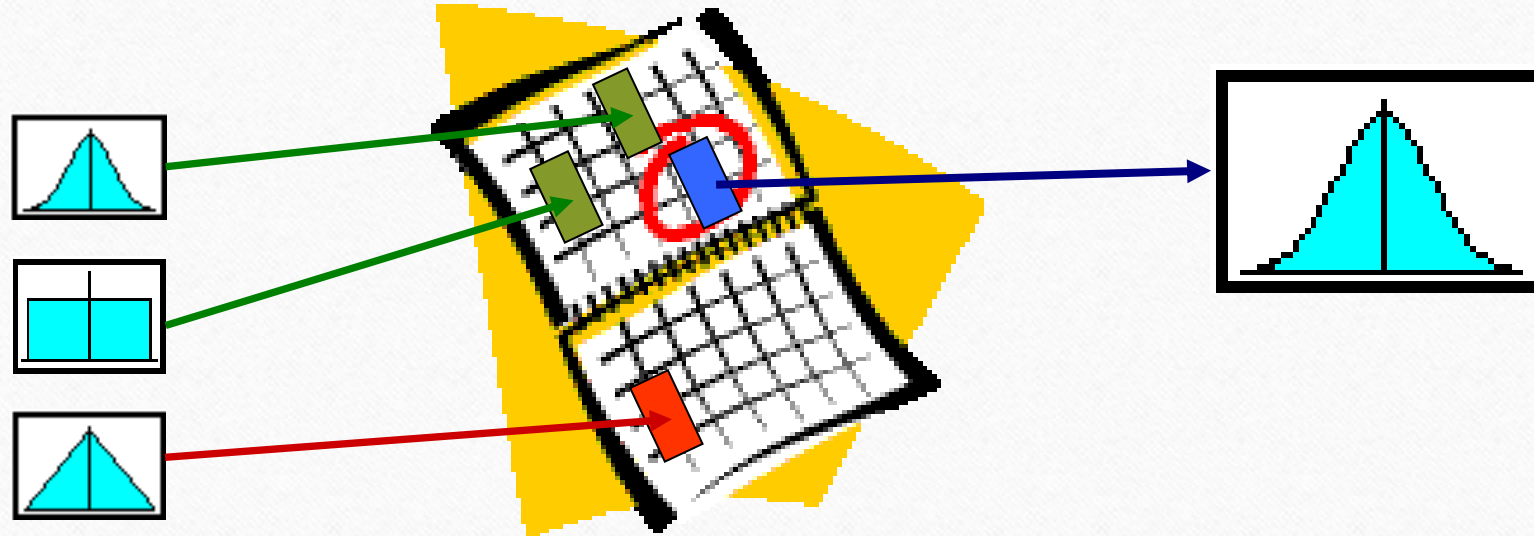


Savvakis C. Savvides

RiskEase©

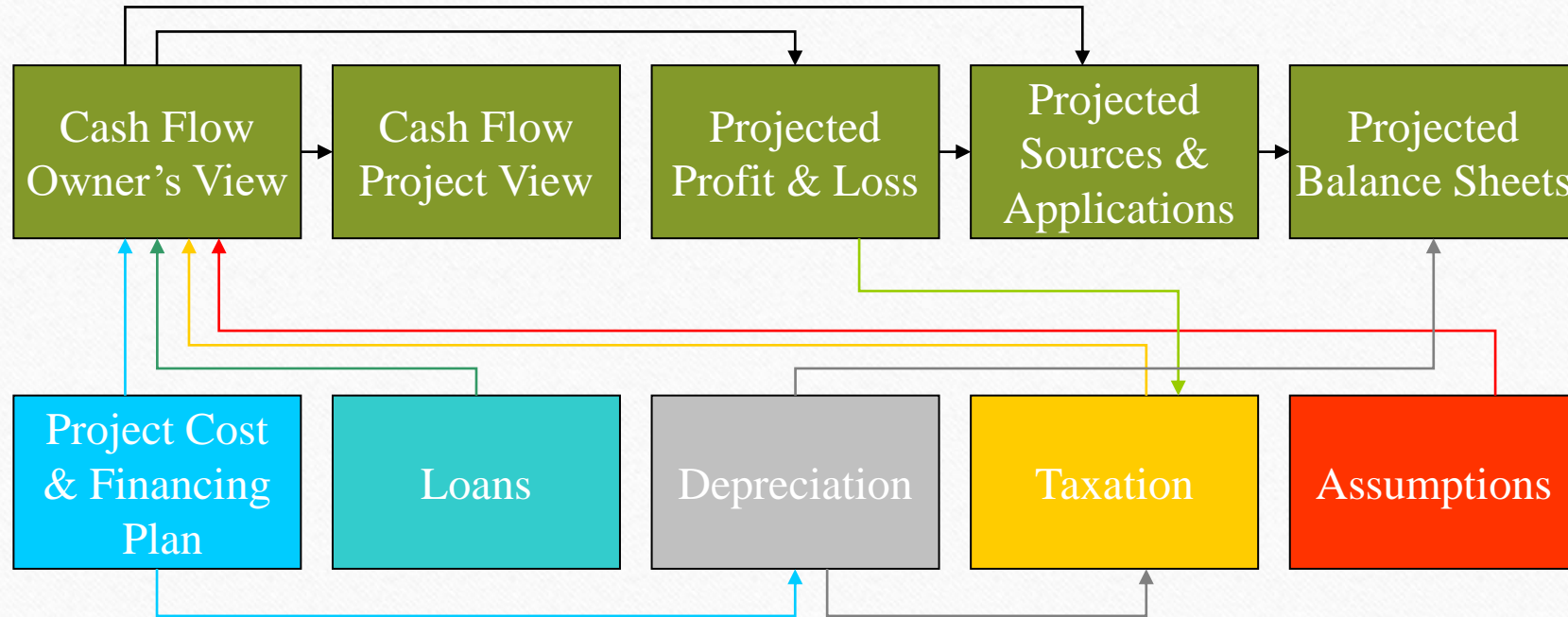
Monte-Carlo Simulation

- Monte Carlo simulation is a methodology that handles the complexity arising from projecting **multi-valued probability distributions** as inputs to a model.
- Practically this is only possible to be applied through the use of a computer and **specialised software** – such as **RiskEase**.

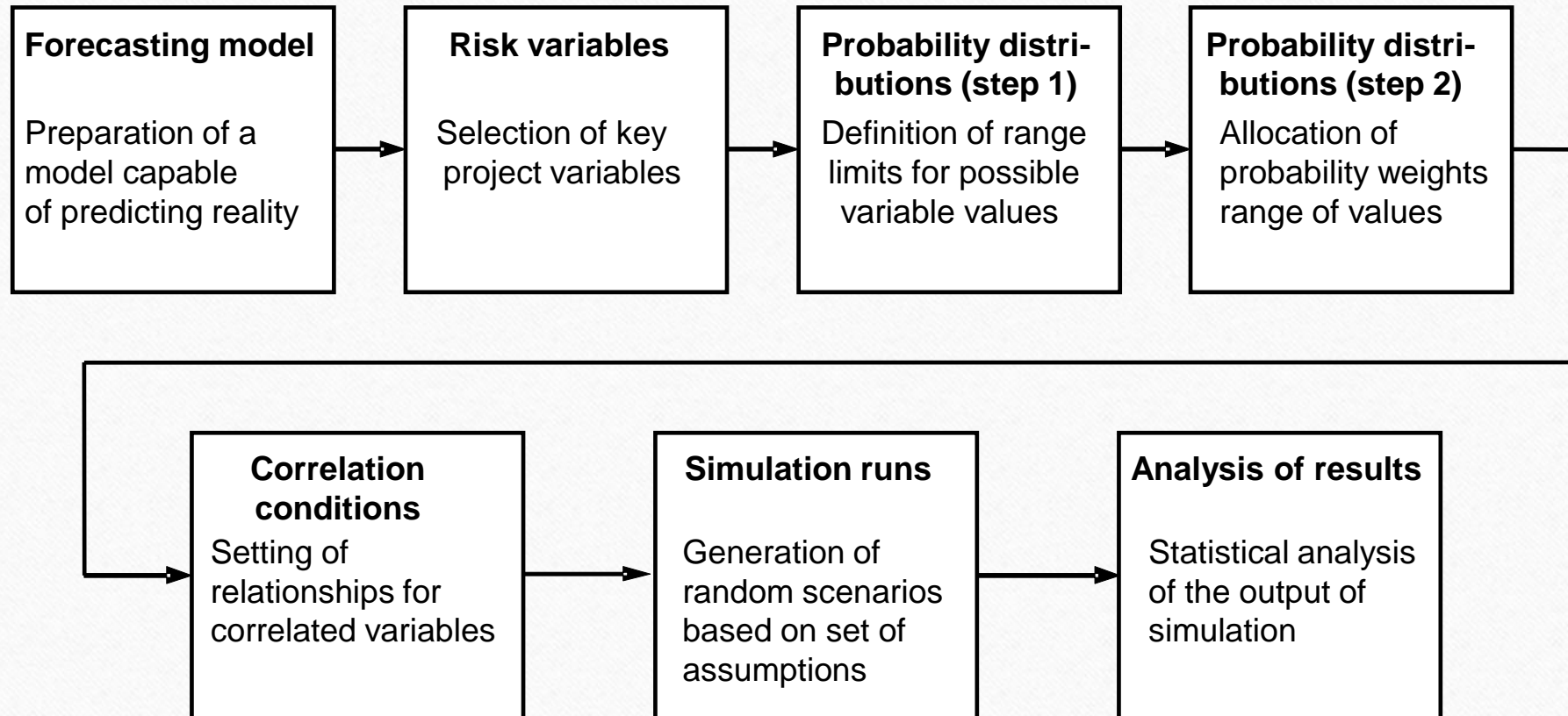


The projected outcome should be the expected value of the scenarios generated through the model after allowing all input probability distributions to impact it

The Financial Model



The Risk Analysis Process



The Monte-Carlo Simulation process

1. Identify the critical/most uncertain input variables in a projected model – **risk variables**.
2. Substitute single-value assumptions with **probability distributions** which tend to express the possible variability for each of the identified risk variables.

The Monte-Carlo Simulation process

3. **Set correlation** conditions to limit the possibility of generating internally inconsistent scenarios during a simulation.
4. Identify the critical calculated results you wish to apply the analysis on – **model results**.

The Monte-Carlo Simulation process

5. **Run simulation** creating a sample of computer scenarios based on inputs from the probability distributions and with respect to any correlation conditions set.
6. **Analyse results** generated in the simulation run, calculating statistical measures and plotting probability distribution graphs of the results, which indicate all the potential outcomes and their likelihood of occurrence.

Using multi-valued probability distributions as inputs

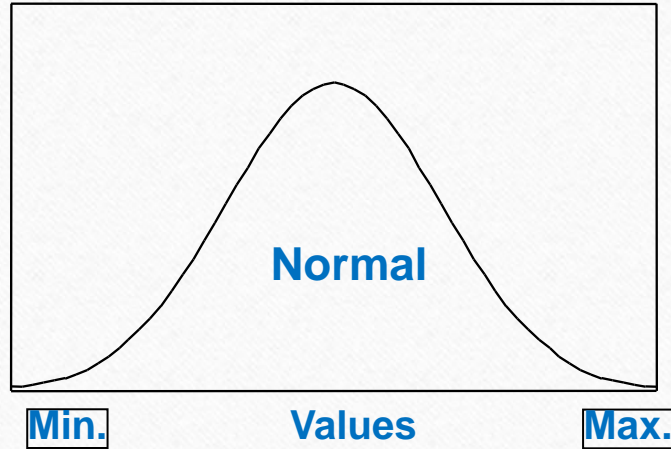
- Any possible deviation in any of the critical input variables of a predictive model will generate a new scenario with a different outcome (or outcomes).
- There are potentially an **infinite number** of combinations of input values possible, each causing a different set of results/outcomes.

Monte-Carlo Simulation

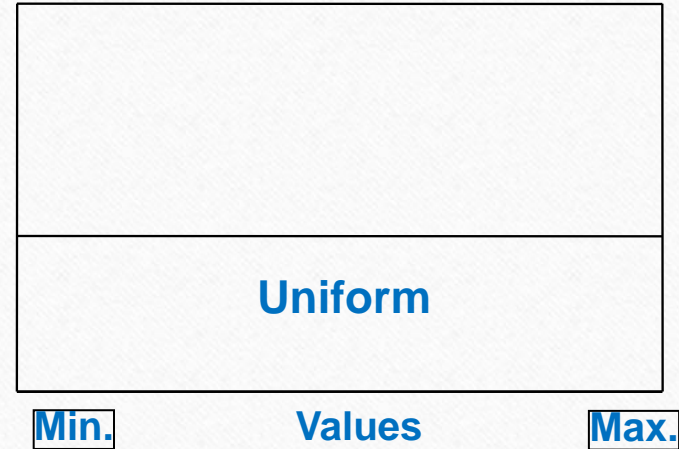
- Monte Carlo simulation is a methodology that handles the complexity arising from projecting multi-valued probability distributions as inputs to a model.
- Practically this is only possible to be applied through the use of a computer and specialised software – such as **RiskEase**.

Multi-valued probability distributions

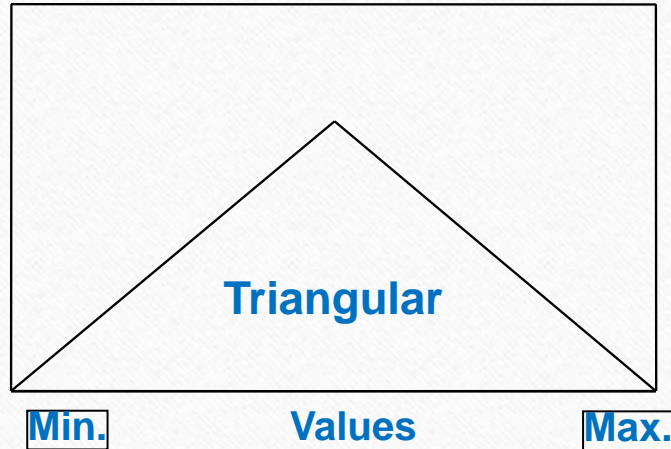
Probability



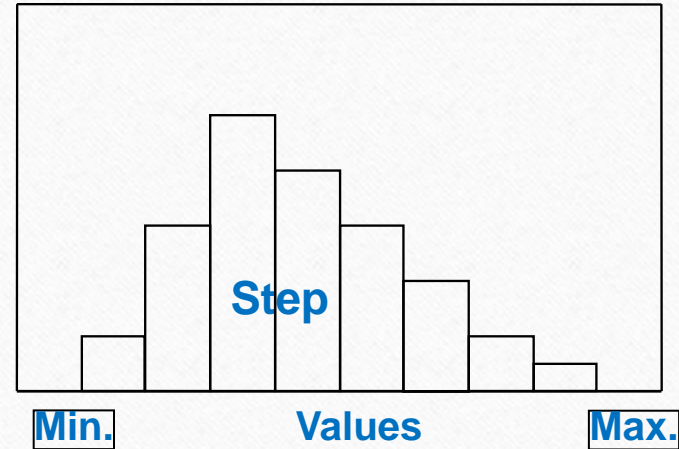
Probability



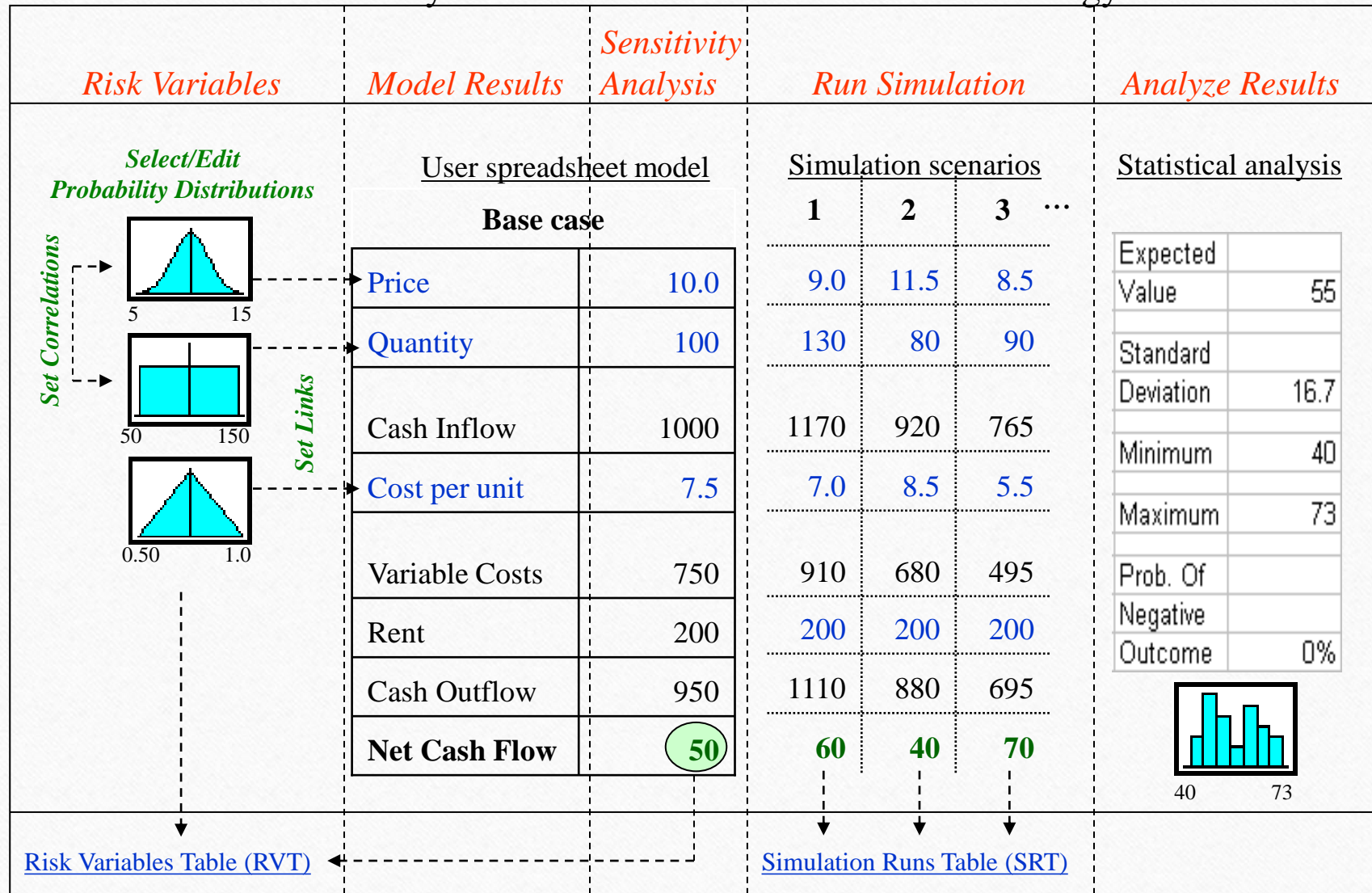
Probability



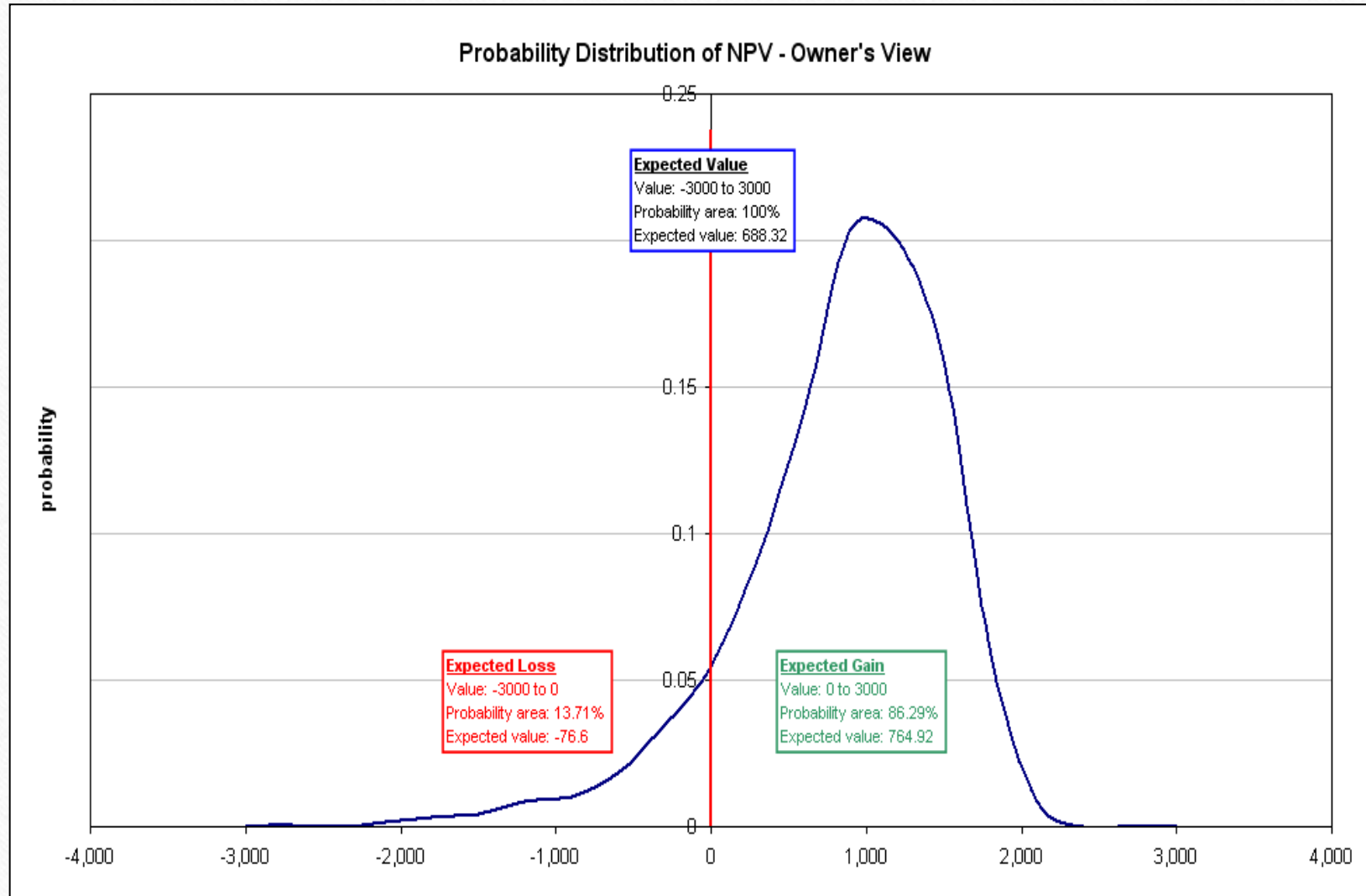
Probability



Risk Analysis – Monte Carlo Simulation Methodology



Risk Analysis generated Net Present Value distribution



Advantages of risk analysis

1. It enhances decision making on marginal projects.
2. It screens new project ideas and aids the identification of investment opportunities.
3. It highlights project areas that need further investigation and guides the collection of information.
4. It aids the reformulation of projects to suit the attitudes and requirements of the investor.
5. It induces the careful re-examination of the single-value estimates in the deterministic appraisal.
6. It helps reduce project evaluation bias through eliminating the need to resort to conservative estimates.

Advantages of risk analysis (cont.)

7. It facilitates the thorough use of experts.
8. It bridges the communication gap between the analyst and the decision maker.
9. It supplies a framework for evaluating project result estimates.
10. It provides the necessary information base to facilitate a more efficient allocation and management of risk among various parties involved in a project.
11. It makes possible the identification and measurement of explicit liquidity and repayment problems in terms of time and probability that these may occur during the life of the project.

Finally two words of caution:

- Overlooking significant inter-relationships among the projected variables can distort the results of risk analysis and lead to misleading conclusions.
- The accuracy of the results of risk analysis can only be as good as the predictive capacity of the model employed.

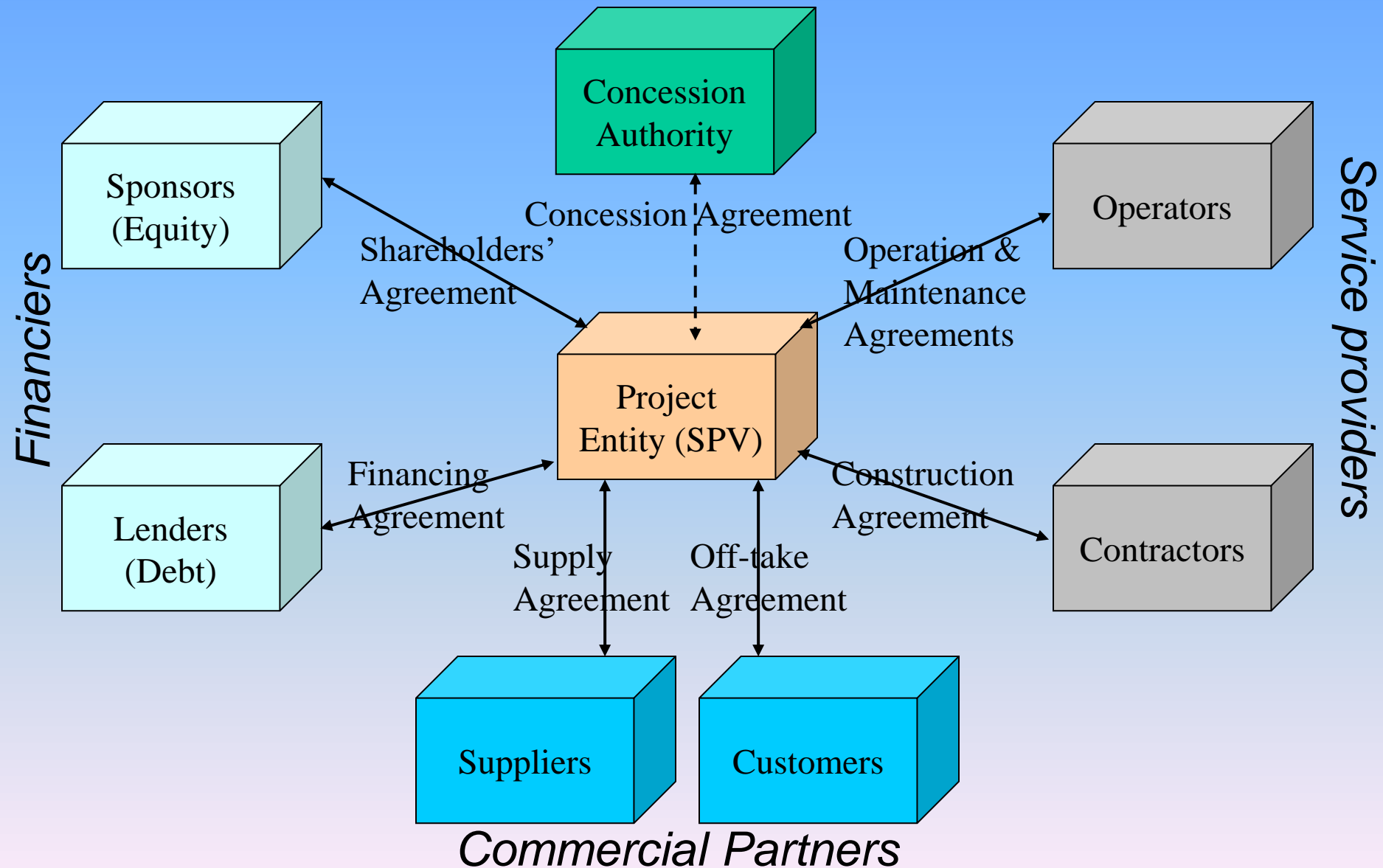
Project Risk and Contracting (Guarantees and Undertakings)



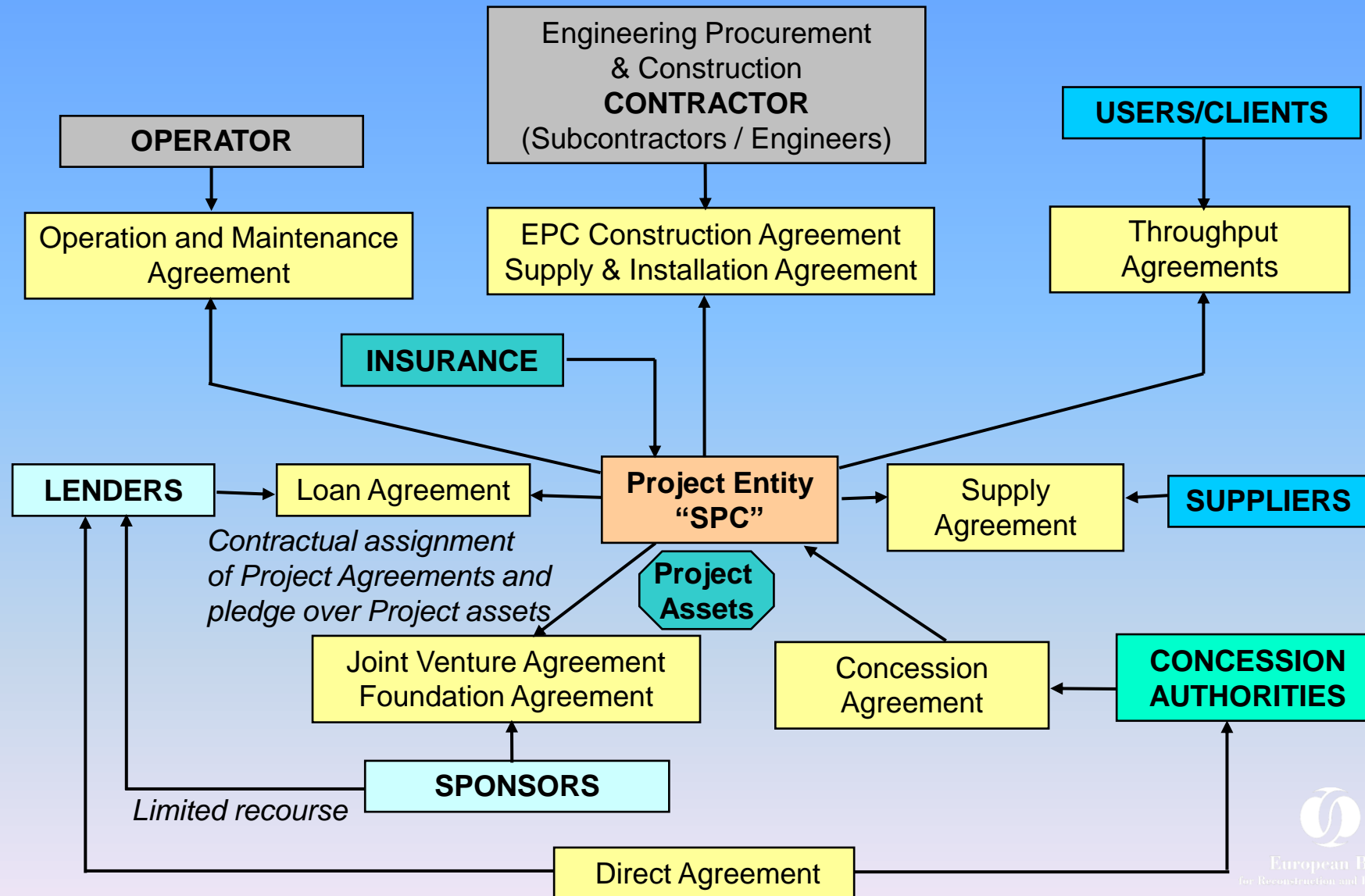
- An objective of project financing is to combine and amalgamate various kinds of guarantees and undertakings from interested parties so that:
- The financial burden or risk of any one party will not be too onerous,
- But the combined guarantees and undertakings of all the parties will amount to a bankable credit.

Public Private Partnership (PPP) Set-up

Project Financing Set-up



Risk transference through Contracts



Source: EBRD

Evaluating and pricing contracts

A public sector concession in a
Public Private Partnership (PPP)

The Evaluation of a guarantee
in a Motorway Project

An example:

Using the *Integrated Financial Model (IFM)* and **RiskEase**

RiskEase Ltd.

Motorway Project

Methodology

RiskEase Ltd.

Motorway Project Case

- The financial model employed is based on a real **motorway project** in Greece. Some of the values have been changed but the basic format of the financial model remain in tact.
- The project assumed that a Government guarantee will be in place to cover a large part of the downside risk of the Project Owner.
- It uses the **Integrated Financial Model**® (**IFM**) by **RiskEase Ltd** to model the motorway project and **RiskEase Master Edition** to run the simulations and do the analysis on the results.
- *Some of the figures have been changed to maintain the disclosure requirements. But the basic structure and format of the financial model is basically the same as the one used when appraised with the view of participating in its financing.*

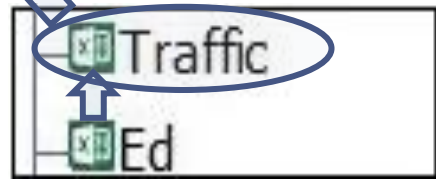
Structuring the **Financial Model** to evaluate **risk and return** without and with the guarantee

Integrated **Financial Model**

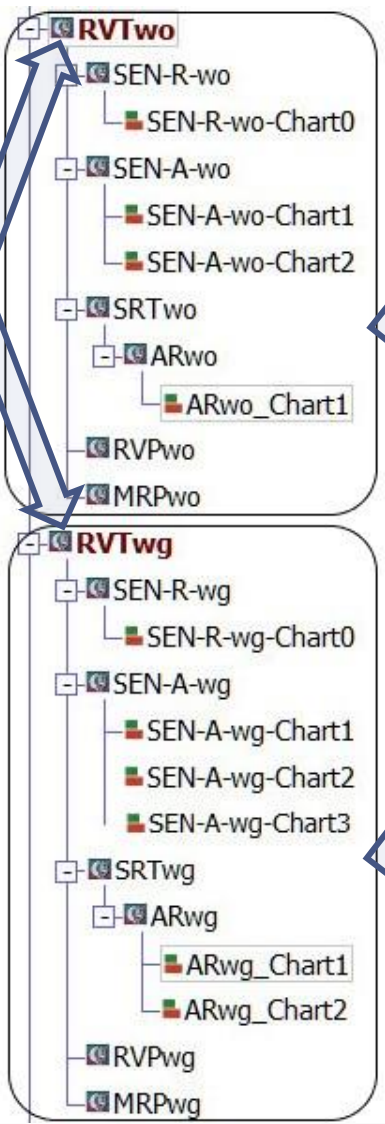
- CF-Owner
- CF-Project
- PL
- BS
- SAF
- Plan
- Loans
- Depr
- Tax
- Assumptions

Switchable modes: Without (wo) and With (wg) guarantee

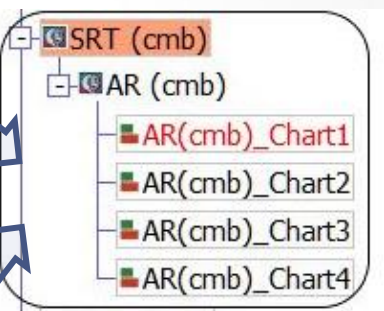
31	Guaranteed trips	65,000,000	Without Guarantee
32			With Guarantee
33	Trips without Guarantee		Without Guarantee



Risk Analysis

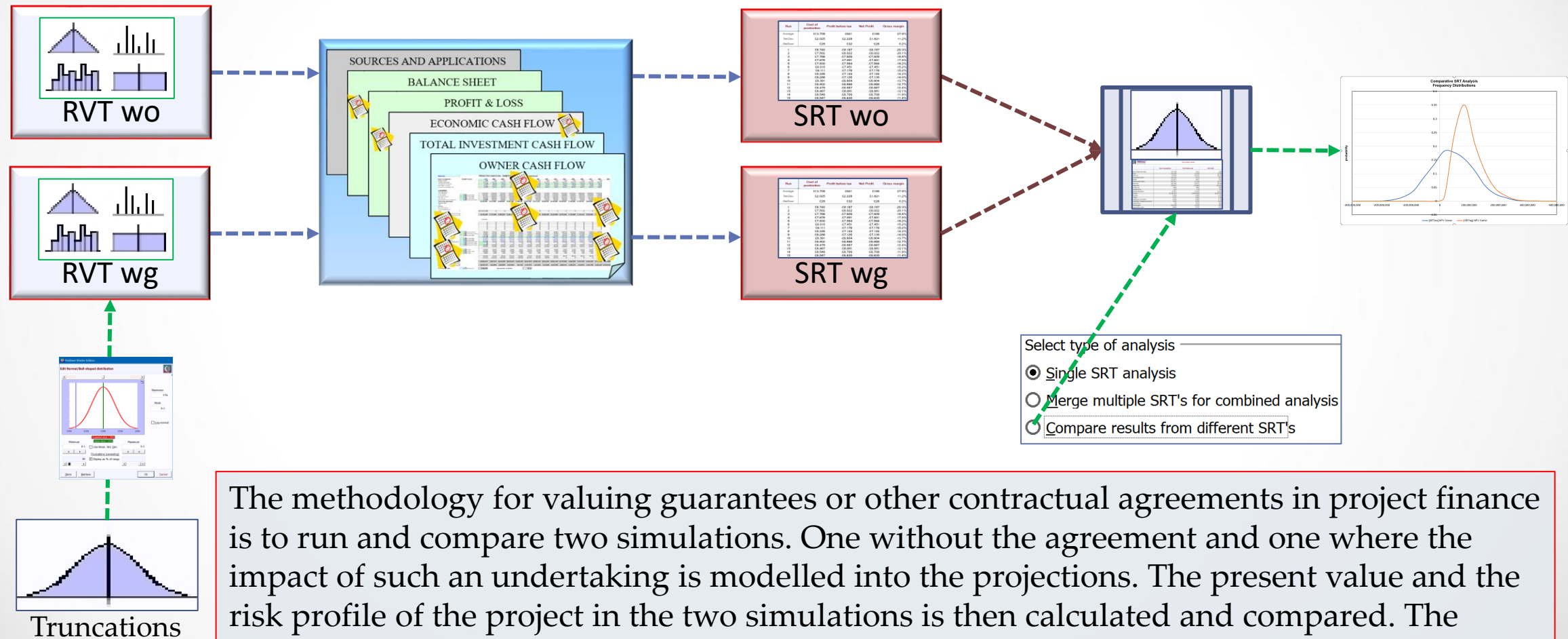


Combined Results and Evaluation of guarantee



Using RiskEase to Evaluate and Price contracts and guarantees

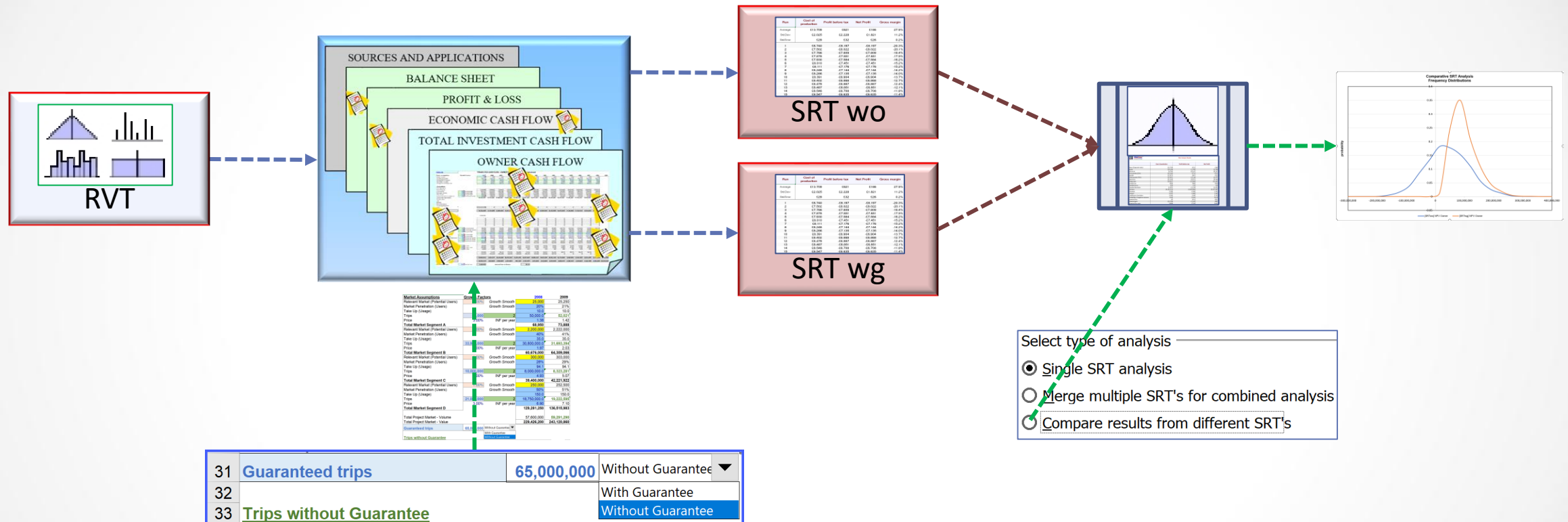
1. Setting Truncations to risk variables and modelling its impact in the Financial Model



The methodology for valuing guarantees or other contractual agreements in project finance is to run and compare two simulations. One without the agreement and one where the impact of such an undertaking is modelled into the projections. The present value and the risk profile of the project in the two simulations is then calculated and compared. The value of the contract is the difference in the two expected NPVs.

Using RiskEase to Evaluate and Price contracts and guarantees

2. Modelling with and without guarantees for contracts that have outputs as triggers



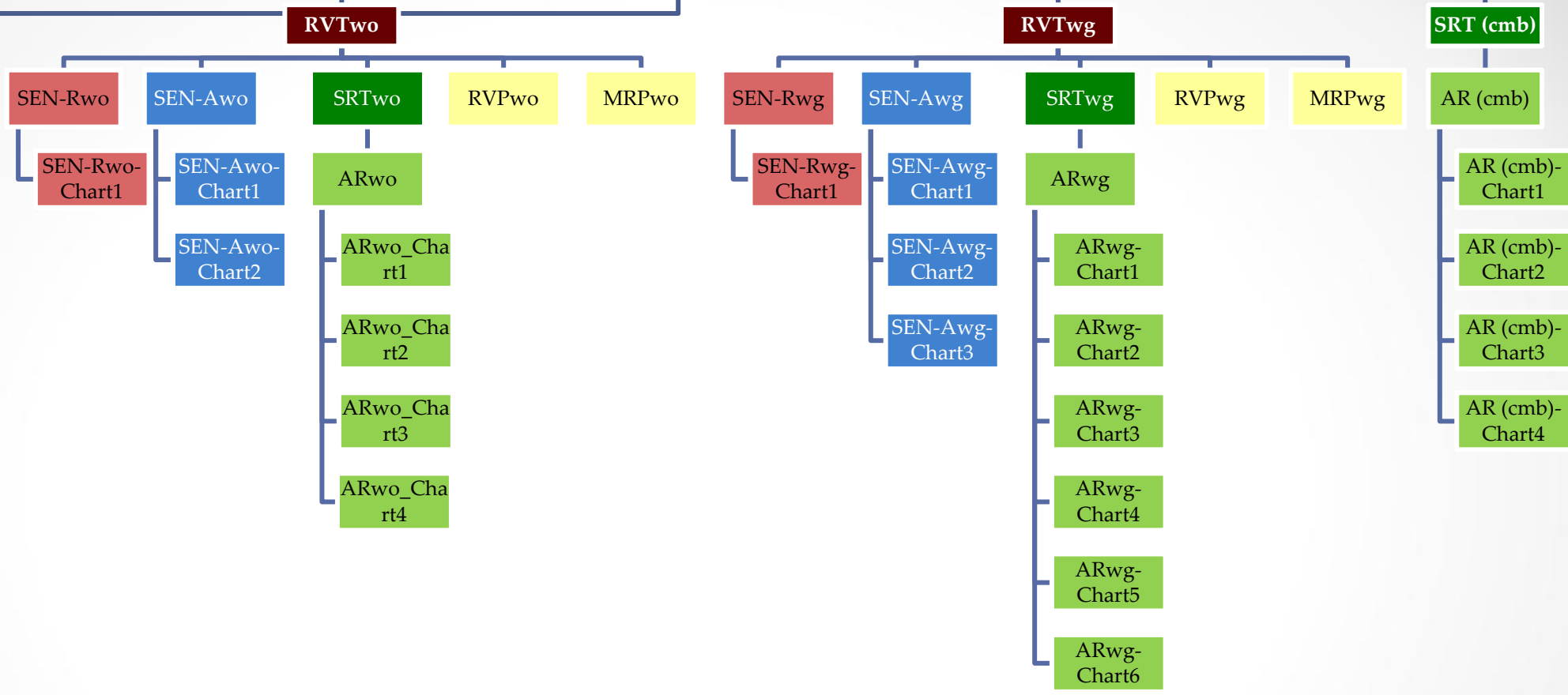
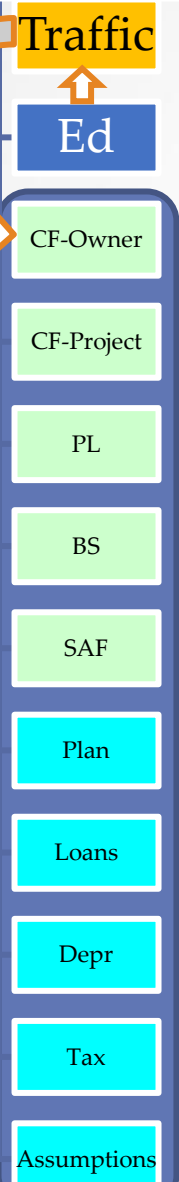
Using a drop down menu form and if statements in Excel sets up the affected cash flows to two states. One **without the guarantee** and one **with the guarantee**. The financial model runs in two modes where a trigger switches from one to the other. In the **With Guarantee** mode the assumptions about the guarantee set are allowed to affect the outcome. It is also possible to estimate the cost/price of the guarantee from the estimation of the annual payments that are thus calculated and stored in a Monte Carlo simulation process.

Motorway Project

Calculates
Without (wo)
and
With (wg)
the Guarantee

Integrated
Financial
Model[®]

Financial Model



Calculates
Without (wo)
and
With (wg)
the Guarantee

Traffic

Ed

CF-Owner

CF-Project

PL

BS

SAF

Plan

Loans

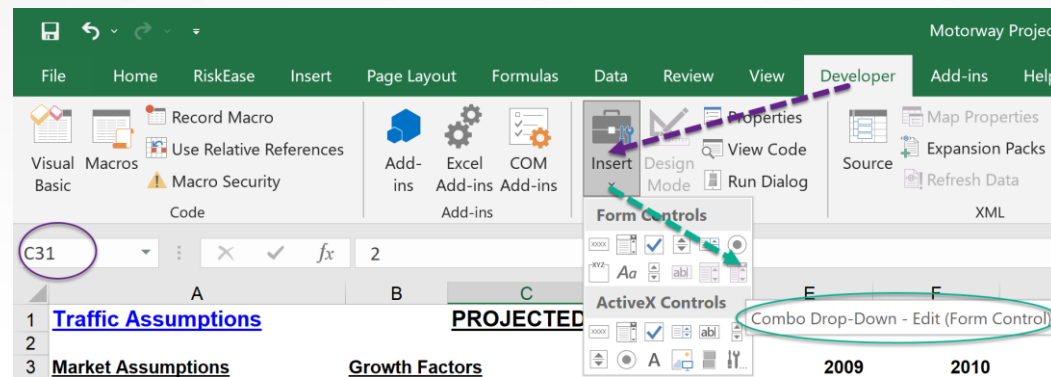
Depr

Tax

Assumptions

Motorway
Project

Integrated
Financial
Model®



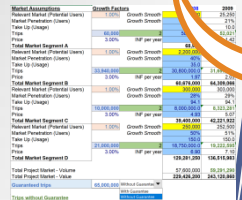
	A	B	C	D	E	F	G	H
1	Traffic Assumptions		PROJECTED CASH FLOW					
2								
3	Market Assumptions	Growth Factors		2008	2009	2010	2011	2012
4	Relevant Market (Potential Users)	1.00%	Growth Smooth	26,500	26,765	27,033	27,303	27,576
5	Market Penetration (Users)		Growth Smooth					
6	Take Up (Usage)							
7	Trips	100,000	2					
8	Price	3.00%	INF per year					
9	Total Market Segment A							
10	Relevant Market (Potential Users)	1.00%	Growth Smooth					
11	Market Penetration (Users)		Growth Smooth					
12	Take Up (Usage)							
13	Trips	35,000,000	2					
14	Price	3.00%	INF per year					
15	Total Market Segment B							
16	Relevant Market (Potential Users)	1.00%	Growth Smooth					
17	Market Penetration (Users)		Growth Smooth					
18	Take Up (Usage)							
19	Trips	10,900,000	2					
20	Price	3.00%	INF per year					
21	Total Market Segment C							
22	Relevant Market (Potential Users)	1.00%	Growth Smooth					
23	Market Penetration (Users)		Growth Smooth					
24	Take Up (Usage)							
25	Trips	9,000,000	2					
26	Price	3.00%	INF per year					
27	Total Market Segment D							
28								
29	Total Project Market - Volume							
30	Total Project Market - Value							
31	Guaranteed trips	55,000,000	Without Guarantee					
32								

Setting up the Traffic sheet to
apply the With or Without
the Guarantee modes using a
drop down menu.

	AA	AB
1	With Guarantee	
2	Without Guarantee	
3		

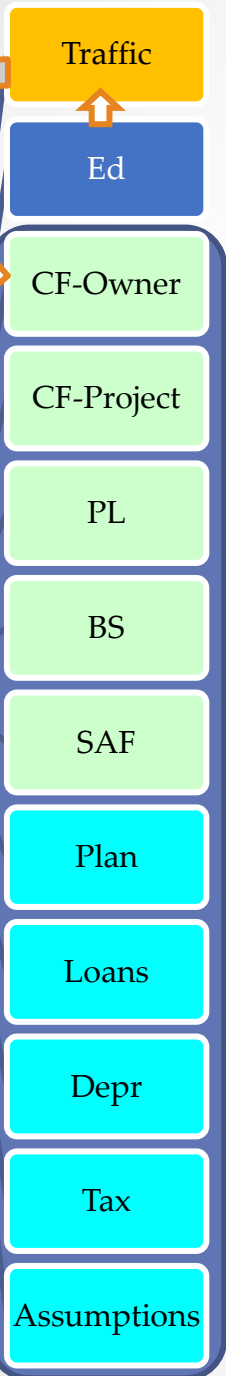
Makes current the value 1 if the first label
stored in cell AA1 "With Guarantee" is
selected or the value 2 if the second choice
label stored in AA2 "Without Guarantee" in
the drop down menu is selected.

Calculates
Without (wo)
and
With (wg)
the Guarantee



Motorway
Project

Integrated
Financial
Model®

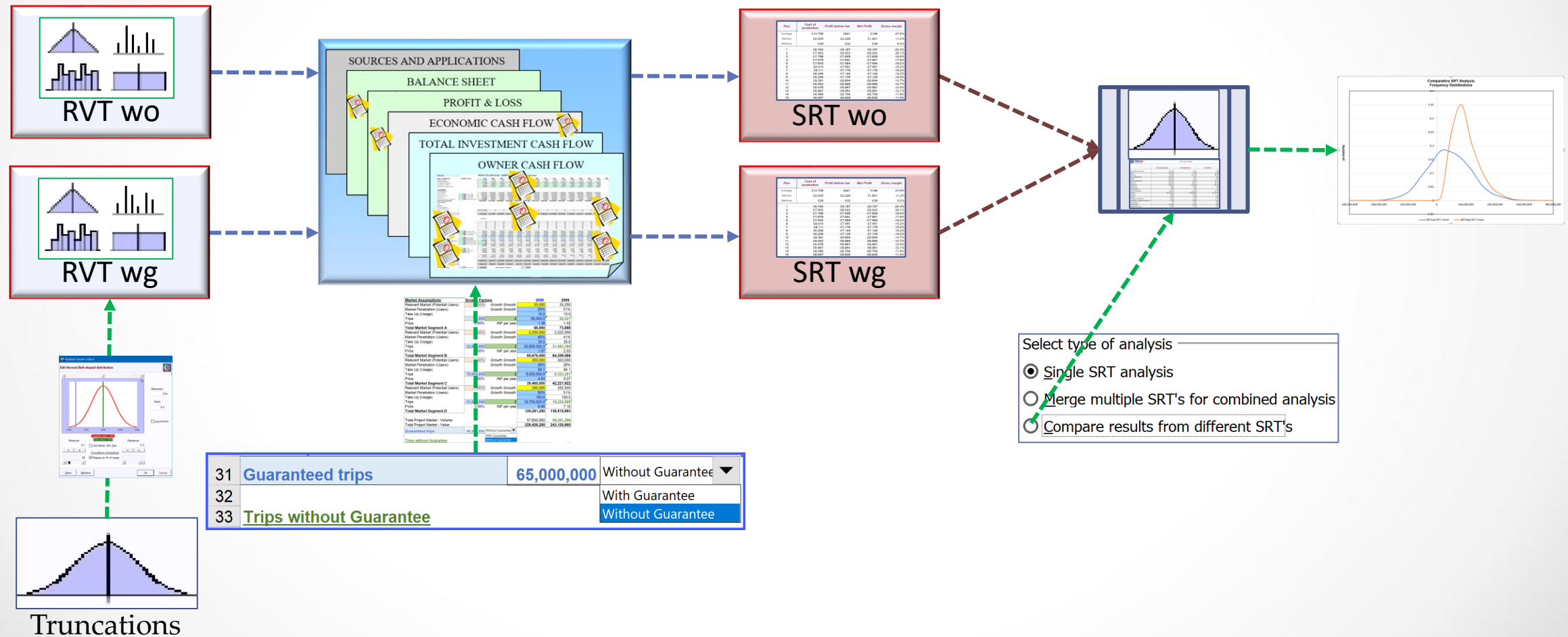


E7					=IF(\$C\$7=1,IF(\$B7>(E4*E5*E6),\$B7,(E4*E5*E6)),(E4*E5*E6))	
	A	B	C	D	E	F
1	<u>Traffic Assumptions</u>					
2						
3	<u>Market Assumptions</u>	<u>Growth Factors</u>		<u>2008</u>	<u>2009</u>	<u>2010</u>
4	Relevant Market (Potential Users)	1.00%	Growth Smooth	26,500	26,765	27,033
5	Market Penetration (Users)		Growth Smooth	20%	21%	21%
6	Take Up (Usage)			10.0	10.0	10.0
7	Trips	100,000	2	53,000.0	55,142	57,166
8	Price	3.00%	INF per year	1.38	1.42	1.46
9	<u>Total Market Segment A</u>			73,087	78,322	83,633
10	Relevant Market (Potential Users)	1.00%	Growth Smooth	2,200,000	2,222,000	2,244,220
11	Market Penetration (Users)		Growth Smooth	38%	39%	40%
12	Take Up (Usage)			35.0	35.0	35.0
13	Trips	35,000,000	2	29,260,000.0	30,372,152	324,850
14	Price	3.00%	INF per year	1.97	2.03	2.09
15	<u>Total Market Segment B</u>			57,642,200	61,628,133	65,677,088
16	Relevant Market (Potential Users)	1.00%	Growth Smooth	302,500	305,525	308,580
17	Market Penetration (Users)		Growth Smooth	28%	29%	30%
18	Take Up (Usage)			93.8	93.8	93.8
19	Trips	10,900,000	2	8,000,000.0	8,331,128	8,643,942
20	Price	3.00%	INF per year	4.93	5.07	5.22
21	<u>Total Market Segment C</u>			39,400,000	42,261,732	45,164,016
22	Relevant Market (Potential Users)	1.00%	Growth Smooth	251,000	253,510	256,045
23	Market Penetration (Users)		Growth Smooth	35%	38%	41%
24	Take Up (Usage)			149.8	149.8	149.8
25	Trips	9,000,000	2	13,125,000.0	14,405,578	15,599,989
26	Price	3.00%	INF per year	6.90	7.10	7.31
27	<u>Total Market Segment D</u>			90,496,875	102,306,255	114,112,443
28						
29	Total Project Market - Volume			50,438,000	53,164,000	55,725,947
30	Total Project Market - Value			187,612,162	206,274,442	225,037,180
31	<u>Guaranteed trips</u>	55,000,000	Without Guarantee			
32			With Guarantee			
33	<u>Trips without Guarantee</u>		Without Guarantee			

Entering
the IF
statement
formulas to
use
appropriate
calculations
depending
which
mode is
selected
using the
drop down
menu.


Using RiskEase to Evaluate and Price contracts and guarantees

3. Using BOTH Risk Variable truncations and modelling the contract's impact on the outputs



Motorway Project - Evaluation of a Public Sector Guarantee using RiskEase

Calculates Without (wo) and With (wg) the Guarantee and updates the projections accordingly in the CF-Owner



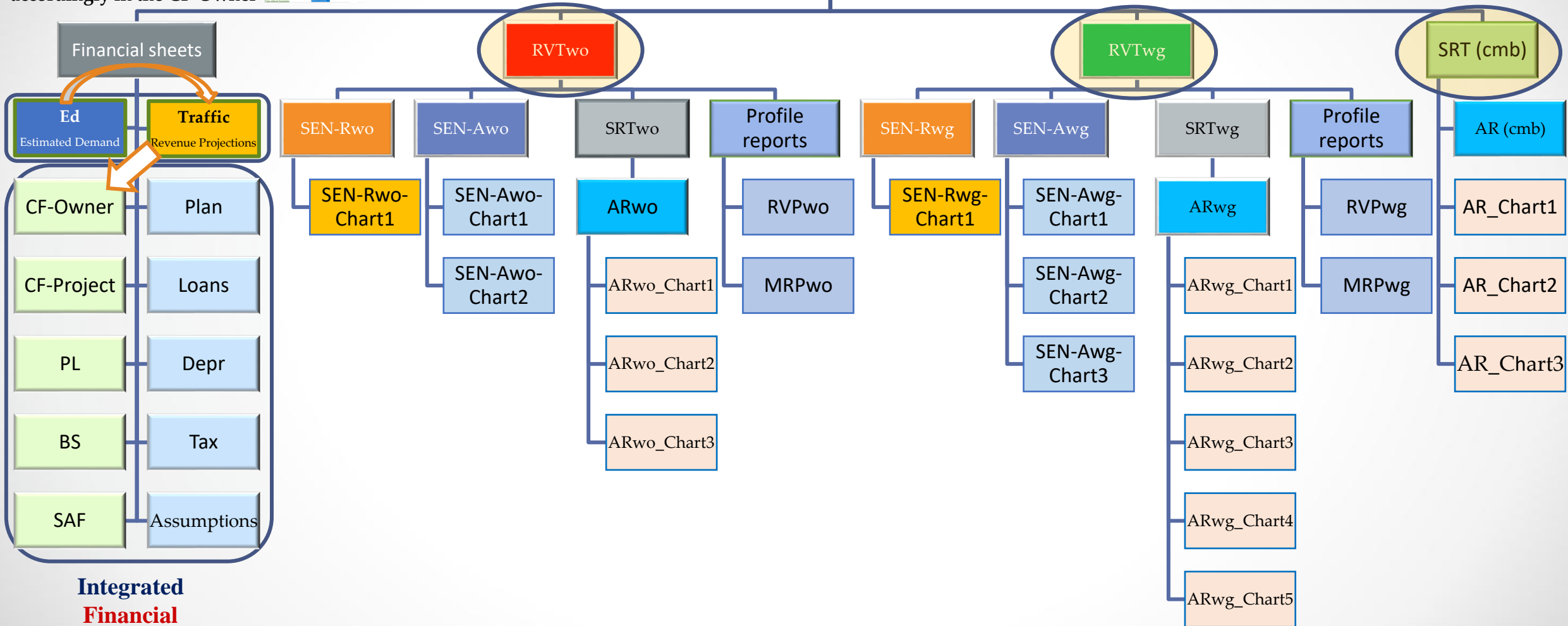
Model Assumptions	Value
Initial Investment	100000000
Initial Investment Year	0
Initial Investment Duration	1
Initial Investment Type	Capital Expenditure
Initial Investment Category	Investment
Initial Investment Sub-category	Capital Expenditure
Initial Investment Description	Initial Investment
Initial Investment Unit	£
Initial Investment Currency	GBP
Initial Investment Risk	Low
Initial Investment Weight	1
Initial Investment Status	Active
Initial Investment Date	2023-01-01
Initial Investment Location	UK
Initial Investment Industry	Transport
Initial Investment Sector	Infrastructure
Initial Investment Sub-sector	Motorway
Initial Investment Type	Capital Expenditure
Initial Investment Category	Investment
Initial Investment Sub-category	Capital Expenditure
Initial Investment Description	Initial Investment
Initial Investment Unit	£
Initial Investment Currency	GBP
Initial Investment Risk	Low
Initial Investment Weight	1
Initial Investment Status	Active
Initial Investment Date	2023-01-01
Initial Investment Location	UK
Initial Investment Industry	Transport
Initial Investment Sector	Infrastructure
Initial Investment Sub-sector	Motorway

Simulation Risk Variables and Traffic set to be calculated **Without** the Guarantee (wo)

Motorway Project

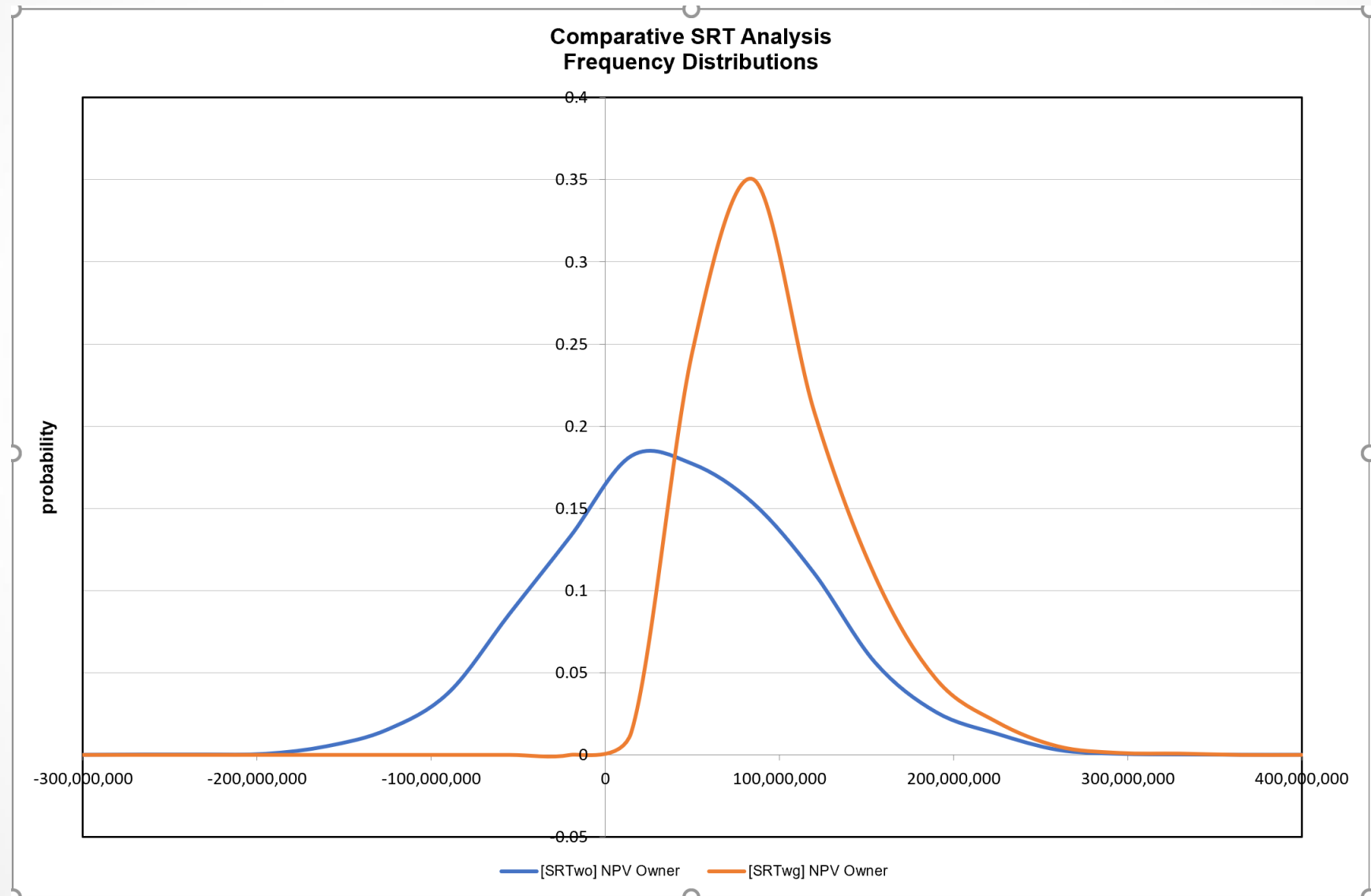
Simulation Risk Variables and Traffic set to be calculated **With** the Guarantee (wg)

Simulations **Without** and **With** the Guarantee are combined and compared



RiskEase enables the easy comparison of the results of two or more simulations.

By comparing the output of With and Without Simulations one can extract and measure the shift in risk from one party to another because of the undertaking of a contractual obligation.



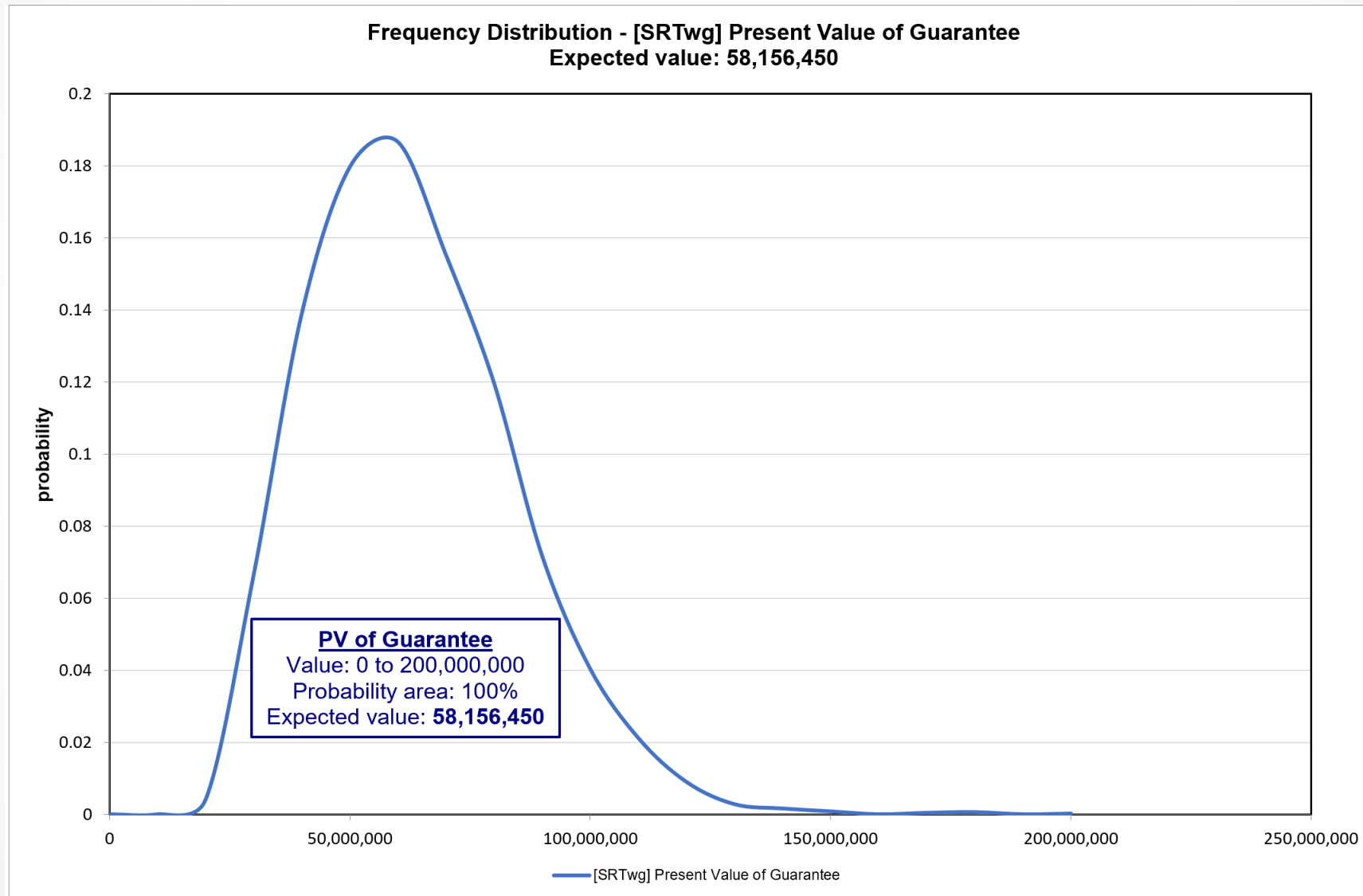
Using RiskEase to Evaluate and Price contracts and guarantees

Estimating Expected Value by simulating Without and With the guarantee

	[SRTwo] NPV Owner	[SRTwg] NPV Owner
Mean (Expected value)	-42,533,927	10,060,402
Mode	-22,500,000	17,000,000
Minimum	-227,607,170	-53,981,914
First quartile (25%)	-63,960,611	-1,630,389
Median	-40,612,562	10,357,665
Third quartile (75%)	-19,731,809	21,734,105
Maximum	68,813,816	72,716,143
Range span	296,420,985	126,698,057
Sample size	5000	5000
Standard error	483,357	250,200
Standard deviation	34,178,510	17,691,789
Variance	1,168,170,531,333,440	312,999,380,827,285
Skewness	-0.381	-0.049
Kurtosis	0.837	0.132
Coefficient of variation	-0.804	1.759
Probability of negative outcome	90.7%	28.0%
Expected loss	43,934,190	3,150,946
Expected gain	1,400,262	13,211,348
Expected loss ratio	0.969	0.193

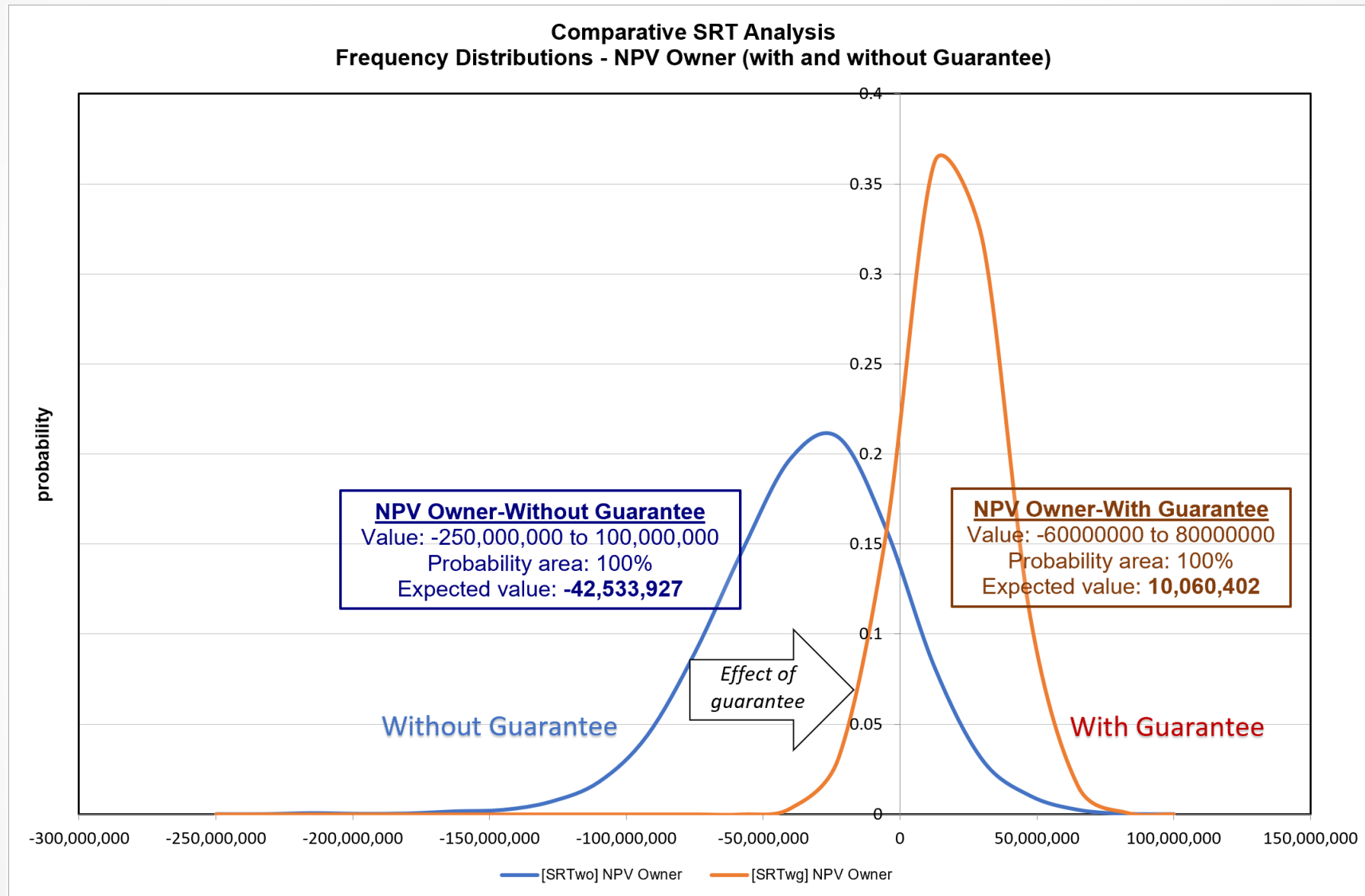
Using RiskEase to Evaluate and Price contracts and guarantees

Estimating the Cost of a guarantee directly from the modelled outputs in a Monte Carlo Simulation

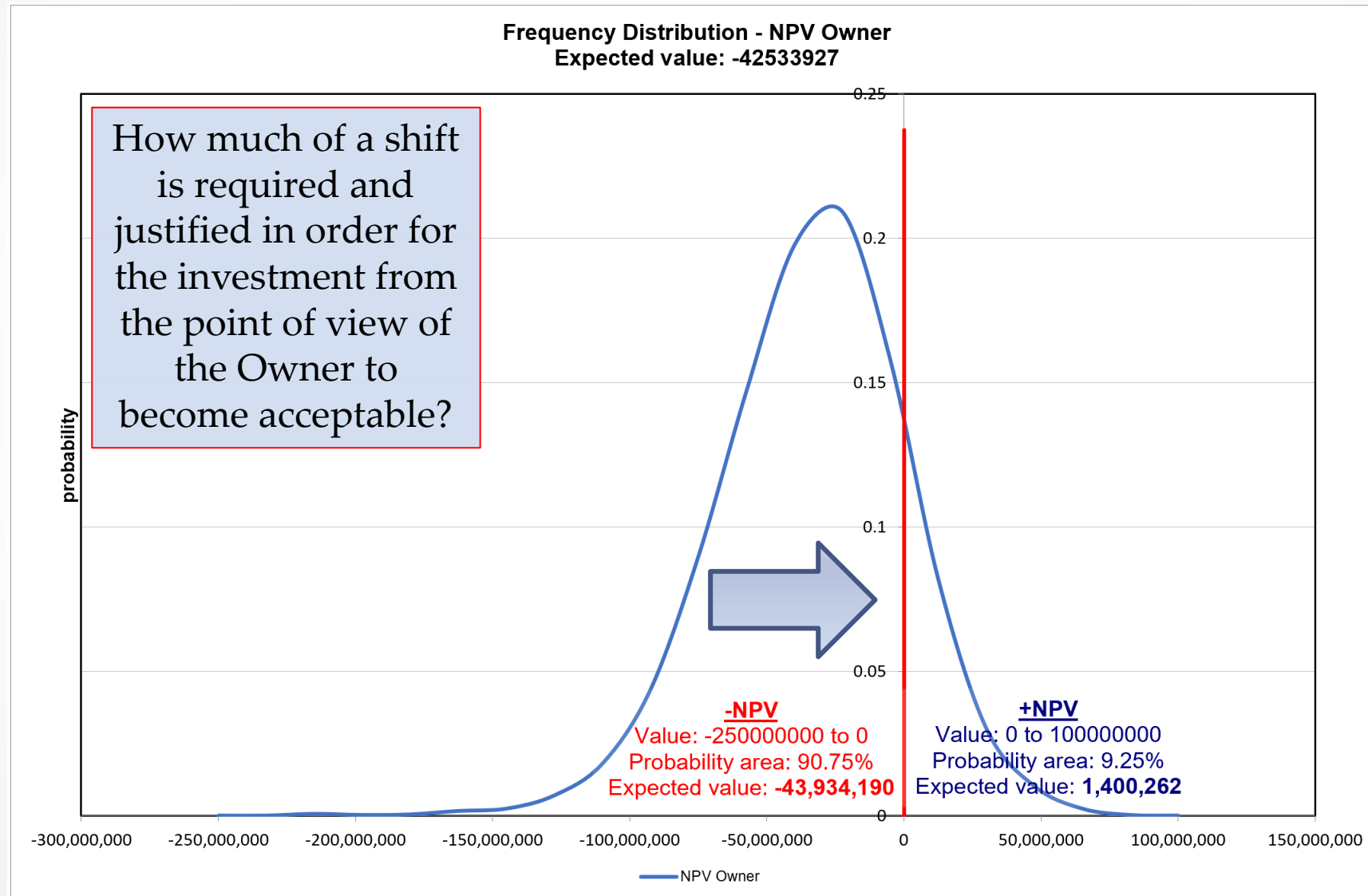


Using RiskEase to Evaluate and Price contracts and guarantees

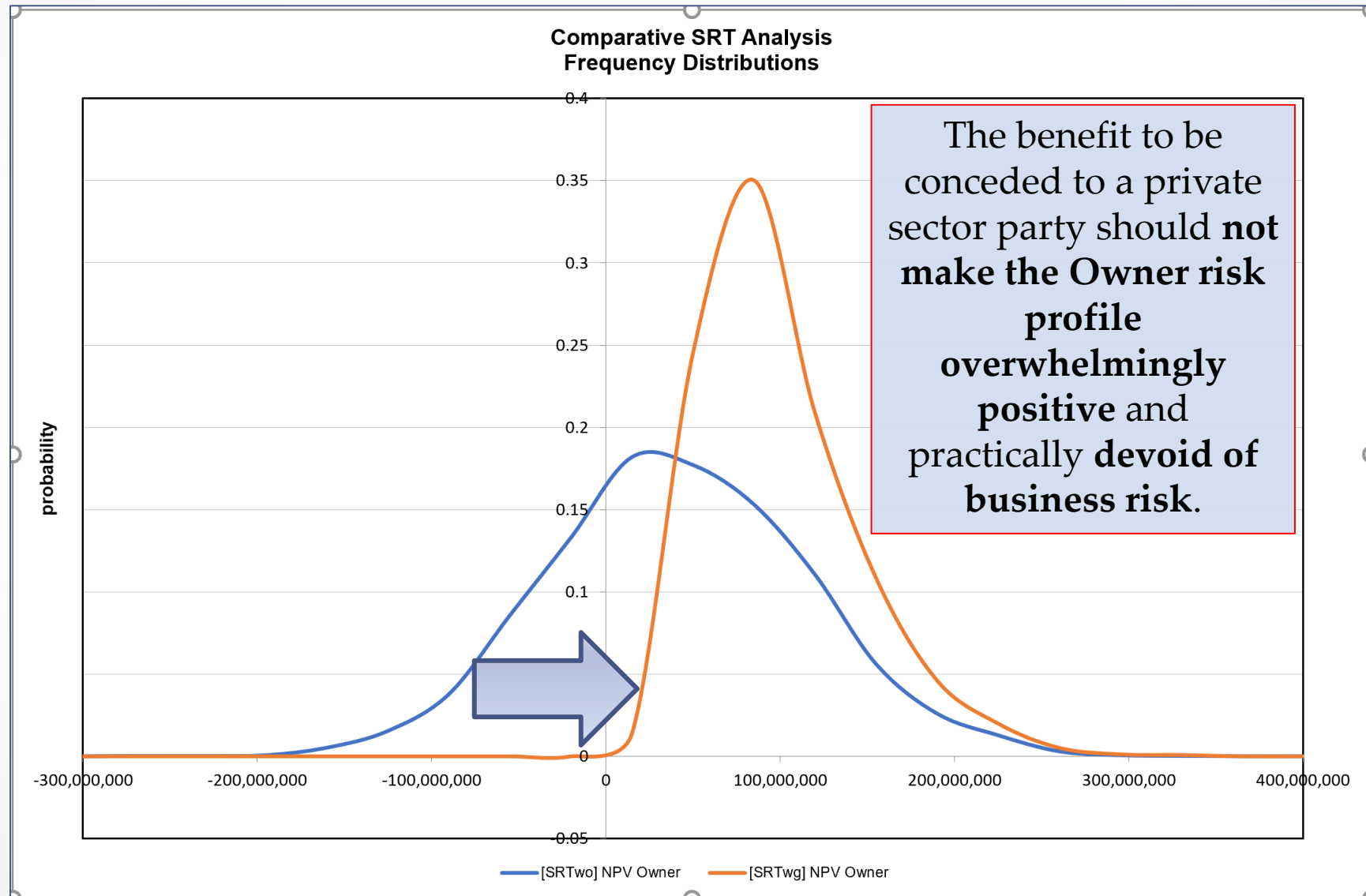
The Analysis can quantify and clearly show the shift of project risk



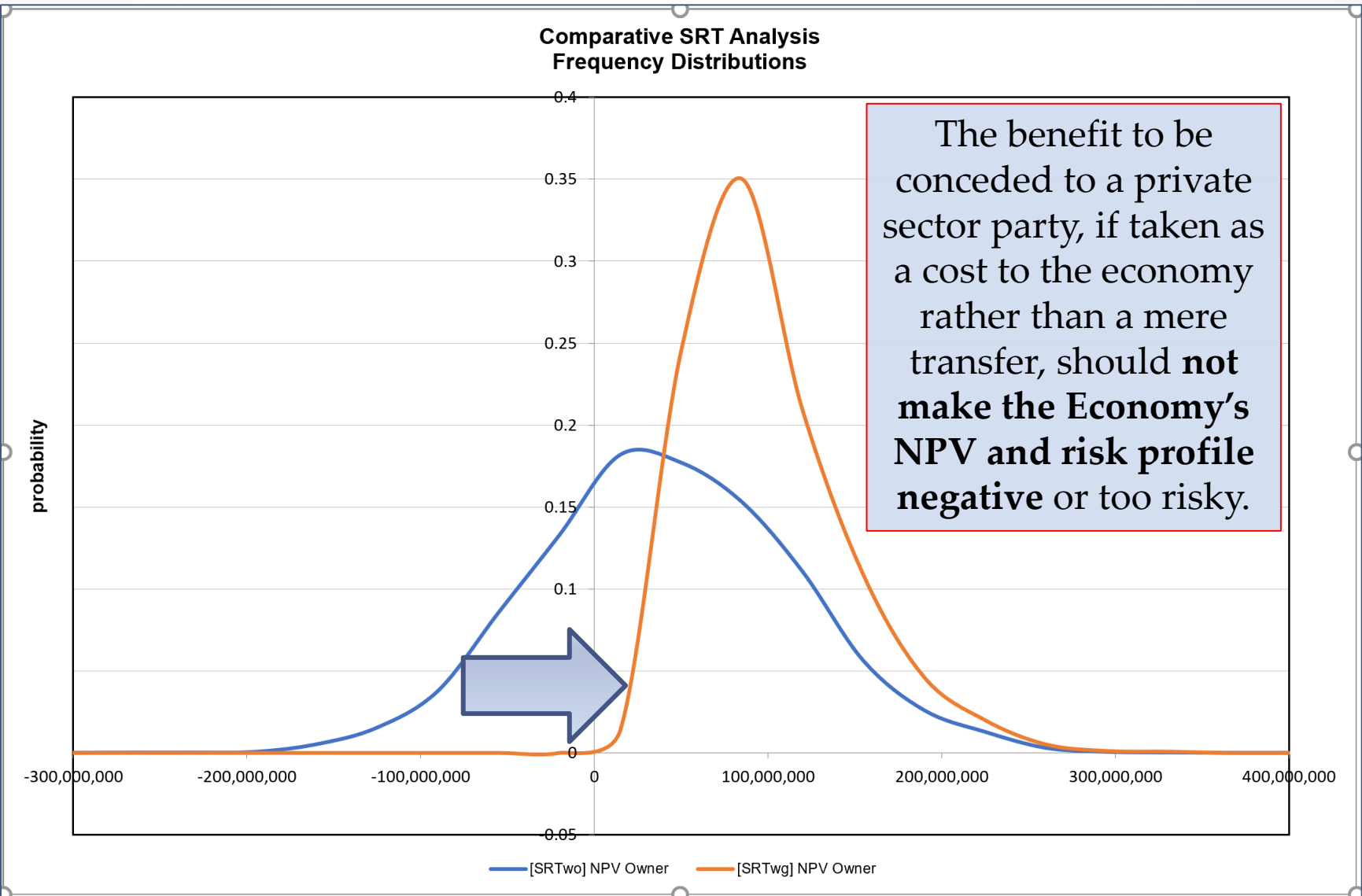
Given that a private investor is not risk neutral (in other words the weights attached to the risk of losing are higher than the ones that one attaches for gaining the same amounts), how do we determine the shift of risk required to make the decision to invest from for a Project Owner from negative to positive?



A contract benefit by one project party is a counter cost to another. An improvement in the NPV and risk profile of the project owner in a concession agreement between the Public sector and a private investors should not make the private sector project owner indifferent to the inherent business risk.



A contract benefit by one project party is a counter cost to another. An improvement in the NPV and risk profile of the project owner in a concession agreement between the Public sector and a private investors will cause a corresponding deterioration in the Economy's NPV and Risk Profile



General rules for entering into a contracting undertaking for public sector projects and PPPs

1. A project should be economically viable in the first place.
2. Contract undertakings in project finance should aim to create situations of non-zero sum benefits. The project owner should have an incentive to maximise return and deal with inherent business risks.
3. The benefit to be conceded to a private sector party should not outweigh the **economic benefits with excessive costs and inherent risks** for the tax payer.
4. Unfortunately, more often than not in PPP agreements such undertakings are put together without considering the above and are merely a method for privatising the benefits and socialising the costs.

Economic analysis and the rules for entering into contracting undertakings for public sector projects and PPPs

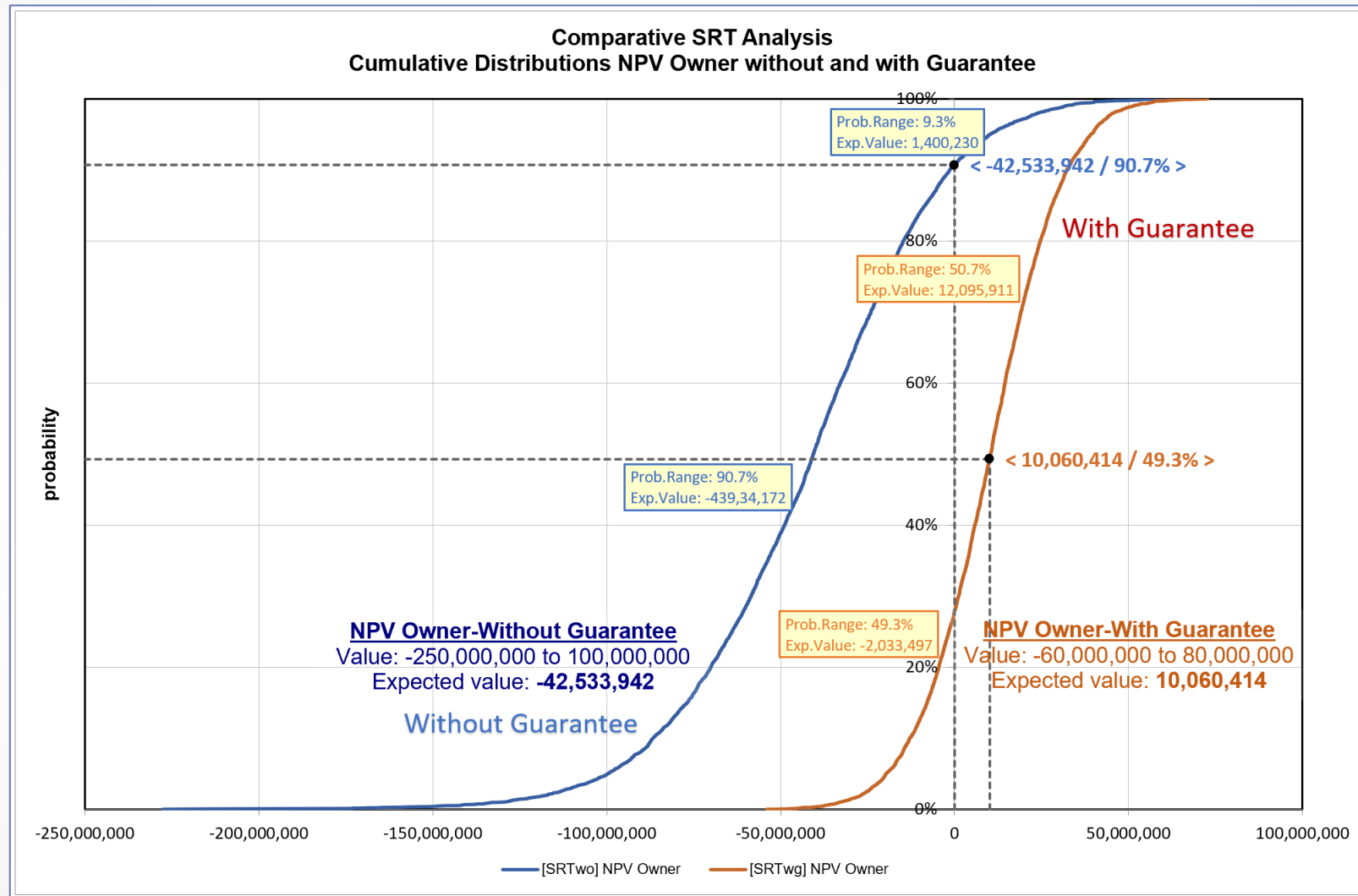
1. As a rule, the benefit to be conceded to a private sector party should **not make the Economy's NPV and risk profile negative or too risky.**
2. However, the **third postulate of welfare Economics** assumes this possibility away. Any price paid by a public sector entity in a private sector partnership with a local stakeholder is assumed to be **an internal transfer** and therefor cannot, by definition, affect the economic cash flows of such projects.

Economic analysis and the rules for entering into contracting undertakings for public sector projects and PPPs

3. Some, including myself, have an issue with this rather “**heroic**” **assumption** contained in the third postulate. It is however recognised that it is a fundamental assumption at the very **foundations of the methodology** and practice of economic analysis in project appraisal.
4. However, redistribution of wealth does affect economic welfare and there are many instances in the world that this is proven to be the case. Deals done under the veil of this broad assumption inevitably lead to crony capitalism with the private sector party being granted a red carpet to extract rents.

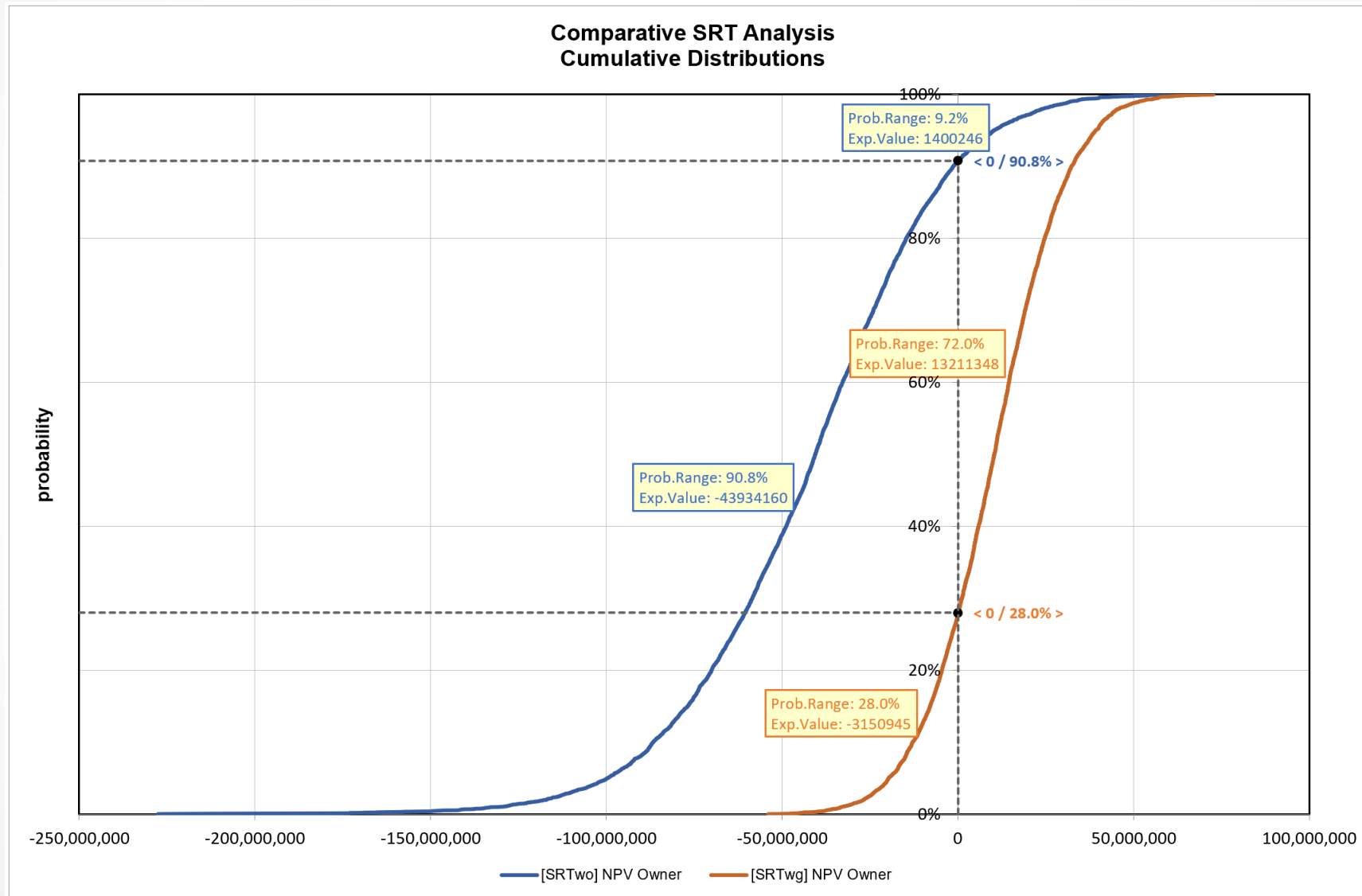
Using RiskEase to Evaluate and Price contracts and guarantees

Segmentation Analysis can further elaborate the implications of a project contract



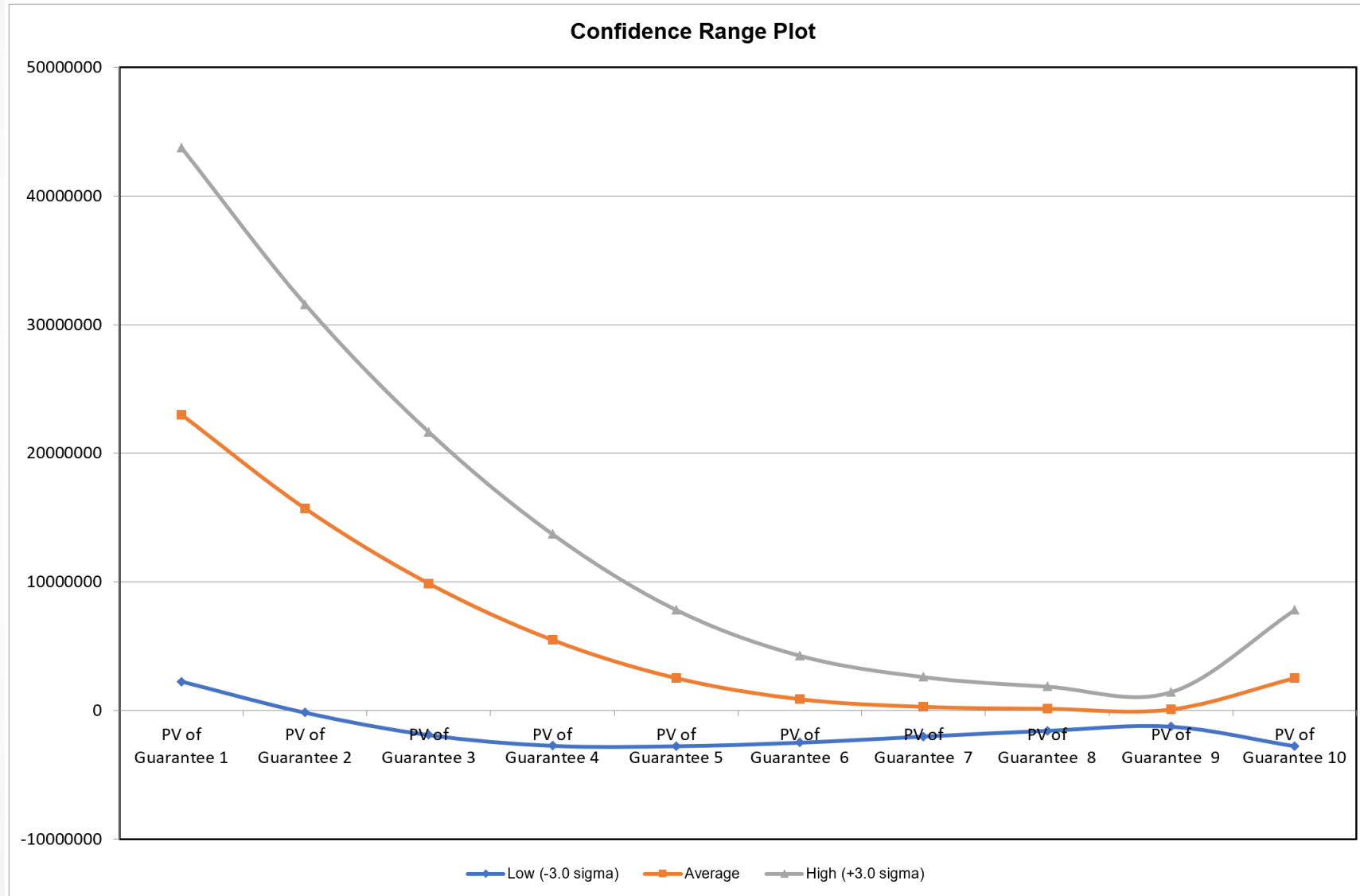
Using RiskEase to Evaluate and Price contracts and guarantees

Segmentation Analysis can show the impact of a contract in changing the risk profile for a party



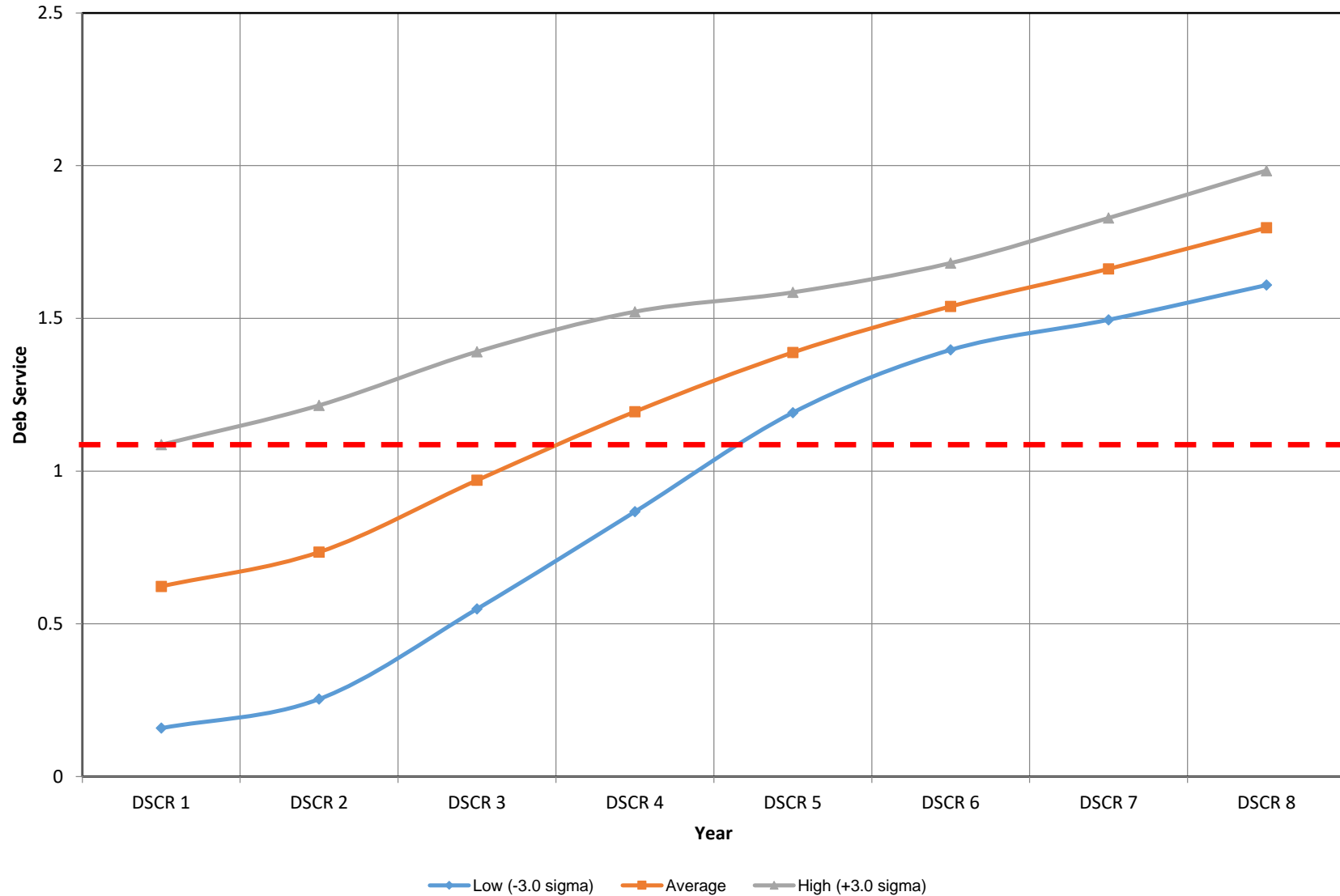
Using RiskEase to Evaluate and Price contracts and guarantees

The Confidence Range Plot can show the years that the guarantee is likely to come into play

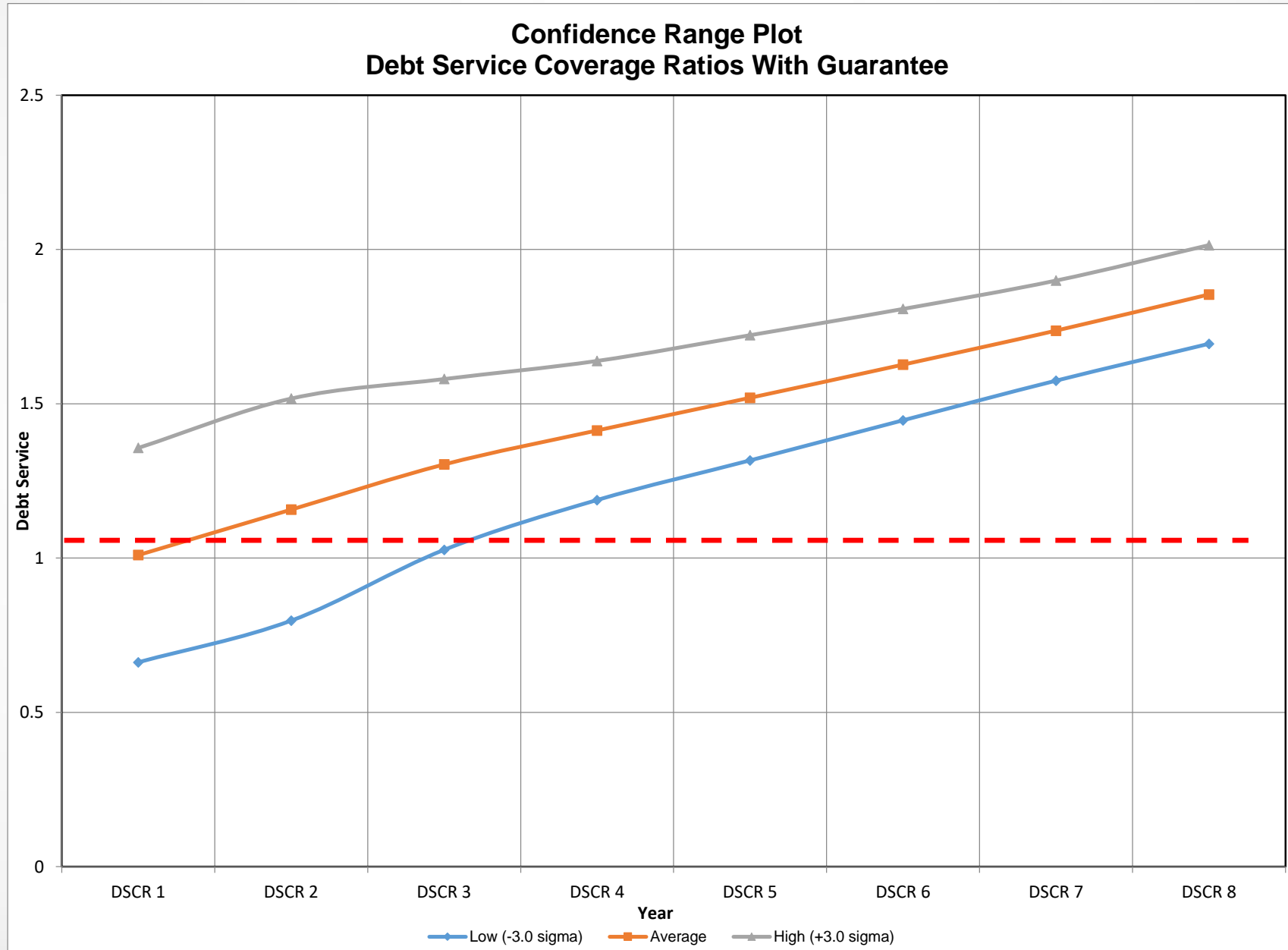


Debt service without a guarantee

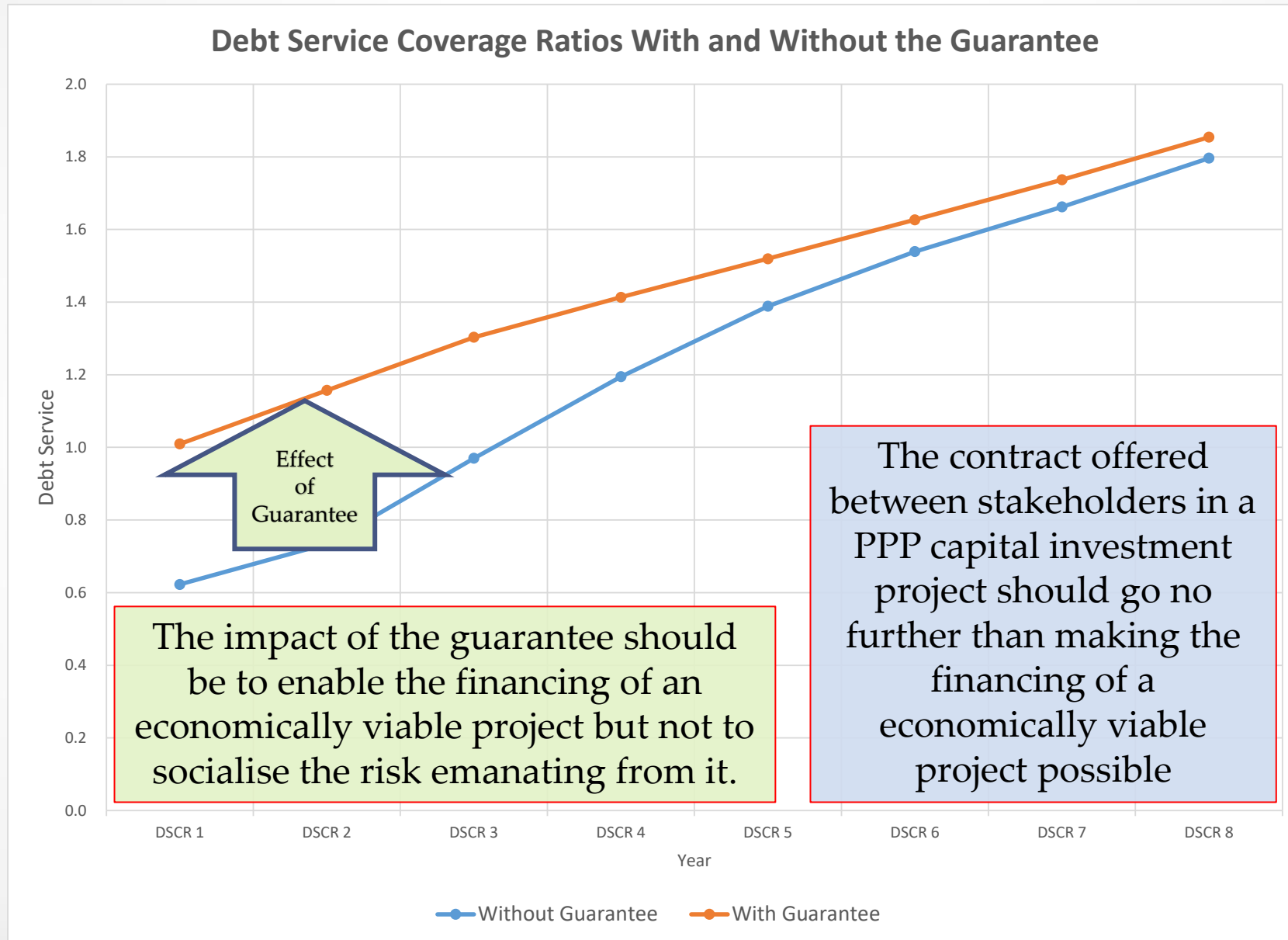
Confidence Range Plot
Debt Service Coverage Ratios Without Guarantee



Debt service and repayment capability with guarantee in place



How a contract of guarantee can transform the assessment of a loan into one with a sound and acceptable repayment profile



The need for proper evaluation and assessment of concessions

How to contain crony deals between the private and public sector

- Without proper **public sector comparator** studies and **independent economic analysis** and under the veil of promoting economic development **dubious agreements** between the public and the private sector are adopted and implemented.
- These contracts, more often than not, result in **passing the business risk to the public sector** and lead to **Government created monopolies**.
- Such agreements merely achieve to **privatise the gains** of risky investment projects and to **socialise the costs**.
- The problem is not that the private sector, as expected, is always looking for loopholes to exploit and take advantage of. What is needed is for the public sector to independently study and meticulously evaluate the return and risks from such agreements before agreeing on a concession.

The Motorway Project

Using Risk Analysis to Evaluate a Concession

Financial Modelling and Risk Analysis

applied by

RiskEase *software*

RiskEase Ltd.

Motorway Project

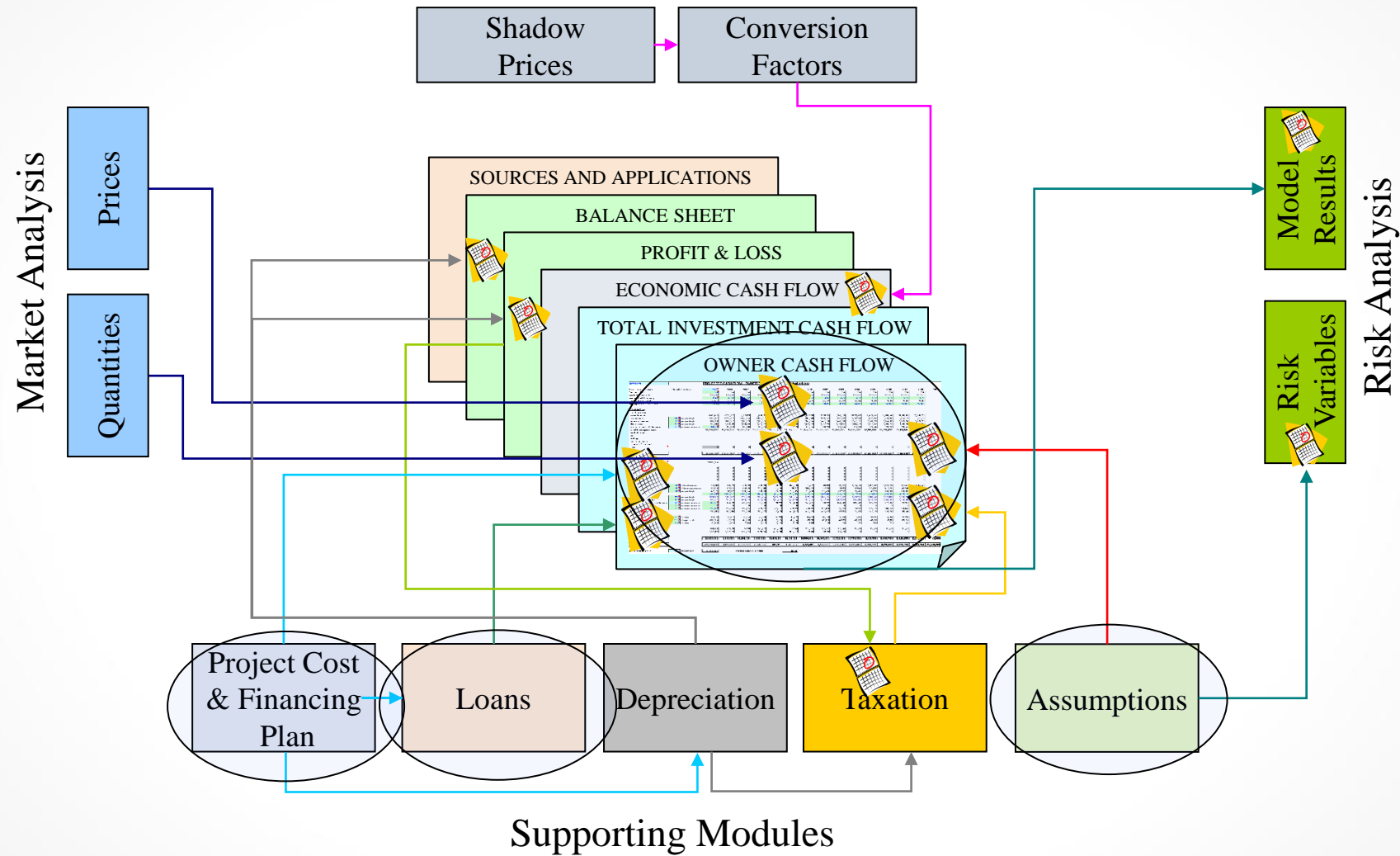
The Financial Model

RiskEase Ltd.

Integrated Financial Model

Savvakis C. Savvides ©

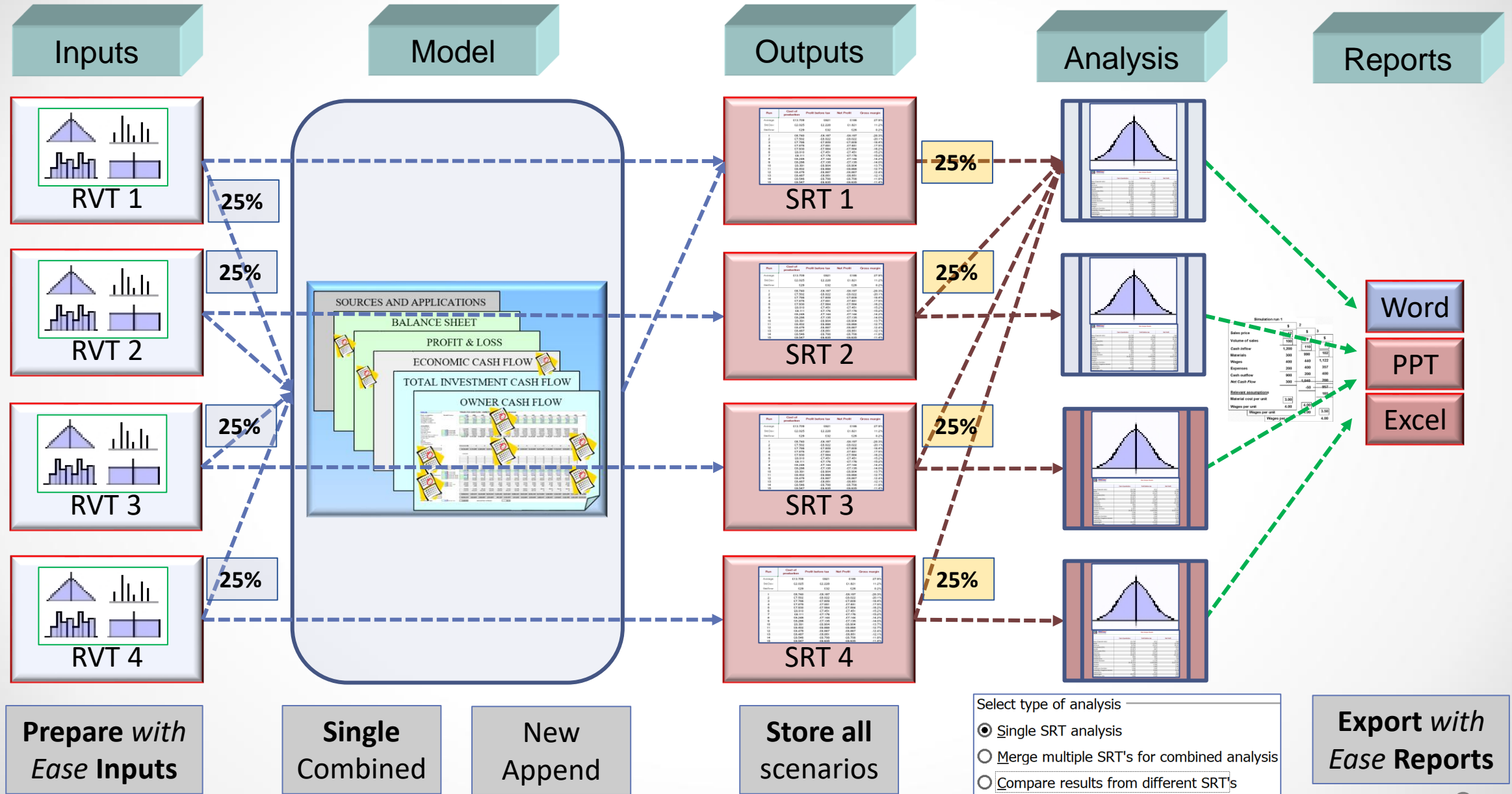
Economic Analysis



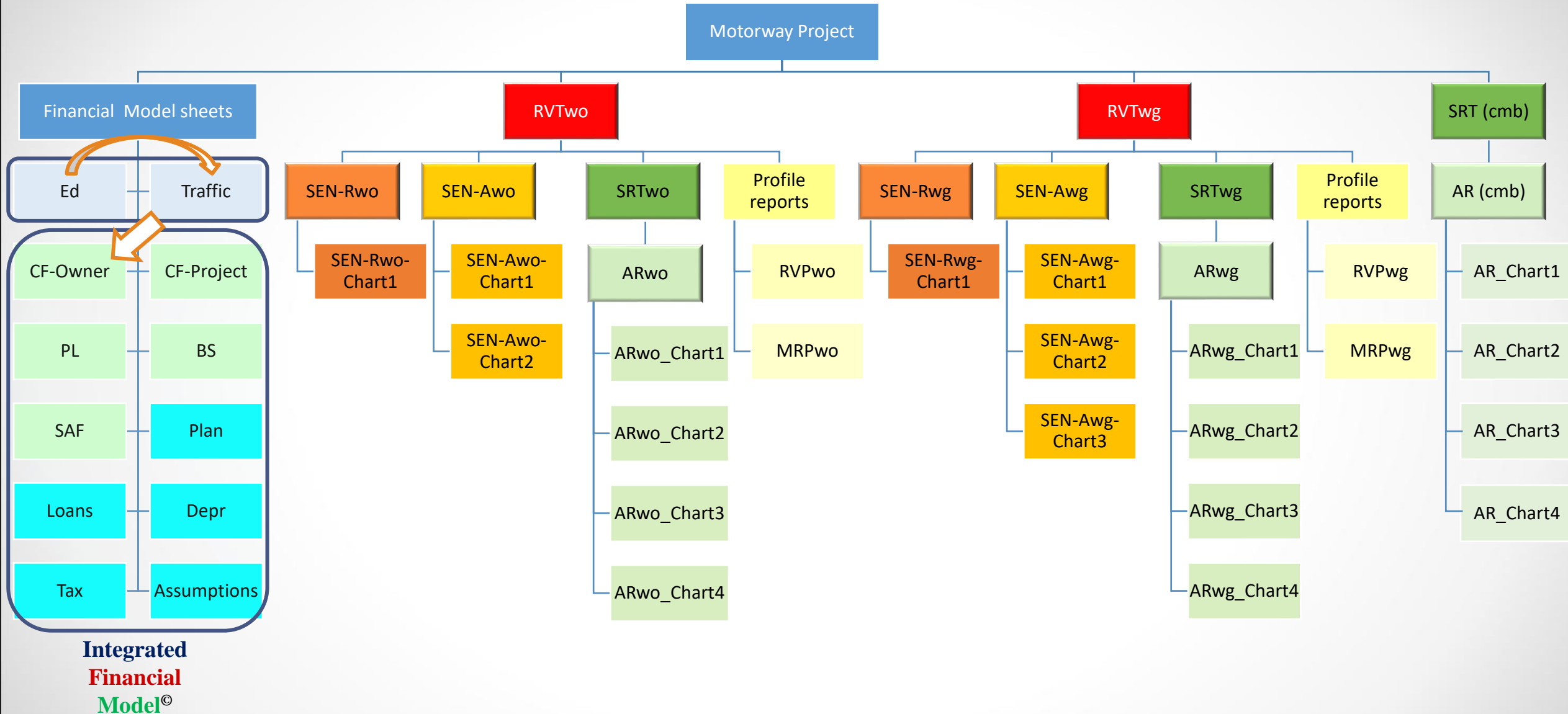
Index:



RiskEase Features and Unique Multi Input-Output Design



Workbook Map



Workbook Map

Motorway Project

Financial Model sheets

Ed

Traffic

CF-Owner

CF-Project

PL

BS

SAF

Plan

Loans

Depr

Tax

Assumptions

RVTwo

SEN-Rwo

SEN-Rwo-Chart1

SEN-Awo

SEN-Awo-Chart1

SEN-Awo-Chart2

SRTwo

ARwo

ARwo_Chart1

ARwo_Chart2

ARwo_Chart3

ARwo_Chart4

Profile reports

RVPwo

MRPwo

RVTwg

SEN-Rwg

SEN-Rwg-Chart1

SEN-Awg

SEN-Awg-Chart1

SEN-Awg-Chart2

SEN-Awg-Chart3

SRTwg

ARwg

ARwg_Chart1

ARwg_Chart2

ARwg_Chart3

ARwg_Chart4

Profile reports

RVPwg

MRPwg

SRT (cmb)

AR (cmb)

AR_Chart1

AR_Chart2

AR_Chart3

AR_Chart4

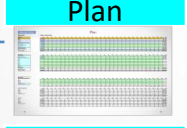
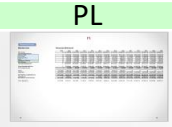
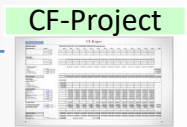
Workbook Map *

Motorway Project

Financial Model sheets

Ed

Traffic

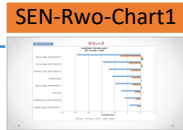
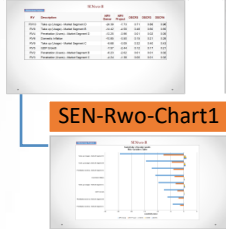


Assumptions

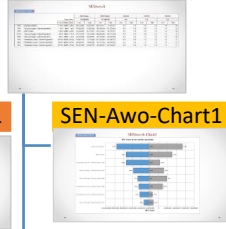
RVTwo



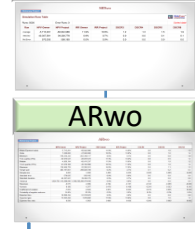
SEN-Rwo



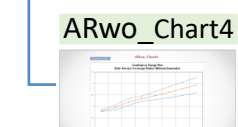
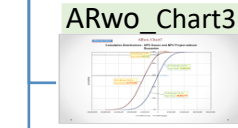
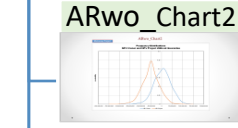
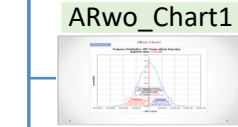
SEN-Awo



SRTwo



ARwo

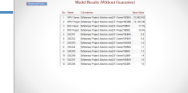


Profile reports

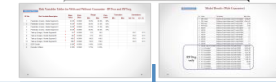
RVPwo



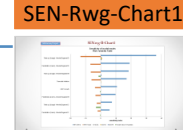
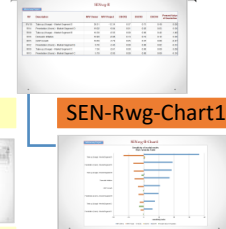
MRPwo



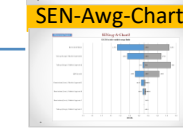
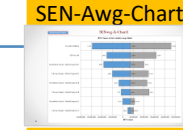
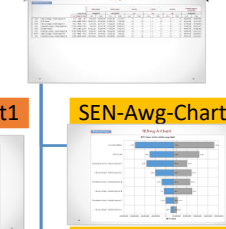
RVTwg



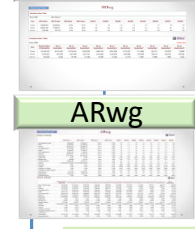
SEN-Rwg



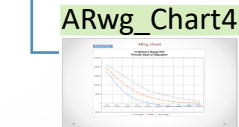
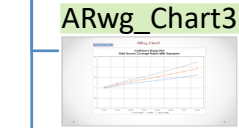
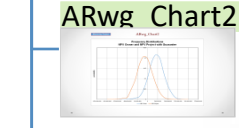
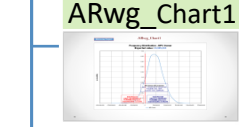
SEN-Awg



SRTwg



ARwg



Profile reports

RVPwg



MRPwg



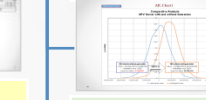
SRT (cmb)



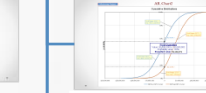
AR (cmb)



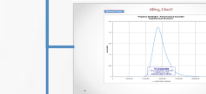
AR_Chart1



AR_Chart2



AR_Chart3



AR_Chart4



* Click on a miniature sheet to zoom in and on the **Motorway Project** label in each sheet to return to the master slide.

Motorway Project

CF-Owner

Motorway Project

(Cashflows Without Guarantee)

Basic assumptions	Growth	Projection
		None
		None
		None
		None
		None

Cash Inflows

From Operations		
		None
		None
		None
		None
		None

Total from operations

Residual values		
Land	2.5%	inflation rate
Buildings	2.5%	inflation rate
Electromechanical	2.5%	inflation rate
Furnishings/Equipment	2.5%	inflation rate
Loans		

Total Cash Inflows

Cash Outflows

Value of existing assets *

Capital Investment

Land	
Buildings	
Electromechanical	
Furnishings & Equipment	
Preliminary and preoperational	

Operating expenditure

Payroll and Staff		None
Administration	2.00%	Linear
Electricity and Fuel	3.00%	Linear
Water	3.00%	Linear
Postages and Telephone	3.00%	Linear
Maintenance	2.50%	Linear
Sales and Distribution	2.50%	Linear
Advertising and Promotion	-5.00%	Linear
		None
		None

Corporate taxation

Accounts receivable (change)	8.3%	of sales
Accounts payable (change)	16.7%	of oper. costs
Cash reserves (change)	0.2%	of sales

Loan repayments

Loans - interest payments

Loan - principal payments

Total Cash Outflows

Net Cash Flow

Net Present Value	12.0%	discount rate
(Cashflows Without Guarantee)		

Repayment Capability Calculation

Net Cash Flow (net of existing assets)	
Outside Obligations	
Outside Cash	
Opening Cash Balance	
Closing Cash Balance (accumulated funds)	
Debt Service Coverage (Based on annual net cash flow)	
Debt Service Coverage (Based on accumulated funds)	

PROJECTED CASH FLOW - OWNER'S PERSPECTIVE (nominal prices)

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022

	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701	

0	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701	
---	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	--

															282,594,764
															217,958,728
															15,031,636
															2,393,788

465,187,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-------------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--

465,187,500	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701	517,978,916	
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	--

0

200,000,000															
250,000,000															
400,000,000															
55,000,000															
45,000,000															

	75,000,000	76,500,000	78,030,000	79,590,600	81,182,412	82,806,060	84,462,181	86,151,425	87,874,454	89,631,943	91,424,581	93,253,073	95,118,135	
	10,000,000	10,200,000	10,404,000	10,612,080	10,824,322	11,040,808	11,261,624	11,486,857	11,716,594	11,950,926	12,189,944	12,433,743	12,682,418	
	7,500,000	7,725,000	7,956,750	8,195,453	8,441,316	8,694,556	8,953,392	9,224,054	9,500,776	9,785,799	10,079,373	10,381,754	10,693,207	
	3,000,000	3,090,000	3,182,700	3,278,181	3,376,526	3,477,822	3,582,157	3,689,622	3,800,310	3,914,320	4,031,749	4,152,702	4,277,283	
	1,000,000	1,036,000	1,060,900	1,092,727	1,125,509	1,159,274	1,194,052	1,229,874	1,266,770	1,304,773	1,343,916	1,384,234	1,425,761	
	7,050,000	7,226,250	7,406,906	7,592,079	7,781,881	7,976,428	8,175,839	8,380,235	8,589,740	8,804,484	9,024,596	9,250,211	9,481,466	
	25,000,000	25,625,000	26,265,625	26,922,266	27,595,322	28,285,205	28,992,335	29,717,144	30,460,072	31,221,574	32,002,114	32,802,166	33,622,221	
	20,000,000	19,000,000	18,050,000	17,147,500	16,290,125	15,475,619	14,701,838	13,966,746	13,268,409	12,604,988	11,974,739	11,376,002	10,807,202	
0	1,840,231	0	0	0	98,545	13,957,353	22,655,816	32,924,619	43,401,363	52,061,694	59,882,763	80,736,207	87,249,879	

	16,809,159	1,106,501	1,127,028	1,205,821	1,427,036	1,862,856	2,432,886	2,885,409	2,930,810	2,805,953	2,565,383	2,342,473	2,194,743	-41,696,058
	-25,065,038	-1,003	-326,772	-345,667	-380,846	-2,692,861	-1,851,352	-2,131,557	-2,184,652	-1,900,336	-1,778,879	-3,969,386	-1,597,913	44,226,262
	403,420	26,556	27,049	28,940	34,249	44,709	58,389	69,250	70,339	67,343	61,569	56,219	52,674	-1,000,705

	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390						
	45,750,684	48,838,855	52,135,478	55,654,622	59,411,309	63,421,573	67,702,529	72,272,450						

950,000,000	219,688,611	228,679,143	230,335,026	232,470,819	234,947,238	249,238,669	261,771,999	274,744,518	210,694,985	222,253,461	232,801,849	254,199,398	266,007,075	1,529,498
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-----------

-484,812,500	-17,978,703	-13,691,228	-1,822,773	10,511,288	25,159,299	33,222,144	49,883,446	71,535,840	170,755,092	192,868,053	213,104,261	219,816,382	234,345,627	516,449,418
--------------	-------------	-------------	------------	------------	------------	------------	------------	------------	-------------	-------------	-------------	-------------	-------------	-------------

-23,092,603	Internal Rate of Return	11.5%
-------------	-------------------------	-------

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
15,187,500	-17,978,703	-13,691,228	-1,822,773	10,511,288	25,159,299	33,222,144	49,883,446	71,535,840	170,755,092	192,868,053	213,104,261	219,816,382	234,345,627	
0	15,187,500	-2,791,203	-16,482,431	-18,305,203	-7,793,915	17,365,385	50,587,529	100,470,975	172,006,815	342,761,907	535,629,960	748,734,221	968,550,602	
15,187,500	-2,791,203	-16,482,431	-18,305,203	-7,793,915	17,365,385	50,587,529	100,470,975	172,006,815	342,761,907	535,629,960	748,734,221	968,550,602	1,202,896,229	
	0.8	0.8	1.0	1.1	1.3	1.4	1.6	1.9						
	1.0	0.8	0.8	0.9	1.2	1.7	2.3	3.2						

Motorway Project

CF-Project

Motorway Project

PROJECTED CASH FLOW - TOTAL INVESTMENT PERSPECTIVE (nominal prices)

Basic assumptions		Growth		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
		None																	
		None																	
		None																	
		None																	
		None																	
Cash Inflows																			
From Operations																			
		None			201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701		
		None																	
		None																	
		None																	
		None																	
Total from operations				0	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701		
Residual values																			
Land				2.5%	inflation rate													282,594,764	
Buildings				2.5%	inflation rate													217,958,728	
Electromechanical				2.5%	inflation rate													15,031,636	
Furnishings/Equipment				2.5%	inflation rate													2,393,788	
Total Cash Inflows				0	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701	517,978,916	
Cash Outflows																			
Value of existing assets *				0															
Capital Investment																			
Land				200,000,000															
Buildings				250,000,000															
Electromechanical				400,000,000															
Furnishings & Equipment				55,000,000															
Preliminary and preoperational				45,000,000															
Operating expenditure																			
Payroll and Staff					75,000,000	76,500,000	78,030,000	79,590,600	81,182,412	82,806,060	84,462,181	86,151,425	87,874,454	89,631,943	91,424,581	93,253,073	95,118,135		
Administration				2.0%	Linear	10,000,000	10,200,000	10,404,000	10,612,080	10,824,322	11,040,808	11,261,624	11,486,857	11,716,594	11,950,926	12,189,944	12,433,743	12,682,418	
Electricity and Fuel				0.03	Linear	7,500,000	7,725,000	7,956,750	8,195,453	8,441,316	8,694,556	8,955,392	9,224,054	9,500,776	9,785,799	10,079,373	10,381,754	10,693,207	
Water				3.0%	Linear	3,000,000	3,090,000	3,182,700	3,278,181	3,376,526	3,477,822	3,582,157	3,689,622	3,800,310	3,914,320	4,031,749	4,152,702	4,277,283	
Postages and Telephone				3.0%	Linear	1,000,000	1,030,000	1,060,900	1,092,727	1,125,509	1,159,274	1,194,052	1,229,874	1,266,770	1,304,773	1,343,916	1,384,234	1,425,761	
Maintenance				0.03	Linear	7,050,000	7,226,250	7,406,906	7,592,079	7,781,881	7,976,428	8,175,839	8,380,235	8,589,740	8,804,484	9,024,596	9,250,211	9,481,466	
Sales and Distribution				2.5%	Linear	25,000,000	25,625,000	26,265,625	26,922,266	27,595,322	28,285,205	28,992,335	29,717,144	30,460,072	31,221,574	32,002,114	32,802,166	33,622,221	
Advertising and Promotion				-5.0%	Linear	20,000,000	19,000,000	18,050,000	17,147,500	16,290,125	15,475,619	14,701,838	13,966,746	13,268,409	12,604,988	11,974,739	11,376,002	10,807,202	
Corporate taxation				0	1,840,231	0	0	0	98,545	13,957,353	22,655,816	32,924,619	43,401,363	52,061,694	59,882,763	80,736,207	87,249,879		
Accounts receivable (change)				8.3%	of sales	16,809,159	1,106,501	1,127,028	1,205,821	1,427,036	1,862,856	2,432,886	2,885,409	2,930,810	2,805,953	2,565,383	2,342,473	2,194,743	-41,696,058
Accounts payable (change)				16.7%	of oper. costs	-25,065,038	-1,003	-326,772	-345,667	-380,846	-2,692,861	-1,851,352	-2,131,557	-2,184,652	-1,900,336	-1,778,879	-3,969,386	-1,597,913	44,226,262
Cash reserves (change)				0.2%	of sales	403,420	26,556	27,049	28,940	34,249	44,709	58,389	69,250	70,339	67,343	61,569	56,219	52,674	-1,000,705
Total Cash Outflows				950,000,000	142,537,771	151,528,303	153,184,186	155,319,979	157,796,398	172,087,829	184,621,159	197,593,678	210,694,985	222,253,461	232,801,849	254,199,398	266,007,075	1,529,498	
Net Cash Flow				-950,000,000	59,172,137	63,459,612	75,328,067	87,662,128	102,310,140	110,372,985	127,034,286	148,686,680	170,755,092	192,868,053	213,104,261	219,816,382	234,345,627	516,449,418	
Net Present Value				11.5%	discount rate	-74,126,536	Internal Rate of Return				10.4%								

Motorway Project

Motorway Project

Sales revenue
Less Operating Expenses

Payroll and Staff
Administration
Electricity and Fuel
Water
Postages and Telephone
Other Expenses
Total Operating Expenses

Gross Operating Profit/Loss
G.O.P margin on Sales

Interest
Depreciation

NET PROFIT/LOSS BEFORE TAX
Corporation tax
NET PROFIT/LOSS AFTER TAX

Profit + Depreciation

PROJECTED PROFIT/LOSS

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	0	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701
	0	75,000,000	76,500,000	78,030,000	79,590,600	81,182,412	82,806,060	84,462,181	86,151,425	87,874,454	89,631,943	91,424,581	93,253,073	95,118,135
	0	10,000,000	10,200,000	10,404,000	10,612,080	10,824,322	11,040,808	11,261,624	11,486,857	11,716,594	11,950,926	12,189,944	12,433,743	12,682,418
	0	7,500,000	7,725,000	7,956,750	8,195,453	8,441,316	8,694,556	8,955,392	9,224,054	9,500,776	9,785,799	10,079,373	10,381,754	10,693,207
	0	3,000,000	3,090,000	3,182,700	3,278,181	3,376,526	3,477,822	3,582,157	3,689,622	3,800,310	3,914,320	4,031,749	4,152,702	4,277,283
	0	1,000,000	1,030,000	1,060,900	1,092,727	1,125,509	1,159,274	1,194,052	1,229,874	1,266,770	1,304,773	1,343,916	1,384,234	1,425,761
	0	52,050,000	51,851,250	51,722,531	51,661,845	51,667,328	51,737,252	51,870,012	52,064,124	52,318,221	52,631,046	53,001,448	53,428,379	53,910,889
	0	148,550,000	150,396,250	152,356,881	154,430,885	156,617,413	158,915,772	161,325,419	163,845,956	166,477,125	169,218,806	172,071,012	175,033,885	178,107,691
	0	53,159,908	64,591,666	76,155,372	88,551,222	103,489,124	123,545,041	150,330,026	182,434,402	214,972,952	245,902,708	273,835,097	298,981,895	322,245,010
		26.35%	30.04%	33.33%	36.44%	39.79%	43.74%	48.24%	52.68%	56.36%	59.24%	61.41%	63.07%	64.40%
	15,187,500	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390	0	0	0	0	0
	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	20,311,170
	-60,163,564	-23,216,312	-8,696,383	6,163,946	22,078,940	40,773,530	64,839,710	95,905,651	132,579,948	169,996,888	200,926,644	228,859,033	254,005,831	301,933,840
	0	1,840,231	0	0	0	98,545	13,957,353	22,655,816	32,924,619	43,401,363	52,061,694	59,882,763	80,736,207	87,249,879
	-60,163,564	-25,056,542	-8,696,383	6,163,946	22,078,940	40,674,984	50,882,357	73,249,835	99,655,328	126,595,525	148,864,950	168,976,270	173,269,624	214,683,961
	-15,187,500	19,919,521	36,279,681	51,140,010	67,055,004	85,651,048	95,858,421	118,225,898	144,631,392	171,571,589	193,841,014	213,952,334	218,245,688	234,995,131

PROJECTED BALANCE SHEETS

2021

Land	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000	200,000,000
Buildings at cost	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447	265,957,447
Less accumulated depreciation	7,978,723	15,957,447	23,936,170	31,914,894	39,893,617	47,872,340	55,851,064	63,829,787	71,808,511	79,787,234	87,765,957	95,744,681	103,723,404	111,702,128	119,680,852
Electromechanical	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915	425,531,915
Less accumulated depreciation	31,914,894	63,829,787	95,744,681	127,659,574	159,574,468	191,489,362	223,404,255	255,319,149	287,234,043	319,148,936	351,063,830	382,978,723	414,893,617	446,808,511	478,723,404
Fixtures and Fittings	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957	67,765,957
Less accumulated depreciation	5,082,447	10,164,894	15,247,340	20,329,787	25,412,234	30,494,681	35,577,128	40,659,574	45,742,021	50,824,468	55,906,915	60,989,362	66,071,809	71,154,256	76,236,703
Remaining Balance of Fixed Assets	914,279,255	869,303,191	824,327,128	779,351,064	734,375,000	689,398,936	644,422,872	599,446,809	554,470,745	509,494,681	464,518,617	419,542,553	374,566,489	329,590,425	284,614,361

Debtors		16,809,159	17,915,660	19,042,688	20,248,509	21,675,545	23,538,401	25,971,287	28,856,696	31,787,506	34,593,460	37,158,842	39,501,315	41,696,058
Bank	15,187,500	-2,791,203	-16,482,431	-18,305,203	-7,793,915	17,365,385	50,587,529	100,470,975	172,006,815	342,761,907	535,629,960	748,734,221	968,550,602	1,202,896,229
Cash		403,420	429,976	457,025	485,964	520,213	564,922	623,311	692,561	762,900	830,243	891,812	948,032	1,000,705
Total Current Assets	15,187,500	14,421,376	1,863,205	1,194,509	12,940,558	39,561,142	74,690,852	127,065,573	201,556,072	375,312,313	571,053,662	786,784,875	1,008,998,949	1,245,592,993

Creditors	15,187,500	40,252,538	40,253,542	40,580,314	40,925,981	41,306,826	43,999,687	45,851,039	47,982,596	50,167,248	52,067,583	53,846,463	57,815,849	59,413,762
-----------	------------	------------	------------	------------	------------	------------	------------	------------	------------	------------	------------	------------	------------	------------

Equity	500,000,000	439,836,436	414,779,894	406,083,511	412,247,457	434,326,397	475,001,381	525,883,739	599,133,573	698,788,902	825,384,427	974,249,377	1,143,225,647	1,316,495,271
Profit/Loss	-60,163,564	-25,056,542	-8,696,383	6,163,946	22,078,940	40,674,984	50,882,357	73,249,835	99,655,328	126,595,525	148,864,950	168,976,270	173,269,624	214,683,961
Loans	465,187,500	419,436,816	370,597,961	318,462,483	262,807,861	203,396,552	139,974,979	72,272,450	0	0	0	0	0	0
Total Net Worth	905,023,936	834,216,710	776,681,472	730,709,940	697,134,258	678,397,933	665,858,717	671,406,023	698,788,902	825,384,427	974,249,377	1,143,225,647	1,316,495,271	1,531,179,231

Debt	465,187,500	419,436,816	370,597,961	318,462,483	262,807,861	203,396,552	139,974,979	72,272,450	0	0	0	0	0	0
------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	------------	---	---	---	---	---	---

Debt	465,187,500	419,436,816	370,597,961	318,462,483	262,807,861	203,396,552	139,974,979	72,272,450	0	0	0	0	0	0
------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	------------	---	---	---	---	---	---

Gearing Ratio	51.4%	50.3%	47.7%	43.6%	37.7%	30.0%	21.0%	10.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
---------------	-------	-------	-------	-------	-------	-------	-------	-------	------	------	------	------	------	------

Net Present Value of Equity	4,421,351,602
-----------------------------	---------------

Net Present Value of Debt	1,747,838,267
---------------------------	---------------

Equity Ratio	0.72
--------------	------

Debt Ratio	0.28
------------	------

SAF

Motorway Project

Motorway Project

Sources of Funds

Net profit before tax
Interest
Depreciation
Share Capital/Owner's Contribution
Loans

Total Sources

Application of Funds

Land
Buildings
Machinery/Equipment
Furniture & Furnishings
Preliminary & Preoperational
Increase in working capital
Loan Service
Interest
Principal
Taxation

Total Applications

Net Cash Flow

Outside Obligations
Outside Cash
Opening Cash Balance
Closing Cash Balance (accumulated funds)

Debt Service Coverage (Based on annual net cash flow)

Debt Service Coverage (Based on accumulated funds)

SOURCES AND APPLICATION OF FUNDS

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
-60,163,564	-23,216,312	-8,696,383	6,163,946	22,078,940	40,773,530	64,839,710	95,905,651	132,579,948	169,996,888	200,926,644	228,859,033	254,005,831	301,933,840
15,187,500	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390	0	0	0	0	0
44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	20,311,170
500,000,000	0	0	0	0	0	0	0	0	0	0	0	0	0
465,187,500	0	0	0	0	0	0	0	0	0	0	0	0	0
965,187,500	53,159,908	64,591,666	76,155,372	88,551,222	103,489,124	123,545,041	150,330,026	182,434,402	214,972,952	245,902,708	273,835,097	298,981,895	322,245,010
200,000,000													
250,000,000													
400,000,000													
55,000,000													
45,000,000													
0	-7,852,460	1,132,053	827,305	889,094	1,080,439	-785,296	639,924	823,103	816,497	972,960	848,073	-1,570,694	649,504
	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390					
	45,750,684	48,838,855	52,135,478	55,654,622	59,411,309	63,421,573	67,702,529	72,272,450					
0	1,840,231	0	0	0	98,545	13,957,353	22,655,816	32,924,619	43,401,363	52,061,694	59,882,763	80,736,207	87,249,879
950,000,000	71,138,611	78,282,893	77,978,145	78,039,934	78,329,825	90,322,897	100,446,580	110,898,562	44,217,860	53,034,655	60,730,836	79,165,513	87,899,384
15,187,500	-17,978,703	-13,691,228	-1,822,773	10,511,288	25,159,299	33,222,144	49,883,446	71,535,840	170,755,092	192,868,053	213,104,261	219,816,382	234,345,627
0	15,187,500	-2,791,203	-16,482,431	-18,305,203	-7,793,915	17,365,385	50,587,529	100,470,975	172,006,815	342,761,907	535,629,960	748,734,221	968,550,602
15,187,500	-2,791,203	-16,482,431	-18,305,203	-7,793,915	17,365,385	50,587,529	100,470,975	172,006,815	342,761,907	535,629,960	748,734,221	968,550,602	#####
	0.8	0.8	1.0	1.1	1.3	1.4	1.6	1.9					
	1.0	0.8	0.8	0.9	1.2	1.7	2.3	3.2					

Plan

Project Cost and Financing Plan

[illegible][illegible][illegible][illegible][illegible]

Motorway Project

Motorway Project

LOAN FUNDS

Loan A

Loan B

Loan C

Total New loan funds

Total loans (New and Existing)

LOAN SERVICING : Principal

Loan A

Loan B

Loan C

Total Principal

LOAN SERVICING : Interest

Loan A

Loan B

Loan C

Total Interest

PROFIT AND LOSS : Accrued Interest

Loan A

Loan B

Loan C

Total Interest

Loans

LOANS AND REPAYMENTS

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Loan A	465,187,500	0	0	0	0	0	0	0	0	0
Loan B	0	0	0	0	0	0	0	0	0	0
Loan C	0	0	0	0	0	0	0	0	0	0
Total New loan funds	465,187,500	0	0	0	0	0	0	0	0	0
Total loans (New and Existing)	465,187,500									

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Loan A	0	45,750,684	48,838,855	52,135,478	55,654,622	59,411,309	63,421,573	67,702,529	72,272,450	0
Loan B	0	0	0	0	0	0	0	0	0	0
Loan C	0	0	0	0	0	0	0	0	0	0
Total Principal	0	45,750,684	48,838,855	52,135,478	55,654,622	59,411,309	63,421,573	67,702,529	72,272,450	0

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Loan A	0	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390	0
Loan B	0	0	0	0	0	0	0	0	0	0
Loan C	0	0	0	0	0	0	0	0	0	0
Total Interest	0	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390	0

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Loan A	15,187,500	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390	0
Loan B	0	0	0	0	0	0	0	0	0	0
Loan C	0	0	0	0	0	0	0	0	0	0
Total Interest	15,187,500	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390	0

Motorway Project

Loan A

LOAN BALANCE (Opening)

DISBURSEMENTS

CAPITALISATION OF INTEREST

TERM

PAYMENT

INTEREST

PRINCIPAL

ADVANCES

LOAN BALANCE (Closing)

VARIABLE INTEREST RATE

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
LOAN BALANCE (Opening)		465,187,500	419,436,816	370,597,961	318,462,483	262,807,861	203,396,552	139,974,979	72,272,450	0
DISBURSEMENTS	450,000,000									
CAPITALISATION OF INTEREST	15,187,500	0	0	0	0	0	0	0	0	0
TERM	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
PAYMENT	77,150,840	77,150,840	77,150,840	77,150,840	77,150,840	77,150,840	77,150,840	77,150,840	77,150,840	77,150,840
INTEREST	0	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390	0
PRINCIPAL	0	45,750,684	48,838,855	52,135,478	55,654,622	59,411,309	63,421,573	67,702,529	72,272,450	0
ADVANCES										
LOAN BALANCE (Closing)	465,187,500	419,436,816	370,597,961	318,462,483	262,807,861	203,396,552	139,974,979	72,272,450	0	0
VARIABLE INTEREST RATE	6.75%	6.75%	6.75%	6.75%	6.75%	6.75%	6.75%	6.75%	6.75%	6.75%

LOAN SCHEDULES

Motorway Project

Depr

Motorway Project

DEPRECIATION SCHEDULES

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL
DEPRECIATION OF ASSETS																
DEPRECIATION - Buildings	3.00% of base value	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	7,978,723	239,361,702
REMAINING BALANCE		265,957,447	257,978,723	250,000,000	242,021,277	234,042,553	226,063,830	218,085,106	210,106,383	202,127,660	194,148,936	186,170,213	178,191,489	170,212,766	162,234,043	
Cost of Asset		265,957,447														
DEPRECIATION - Installations	7.50% of base value	31,914,894	31,914,894	31,914,894	31,914,894	31,914,894	31,914,894	31,914,894	31,914,894	31,914,894	31,914,894	31,914,894	31,914,894	31,914,894	10,638,298	425,531,915
REMAINING BALANCE		425,531,915	393,617,021	361,702,128	329,787,234	297,872,340	265,957,447	234,042,553	202,127,660	170,212,766	138,297,872	106,382,979	74,468,085	42,553,191	10,638,298	
Cost of Asset		425,531,915														
DEPRECIATION - Equipment / Fittings	7.50% of base value	5,082,447	5,082,447	5,082,447	5,082,447	5,082,447	5,082,447	5,082,447	5,082,447	5,082,447	5,082,447	5,082,447	5,082,447	5,082,447	1,694,149	67,765,957
REMAINING BALANCE		67,765,957	62,683,511	57,601,064	52,518,617	47,436,170	42,353,723	37,271,277	32,188,830	27,106,383	22,023,936	16,941,489	11,859,043	6,776,596	1,694,149	
Cost of Asset		67,765,957														
DEPRECIATION -	of base value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING BALANCE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of Asset		0														
DEPRECIATION -	of base value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING BALANCE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of Asset		0														
DEPRECIATION -	of base value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING BALANCE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of Asset		0														
TOTAL DEPRECIATION		44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	20,311,170	732,659,574
TOTAL REMAINING BALANCE		759,255,319	714,279,255	669,303,191	624,327,128	579,351,064	534,375,000	489,398,936	444,422,872	399,446,809	354,470,745	309,494,681	264,518,617	219,542,553	174,566,489	
TOTAL COST OF ASSETS (Cumulative)		759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL
Wear + Tear Allowance																
DEPRECIATION - Buildings	4.00% of base value	0	0	10,638,298	10,638,298	10,638,298	10,638,298	10,638,298	10,638,298	10,638,298	10,638,298	10,638,298	10,638,298	10,638,298	10,638,298	265,957,447
REMAINING BALANCE	Type: 8	0	0	265,957,447	255,319,149	244,680,851	234,042,553	223,404,255	212,765,957	202,127,660	191,489,362	180,851,064	170,212,766	159,574,468	148,936,170	
Cost of Asset		0		265,957,447												
DEPRECIATION - Electromechanical	10.00% of base value	0	0	42,553,191	42,553,191	42,553,191	42,553,191	42,553,191	42,553,191	42,553,191	42,553,191	42,553,191	42,553,191	0	0	425,531,915
REMAINING BALANCE	Type: 9	0	0	425,531,915	382,978,723	340,425,532	297,872,340	255,319,149	212,765,957	170,212,766	127,659,574	85,106,383	42,553,191	0	0	
Cost of Asset		0		425,531,915												
DEPRECIATION - Equipment / Fittings	10.00% of base value	0	0	6,776,596	6,776,596	6,776,596	6,776,596	6,776,596	6,776,596	6,776,596	6,776,596	6,776,596	6,776,596	0	0	67,765,957
REMAINING BALANCE	Type: 9	0	0	67,765,957	60,989,362	54,212,766	47,436,170	40,659,574	33,882,979	27,106,383	20,329,787	13,553,191	6,776,596	0	0	
Cost of Asset	10	0		67,765,957												
DEPRECIATION - Vehicles	0.00% of base value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING BALANCE	Type: 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of Asset		0		0												
DEPRECIATION - Ships	0.00% of base value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING BALANCE	Type: 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of Asset		0		0												
DEPRECIATION -	of base value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING BALANCE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of Asset		0		0												
TOTAL WEAR + TEAR ALLOWANCE		0	0	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	10,638,298	10,638,298	759,255,319
TOTAL REMAINING BALANCE		0	0	759,255,319	699,287,234	639,319,149	579,351,064	519,382,979	459,414,894	399,446,809	339,478,723	279,510,638	219,542,553	159,574,468	148,936,170	
TOTAL COST OF ASSETS (Cumulative)		0	0	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	759,255,319	

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	TOTAL
Investment Allowance																
DEPRECIATION - Buildings	- of base value	0	0	0	0	0	0	0	0	0	0	265,957,447	0	0	0	265,957,447
REMAINING BALANCE	Type: 8	0	0	0	0	0	0	0	0	0	0	265,957,447	0	0	0	265,957,447
Cost of Asset - Buildings		0	0	0	0	0	0	0	0	0	0	265,957,447	0	0	0	265,957,447
DEPRECIATION - Electromechanical	- of base value	0	0	0	0	0	0	0	0	0	0	425,531,915	0	0	0	425,531,915
REMAINING BALANCE	Type: 9	0	0	0	0	0	0	0	0	0	0	425,531,915	0	0	0	425,531,915
Cost of Asset		0	0	0	0	0	0	0	0	0	0	425,531,915	0	0	0	425,531,915
DEPRECIATION - Equipment / Fittings	- of base value	0	0	0	0	0	0	0	0	0	0	67,765,957	0	0	0	67,765,957
REMAINING BALANCE	Type: 9	0	0	0	0	0	0	0	0	0	0	67,765,957	0	0	0	67,765,957
Cost of Asset		0	0	0	0	0	0	0	0	0	0	67,765,957	0	0	0	67,765,957
DEPRECIATION - Vehicles	0.00% of base value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING BALANCE	Type: 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of Asset		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEPRECIATION - Ships	0.00% of base value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING BALANCE	Type: 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of Asset		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEPRECIATION -	of base value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REMAINING BALANCE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost of Asset		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INVESTMENT ALLOWANCE		0	0	0	0	0	0	0	0	0	0	759,255,319	0	0	0	759,255,319
TOTAL REMAINING BALANCE		0	0	0	0	0	0	0	0	0	0	759,255,319	759,255,319	759,255,319	759,255,319	
TOTAL COST OF ASSETS (Cumulative)		0	0	0	0	0	0	0	0	0	0	759,255,319	759,255,319	759,255,319	759,255,319	

Motorway Project

TAX COMPUTATION

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NET PROFIT/LOSS BEFORE TAX	-60,163,564	-23,216,312	-8,696,383	6,163,946	22,078,940	40,773,530	64,839,710	95,905,651	132,579,948	169,996,888	200,926,644	228,859,033	254,005,831	301,933,840	
+DEPRECIATION	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	44,976,064	20,311,170	
- WEAR AND TEAR ALLOWANCE	0	0	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	59,968,085	10,638,298	10,638,298	10,638,298
- INVESTMENT ALLOWANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
=TAXABLE INCOME FOR THE YEAR	-15,187,500	21,759,752	-23,688,405	-8,828,075	7,086,919	25,781,508	49,847,689	80,913,630	117,587,926	155,004,867	185,934,623	213,867,012	288,343,597	311,606,712	-10,638,298
GENERATED LOSSES	15,187,500	0	23,688,405	8,828,075	0	0	0	0	0	0	0	0	0	0	10,638,298
UTILISED LOSSES	0	-15,187,500	0	0	-7,086,919	-25,429,560	0	0	0	0	0	0	0	0	0
NET TAXABLE INCOME ON PROFITS	-15,187,500	6,572,252	-23,688,405	-8,828,075	0	351,948	49,847,689	80,913,630	117,587,926	155,004,867	185,934,623	213,867,012	288,343,597	311,606,712	-10,638,298
TAXES:															
DEFENCE FUND:															
Income Threshold	0.00% of Taxable Inc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCOME TAX (on loss brought forward)	0.00% of Taxable Inc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCOME TAX (on first Income Threshold)	0.00% of Taxable Inc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCOME TAX (income above Threshold)	28.00% of Taxable Inc.	0	1,840,231	0	0	0	98,545	13,957,353	22,655,816	32,924,619	43,401,363	52,061,694	59,882,763	80,736,207	87,249,879
SPECIAL Contribution (On Deemed Distributions)	Not Applicable														
TOTAL TAXES PAYABLE		0	1,840,231	0	0	0	98,545	13,957,353	22,655,816	32,924,619	43,401,363	52,061,694	59,882,763	80,736,207	87,249,879

COMPUTATION OF CARRY-FORWARD LOSSES

Year	-5	-4	-3	-2	-1
Loss c/f					
Balance b/f	0	0	0	0	0
+Generated	0	0	0	0	0
- Utilised	0	0	0	0	0
- Expired Tax Losses (Net)	0	0	0	0	0
Balance C/f	0	0	0	0	0
Taxable Income on Losses	0	0	0	0	0
Expired Tax Losses (Gross)	0	0	0	0	0
Amount Utilised	0	0	0	0	0

COMPUTATION OF CARRY-FORWARD LOSSES

Year	5	Losses c/f period	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Loss c/f			-15,187,500	21,759,752	-23,688,405	-8,828,075	7,086,919	25,781,508	49,847,689	80,913,630	117,587,926	155,004,867	185,934,623	213,867,012	288,343,597	311,606,712	-10,638,298
Balance b/f			0	15,187,500	0	23,688,405	32,516,480	25,429,560	0	0	0	0	0	0	0	0	0
+Generated			15,187,500	0	23,688,405	8,828,075	0	0	0	0	0	0	0	0	0	0	10,638,298
- Utilised			0	-15,187,500	0	0	-7,086,919	-25,429,560	0	0	0	0	0	0	0	0	0
- Expired Tax Losses (Net)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Balance C/f			15,187,500	0	23,688,405	32,516,480	25,429,560	0	0	0	0	0	0	0	0	0	10,638,298
Taxable Income on Losses			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Expired Tax Losses (Gross)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amount Utilised			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Applicable
Not Applicable

Motorway Project

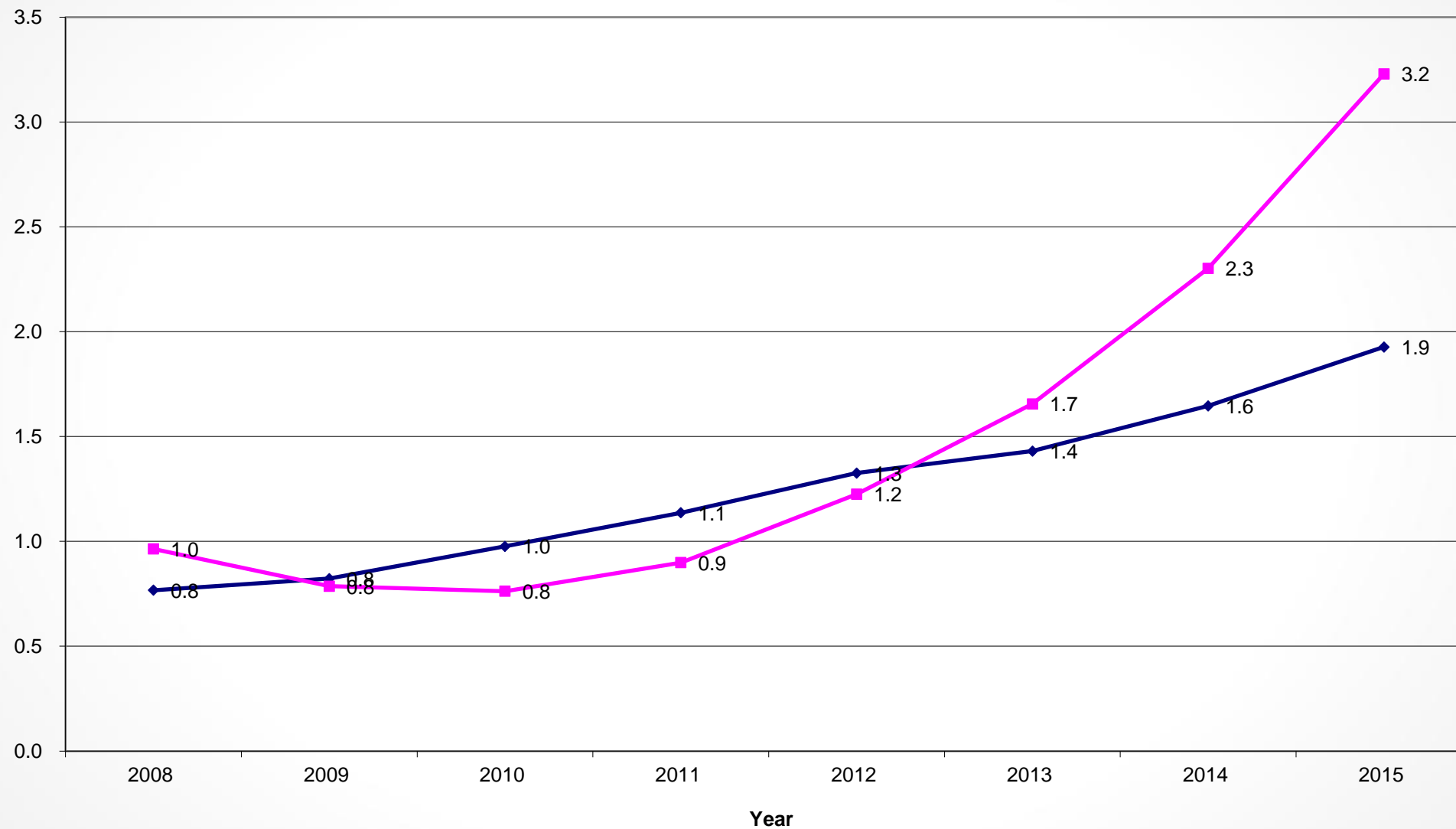
Assumptions

[illegible]

Motorway Project

DSCR Chart

Debt Service



◆ Debt Service Coverage (Based on annual net cash flow)

■ Debt Service Coverage (Based on accumulated funds)

Motorway Project

Estimated Demand (Ed)

Market without Project (Estimated demand)																																								
Vehicles	Customer Groups - Relevant Market				Market Penetration				Customers				Usage or Take Up Rate				Quantity Demanded				Price	Market Revenue																		
Market Segment	Households	Tour Operators	Organisations	Total	Households	Tour Operators	Organisations	Penetration	Households	Tour Operators	Organisations	Total	Households	Tour Operators	Organisations	Usage	Households	Tour Operators	Organisations	Total	Toll	Households	Tour Operators	Organisations	Total															
Vehicle Category 1 (MCycles, Tricycles)	25,000	0	0	25,000				10%	2,500	0	0	2,500				2.0	5,000	0	0	5,000	0.15	750	0	0	750															
Vehicle Category 2 (Cars, Mini Buses)	2,000,000	0	0	2,000,000				12%	240,000	0	0	240,000				3.0	720,000	0	0	720,000	0.30	216,000	0	0	216,000															
Vehicle Category 3 (Light Trucks, Buses)	0	20,000	80,000	100,000				5%	0	1,000	4,000	5,000				7.8	0	7,000	32,000	39,000	0.60	0	4,200	19,200	23,400															
Vehicle Category 4 (Heavy Trucks)	0	0	200,000	200,000				5%	0	0	10,000	10,000				17.0	0	0	170,000	170,000	0.90	0	0	153,000	153,000															
Market Size	2,025,000	20,000	280,000	2,325,000					242,500	1,000	14,000	257,500					725,000	7,000	202,000	934,000		216,750	4,200	172,200	393,150															
Market with Project																																								
Vehicles	Customer Groups - Relevant Market				Market Penetration				Customers				Usage or Take Up Rate				Quantity Demanded				Trips	Price	Market Revenue																	
Market Segment	Households	Tour Operators	Organisations	Total	Households	Tour Operators	Organisations	Penetration	Households	Tour Operators	Organisations	Total	Households	Tour Operators	Organisations	Usage	Households	Tour Operators	Organisations	Total	Toll	Households	Tour Operators	Organisations	Total															
Vehicle Category 1 (MCycles, Tricycles)	26,500	0	0	26,500				20%	5,300	0	0	5,300				10.0	53,000			53,000	1.38	73,087			73,087															
Vehicle Category 2 (Cars, Mini Buses)	2,200,000	0	0	2,200,000				38%	836,000	0	0	836,000				35.0	29,260,000			29,260,000	1.97	57,642,200			57,642,200															
Vehicle Category 3 (Light Trucks, Buses)	2,500	50,000	250,000	302,500				28%	250	10,000	75,000	85,250				93.8		500,000	7,500,000	8,000,000	4.93		2,462,500	36,937,500	39,400,000															
Vehicle Category 4 (Heavy Trucks)	1,000	0	250,000	251,000				35%	100	0	87,500	87,600				149.8			13,125,000	13,125,000	6.90			90,496,875	90,496,875															
Market Size	2,230,000	50,000	500,000	2,780,000					841,650	10,000	162,500	1,014,150					29,313,000	500,000	20,625,000	50,438,000		57,715,287	2,462,500	127,434,375	187,612,162															

Motorway Project



RiskEase™
RISK ANALYSIS SOFTWARE

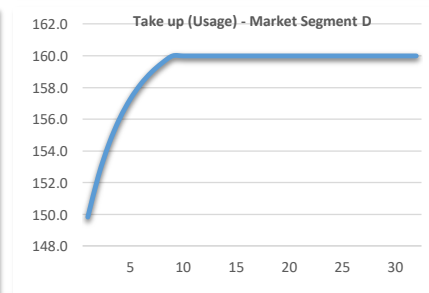
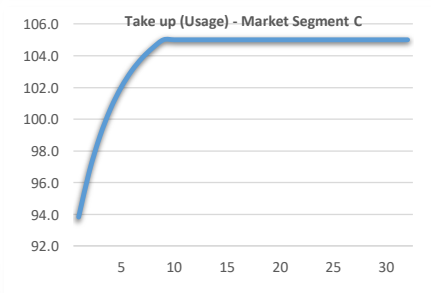
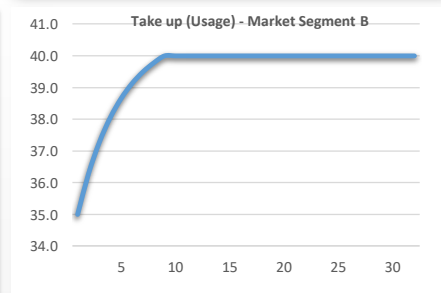
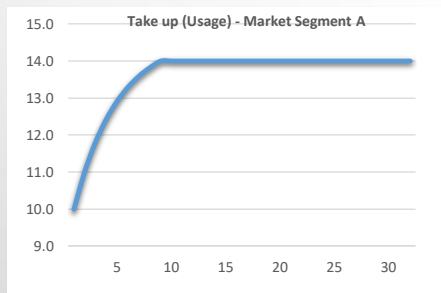
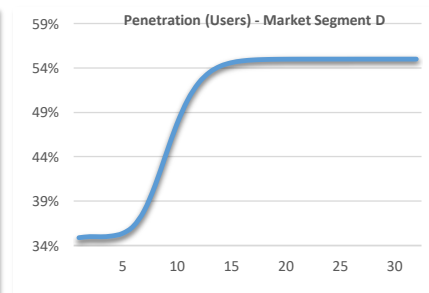
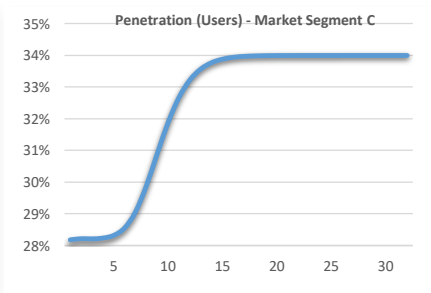
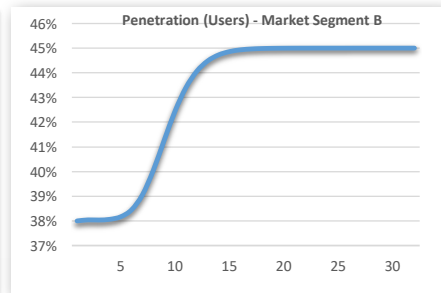
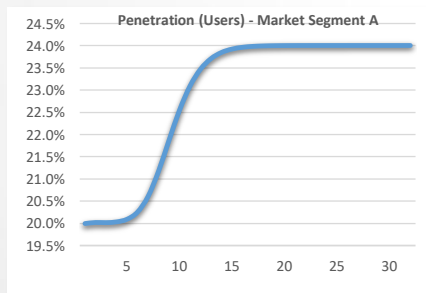
Investment Analysis Toolpak

Excel functions for projecting growth patterns in financial models to be used in Risk Analysis

[Disclaimer](#)

GROWTH PROJECTIONS (Using Invest.xlam add-in)

Growth Smooth		Base	Ceiling	Duration	Steepness			0	1	2	3	4	5	6	7	8	9	10
Growth Exp.		Base	Growth rate															
Cyclical		Base	Growth rate	Amplitude	Period	Shift												
Life cycle		Base	Ceiling	Intro	Growth	Maturity	Decline	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Penetration (Users) - Market Segment A	Life cycle	20.0%	24.0%	5.0	8.0	40.0	1.0	20.0%	20.0%	20.0%	20.0%	20.1%	20.3%	20.6%	21.2%	21.9%	22.5%	23.1%
Penetration (Users) - Market Segment B	Life cycle	38.0%	45.0%	5.0	8.0	40.0	1.0	38.0%	38.0%	38.0%	38.1%	38.2%	38.4%	39.1%	40.0%	41.3%	42.4%	43.4%
Penetration (Users) - Market Segment C	Life cycle	28.2%	34.0%	5.0	8.0	40.0	1.0	28.2%	28.2%	28.2%	28.2%	28.3%	28.6%	29.1%	29.9%	30.9%	31.9%	32.7%
Penetration (Users) - Market Segment D	Life cycle	34.9%	55.0%	5.0	8.0	40.0	1.0	34.9%	35.0%	35.0%	35.1%	35.4%	36.2%	37.9%	40.8%	44.3%	47.7%	50.4%
Take up (Usage) - Market Segment A	Growth Smooth	10.0	14.0	8.0	2.0			10.0	11.0	11.8	12.4	12.9	13.3	13.6	13.8	14.0	14.0	14.0
Take up (Usage) - Market Segment B	Growth Smooth	35.0	40.0	8.0	2.0			35.0	36.3	37.3	38.1	38.7	39.1	39.5	39.8	40.0	40.0	40.0
Take up (Usage) - Market Segment C	Growth Smooth	93.8	105.0	8.0	2.0			93.8	96.7	98.9	100.7	102.0	103.0	103.9	104.5	105.0	105.0	105.0
Take up (Usage) - Market Segment D	Growth Smooth	149.8	160.0	8.0	2.0			149.8	152.4	154.5	156.0	157.3	158.2	159.0	159.5	160.0	160.0	160.0



Motorway Project

Traffic Assumptions

PROJECTED CASH FLOW

Traffic (Without Guarantee)

Market Assumptions		Growth Factors		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Relevant Market (Potential Users)		2.00%	GDP growth	26,500	27,030	27,571	28,122	28,684	29,258	29,843	30,440	31,049	31,670	32,303	32,949	33,608	34,281	
Market Penetration (Users)			Lifecycle	20%	20%	20%	20%	20%	20%	21%	20%	22%	23%	24%	24%	24%		
Take Up (Usage)		0.00%	Growth Smooth	10.0	11.0	11.8	12.4	12.9	13.3	13.6	13.8	14.0	14.0	14.0	14.0	14.0	14.0	
Trips		100,000	No Guarantee	53,000	59,663	65,246	70,103	74,499	78,827	83,586	89,067	95,045	99,945	104,403	108,241	111,528	114,426	
Price		2.50%	Inflation per year	1.38	1.41	1.45	1.49	1.52	1.56	1.60	1.64	1.68	1.72	1.77	1.81	1.85	1.90	
Total Market Segment A				73,087	84,333	94,529	104,105	113,399	122,987	133,672	145,998	159,692	172,124	184,296	195,847	206,839	217,519	
Relevant Market (Potential Users)		2.00%	GDP growth	2,200,000	2,244,000	2,288,880	2,334,658	2,381,351	2,428,978	2,477,557	2,527,108	2,577,651	2,629,204	2,681,788	2,735,423	2,790,132	2,845,935	
Market Penetration (Users)			Lifecycle	38%	38%	38%	38%	38%	38%	39%	40%	41%	42%	43%	44%	44%	45%	
Take Up (Usage)		0.00%	Growth Smooth	35.0	36.3	37.3	38.1	38.7	39.1	39.5	39.8	40.0	40.0	40.0	40.0	40.0	40.0	
Trips		35,000,000	No Guarantee	29,260,000	30,970,159	32,452,101	33,815,725	35,133,413	36,539,605	38,214,357	40,254,348	42,545,776	44,641,715	46,555,345	48,212,620	49,642,621	50,912,558	
Price		2.50%	Inflation per year	1.97	2.02	2.07	2.12	2.17	2.23	2.28	2.34	2.40	2.46	2.52	2.58	2.65	2.72	
Total Market Segment B				57,642,200	62,536,493	67,167,127	71,739,199	76,398,006	81,442,182	87,304,368	94,264,046	102,120,658	109,830,229	117,401,712	124,620,498	131,524,697	138,261,542	
Relevant Market (Potential Users)		2.00%	GDP growth	302,500	308,550	314,721	321,015	327,436	333,984	340,664	347,477	354,427	361,516	368,746	376,121	383,643	391,316	
Market Penetration (Users)			Lifecycle	28%	28%	28%	28%	28%	29%	29%	30%	31%	32%	33%	33%	34%	34%	
Take Up (Usage)		0.00%	Growth Smooth	93.8	96.7	98.9	100.7	102.0	103.0	103.9	104.5	105.0	105.0	105.0	105.0	105.0	105.0	
Trips		10,900,000	No Guarantee	8,000,000	8,418,647	8,782,967	9,123,180	9,458,559	9,827,513	10,282,423	10,850,839	11,497,462	12,100,918	12,649,175	13,120,009	13,522,134	13,875,702	
Price		2.50%	Inflation per year	4.93	5.05	5.17	5.30	5.44	5.57	5.71	5.85	6.00	6.15	6.30	6.46	6.62	6.79	
Total Market Segment C				39,400,000	42,498,381	45,445,955	48,386,485	51,419,363	54,760,724	58,727,954	63,523,818	68,992,065	74,428,515	79,745,668	84,781,852	89,564,901	94,204,458	
Relevant Market (Potential Users)		2.00%	GDP growth	251,000	256,020	261,140	266,363	271,690	277,124	282,667	288,320	294,087	299,968	305,968	312,087	318,329	324,695	
Market Penetration (Users)			Lifecycle	35%	35%	35%	35%	35%	36%	38%	41%	44%	48%	50%	52%	54%	54%	
Take Up (Usage)		0.00%	Growth Smooth	149.8	152.4	154.5	156.0	157.3	158.2	159.0	159.5	160.0	160.0	160.0	160.0	160.0	160.0	
Trips		9,000,000	No Guarantee	13,125,000	13,667,126	14,119,197	14,583,181	15,116,872	15,867,158	17,045,192	18,755,710	20,832,077	22,880,184	24,675,428	26,120,499	27,253,220	28,161,375	
Price		2.50%	Inflation per year	6.90	7.07	7.24	7.43	7.61	7.80	8.00	8.20	8.40	8.61	8.83	9.05	9.27	9.50	
Total Market Segment D				90,496,875	96,590,702	102,280,305	108,282,465	115,051,339	123,780,643	136,294,820	153,721,582	175,007,943	197,019,209	217,789,837	236,307,913	252,719,343	267,669,182	
Total Project Market - Volume				50,438,000	53,115,594	55,419,511	57,592,189	59,783,343	62,313,103	65,625,556	69,949,963	74,970,360	79,722,763	83,984,351	87,561,370	90,529,502	93,064,061	
Total Project Market - Value				187,612,162	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701	
Guaranteed trips		55,000,000	Without Guarantee ▼															

Trips without Guarantee

Market Segment A	59,663	65,246	70,103	74,499	78,827	83,586	89,067	95,045	99,945	104,403	108,241	111,528	114,426
Market Segment B	30,970,159	32,452,101	33,815,725	35,133,413	36,539,605	38,214,357	40,254,348	42,545,776	44,641,715	46,555,345	48,212,620	49,642,621	50,912,558
Market Segment C	8,418,647	8,782,967	9,123,180	9,458,559	9,827,513	10,282,423	10,850,839	11,497,462	12,100,918	12,649,175	13,120,009	13,522,134	13,875,702
Market Segment D	13,667,126	14,119,197	14,583,181	15,116,872	15,867,158	17,045,192	18,755,710	20,832,077	22,880,184	24,675,428	26,120,499	27,253,220	28,161,375

Trips with Guarantee

Market Segment A	59,663	65,246	70,103	74,499	78,827	83,586	89,067	95,045	99,945	104,403	108,241	111,528	114,426
Market Segment B	30,970,159	32,452,101	33,815,725	35,133,413	36,539,605	38,214,357	40,254,348	42,545,776	44,641,715	46,555,345	48,212,620	49,642,621	50,912,558
Market Segment C	8,418,647	8,782,967	9,123,180	9,458,559	9,827,513	10,282,423	10,850,839	11,497,462	12,100,918	12,649,175	13,120,009	13,522,134	13,875,752
Market Segment D	13,667,126	14,119,197	14,583,181	15,116,872	15,867,158	17,045,192	18,755,710	20,832,077	22,880,184	24,675,428	26,120,499	27,253,220	28,161,375

Guranteed Trips - Volume

[illegible]

Compensation price

Market Segment A	1.41	1.45	1.49	1.52	1.56	1.60	1.64	1.68	1.72	1.77	1.81	1.85	1.90
Market Segment B	2.02	2.07	2.12	2.17	2.23	2.28	2.34	2.40	2.46	2.52	2.58	2.65	2.72
Market Segment C	5.05	5.17	5.30	5.44	5.57	5.71	5.85	6.00	6.15	6.30	6.46	6.62	6.79
Market Segment D	7.07	7.24	7.43	7.61	7.80	8.00	8.20	8.40	8.61	8.83	9.05	9.27	9.50

Value of Guarantee

[illegible]

Motorway Project

Traffic Assumptions

PROJECTED CASH FLOW

Traffic (With Guarantee)

Market Assumptions	Growth Factors	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Relevant Market (Potential Users)	2.00%	GDP growth	26,500	27,030	27,571	28,122	28,684	29,258	29,843	30,440	31,049	31,670	32,303	32,949	33,608	34,281
Market Penetration (Users)		Lifecycle	20%	20%	20%	20%	20%	20%	21%	21%	22%	23%	23%	23%	24%	24%
Take Up (Usage)	0.00%	Growth Smooth	10.0	11.0	11.8	12.4	12.9	13.3	13.6	13.8	14.0	14.0	14.0	14.0	14.0	14.0
Trips	100,000	Guarantee	53,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	104,403	108,241	111,528	114,426	
Price	2.50%	Inflation per year	1.38	1.41	1.45	1.49	1.52	1.56	1.60	1.64	1.68	1.72	1.77	1.81	1.85	1.90
Total Market Segment A			73,087	141,348	144,881	148,503	152,216	156,021	159,922	163,920	168,018	172,218	184,296	195,847	206,839	217,519
Relevant Market (Potential Users)	2.00%	GDP growth	2,200,000	2,244,000	2,288,880	2,334,658	2,381,351	2,428,978	2,477,557	2,527,108	2,577,651	2,629,204	2,681,788	2,735,423	2,790,132	2,845,935
Market Penetration (Users)		Lifecycle	38%	38%	38%	38%	38%	38%	39%	40%	41%	42%	43%	44%	44%	45%
Take Up (Usage)	0.00%	Growth Smooth	35.0	36.3	37.3	38.1	38.7	39.1	39.5	39.8	40.0	40.0	40.0	40.0	40.0	40.0
Trips	35,000,000	Guarantee	29,260,000	35,000,000	35,000,000	35,000,000	35,133,413	36,539,605	38,214,357	40,254,348	42,545,776	44,641,715	46,555,345	48,212,620	49,642,621	50,912,558
Price	2.50%	Inflation per year	1.97	2.02	2.07	2.12	2.17	2.23	2.28	2.34	2.40	2.46	2.52	2.58	2.65	2.72
Total Market Segment B			57,642,200	70,673,750	72,440,594	74,251,609	76,398,006	81,442,182	87,304,368	94,264,046	102,120,658	109,830,229	117,401,712	124,620,498	131,524,697	138,261,542
Relevant Market (Potential Users)	2.00%	GDP growth	302,500	308,550	314,721	321,015	327,436	333,984	340,664	347,477	354,427	361,516	368,746	376,121	383,643	391,316
Market Penetration (Users)		Lifecycle	28%	28%	28%	28%	28%	29%	29%	30%	31%	32%	33%	33%	34%	34%
Take Up (Usage)	0.00%	Growth Smooth	93.8	96.7	98.9	100.7	102.0	103.0	103.9	104.5	105.0	105.0	105.0	105.0	105.0	105.0
Trips	10,900,000	Guarantee	8,000,000	10,900,000	10,900,000	10,900,000	10,900,000	10,900,000	10,900,000	10,900,000	11,497,462	12,100,918	12,649,175	13,120,009	13,522,134	13,875,702
Price	2.50%	Inflation per year	4.93	5.05	5.17	5.30	5.44	5.57	5.71	5.85	6.00	6.15	6.30	6.46	6.62	6.79
Total Market Segment C			39,400,000	55,024,563	56,400,177	57,810,181	59,255,436	60,736,821	62,255,242	63,811,623	68,992,065	74,428,515	79,745,668	84,781,852	89,564,901	94,204,458
Relevant Market (Potential Users)	2.00%	GDP growth	251,000	256,020	261,140	266,363	271,690	277,124	282,667	288,320	294,087	299,968	305,968	312,087	318,329	324,695
Market Penetration (Users)		Lifecycle	35%	35%	35%	35%	35%	36%	38%	41%	44%	48%	50%	52%	54%	54%
Take Up (Usage)	0.00%	Growth Smooth	149.8	152.4	154.5	156.0	157.3	158.2	159.0	159.5	160.0	160.0	160.0	160.0	160.0	160.0
Trips	9,000,000	Guarantee	13,125,000	13,667,126	14,119,197	14,583,181	15,116,872	15,867,158	17,045,192	18,755,710	20,832,077	22,880,184	24,675,428	26,120,499	27,253,220	28,161,375
Price	2.50%	Inflation per year	6.90	7.07	7.24	7.43	7.61	7.80	8.00	8.20	8.40	8.61	8.83	9.05	9.27	9.50
Total Market Segment D			90,496,875	96,590,702	102,280,305	108,282,463	115,051,339	123,780,643	136,294,820	153,721,582	175,007,943	197,019,209	217,789,837	236,307,913	252,719,343	267,669,182
Total Project Market - Volume			50,438,000	59,667,126	60,119,197	60,583,181	61,250,285	63,406,763	66,259,548	70,010,058	74,975,315	79,722,818	83,984,351	87,561,370	90,529,502	93,064,061
Total Project Market - Value			187,612,162	222,430,362	231,265,956	240,492,758	250,856,996	266,115,668	286,014,351	311,961,171	346,288,683	381,450,171	415,121,514	445,906,110	474,015,780	500,352,701
Guaranteed trips	55,000,000	With Guarantee														

Trips without Guarantee

Market Segment A	59,663	65,246	70,103	74,499	78,827	83,586	89,067	95,045	99,945	104,403	108,241	111,528	114,426
Market Segment B	30,970,159	32,452,101	33,815,725	35,133,413	36,539,605	38,214,357	40,254,348	42,545,776	44,641,715	46,555,345	48,212,620	49,642,621	50,912,558
Market Segment C	8,418,647	8,782,967	9,123,180	9,458,559	9,827,513	10,282,423	10,850,839	11,497,462	12,100,918	12,649,175	13,120,009	13,522,134	13,875,702
Market Segment D	13,667,126	14,119,197	14,583,181	15,116,872	15,867,158	17,045,192	18,755,710	20,832,077	22,880,184	24,675,428	26,120,499	27,253,220	28,161,375

Trips with Guarantee

Market Segment A	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	104,403	108,241	111,528	114,426
Market Segment B	35,000,000	35,000,000	35,000,000	35,133,413	36,539,605	38,214,357	40,254,348	42,545,776	44,641,715	46,555,345	48,212,620	49,642,621	50,912,558
Market Segment C	10,900,000	10,900,000	10,900,000	10,900,000	10,900,000	10,900,000	10,900,000	11,497,462	12,100,918	12,649,175	13,120,009	13,522,134	13,875,702
Market Segment D	13,667,126	14,119,197	14,583,181	15,116,872	15,867,158	17,045,192	18,755,710	20,832,077	22,880,184	24,675,428	26,120,499	27,253,220	28,161,375

Guaranteed Trips - Volume

Market Segment A	40,337	34,754	29,897	25,501	21,173	16,414	10,933	4,955	55				
Market Segment B	4,029,841	2,547,899	1,184,275										
Market Segment C	2,481,353	2,117,033	1,776,820	1,441,441	1,072,487	617,577	49,161						
Market Segment D													

Compensation price

Market Segment A	1.41	1.45	1.49	1.52	1.56	1.60	1.64	1.68	1.72	1.77	1.81	1.85	1.90
Market Segment B	2.02	2.07	2.12	2.17	2.23	2.28	2.34	2.40	2.46	2.52	2.58	2.65	2.72
Market Segment C	5.05	5.17	5.30	5.44	5.57	5.71	5.85	6.00	6.15	6.30	6.46	6.62	6.79
Market Segment D	7.07	7.24	7.43	7.61	7.80	8.00	8.20	8.40	8.61	8.83	9.05	9.27	9.50

Value of Guarantee

Market Segment A	57,015	50,352	44,398	38,817	33,034	26,250	17,922	8,325	94	0	0	0	0
Market Segment B	8,137,257	5,273,467	2,512,410	0	0	0	0	0	0	0	0	0	0
Market Segment C	12,526,182	10,954,221	9,423,696	7,836,072	5,976,097	3,527,288	287,805	0	0	0	0	0	0
Market Segment D	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Value - cost of Guarantee	20,720,454	16,278,041	11,980,504	7,874,889	6,009,131	3,553,538	305,727	8,325	94	0	0	0	0
Present Value of Guarantee	18,500,405	12,976,754	8,527,486	5,004,634	3,409,742	1,800,333	138,295	3,363	34	0	0	0	0

Motorway Project

Cash Flow Owner (Without Guarantee)

Motorway Project

(Cashflows Without Guarantee)

Basic assumptions	Growth	Projection
		None
		None
		None
		None

Cash Inflows

From Operations		None
		None
		None
		None

Total from operations

Residual values		
Land	2.5%	inflation rate
Buildings	2.5%	inflation rate
Electromechanical	2.5%	inflation rate
Furnishings/Equipment	2.5%	inflation rate
Loans		

Total Cash Inflows

Cash Outflows

Value of existing assets *

Capital Investment

Land		
Buildings		
Electromechanical		
Furnishings & Equipment		
Preliminary and preoperational		

Operating expenditure

Payroll and Staff		None
Administration	2.00%	Linear
Electricity and Fuel	3.00%	Linear
Water	3.00%	Linear
Postages and Telephone	3.00%	Linear
Maintenance	2.50%	Linear
Sales and Distribution	2.50%	Linear
Advertising and Promotion	-5.00%	Linear
		None
		None

Corporate taxation

Accounts receivable (change)	8.3%	of sales
Accounts payable (change)	16.7%	of oper. costs
Cash reserves (change)	0.2%	of sales

Loan repayments

Loans - interest payments	
Loan - principal payments	

Total Cash Outflows

Net Cash Flow

Net Present Value	12.0%	discount rate
-------------------	-------	---------------

(Cashflows Without Guarantee)

Repayment Capability Calculation

Net Cash Flow (net of existing assets)	
Outside Obligations	
Outside Cash	
Opening Cash Balance	
Closing Cash Balance (accumulated funds)	
Debt Service Coverage (Based on annual net cash flow)	
Debt Service Coverage (Based on accumulated funds)	

PROJECTED CASH FLOW - OWNER'S PERSPECTIVE (nominal prices)

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022

	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701	

0	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701	
---	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	--

														282,594,764
														217,958,728
														15,031,636
														2,393,788

465,187,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-------------	---	---	---	---	---	---	---	---	---	---	---	---	---	---

465,187,500	201,709,908	214,987,916	228,512,254	242,982,107	260,106,537	282,460,813	311,655,445	346,280,357	381,450,077	415,121,514	445,906,110	474,015,780	500,352,701	517,978,916
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------

0

200,000,000														
250,000,000														
400,000,000														
55,000,000														
45,000,000														

	75,000,000	76,500,000	78,030,000	79,590,600	81,182,412	82,806,060	84,462,181	86,151,425	87,874,454	89,631,943	91,424,581	93,253,073	95,118,135	
	10,000,000	10,200,000	10,404,000	10,612,080	10,824,322	11,040,808	11,261,624	11,486,857	11,716,594	11,950,926	12,189,944	12,433,743	12,682,418	
	7,500,000	7,725,000	7,956,750	8,195,453	8,441,316	8,694,556	8,953,392	9,224,054	9,500,776	9,785,799	10,079,373	10,381,754	10,693,207	
	3,000,000	3,090,000	3,182,700	3,278,181	3,376,526	3,477,822	3,582,157	3,689,622	3,800,310	3,914,320	4,031,749	4,152,702	4,277,283	
	1,000,000	1,030,000	1,060,900	1,092,727	1,125,509	1,159,274	1,194,052	1,229,874	1,266,770	1,304,773	1,343,916	1,384,234	1,425,761	
	7,050,000	7,226,250	7,406,906	7,592,079	7,781,881	7,976,428	8,175,839	8,380,235	8,589,740	8,804,484	9,024,596	9,250,211	9,481,466	
	25,000,000	25,625,000	26,265,625	26,922,266	27,595,322	28,285,205	28,992,335	29,717,144	30,460,072	31,221,574	32,002,114	32,802,166	33,622,221	
	20,000,000	19,000,000	18,050,000	17,147,500	16,290,125	15,475,619	14,701,838	13,966,746	13,268,409	12,604,988	11,974,739	11,376,002	10,807,202	
0	1,840,231	0	0	0	98,545	13,957,353	22,655,816	32,924,619	43,401,363	52,061,694	59,882,763	80,736,207	87,249,879	

	16,809,159	1,106,501	1,127,028	1,205,821	1,427,036	1,862,856	2,432,886	2,885,409	2,930,810	2,805,953	2,565,383	2,342,473	2,194,743	-41,696,058
	-25,065,038	-1,003	-326,772	-345,667	-380,846	-2,692,861	-1,851,352	-2,131,557	-2,184,652	-1,900,336	-1,778,879	-3,969,386	-1,597,913	44,226,262
	403,420	26,556	27,049	28,940	34,249	44,709	58,389	69,250	70,339	67,343	61,569	56,219	52,674	-1,000,705

	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390						
	45,750,684	48,838,855	52,135,478	55,654,622	59,411,309	63,421,573	67,702,529	72,272,450						

950,000,000	219,688,611	228,679,143	230,335,026	232,470,819	234,947,238	249,238,669	261,771,999	274,744,518	210,694,985	222,253,461	232,801,849	254,199,398	266,007,075	1,529,498
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-----------

-484,812,500	-17,978,703	-13,691,228	-1,822,773	10,511,288	25,159,299	33,222,144	49,883,446	71,535,840	170,755,092	192,868,053	213,104,261	219,816,382	234,345,627	516,449,418
--------------	-------------	-------------	------------	------------	------------	------------	------------	------------	-------------	-------------	-------------	-------------	-------------	-------------

-23,092,603	Internal Rate of Return	11.5%
-------------	-------------------------	-------

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
15,187,500	-17,978,703	-13,691,228	-1,822,773	10,511,288	25,159,299	33,222,144	49,883,446	71,535,840	170,755,092	192,868,053	213,104,261	219,816,382	234,345,627	
0	15,187,500	-2,791,203	-16,482,431	-18,305,203	-7,793,915	17,365,385	50,587,529	100,470,975	172,006,815	342,761,907	535,629,960	748,734,221	968,550,802	
15,187,500	-2,791,203	-16,482,431	-18,305,203	-7,793,915	17,365,385	50,587,529	100,470,975	172,006,815	342,761,907	535,629,960	748,734,221	968,550,802	1,202,896,229	
	0.8	0.8	1.0	1.1	1.3	1.4	1.6	1.9						
	1.0	0.8	0.8	0.9	1.2	1.7	2.3	3.2						

Motorway Project

Cash Flow Owner (With Guarantee)

Motorway Project

(Cashflows With Guarantee)

Basic assumptions	Growth	Projection
		None
		None
		None
		None

Cash Inflows

From Operations		None
		None
		None
		None

Total from operations

Residual values		
Land	2.5%	inflation rate
Buildings	2.5%	inflation rate
Electromechanical	2.5%	inflation rate
Furnishings/Equipment	2.5%	inflation rate
Loans		

Total Cash Inflows

Cash Outflows

Value of existing assets *

Capital Investment

Land	
Buildings	
Electromechanical	
Furnishings & Equipment	
Preliminary and preoperational	

Operating expenditure

Payroll and Staff		None
Administration	2.00%	Linear
Electricity and Fuel	3.00%	Linear
Water	3.00%	Linear
Postages and Telephone	3.00%	Linear
Maintenance	2.50%	Linear
Sales and Distribution	2.50%	Linear
Advertising and Promotion	-5.00%	Linear
		None
		None

Corporate taxation

Accounts receivable (change)	8.3%	of sales
Accounts payable (change)	16.7%	of oper. costs
Cash reserves (change)	0.2%	of sales

Loan repayments

Loans - interest payments	
Loan - principal payments	

Total Cash Outflows

Net Cash Flow

Net Present Value	12.0%	discount rate
(Cashflows With Guarantee)		

Repayment Capability Calculation

Net Cash Flow (net of existing assets)

Outside Obligations	
Outside Cash	
Opening Cash Balance	
Closing Cash Balance (accumulated funds)	
Debt Service Coverage (Based on annual net cash flow)	
Debt Service Coverage (Based on accumulated funds)	

PROJECTED CASH FLOW - OWNER'S PERSPECTIVE (nominal prices)

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022

	222,430,362	231,265,956	240,492,758	250,856,996	266,115,668	286,014,351	311,961,171	346,288,683	381,450,171	415,121,514	445,906,110	474,015,780	500,352,701	

0	222,430,362	231,265,956	240,492,758	250,856,996	266,115,668	286,014,351	311,961,171	346,288,683	381,450,171	415,121,514	445,906,110	474,015,780	500,352,701	
---	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	--

														282,594,764
														217,958,728
														15,031,636
														2,393,788

465,187,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-------------	---	---	---	---	---	---	---	---	---	---	---	---	---	---

465,187,500	222,430,362	231,265,956	240,492,758	250,856,996	266,115,668	286,014,351	311,961,171	346,288,683	381,450,171	415,121,514	445,906,110	474,015,780	500,352,701	517,978,916
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------

0

200,000,000														
250,000,000														
400,000,000														
55,000,000														
45,000,000														

	75,000,000	76,500,000	78,030,000	79,590,600	81,182,412	82,806,060	84,462,181	86,151,425	87,874,454	89,631,943	91,424,581	93,253,073	95,118,135	
	10,000,000	10,200,000	10,404,000	10,612,080	10,824,322	11,040,808	11,261,624	11,486,857	11,716,594	11,950,926	12,189,944	12,433,743	12,682,418	
	7,500,000	7,725,000	7,956,750	8,195,453	8,441,316	8,694,556	8,955,392	9,224,054	9,500,776	9,785,799	10,079,373	10,381,754	10,693,207	
	3,000,000	3,090,000	3,182,700	3,278,181	3,376,526	3,477,822	3,582,157	3,689,622	3,800,310	3,914,320	4,031,749	4,152,702	4,277,283	
	1,000,000	1,030,000	1,060,900	1,092,727	1,125,509	1,159,274	1,194,052	1,229,874	1,266,770	1,304,773	1,343,916	1,384,234	1,425,761	
	7,050,000	7,226,250	7,406,906	7,592,079	7,781,881	7,976,428	8,175,839	8,380,235	8,589,740	8,804,484	9,024,596	9,250,211	9,481,466	
	25,000,000	25,625,000	26,265,625	26,922,266	27,595,322	28,285,205	28,992,335	29,717,144	30,460,072	31,221,574	32,002,114	32,802,166	33,622,221	
	20,000,000	19,000,000	18,050,000	17,147,500	16,290,125	15,475,619	14,701,838	13,966,746	13,268,409	12,604,988	11,974,739	11,376,002	10,807,202	
0	7,641,958	0	0	2,997,085	8,901,379	14,952,343	22,741,420	32,926,951	43,401,389	52,061,694	59,882,763	80,736,207	87,249,879	

	18,535,864	736,300	768,900	863,687	1,271,556	1,658,224	2,162,235	2,860,626	2,930,124	2,805,945	2,565,383	2,342,473	2,194,743	-41,696,058
	-26,031,993	965,951	-326,772	-845,181	-1,348,470	-1,391,554	-1,699,787	-2,117,678	-2,184,268	-1,900,331	-1,778,879	-3,969,386	-1,597,913	44,226,262
	444,861	17,671	18,454	20,728	30,517	39,797	51,894	68,655	70,323	67,343	61,569	56,219	52,674	-1,000,705

	31,400,156	28,311,985	25,015,362	21,496,218	17,739,531	13,729,267	9,448,311	4,878,390						
	45,750,684	48,838,855	52,135,478	55,654,622	59,411,309	63,421,573	67,702,529	72,272,450						

950,000,000	226,291,529	229,267,012	229,968,303	234,618,043	242,623,235	251,325,423	261,732,020	274,735,349	210,694,693	222,253,458	232,801,849	254,199,398	266,007,075	1,529,498
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-----------

-484,812,500	-3,861,167	1,998,944	10,524,455	16,238,953	23,492,433	34,688,928	50,229,151	71,553,334	170,755,478	192,868,057	213,104,261	219,816,382	234,345,627	516,449,418
--------------	------------	-----------	------------	------------	------------	------------	------------	------------	-------------	-------------	-------------	-------------	-------------	-------------

14,409,874	Internal Rate of Return	12.3%
------------	-------------------------	-------

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
15,187,500	-3,861,167	1,998,944	10,524,455	16,238,953	23,492,433	34,688,928	50,229,151	71,553,334	170,755,478	192,868,057	213,104,261	219,816,382	234,345,627	
0	15,187,500	11,326,333	13,325,277	23,849,732	40,088,685	63,581,118	98,270,046	148,499,197	220,052,531	390,808,009	583,676,066	796,780,327	1,016,596,709	
15,187,500	11,326,333	13,325,277	23,849,732	40,088,685	63,581,118	98,270,046	148,499,197	220,052,531	390,808,009	583,676,066	796,780,327	1,016,596,709	1,250,942,335	
	0.9	1.0	1.1	1.2	1.3	1.4	1.7	1.9						
	1.1	1.2	1.3	1.5	1.8	2.3	2.9	3.9						

Risk Analysis using **RiskEase**

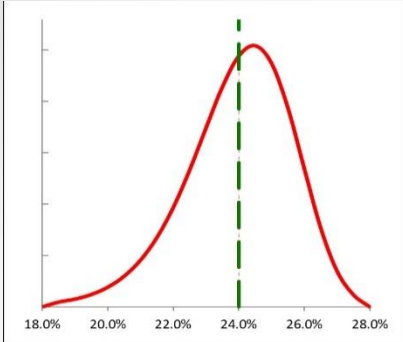
RiskEase Ltd.

Risk Variables Tables for With and Without Guarantee - RVTwo and RVTwg

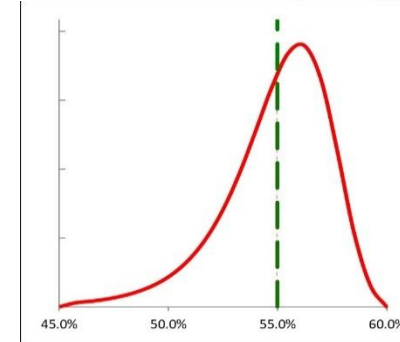
Motorway Project

RV No	Risk Variable Description	Base Value	Prob. Distr.	Range		Parameter	Truncation		Correlations	
				Min	Max		Min	Max	Ind. Var.	r [-1..1]
1	Penetration (Users) - Market Segment A	24.0%	NORM	18.0%	28.0%	29%				
2	Penetration (Users) - Market Segment B	45.0%	NORM	38.0%	55.0%	-25%				
3	Penetration (Users) - Market Segment C	34.0%	NORM	27.0%	37.0%	56%				
4	Penetration (Users) - Market Segment D	55.0%	NORM	45.0%	60.0%	47%				
7	Take up (Usage) - Market Segment A	14.0	NORM	12.0	16.0				RV1	0.70
8	Take up (Usage) - Market Segment B	40.0	NORM	37.0	45.0				RV2	0.70
9	Take up (Usage) - Market Segment C	105.0	NORM	100.0	110.0				RV3	0.70
10	Take up (Usage) - Market Segment D	160.0	NORM	150.0	170.0				RV4	0.70
5	GDP Growth	2.00%	NORM	1.40%	2.60%					
6	Domestic Inflation	2.50%	NORM	1.75%	3.25%					

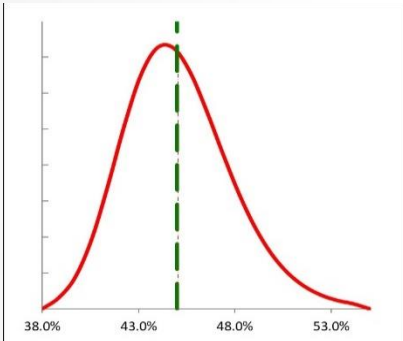
Risk Variables



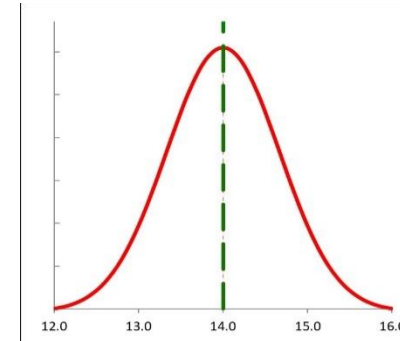
Risk Variable 1 Penetration (Users) - Market Segment A			
Base Value	24.00%		
Probability distribution:	NORMAL		
	MIN	MEAN	MAX
Range:	18.00%	23.00%	28.00%
Standard deviation:	0.02		
Degree of skewness:	29%		



Risk Variable 4 Penetration (Users) - Market Segment D			
Base Value	55.00%		
Probability distribution:	NORMAL		
	MIN	MEAN	MAX
Range:	45.00%	52.50%	60.00%
Standard deviation:	0.03		
Degree of skewness:	47%		

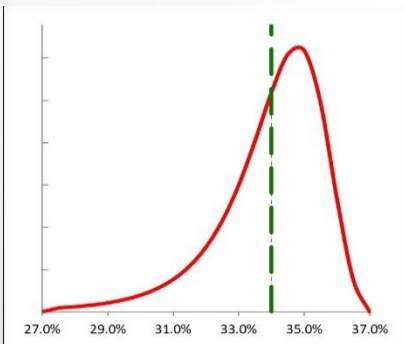


Risk Variable 2 Penetration (Users) - Market Segment B			
Base Value	45.00%		
Probability distribution:	NORMAL		
	MIN	MEAN	MAX
Range:	38.00%	46.50%	55.00%
Standard deviation:	0.03		
Degree of skewness:	-25%		

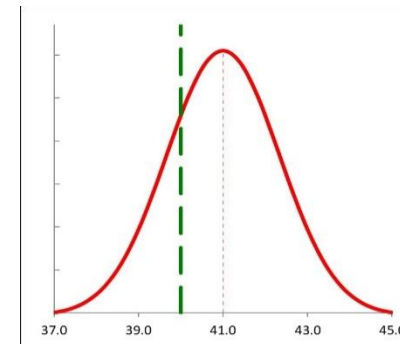


Risk Variable 7 Take up (Usage) - Market Segment A			
Base Value	14		
Probability distribution:	NORMAL		
	MIN	MEAN	MAX
Range:	12	14	16
Standard deviation:	0.67		
Degree of skewness:	0%		

Correlations	
(r = 0.70)	RV1



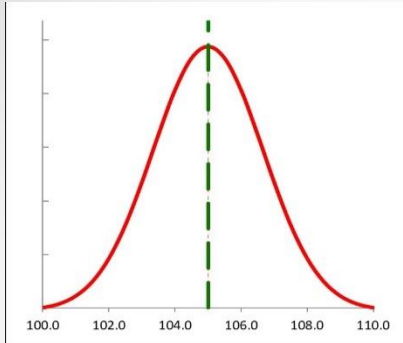
Risk Variable 3 Penetration (Users) - Market Segment C			
Base Value	34.00%		
Probability distribution:	NORMAL		
	MIN	MEAN	MAX
Range:	27.00%	32.00%	37.00%
Standard deviation:	0.02		
Degree of skewness:	56%		



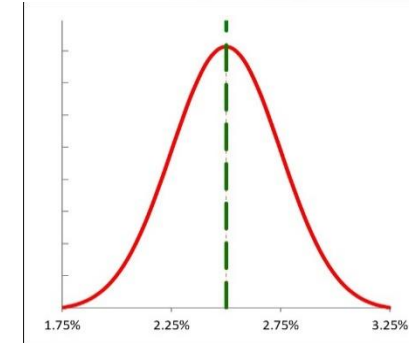
Risk Variable 8 Take up (Usage) - Market Segment B			
Base Value	40		
Probability distribution:	NORMAL		
	MIN	MEAN	MAX
Range:	37	41	45
Standard deviation:	1.33		
Degree of skewness:	0%		

Correlations	
(r = 0.70)	RV2

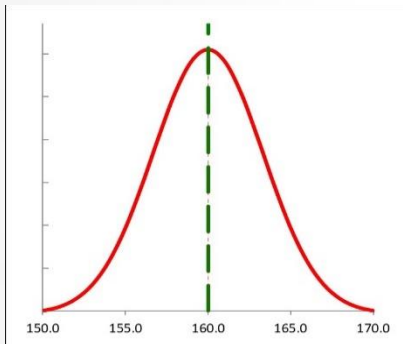
Risk Variables



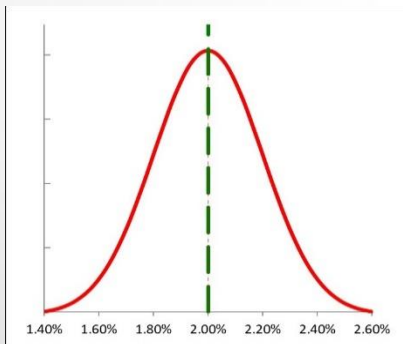
Risk Variable 9				Take up (Usage) - Market Segment C			
Base Value				105			
Probability distribution:				NORMAL			
				MIN	MEAN	MAX	
Range:				100	105	110	
Standard deviation:				1.67			
Degree of skewness:				0%			
Correlations							
(r = 0.70)				RV3			



Risk Variable 6 Domestic Inflation			
Base Value	2.50%		
Probability distribution:	NORMAL		
	MIN	MEAN	MAX
Range:	1.75%	2.50%	3.25%
Standard deviation:	0		
Degree of skewness:	0%		



Risk Variable 10				Take up (Usage) - Market Segment D			
Base Value				160			
Probability distribution:				NORMAL			
				MIN	MEAN	MAX	
Range:				150	160	170	
Standard deviation:				3.33			
Degree of skewness:				0%			
Correlations							
(r = 0.70)				RV4			



Risk Variable 5 GDP Growth			
Base Value	2.00%		
Probability distribution:	NORMAL		
	MIN	MEAN	MAX
Range:	1.40%	2.00%	2.60%
Standard deviation:	0		
Degree of skewness:	0%		

Model Results (Without Guarantee)

No	Name	Cell address	Base Value
1	NPV Owner	'[Motorway Project-Solution.xlsx]CF-Owner'!\$D\$60	-23,092,603
2	NPV Project	'[Motorway Project-Solution.xlsx]CF-Project'!\$D\$60	-74,126,536
3	IRR Owner	'[Motorway Project-Solution.xlsx]CF-Owner'!\$I\$60	11.5%
4	IRR Project	'[Motorway Project-Solution.xlsx]CF-Project'!\$I\$60	10.4%
5	DSCR1	'[Motorway Project-Solution.xlsx]CF-Owner'!\$E\$69	0.8
6	DSCR2	'[Motorway Project-Solution.xlsx]CF-Owner'!\$F\$69	0.8
7	DSCR3	'[Motorway Project-Solution.xlsx]CF-Owner'!\$G\$69	1.0
8	DSCR4	'[Motorway Project-Solution.xlsx]CF-Owner'!\$H\$69	1.1
9	DSCR5	'[Motorway Project-Solution.xlsx]CF-Owner'!\$I\$69	1.3
10	DSCR6	'[Motorway Project-Solution.xlsx]CF-Owner'!\$J\$69	1.4
11	DSCR7	'[Motorway Project-Solution.xlsx]CF-Owner'!\$K\$69	1.6
12	DSCR8	'[Motorway Project-Solution.xlsx]CF-Owner'!\$L\$69	1.9

Model Results (With Guarantee)

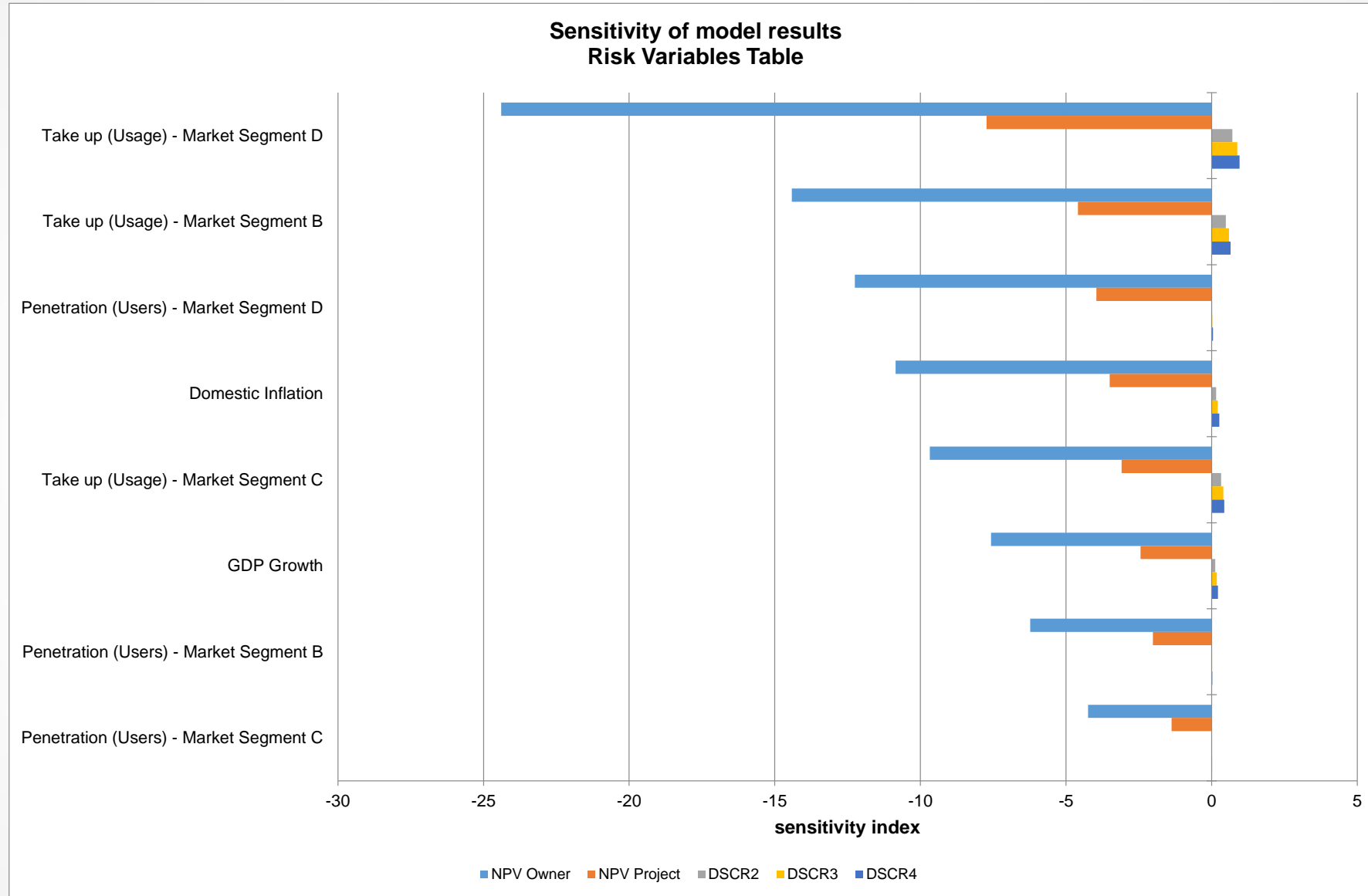
No	Name	Cell address	Base Value
1	NPV Owner	'[Motorway Project-Solution.xlsx]CF-Owner'!\$D\$60	14,409,874
2	NPV Project	'[Motorway Project-Solution.xlsx]CF-Project'!\$D\$60	-42,641,651
3	IRR Owner	'[Motorway Project-Solution.xlsx]CF-Owner'!\$I\$60	12.3%
4	IRR Project	'[Motorway Project-Solution.xlsx]CF-Project'!\$I\$60	10.9%
5	DSCR1	'[Motorway Project-Solution.xlsx]CF-Owner'!\$E\$69	0.9
6	DSCR2	'[Motorway Project-Solution.xlsx]CF-Owner'!\$F\$69	1.0
7	DSCR3	'[Motorway Project-Solution.xlsx]CF-Owner'!\$G\$69	1.1
8	DSCR4	'[Motorway Project-Solution.xlsx]CF-Owner'!\$H\$69	1.2
9	DSCR5	'[Motorway Project-Solution.xlsx]CF-Owner'!\$I\$69	1.3
10	DSCR6	'[Motorway Project-Solution.xlsx]CF-Owner'!\$J\$69	1.4
11	DSCR7	'[Motorway Project-Solution.xlsx]CF-Owner'!\$K\$69	1.7
12	DSCR8	'[Motorway Project-Solution.xlsx]CF-Owner'!\$L\$69	1.9
13	Present Value of Guarantee	'[Motorway Project-Solution.xlsx]Traffic'!\$C\$59	50,361,047
14	PV of Guarantee1	'[Motorway Project-Solution.xlsx]Traffic'!\$E\$59	18,500,405
15	PV of Guarantee2	'[Motorway Project-Solution.xlsx]Traffic'!\$F\$59	12,976,754
16	PV of Guarantee3	'[Motorway Project-Solution.xlsx]Traffic'!\$G\$59	8,527,486
17	PV of Guarantee4	'[Motorway Project-Solution.xlsx]Traffic'!\$H\$59	5,004,634
18	PV of Guarantee5	'[Motorway Project-Solution.xlsx]Traffic'!\$I\$59	3,409,742
19	PV of Guarantee6	'[Motorway Project-Solution.xlsx]Traffic'!\$J\$59	1,800,333
20	PV of Guarantee7	'[Motorway Project-Solution.xlsx]Traffic'!\$K\$59	138,295
21	PV of Guarantee8	'[Motorway Project-Solution.xlsx]Traffic'!\$L\$59	3,363
22	PV of Guarantee9	'[Motorway Project-Solution.xlsx]Traffic'!\$M\$59	34
23	PV of Guarantee10	'[Motorway Project-Solution.xlsx]Traffic'!\$N\$59	0

**RVTwg
only**

SENwo-R

Motorway Project

RV	Description	NPV Owner	NPV Project	DSCR2	DSCR3	DSCR4
RV10	Take up (Usage) - Market Segment D	-24.39	-7.73	0.71	0.88	0.96
RV8	Take up (Usage) - Market Segment B	-14.42	-4.59	0.48	0.60	0.65
RV4	Penetration (Users) - Market Segment D	-12.25	-3.96	0.01	0.02	0.05
RV6	Domestic Inflation	-10.85	-3.50	0.15	0.21	0.26
RV9	Take up (Usage) - Market Segment C	-9.68	-3.09	0.32	0.40	0.43
RV5	GDP Growth	-7.57	-2.44	0.12	0.17	0.21
RV2	Penetration (Users) - Market Segment B	-6.23	-2.02	0.01	0.01	0.02
RV3	Penetration (Users) - Market Segment C	-4.24	-1.38	0.00	0.01	0.02

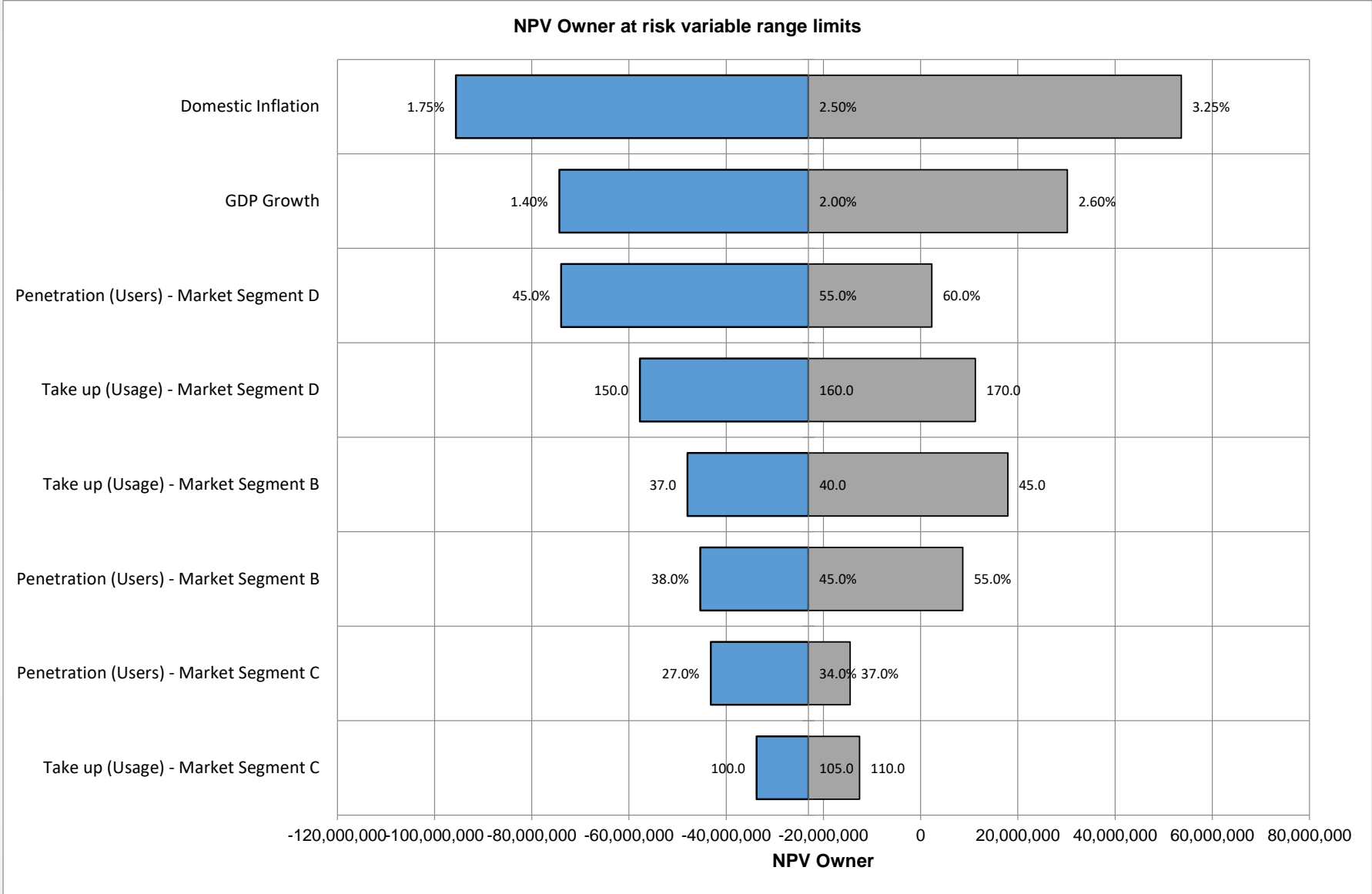


SENwo-A

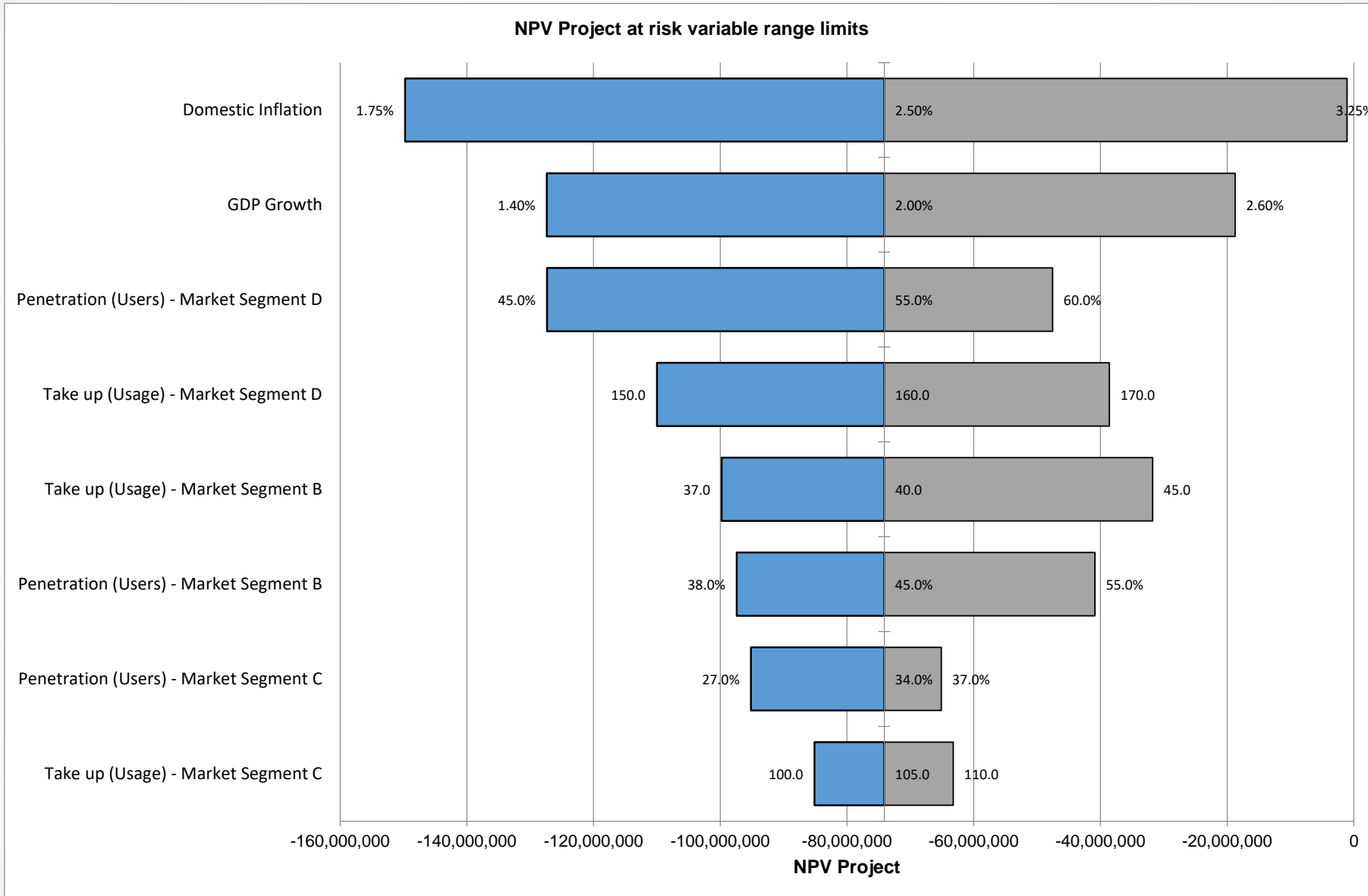
Motorway Project

					NPV Owner		NPV Project		DSCR2		DSCR3		DSCR4				
					Base Value			-23,092,603		-74,126,536		0.8		1.0		1.1	
					Low	Base	High	Low	High	Low	High	Low	High	Low	High	Low	High
RV6	Domestic Inflation	1.75%	2.50%	3.25%	-95,612,696	53,622,651	-149,733,111	-1,070,071	0.8	0.9	0.9	1.0	1.0	1.2			
RV8	Take up (Usage) - Market Segment B	37.0	40.0	45.0	-47,959,052	17,932,202	-99,798,144	-31,753,542	0.8	0.9	0.9	1.0	1.1	1.2			
RV5	GDP Growth	1.40%	2.00%	2.60%	-74,345,406	30,173,037	-127,373,821	-18,753,791	0.8	0.9	0.9	1.0	1.1	1.2			
RV10	Take up (Usage) - Market Segment D	150.0	160.0	170.0	-57,772,335	11,274,489	-109,989,648	-38,571,399	0.8	0.9	0.9	1.0	1.1	1.2			
RV9	Take up (Usage) - Market Segment C	100.0	105.0	110.0	-33,739,188	-12,549,597	-85,119,205	-63,235,900	0.8	0.8	1.0	1.0	1.1	1.2			
RV4	Penetration (Users) - Market Segment D	45.0%	55.0%	60.0%	-73,952,178	2,311,658	-127,332,493	-47,548,703	0.8	0.8	1.0	1.0	1.1	1.1			
RV2	Penetration (Users) - Market Segment B	38.0%	45.0%	55.0%	-45,355,973	8,685,486	-97,417,790	-40,879,643	0.8	0.8	1.0	1.0	1.1	1.1			
RV3	Penetration (Users) - Market Segment C	27.0%	34.0%	37.0%	-43,187,399	-14,487,579	-95,148,972	-65,123,847	0.8	0.8	1.0	1.0	1.1	1.1			

SENwo-A-Chart1



SENwo-A-Chart2

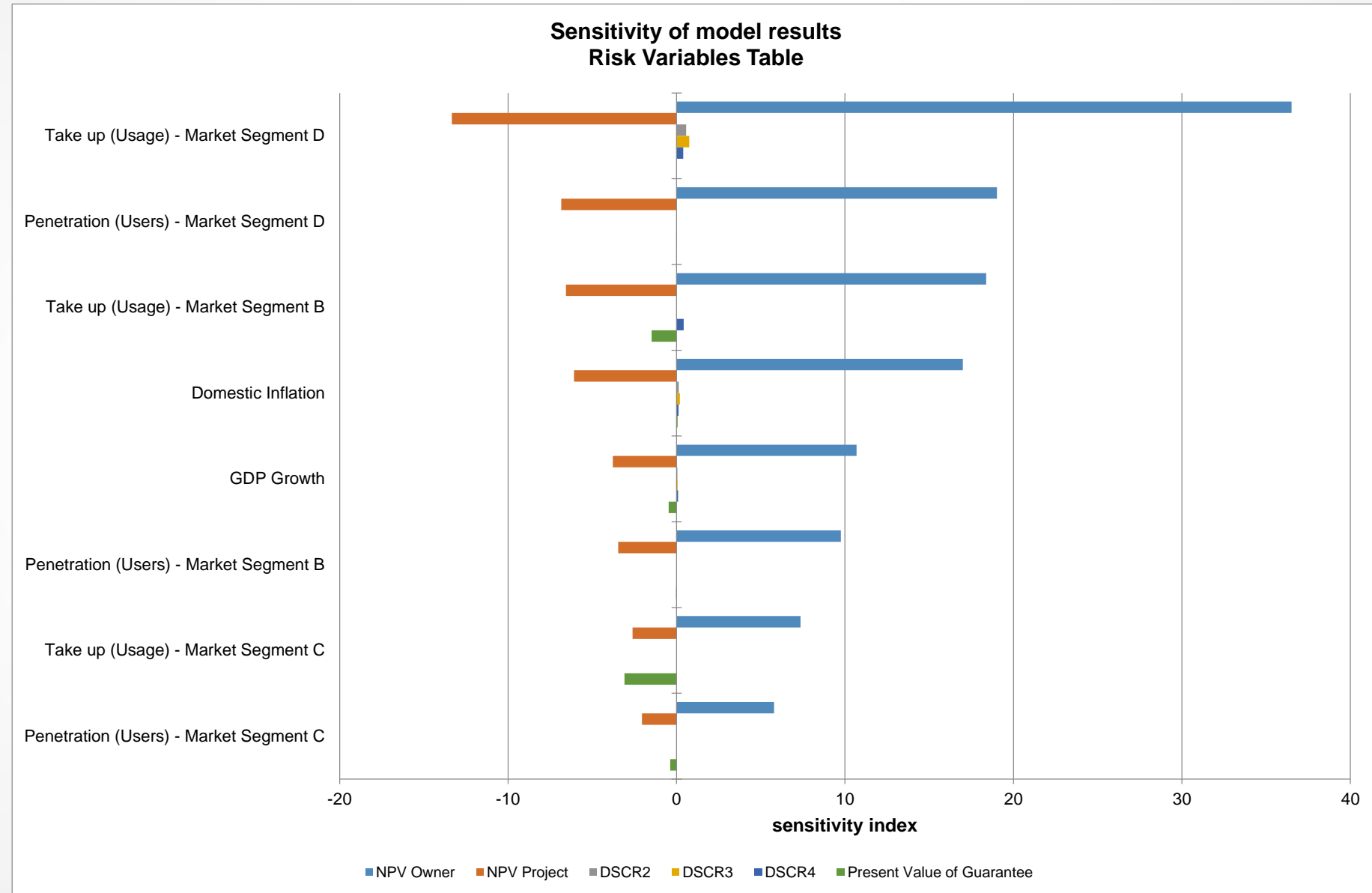


SENwg-R

Motorway Project

RV	Description	NPV Owner	NPV Project	DSCR2	DSCR3	DSCR4	Present Value of Guarantee
RV10	Take up (Usage) - Market Segment D	36.51	-13.34	0.57	0.75	0.40	0.00
RV4	Penetration (Users) - Market Segment D	19.02	-6.84	0.01	0.02	0.03	0.00
RV8	Take up (Usage) - Market Segment B	18.38	-6.56	0.00	0.00	0.42	-1.48
RV6	Domestic Inflation	16.99	-6.08	0.13	0.19	0.12	0.06
RV5	GDP Growth	10.69	-3.79	0.05	0.07	0.09	-0.47
RV2	Penetration (Users) - Market Segment B	9.76	-3.46	0.00	0.00	0.02	-0.03
RV9	Take up (Usage) - Market Segment C	7.36	-2.61	0.00	0.00	0.00	-3.09
RV3	Penetration (Users) - Market Segment C	5.79	-2.05	0.00	0.00	0.00	-0.38

SENwg-R-Chart1

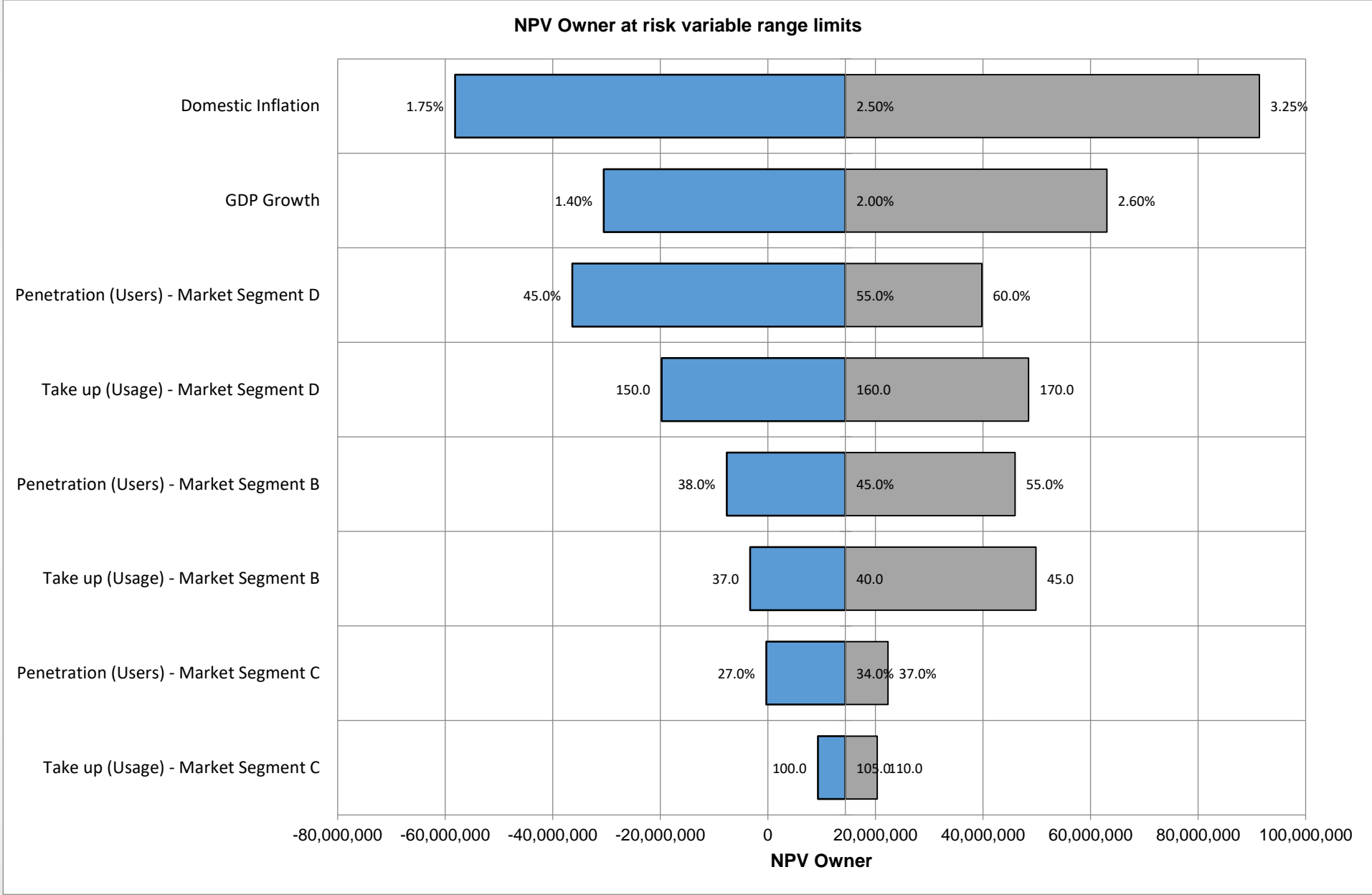


SENwg-A

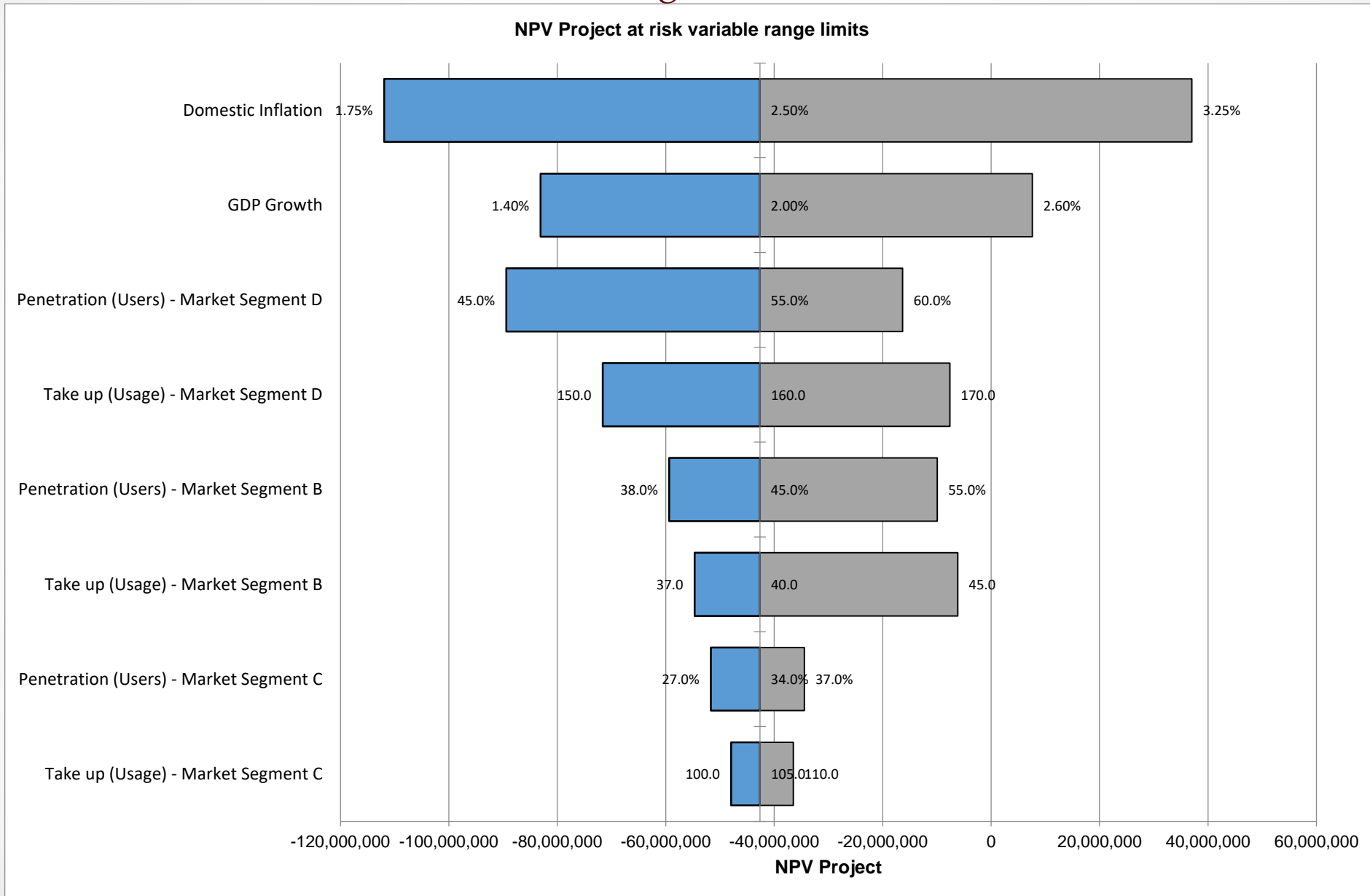
Motorway Project

					NPV Owner		NPV Project		DSCR2		DSCR3		DSCR4		Present Value of Guarantee	
		Base Value			14,409,874		-42,641,651		1.0		1.1		1.2		50,361,047	
		Low	Base	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
RV8	Take up (Usage) - Market Segment B	37.0	40.0	45.0	-3,284,250	49,850,835	-54,687,195	-6,153,847	1.0	1.0	1.1	1.2	1.2	1.3	59,506,937	43,335,746
RV5	GDP Growth	1.40%	2.00%	2.60%	-30,507,551	63,016,566	-83,082,226	7,589,606	1.0	1.0	1.1	1.2	1.2	1.2	58,294,900	44,321,290
RV9	Take up (Usage) - Market Segment C	100.0	105.0	110.0	9,319,399	20,347,581	-47,925,209	-36,489,225	1.0	1.0	1.1	1.1	1.2	1.2	57,756,029	44,149,585
RV3	Penetration (Users) - Market Segment C	27.0%	34.0%	37.0%	-281,633	22,319,149	-51,702,294	-34,429,472	1.0	1.0	1.1	1.1	1.2	1.2	57,866,829	49,397,407
RV6	Domestic Inflation	1.75%	2.50%	3.25%	-58,162,220	91,396,946	-111,943,346	37,002,913	1.0	1.1	1.1	1.2	1.2	1.3	49,498,104	51,238,199
RV2	Penetration (Users) - Market Segment B	38.0%	45.0%	55.0%	-7,656,024	45,961,292	-59,359,160	-9,922,565	1.0	1.0	1.1	1.1	1.2	1.2	50,589,539	50,074,730
RV10	Take up (Usage) - Market Segment D	150.0	160.0	170.0	-19,756,787	48,478,393	-71,625,126	-7,622,281	1.0	1.1	1.1	1.2	1.2	1.2	50,361,047	50,361,047
RV4	Penetration (Users) - Market Segment D	45.0%	55.0%	60.0%	-36,375,894	39,802,759	-89,399,900	-16,314,639	1.0	1.0	1.1	1.1	1.2	1.2	50,361,047	50,361,047

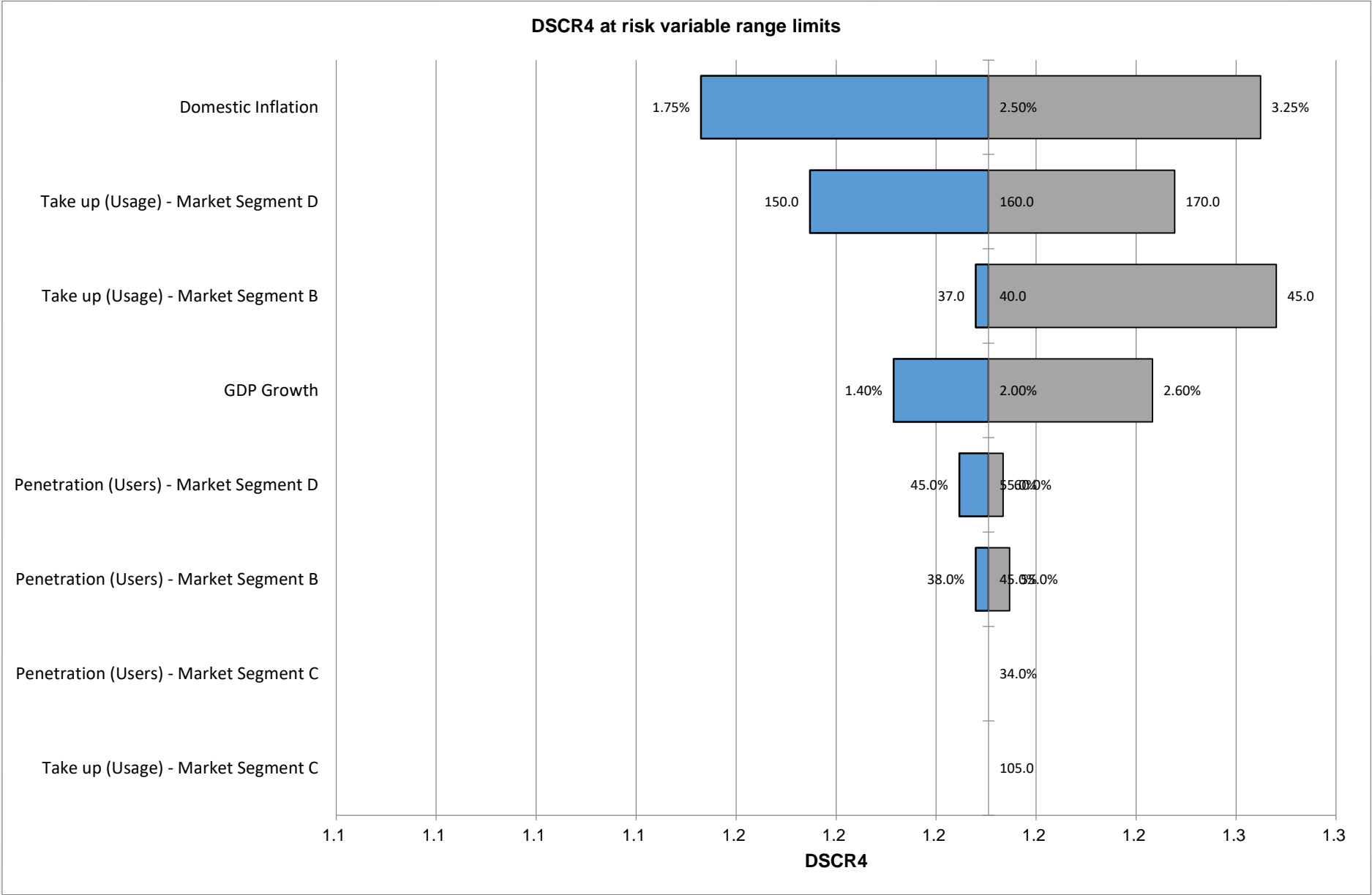
SENwg-A-Chart1

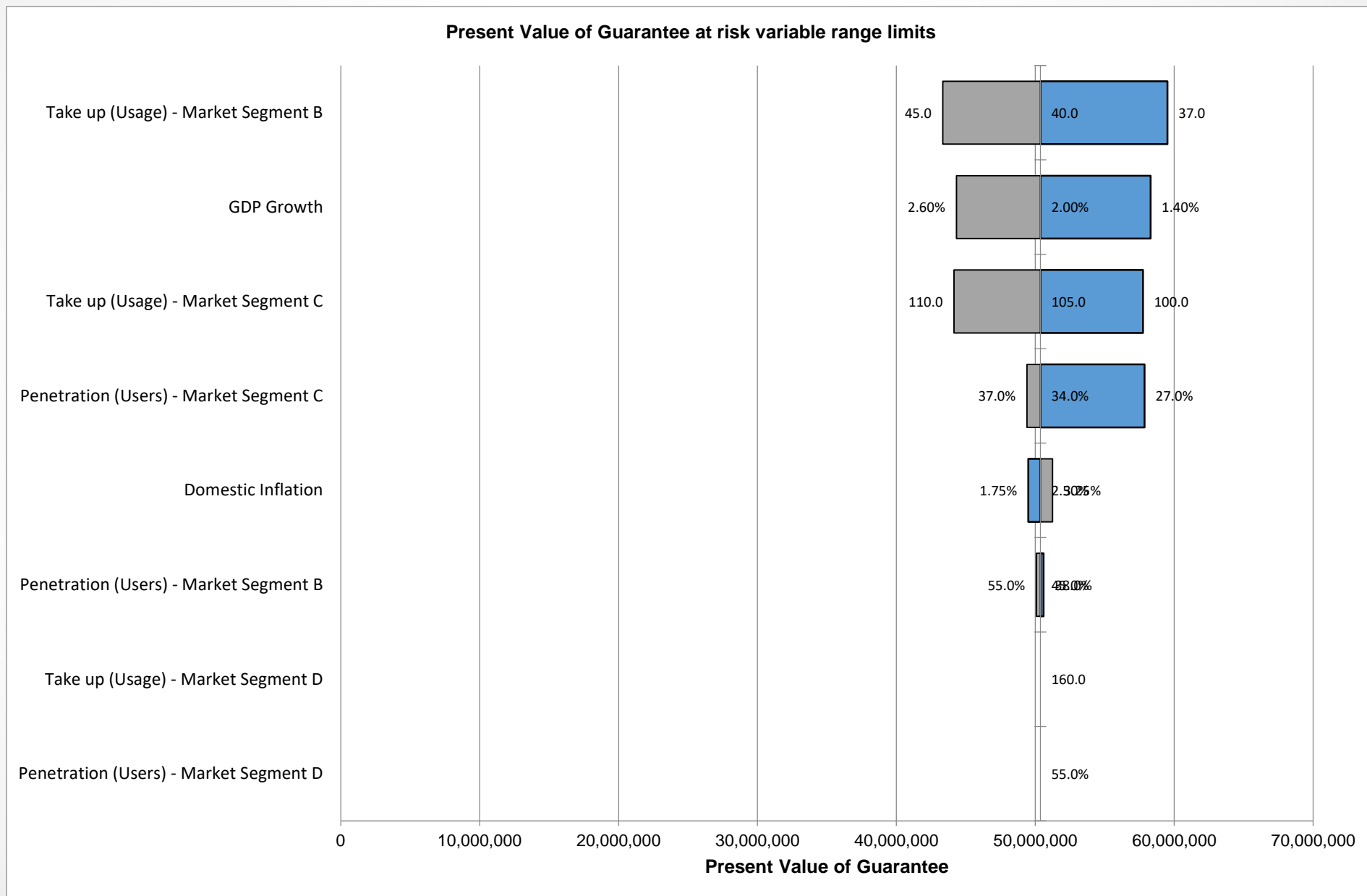


SENwg-A-Chart2



SENwg-A-Chart3





SRTwo

Motorway Project

Simulation Runs Table



Runs: 5000		Error Runs: 0						Sorted data!
Run	NPV Owner	NPV Project	IRR Owner	IRR Project	DSCR3	DSCR4	DSCR5	DSCR8
Average:	-5,713,291	-60,842,986	11.9%	10.6%	1.2	1.3	1.5	1.9
Std.Dev:	40,307,581	39,326,776	0.9%	0.7%	0.0	0.0	0.1	0.1
Std.Error:	570,035	556,165	0.0%	0.0%	0.0	0.0	0.0	0.0

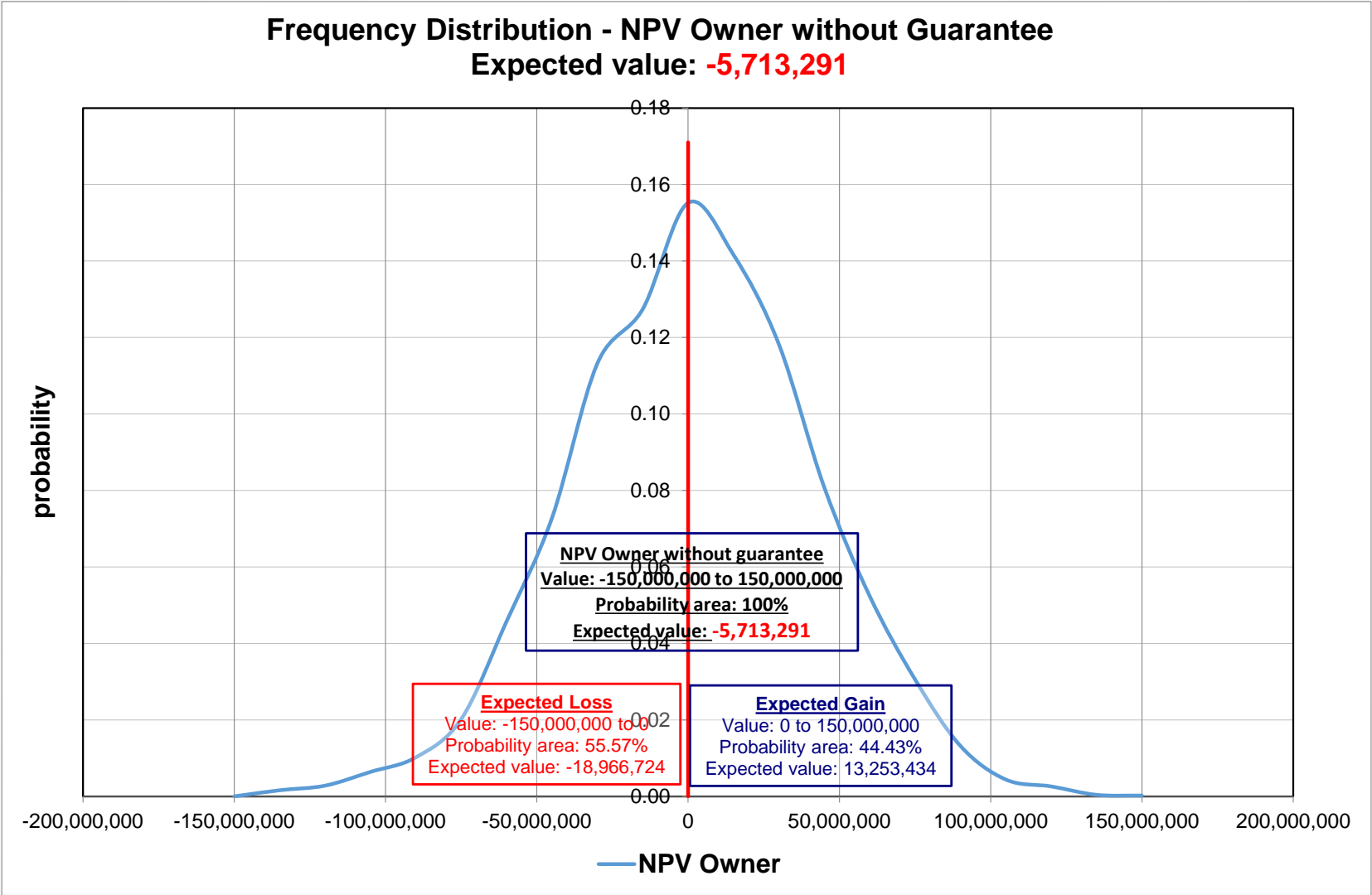
Motorway Project

ARwo

	NPV Owner	NPV Project	IRR Owner	IRR Project	DSCR1	DSCR2	DSCR3
Mean (Expected value)	-5,713,291	-60,842,986	11.9%	10.6%	0.8	1.0	1.2
Mode	7,500,000	-57,500,000	12.0%	10.8%	0.8	1.0	1.2
Minimum	-146,230,332	-203,348,117	8.6%	8.1%	0.8	0.8	1.0
First quartile (25%)	-32,975,547	-85,870,570	11.3%	10.2%	0.8	0.9	1.2
Median	-4,909,194	-60,474,337	11.9%	10.6%	0.8	1.0	1.2
Third quartile (75%)	21,076,168	-36,156,988	12.5%	11.0%	0.8	1.0	1.2
Maximum	136,966,729	83,280,591	14.8%	12.8%	0.9	1.1	1.3
Range span	283,197,061	286,628,708	6.2%	4.7%	0.1	0.2	0.3
Sample size	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Standard error	570,035	556,165	0.0%	0.0%	0.0	0.0	0.0
Standard deviation	40,307,581	39,326,776	0.9%	0.7%	0.0	0.0	0.0
Variance	1,624,701,115,298,590	1,546,595,290,474,490	0.0%	0.0%	0.0	0.0	0.0
Skewness	-0.075	-0.086	-0.184	-0.181	-0.332	-0.299	-0.629
Kurtosis	0.120	0.377	0.170	0.168	0.391	0.353	0.356
Coefficient of variation	-7.055	-0.646	0.075	0.063	0.015	0.035	0.040
Probability of negative outcome	55.6%	93.8%	0.0%	0.0%	0.0%	0.0%	0.0%
Expected loss	18,966,724	61,919,678	0.0%	0.0%	0.0	0.0	0.0
Expected gain	13,253,434	1,076,692	11.9%	10.6%	0.8	1.0	1.2
Expected loss ratio	0.589	0.983	0.000	0.000	0.000	0.000	0.000

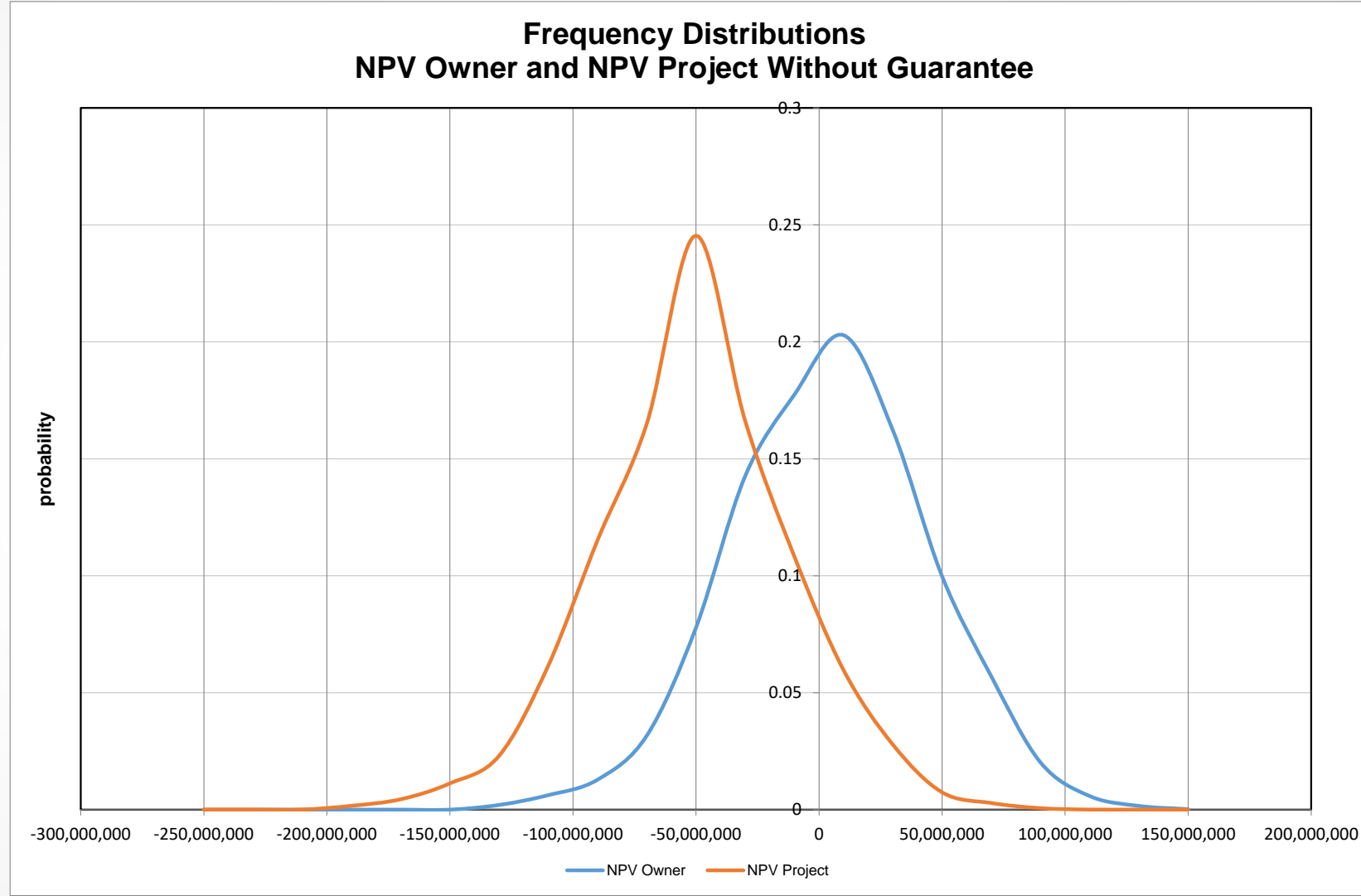
ARwo_Chart1

Motorway Project

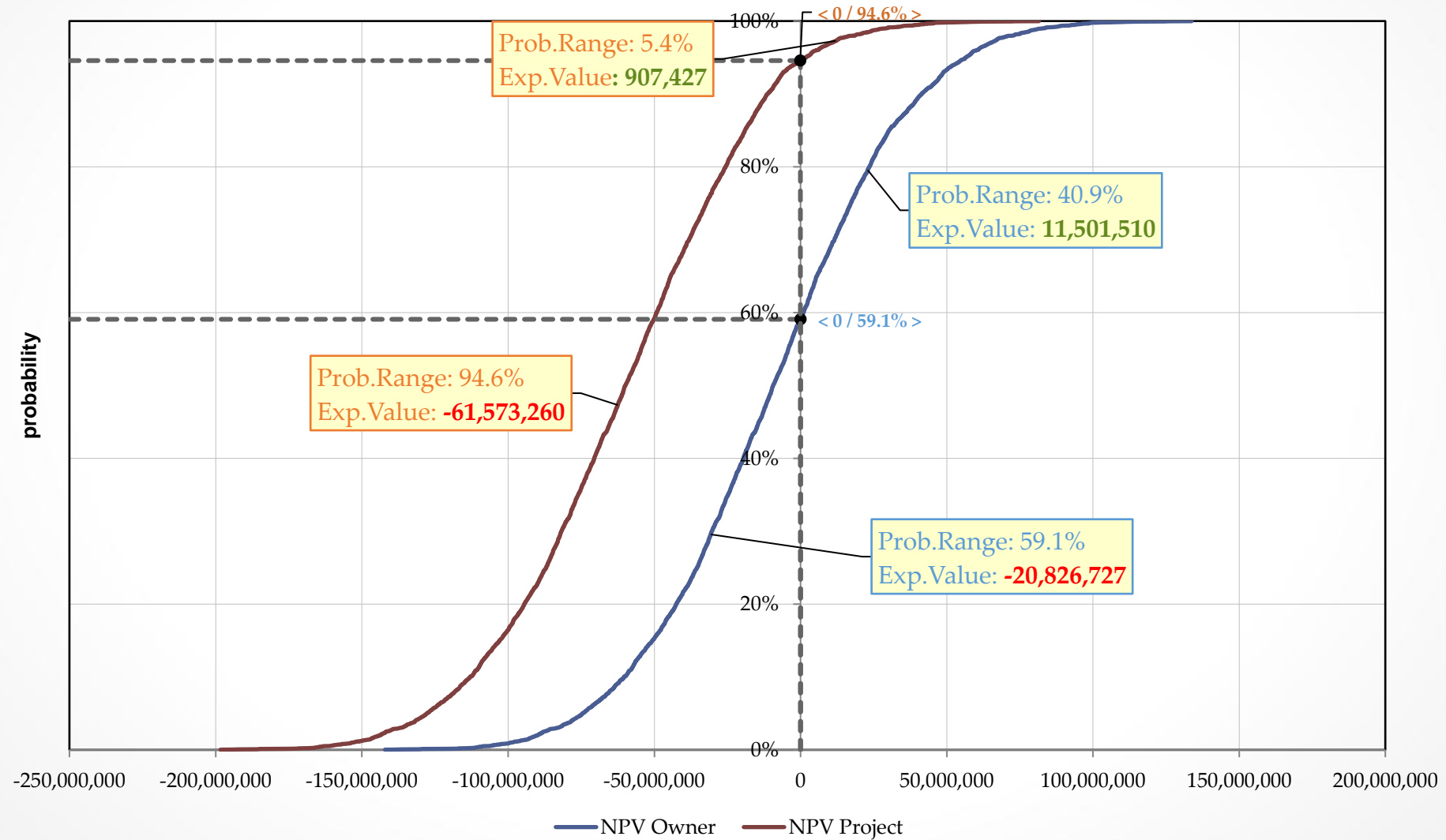


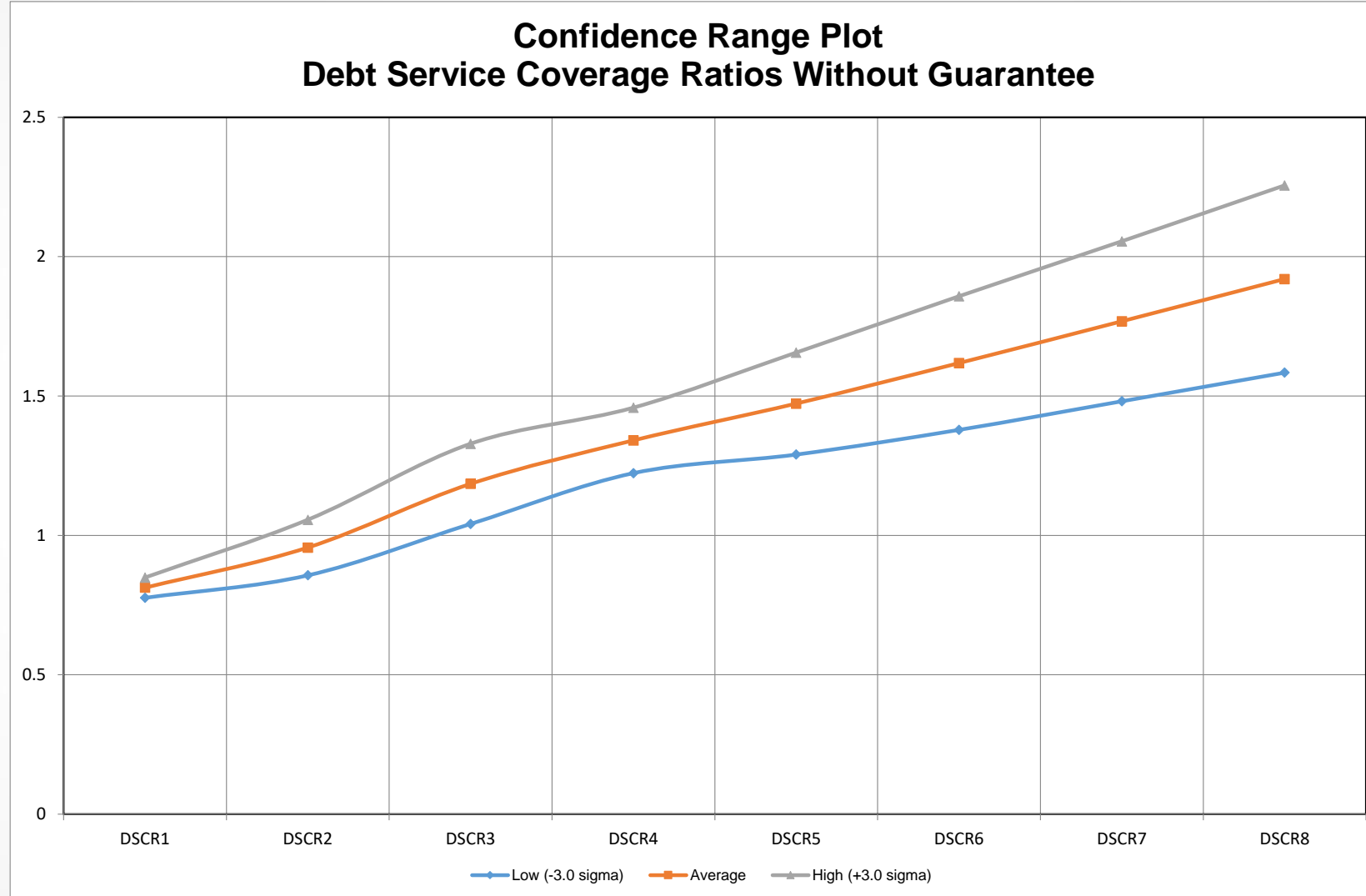
ARwo_Chart2

Motorway Project



Cumulative Distributions - NPV Owner and NPV Project without Guarantee





Simulation Runs Table

Runs: 5000		Error Runs: 0										
Run	NPV Owner	NPV Project	IRR Owner	IRR Project	DSCR1	DSCR2	DSCR3	DSCR4	DSCR5	DSCR6	DSCR7	DSCR8
Average:	33,909,563	-23,548,441	12.8%	11.2%	1.0	1.2	1.3	1.4	1.5	1.7	1.8	1.9
Std.Dev:	36,804,756	37,558,171	0.8%	0.6%	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Std.Error:	520,498	531,153	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Simulation Runs Table



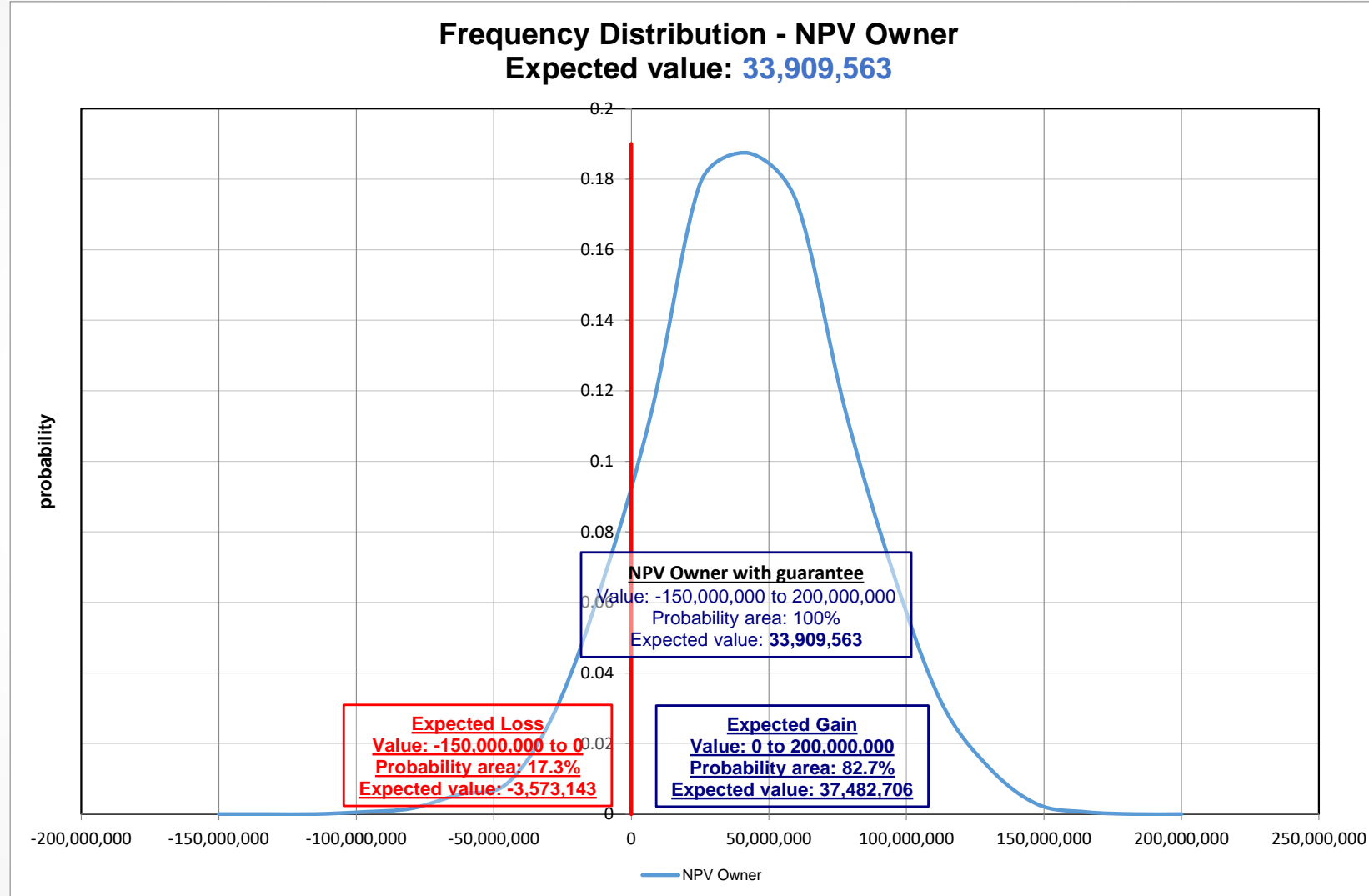
Runs: 5000		Sorted data!									
Run	Present Value of Guarantee	PV of Guarantee1	PV of Guarantee2	PV of Guarantee3	PV of Guarantee4	PV of Guarantee5	PV of Guarantee6	PV of Guarantee7	PV of Guarantee8	PV of Guarantee9	PV of Guarantee10
Average:	56,146,476	19,174,642	13,778,644	9,320,639	5,926,105	3,674,849	2,176,337	1,112,804	501,811	233,578	118,966
Std.Dev:	8,743,205	674,558	1,187,089	1,510,791	1,410,694	1,146,916	1,040,599	975,845	768,110	543,743	376,305
Std.Error:	123,648	9,540	16,788	21,366	19,950	16,220	14,716	13,801	10,863	7,690	5,322

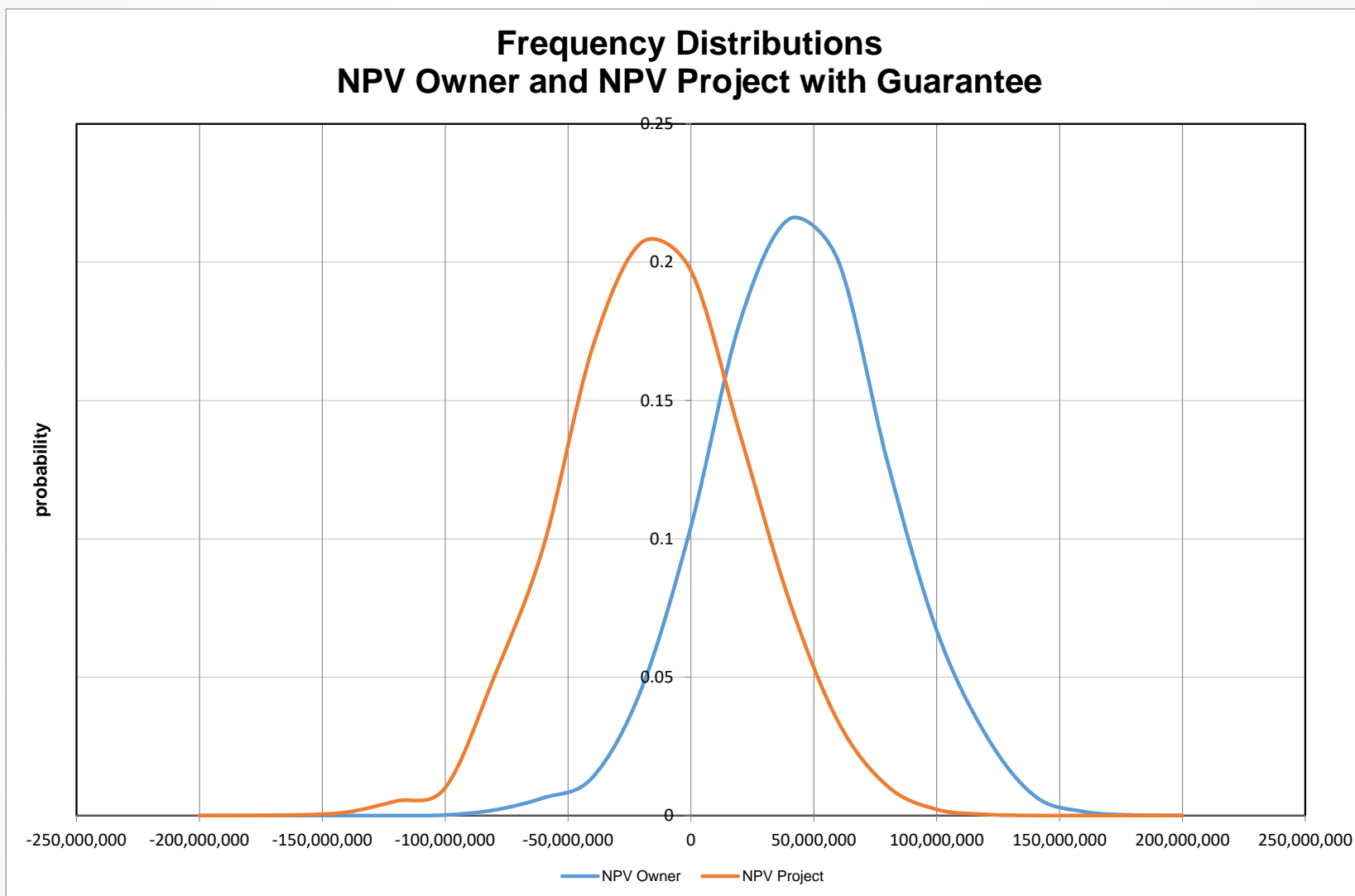
Analysis of Results

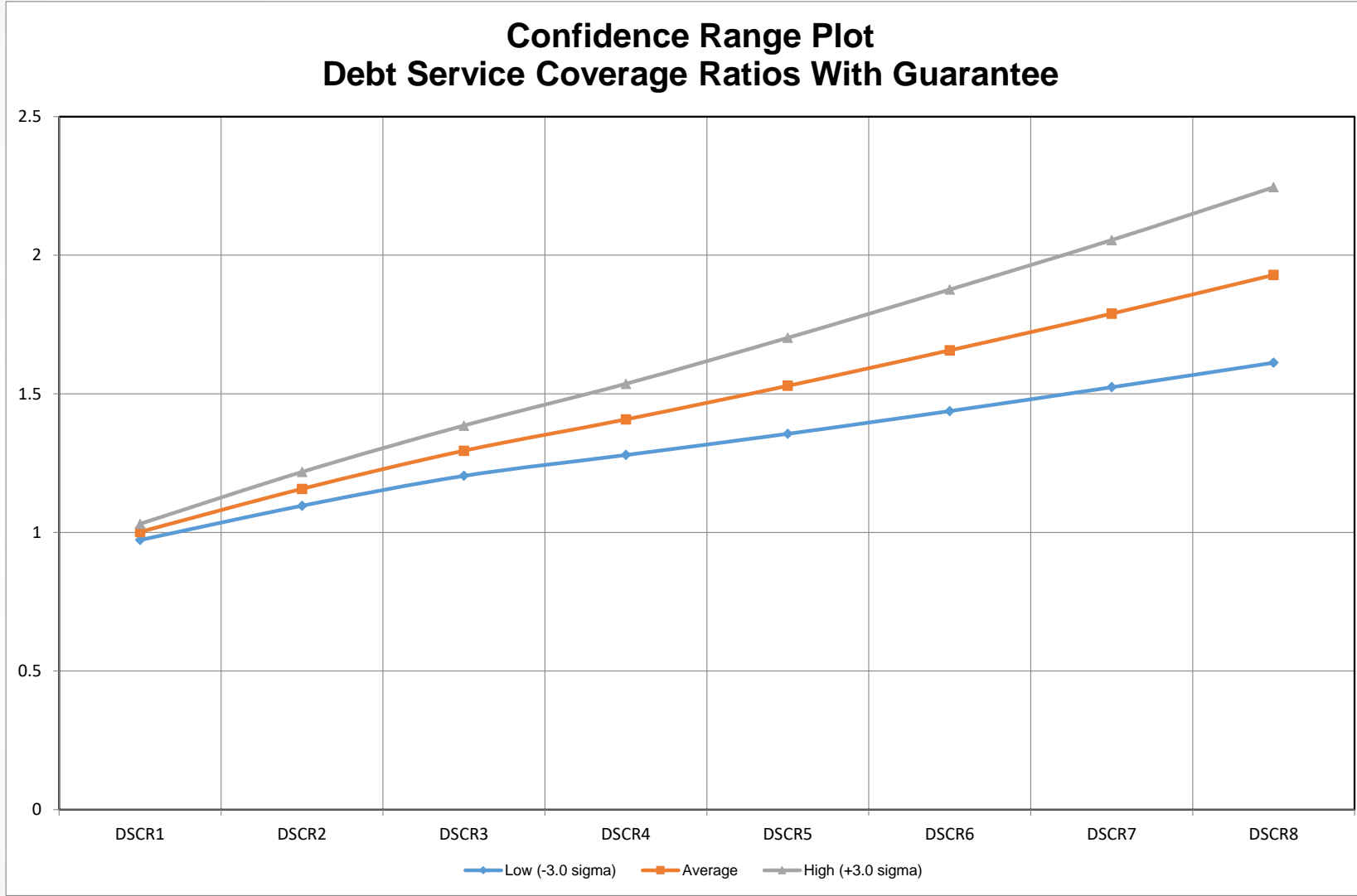
[illegible]

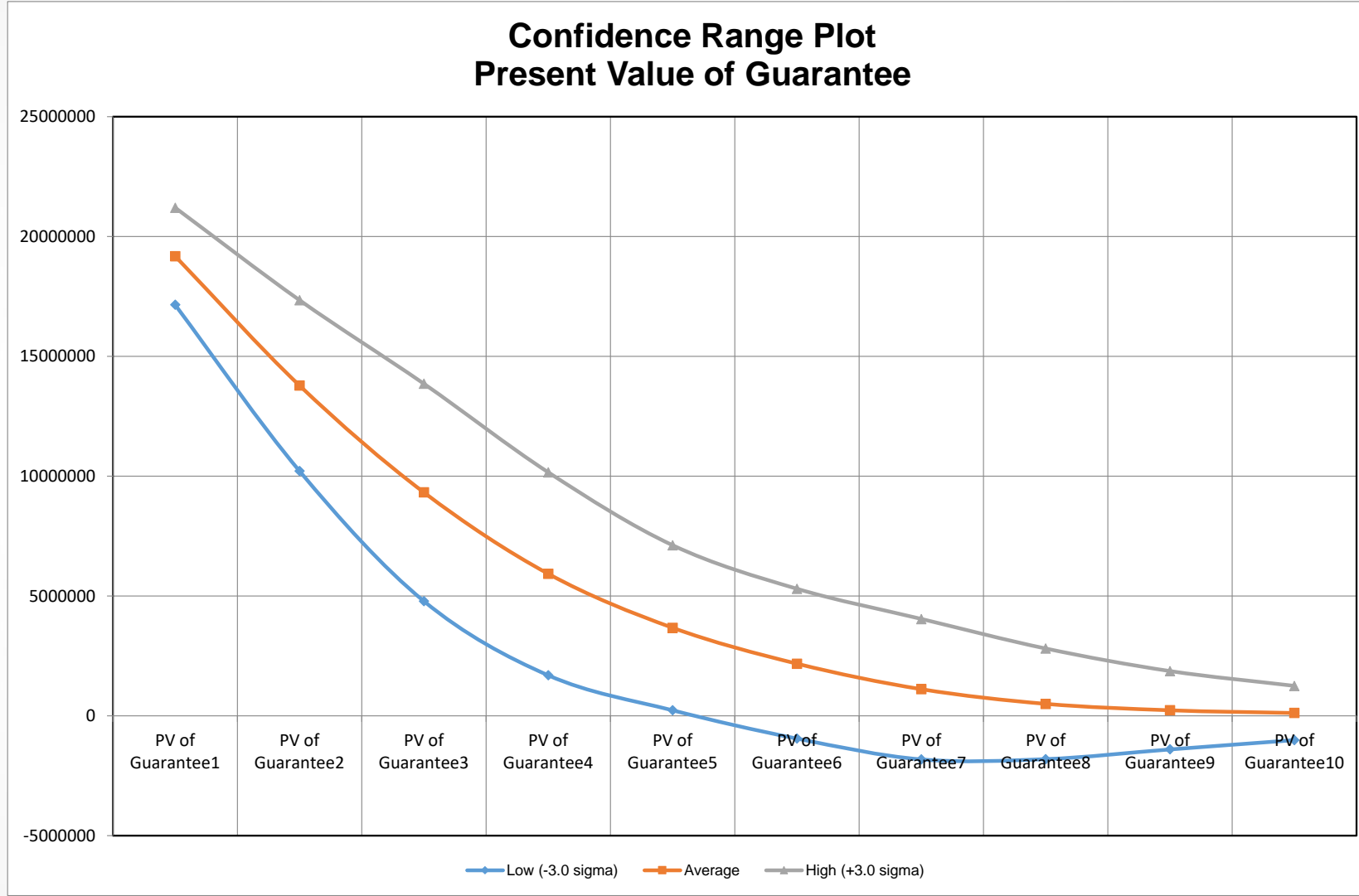
Analysis of Results

[illegible]







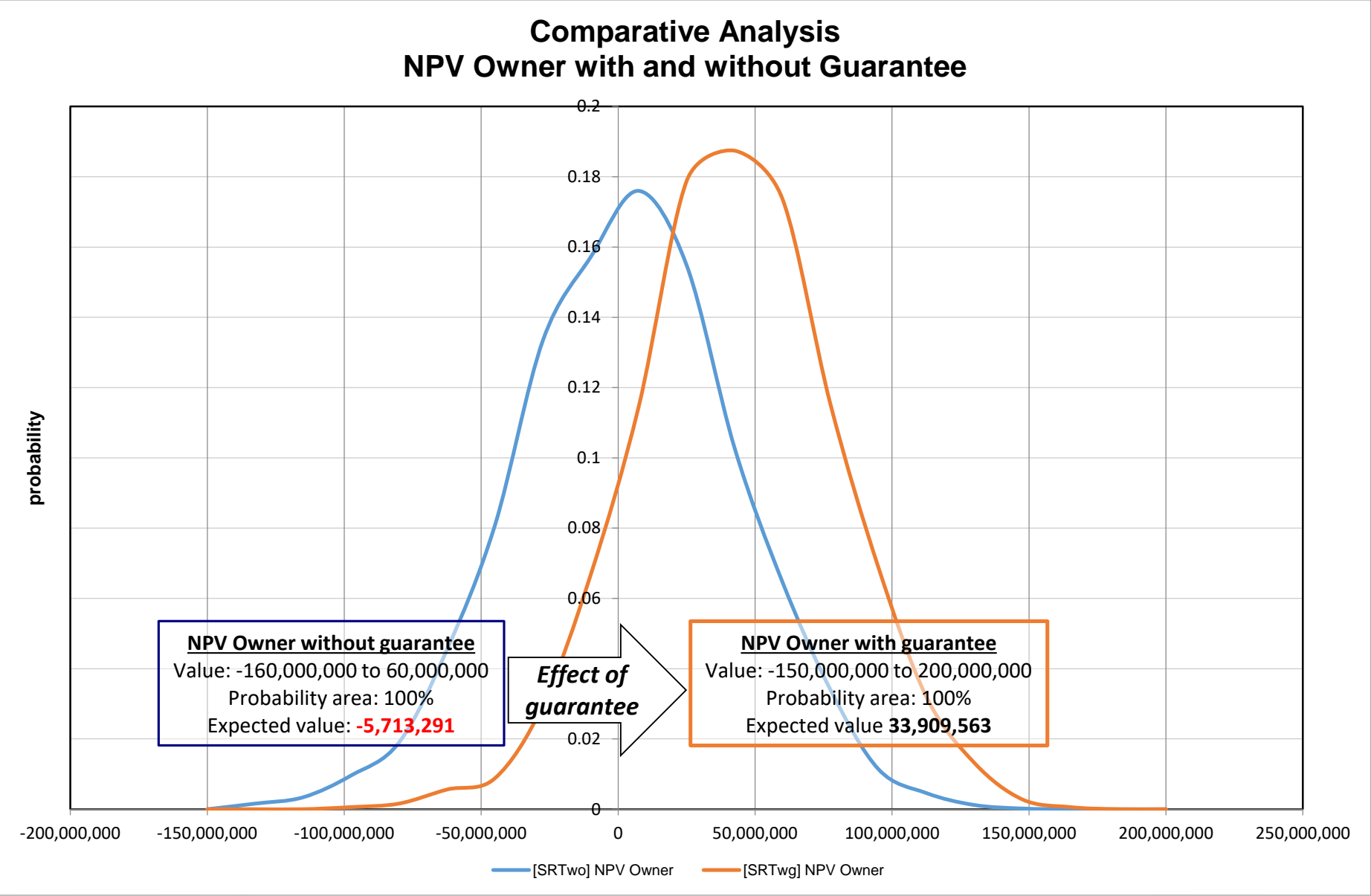


SRT (cmb)

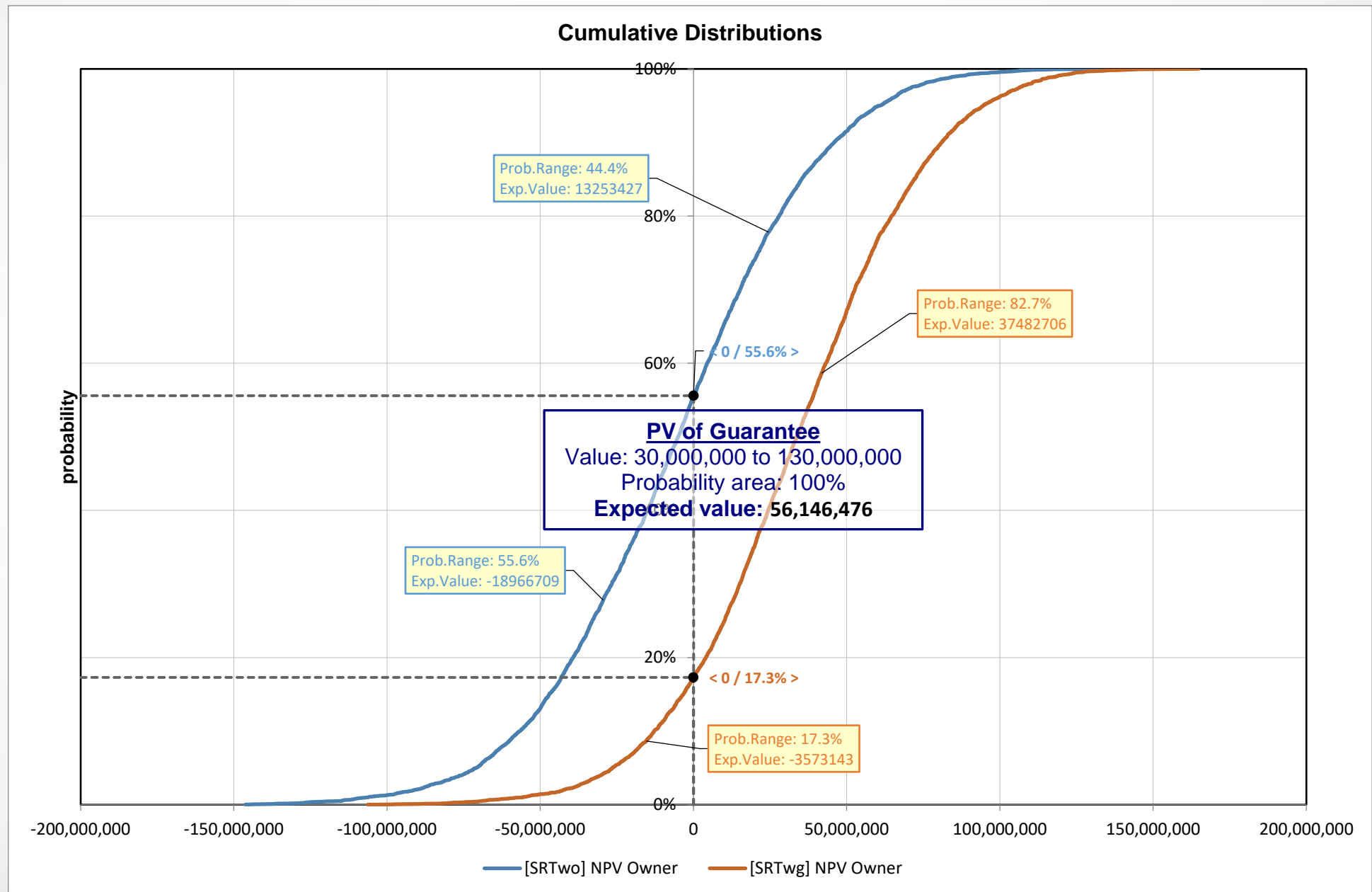
Motorway Project

Runs: 5000		Error Runs: 0													
Run	[SRTwo] NPV Owner	[SRTwo] NPV Project	[SRTwo] IRR Owner	[SRTwo] IRR Project	[SRTwo] DSCR1	[SRTwo] DSCR2	[SRTwo] DSCR3	[SRTwo] DSCR4	[SRTwo] DSCR5	[SRTwo] DSCR6	[SRTwo] DSCR7	[SRTwo] DSCR8	[SRTwg] NPV Owner	[SRTwg] NPV Project	[SRTwg] IRR Owner
Average:	-9,325,220	-60,665,818	11.8%	10.6%	0.8	0.8	1.0	1.2	1.3	1.5	1.7	2.0	26,426,861	-28,462,943	12.5%
Std.Dev:	39,386,085	39,711,416	0.8%	0.6%	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	37,407,096	36,658,225	0.8%
Std.Error:	557,003	561,604	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	529,016	518,426	0.0%

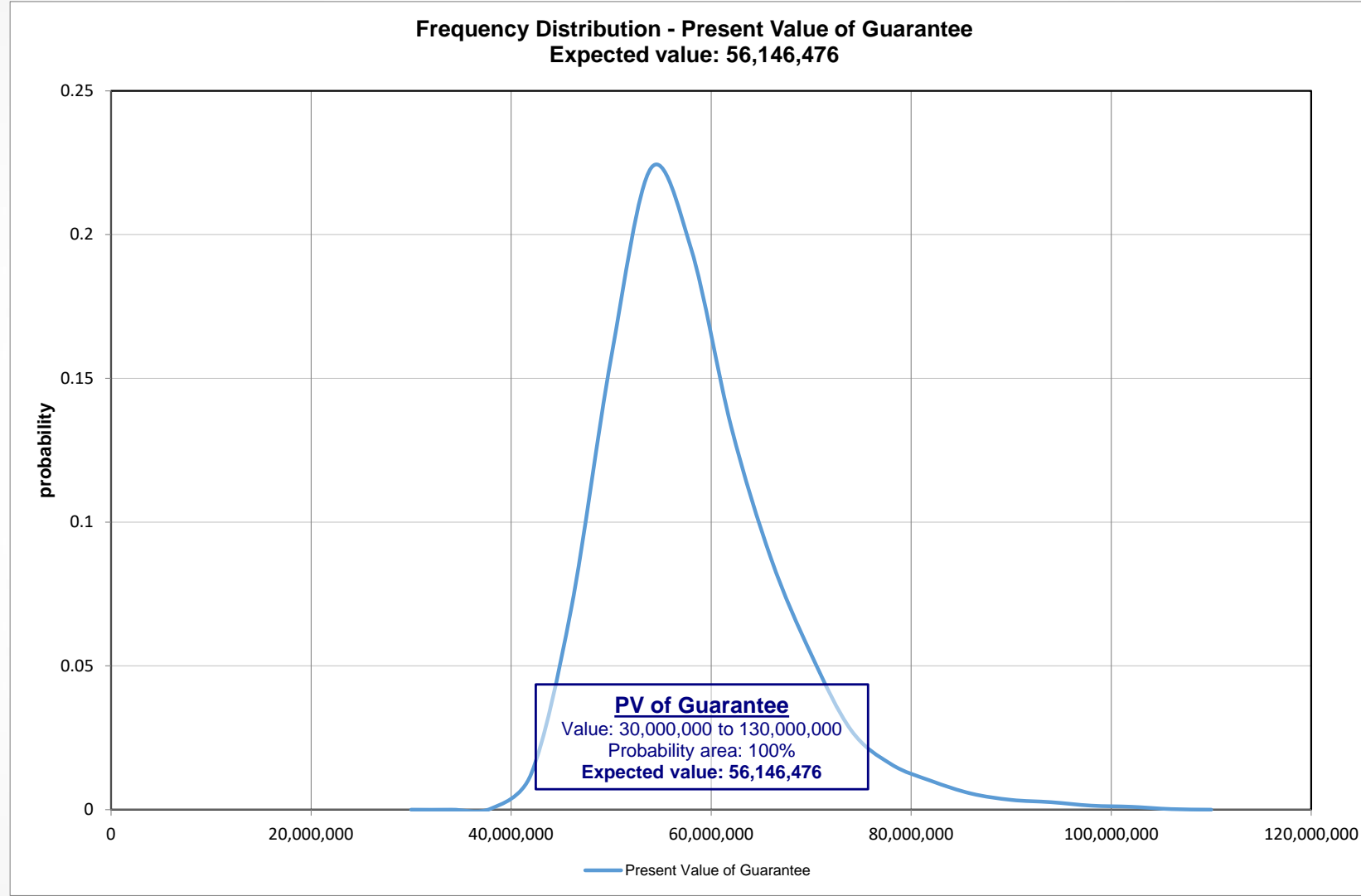
	[SRTwo] NPV Owner	[SRTwg] NPV Owner	[SRTwo] NPV Project	[SRTwg] NPV Project	[SRTwg] Present Value of Guarantee
Mean (Expected value)	-9,325,220	26,426,861	-60,665,818	-28,462,943	48,387,952
Mode	0	42,500,000	-50,000,000	-42,500,000	49,000,000
Minimum	-142,108,520	-105,126,224	-198,354,094	-160,935,939	37,942,738
First quartile (25%)	-35,347,821	895,569	-86,952,204	-51,373,942	45,903,940
Median	-9,401,066	26,322,556	-59,931,234	-30,361,448	48,080,841
Third quartile (75%)	17,175,770	51,510,609	-32,264,246	-4,335,566	50,411,994
Maximum	133,728,867	165,392,978	81,543,478	113,494,366	68,516,248
Range span	275,837,387	270,519,202	279,897,571	274,430,305	30,573,511
Sample size	5,000	5,000	5,000	5,000	5,000
Standard error	557,003	529,016	561,604	518,426	52,190
Standard deviation	39,386,085	37,407,096	39,711,416	36,658,225	3,690,392
Variance	1,551,263,711,776,000	1,399,290,794,601,710	1,576,996,586,238,620	1,343,825,492,392,530	13,618,993,095,680
Skewness	0.028	0.042	-0.089	0.132	0.759
Kurtosis	-0.067	0.021	-0.135	0.203	1.479
Coefficient of variation	-4.224	1.415	-0.655	-1.288	0.076
Probability of negative outcome	59.1%	24.3%	94.6%	78.4%	0.0%
Expected loss	20,826,731	5,255,256	61,573,271	33,289,750	0
Expected gain	11,501,510	31,682,117	907,453	4,826,807	48,387,952
Expected loss ratio	0.644	0.142	0.985	0.873	0.000



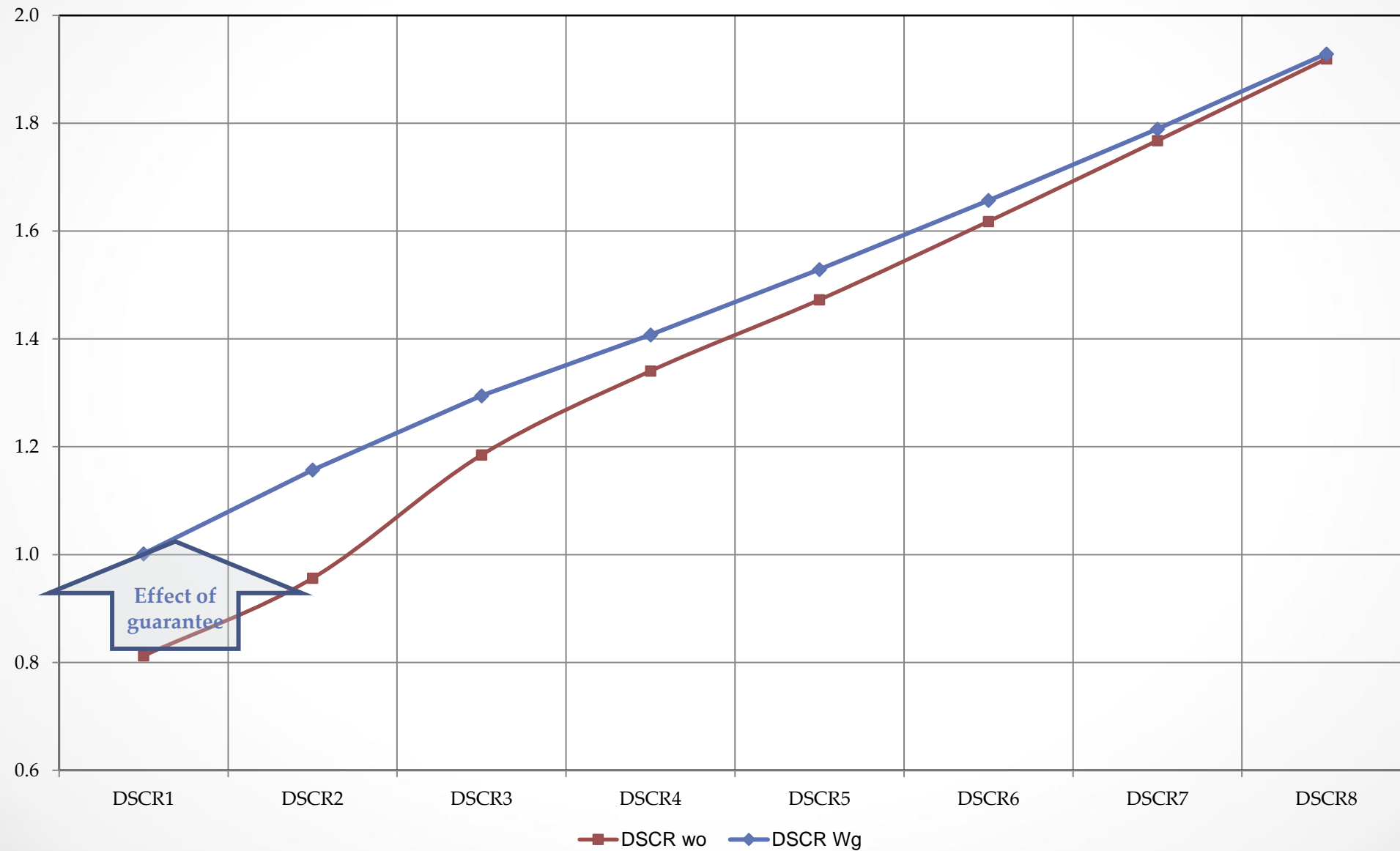
AR_Chart2



ARwg_Chart3



Debt Service Coverage Ratios Without and With Guarantee



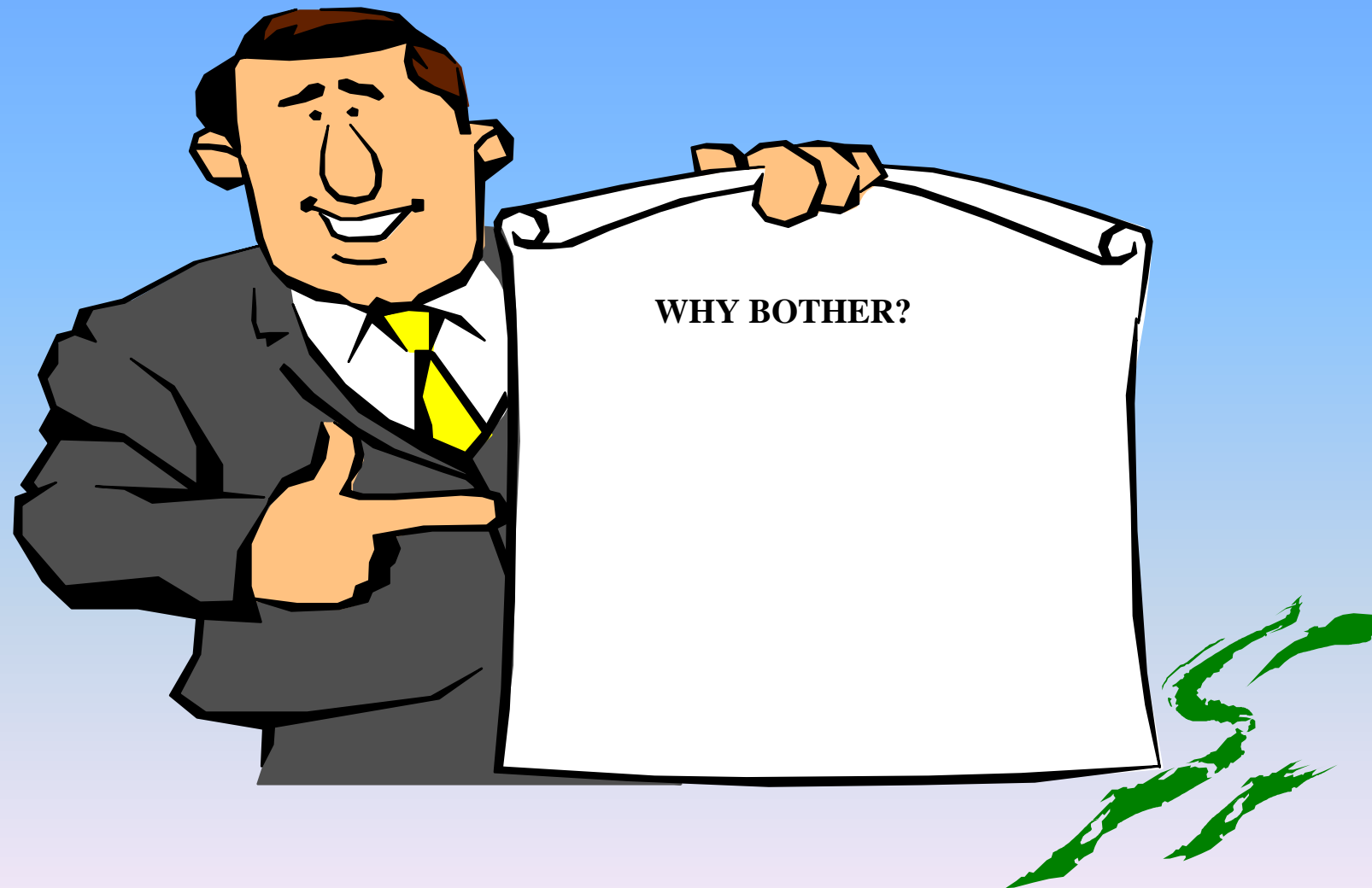
Marketing Analysis and the Assessment of Competitiveness in Project Appraisal



Savvakis C Savvides



I. Introduction



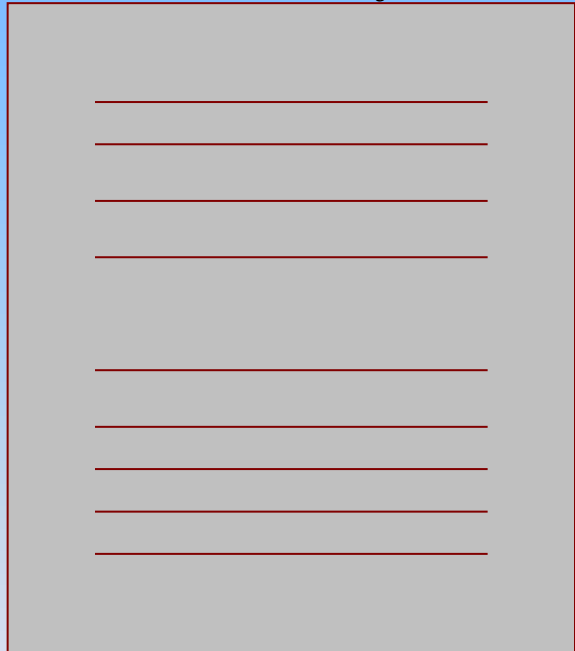
A good project appraisal depends on:

Correct methodology

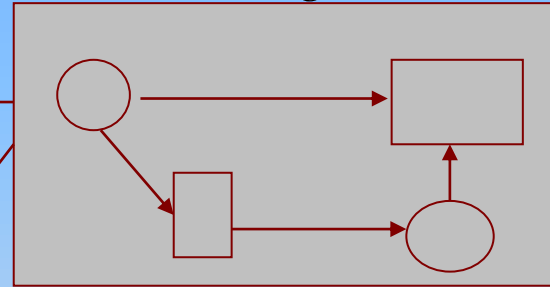
Predictive models

Accurate Data

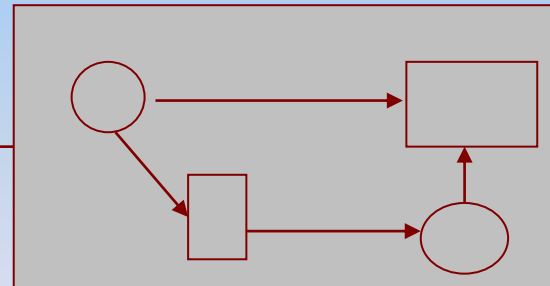
Cash-Flow Projections



Marketing Module



Technical Module



Input Data

Input Data



Problems with projecting data

- Value estimates are projected as certainty equivalents.
- No analytical framework for gathering, interpreting and projecting market data.



Common marketing mistakes in project appraisal:

- ❑ Overstating the relevant market.
- ❑ Shallow customer and competitor analysis.
- ❑ Failure to evaluate the impact of market structure and intensity of competition on prices and market penetration.
- ❑ Unrealistic projected market growth rates.
- ❑ It is often not clear what is the competitive advantage of the project and why it may be sustainable.



Solutions to the problem

- ❑ the use of basic marketing and micro-economic concepts within a project appraisal framework.
- ❑ the thoughtful consideration of available information.
- ❑ common sense.



Marketing Analysis in Project Appraisal

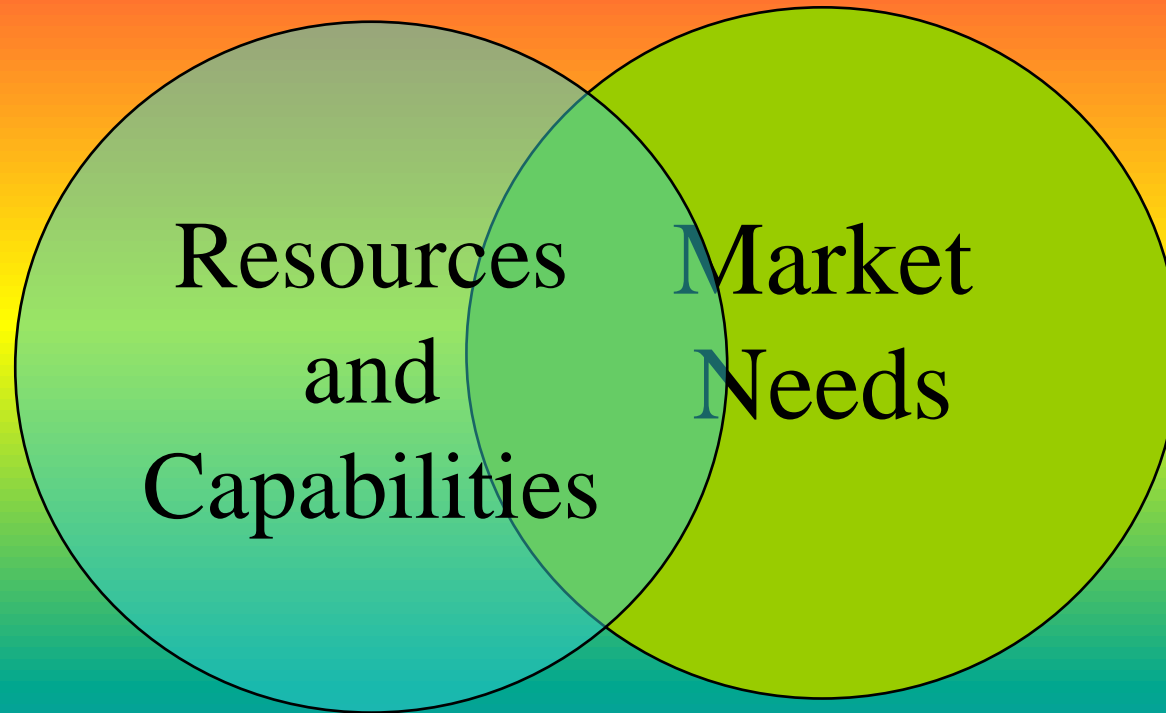
Methodology

- Qualitative
- Research oriented
- Iterative

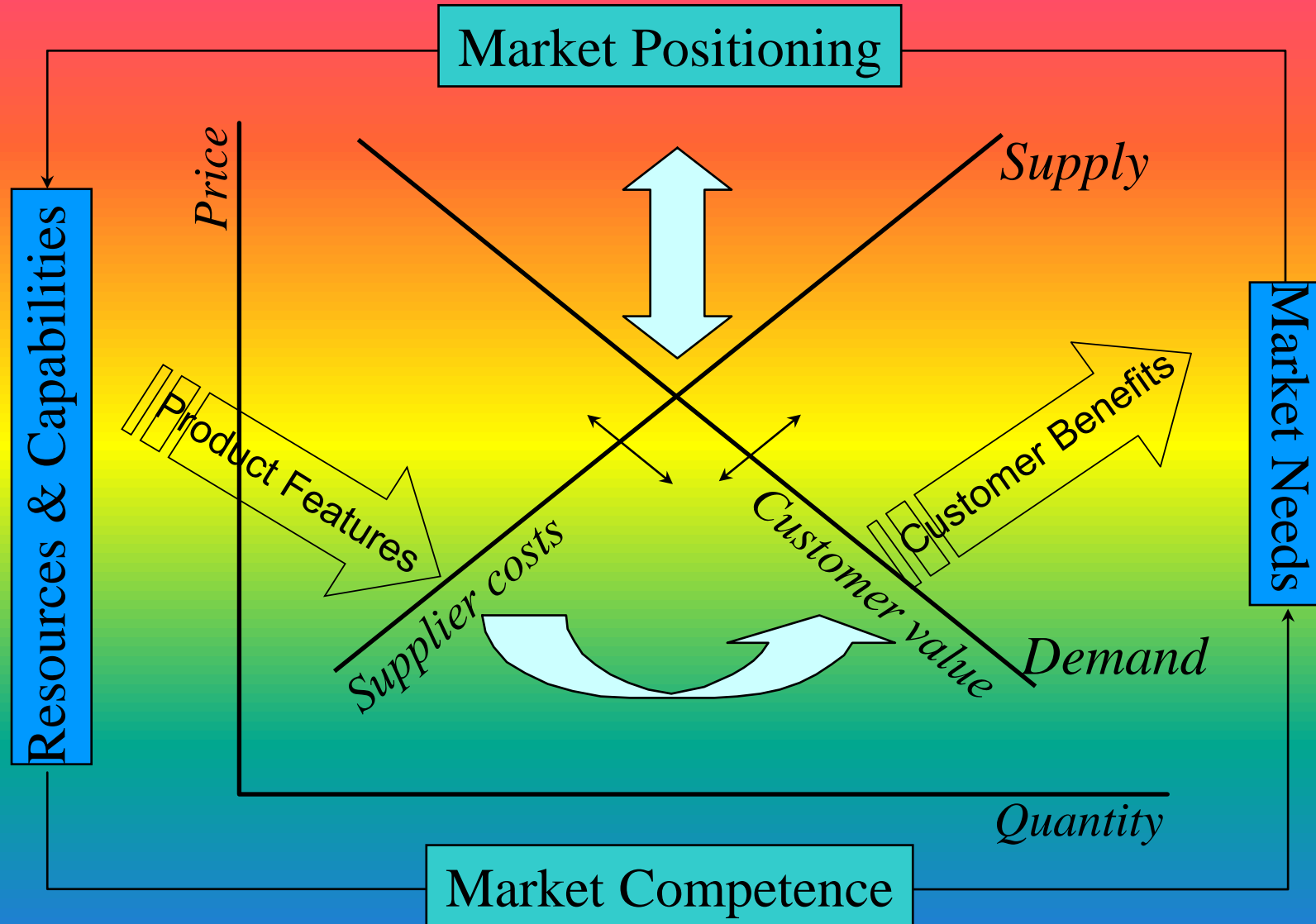
Constraints

- Data availability
- Cost considerations
- Time constraints
- Difficulty in undertaking primary research
- Complexity of project

Economic efficiency, marketing optimisation and project competitiveness are driven by the matching of resources and capabilities to market needs



The Competitive Environment of a Project



Market Analysis and Competitive Strategy Phases

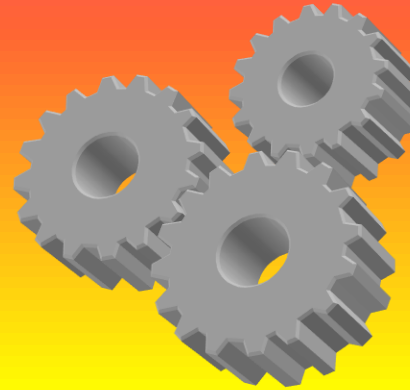
Market Analysis



- Defining the Project Relevant Market
- Estimating Market Size
- Projecting Growth
- Assessing Market Structure
- Understanding Market Expectations
- Analysing Project Capabilities



Competitive Strategy



Developing Market
Competence



Optimising Market
Positioning

Building systems for
organizational competitiveness

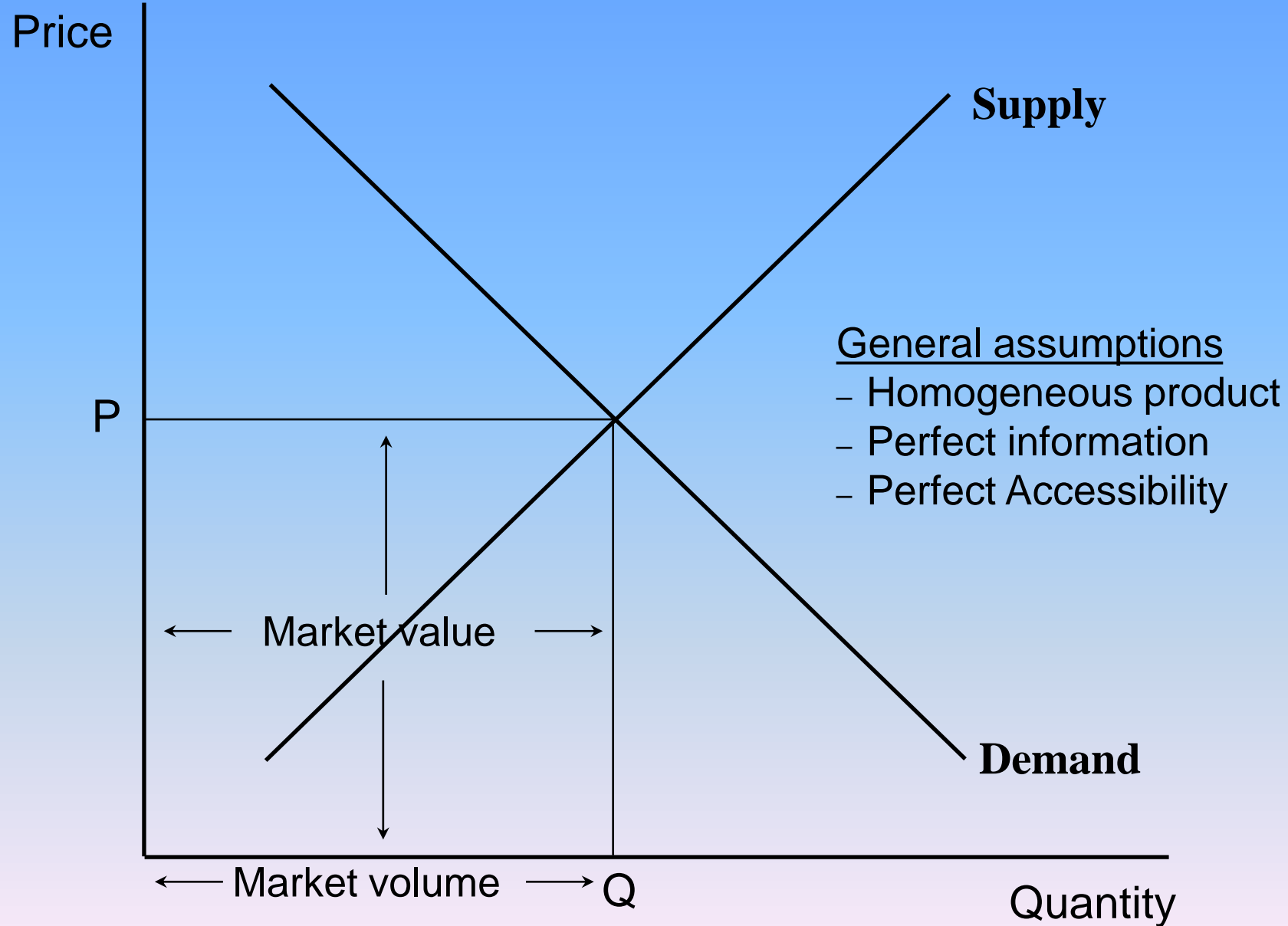
II. The Project Market

III. Project Competitiveness

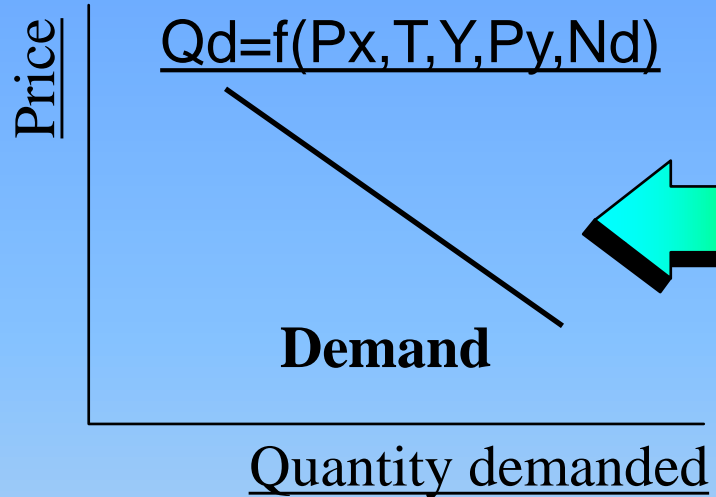
II. The project market



The market demand and supply

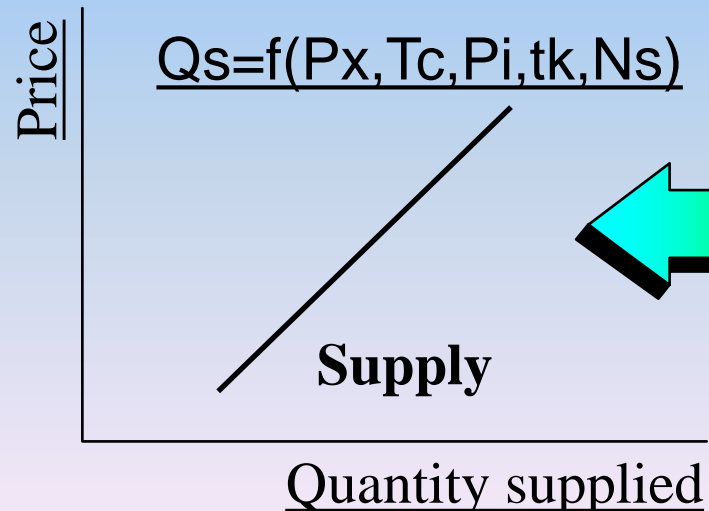


Determinants of demand and supply



□ Demand

- Tastes and Preferences (T)
- Real income (Y)
- The price of related goods (P_y)
- Population (N_d)

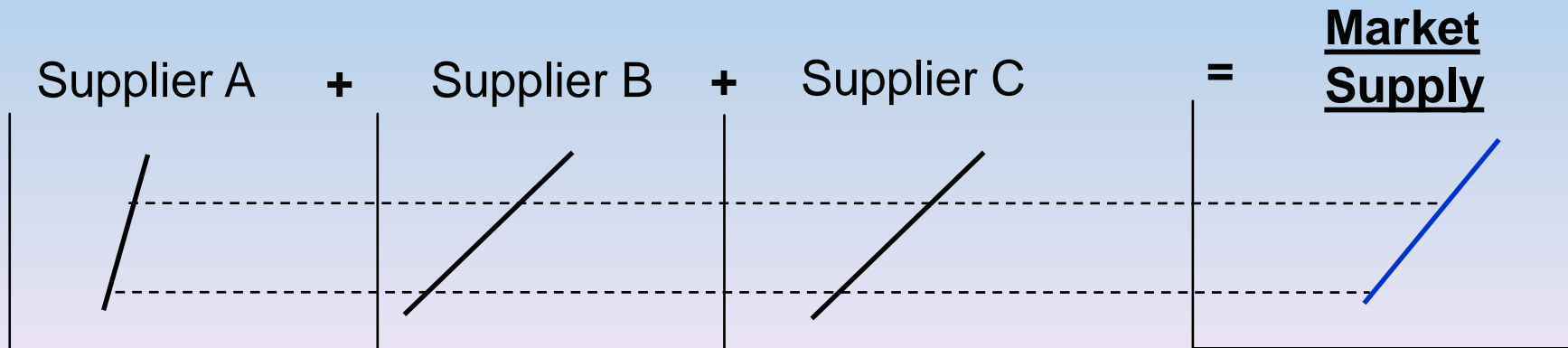
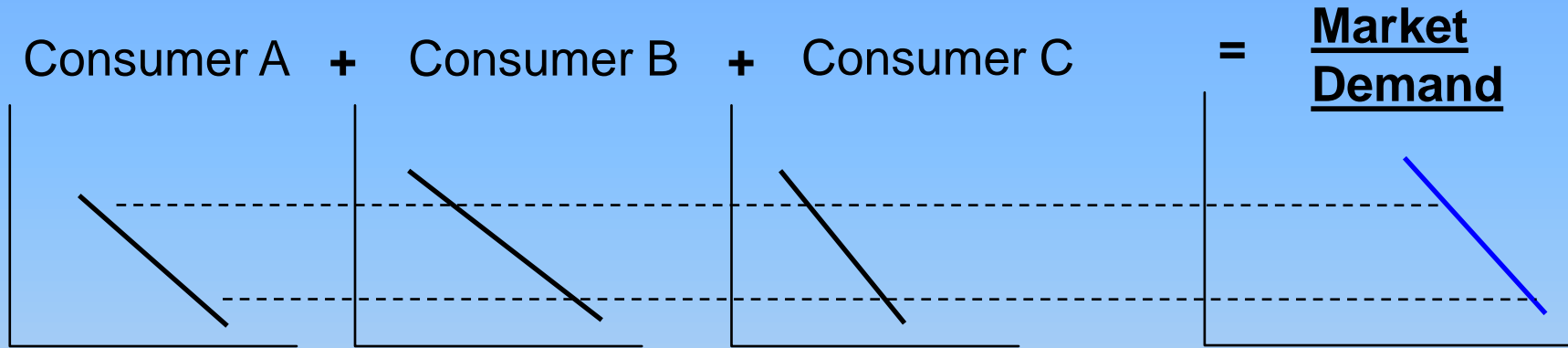


□ Supply

- Technology (T_c)
- Prices of inputs of production (P_i)
- Taxes and subsidies (t_k)
- Number/capacity of suppliers (N_s)

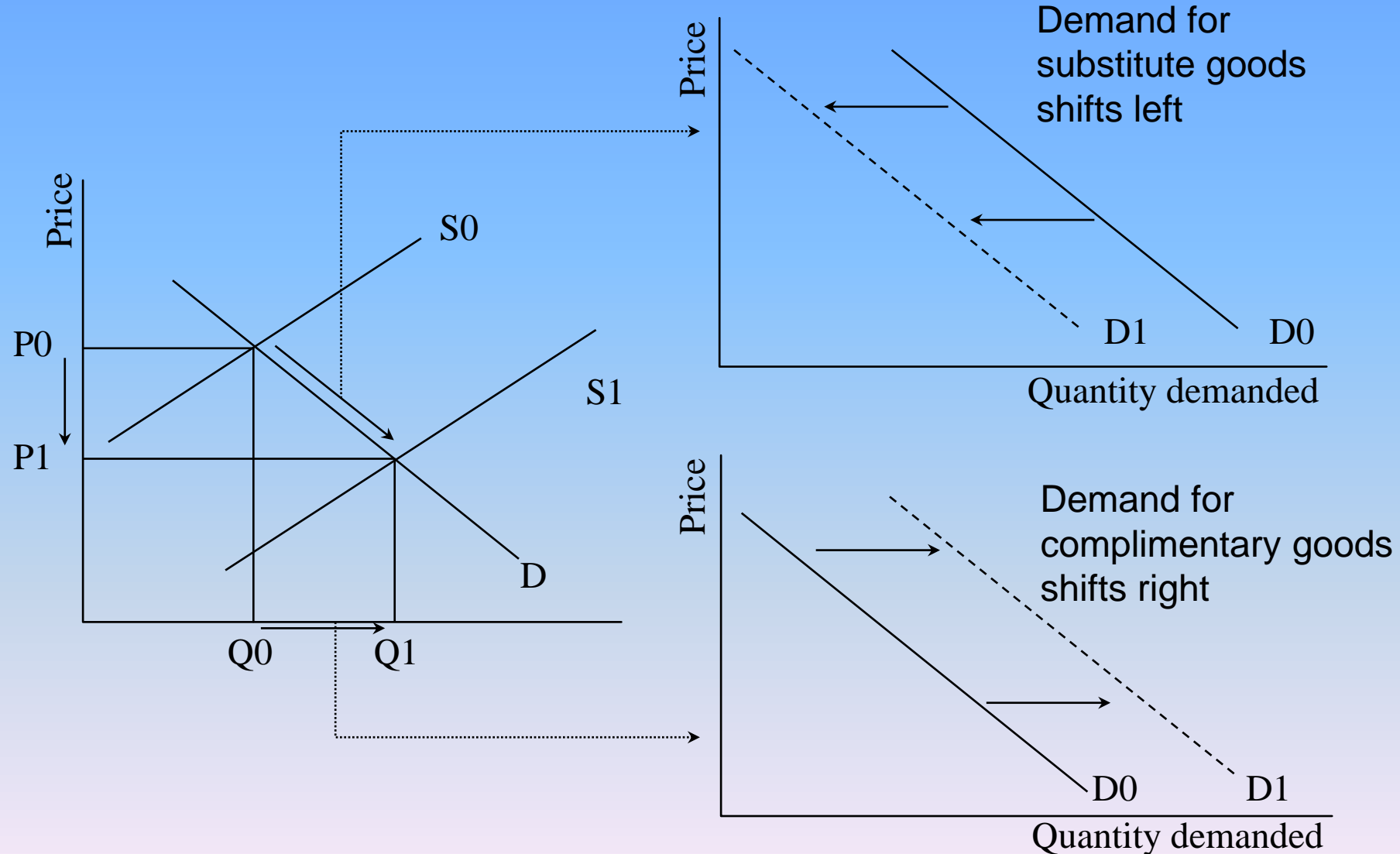
Determining market demand and supply

Market demand and supply is the horizontal summation of the demand and supply curves of each consumer and supplier respectively.

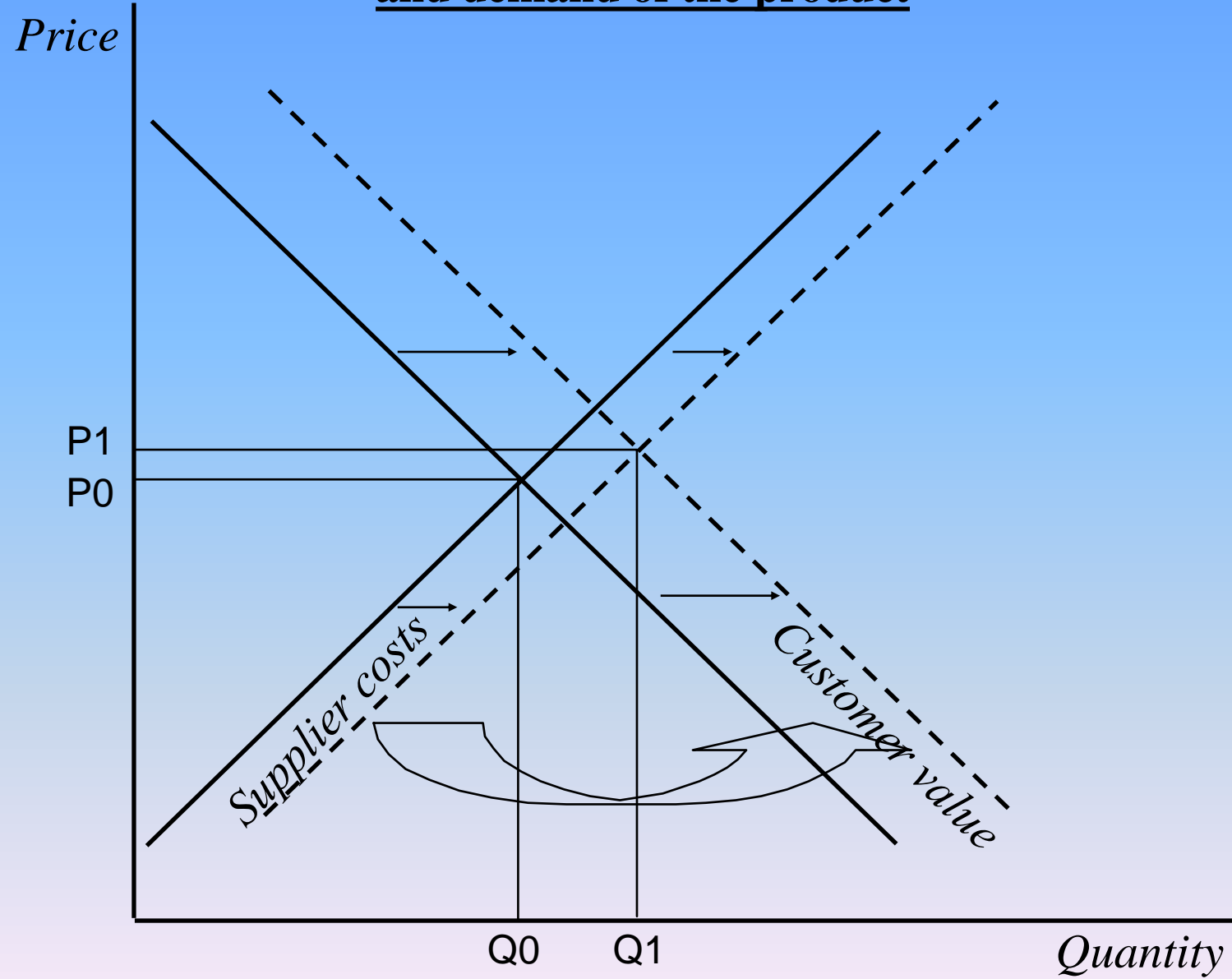


The inter-dependency of markets

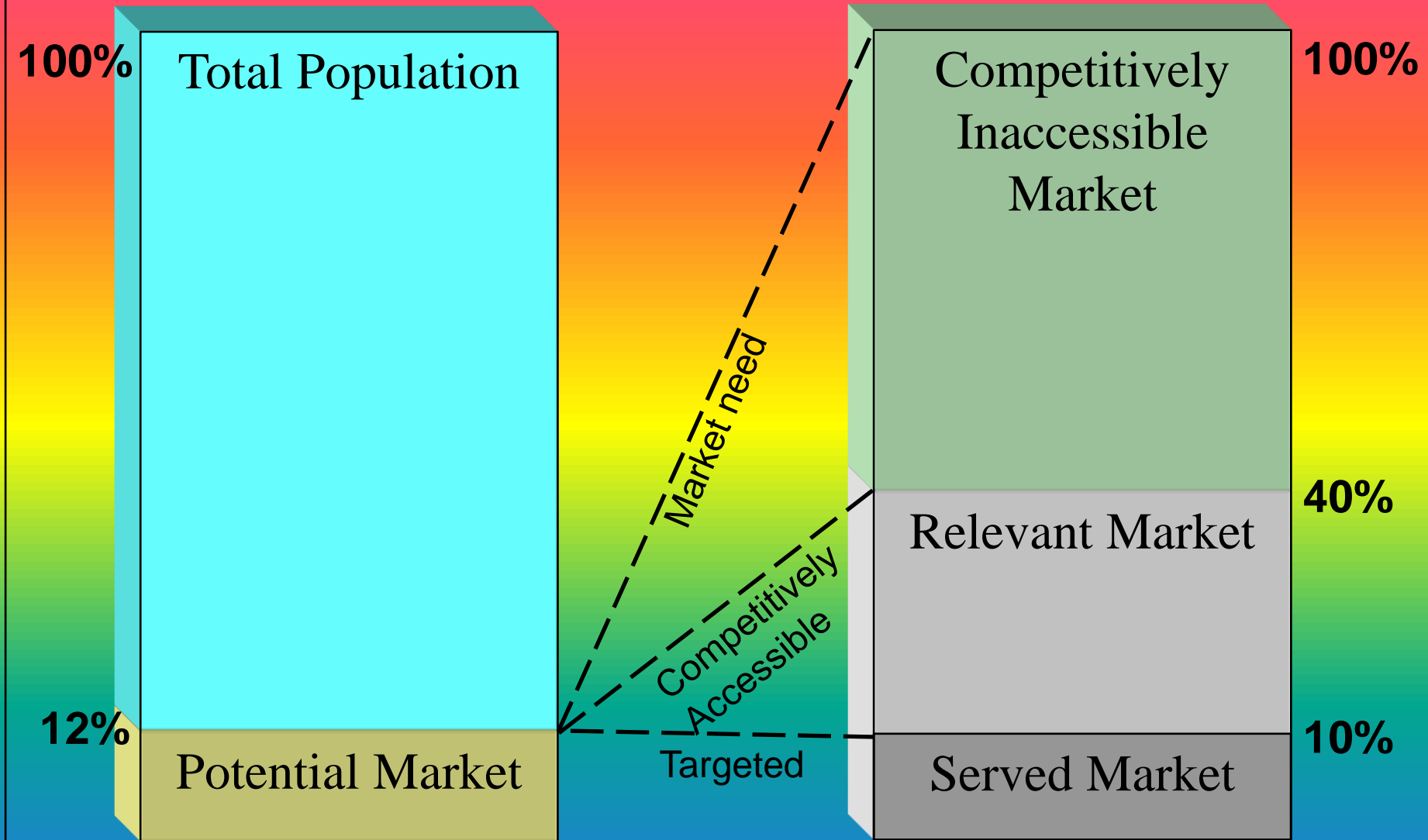
A change in a determinant factor of a product causes a shift in the demand or supply of related products



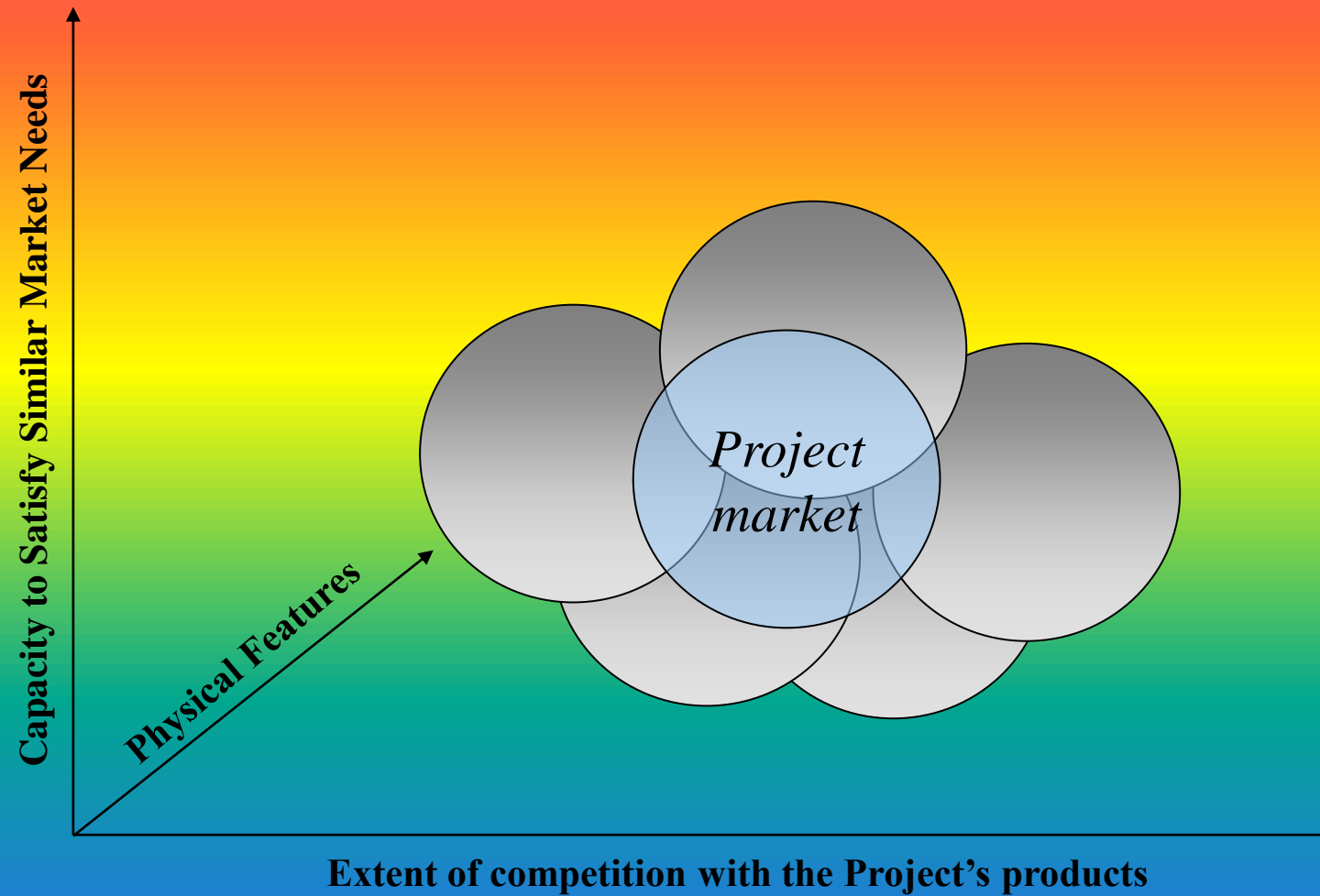
Adding product features affects both the supply
and demand of the product



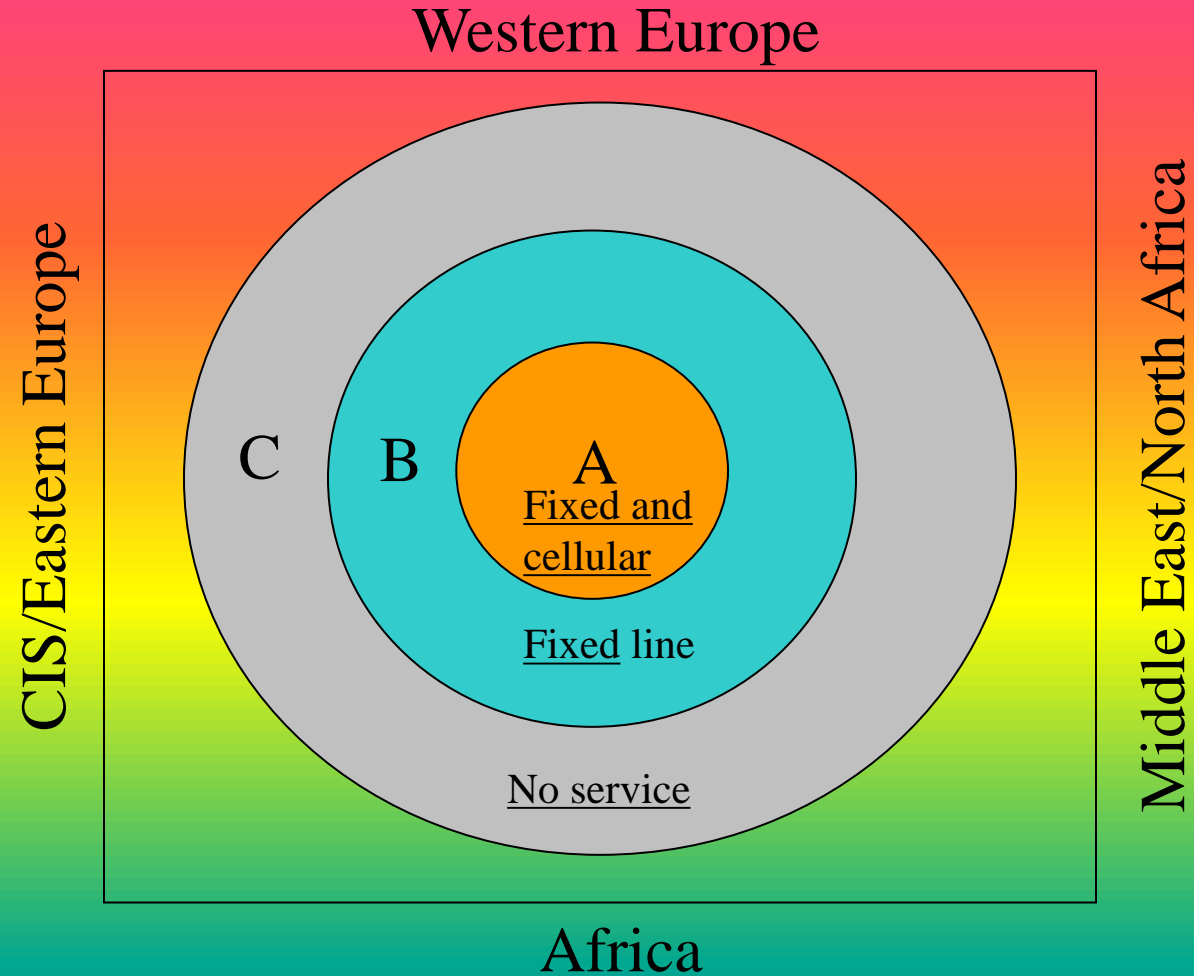
Levels of market definition



Market Definition Basis



Market Definition basis for Mobile Satellite Services project



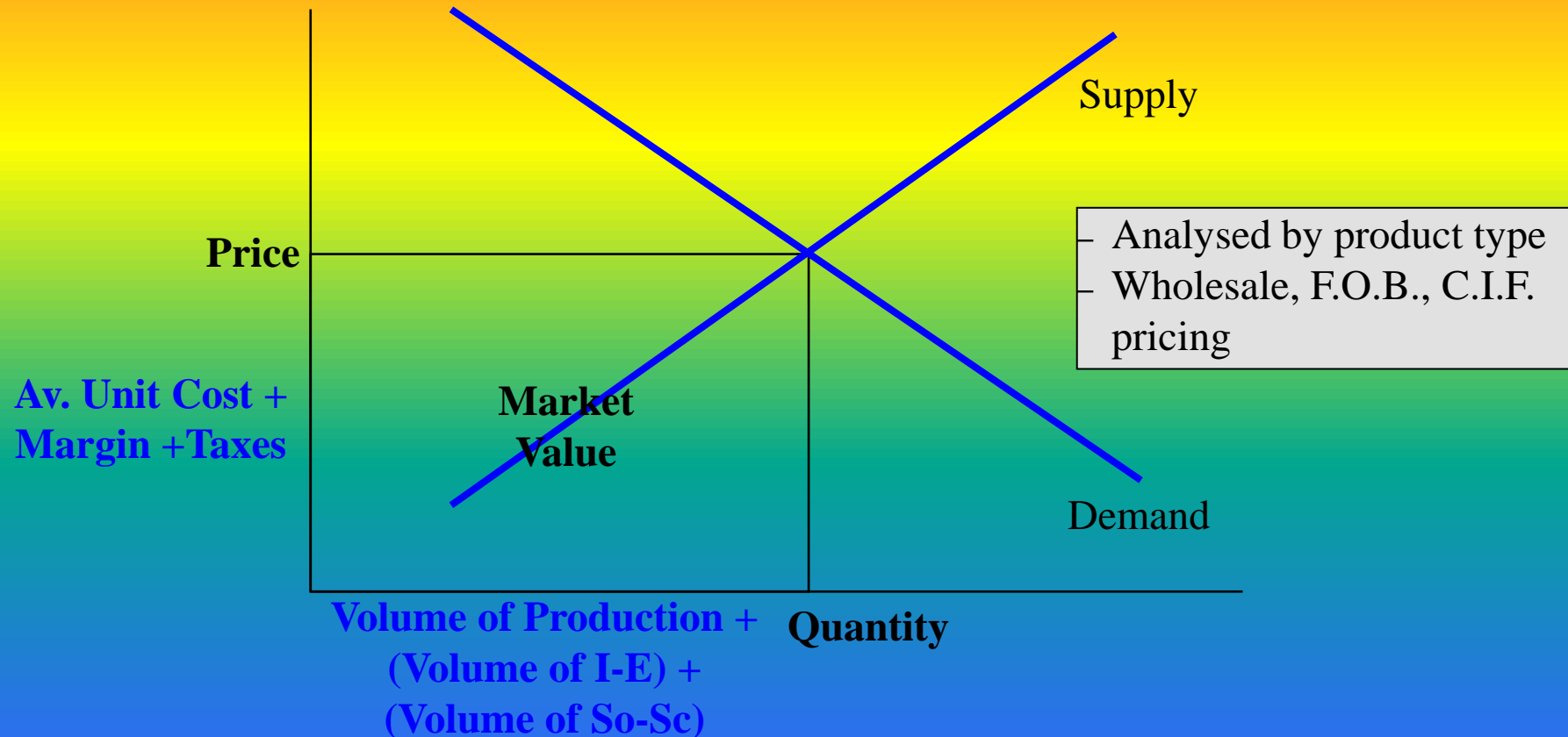
Households and corporate entities within the project's footprint area with a prime need of a telephone service (voice/data) for:

- A Mobile Extension ● B New Mobile ● C Fixed

Market Size by Value and Volume of Exchanges

By Total Supply and Production

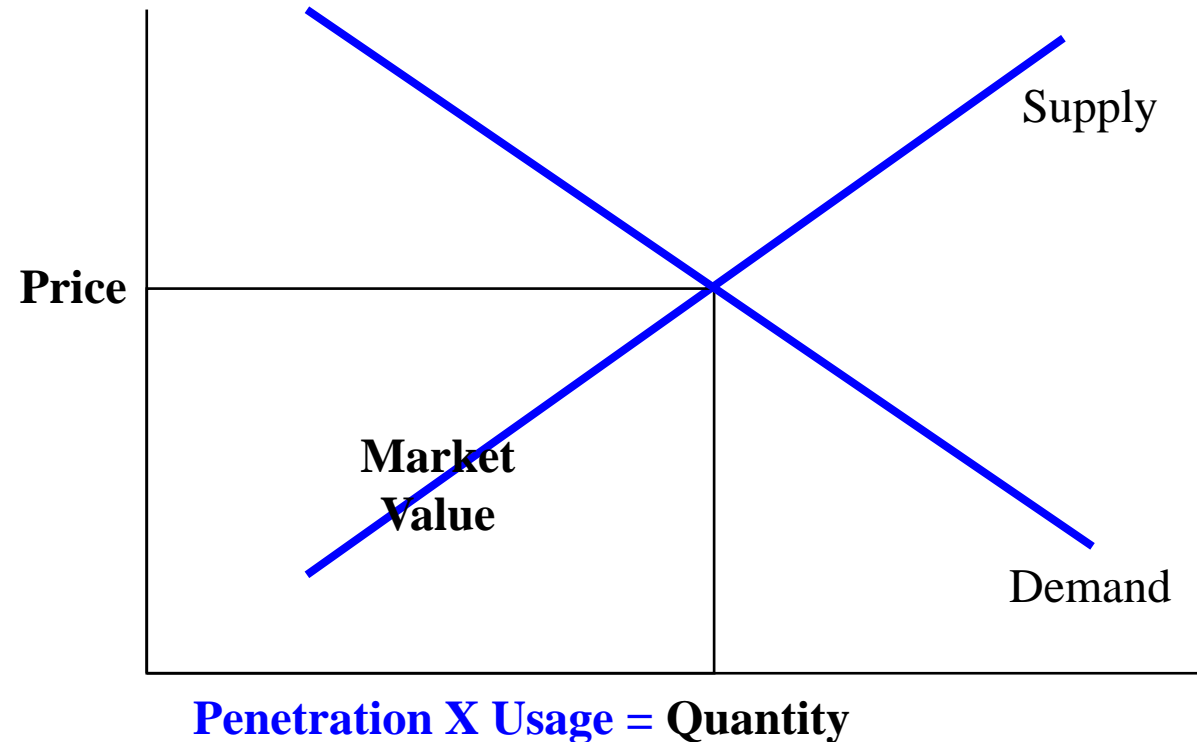
$$\begin{array}{c}
 \text{Value of Production} + \text{Value of Imports - Exports} + \text{Value of Stocks(0) - Stocks(1)} \times [1 + (\text{Trade Margin} + \text{Taxes})] = \text{Market Value}
 \end{array}$$



The Market Size by spread and level of consumption

By Individual Demand and Consumption

$$\text{Market Penetration} \times \text{Usage} \times \text{Price} = \text{Market Value}$$



Supply Side World Market Estimate - example

Supply and Demand for Compound Fertilisers

(million tonnes) - 1988

	Production	Imports	Exports	Consumption
West Europe	30.5	5.8	-7.6	28.7
East Europe	16.1	0.2	-1.1	15.2
Africa	1.9	0.9	-0.2	2.6
North America	29.1	0.3	-0.4	29.0
Latin America	10.0	0.6	-0.1	10.5
Asia/Oceania	11.6	2.3	-0.9	13.0
Total world market	99.2	10.1	-10.3	99.0

Source: Fertecon

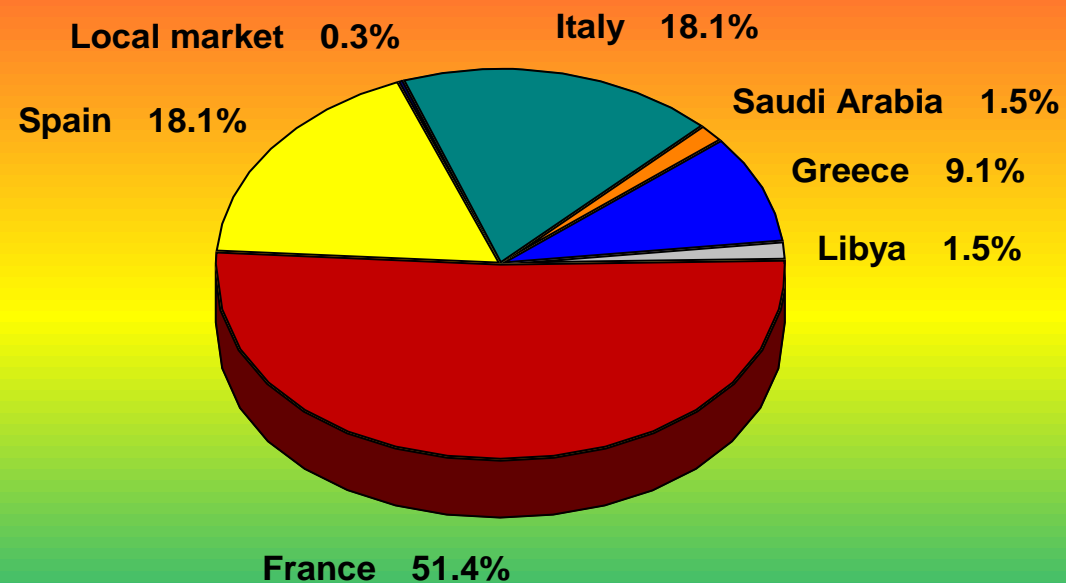
Relevant Market for Cyprus Project Estimate - example

Consumption of Compound Fertilisers

(million tonnes) - 1988

	Consumption
France	6.80
Italy	2.40
Spain	2.40
Greece	1.20
Saudi Arabia	0.20
Libya	0.20
Local Market	0.04
Relevant market	13.24

Source: Fertecon



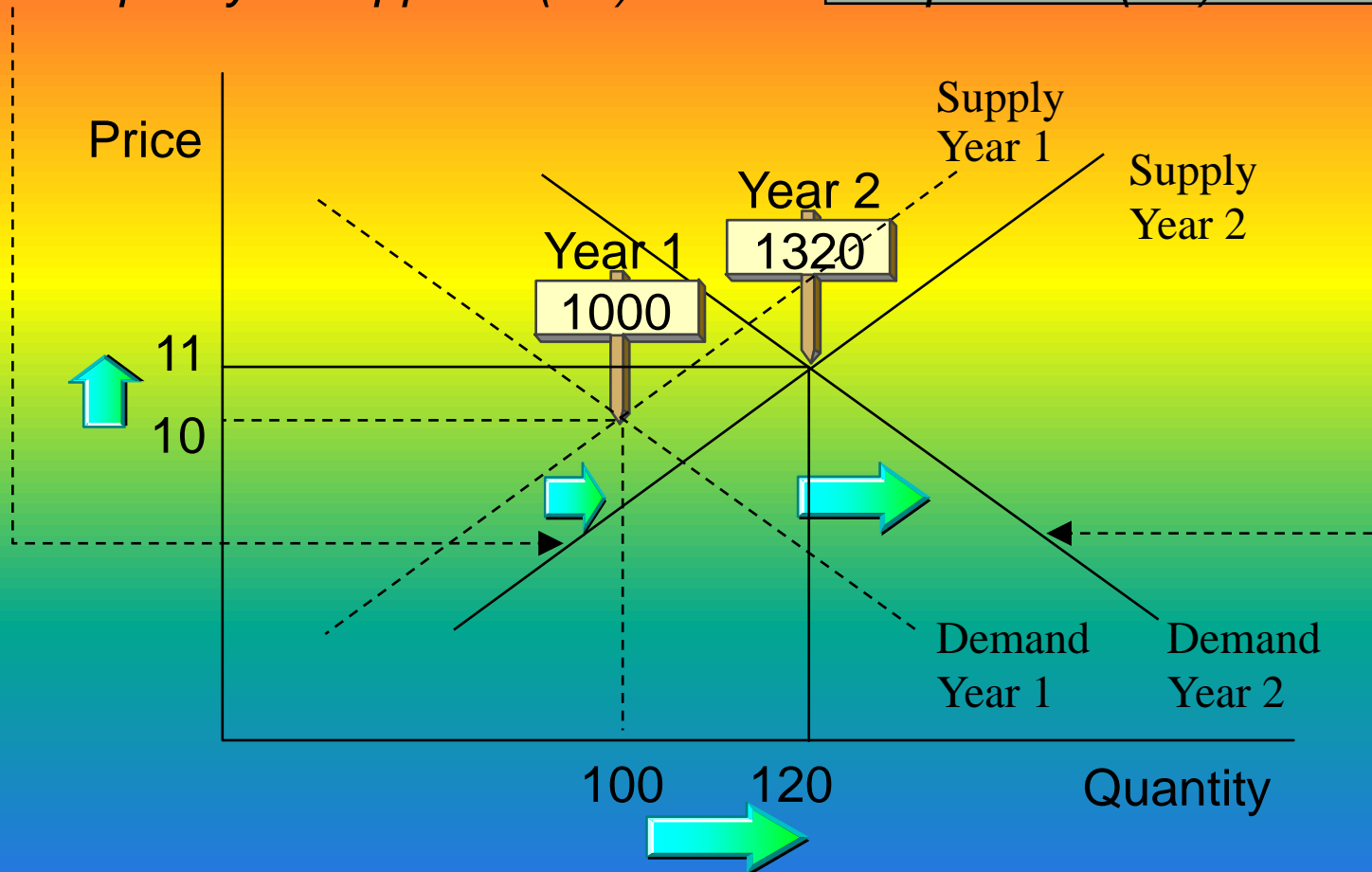
What drives market growth?

Supply side

- Prices of inputs of production (P_i)
- Technology (T_c)
- Taxes and subsidies (t_k)
- Number/capacity of suppliers (N_s)

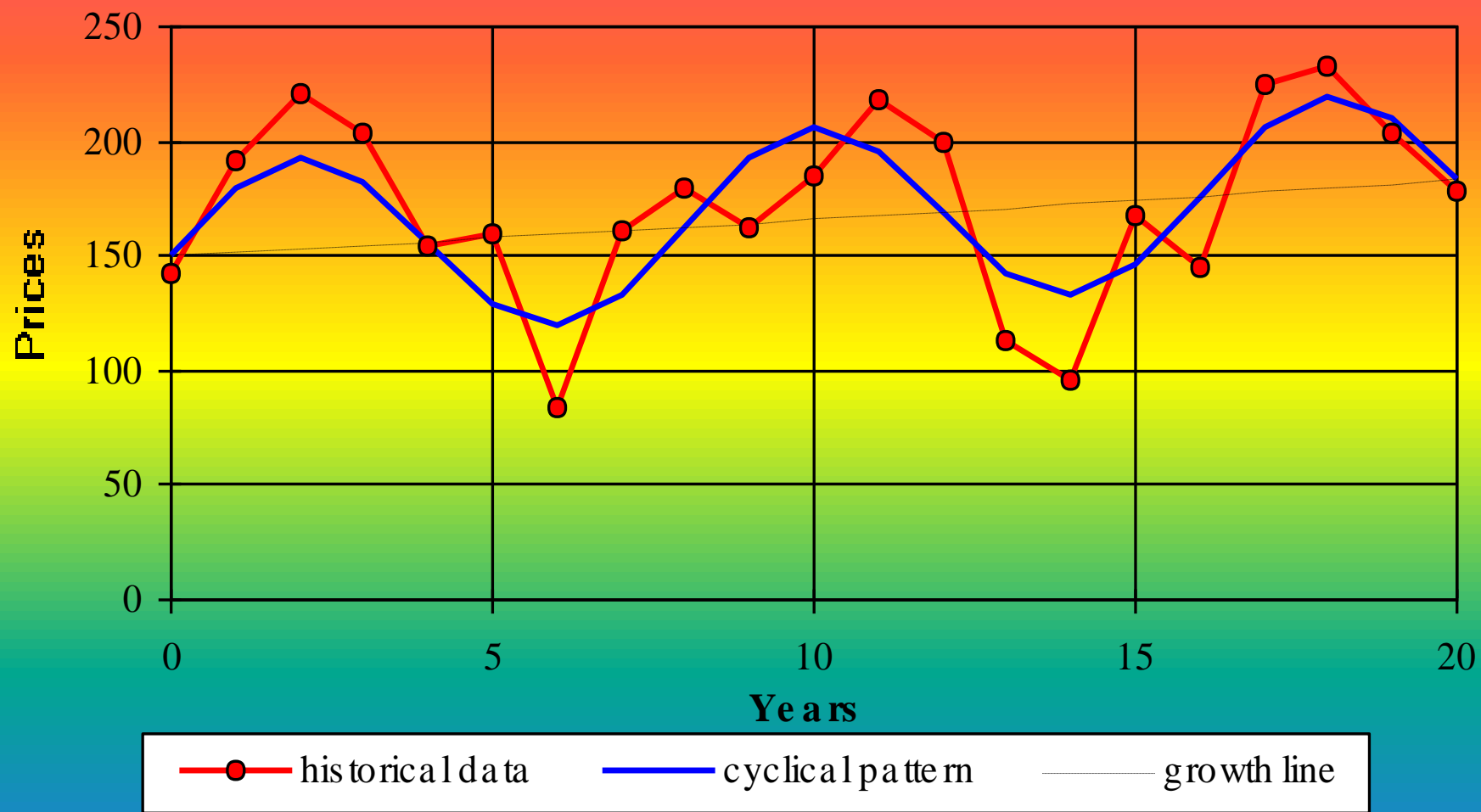
Demand side

- Real income (Y)
- Tastes and Preferences (T)
- Price of related goods (P_y)
- Population (N_d)



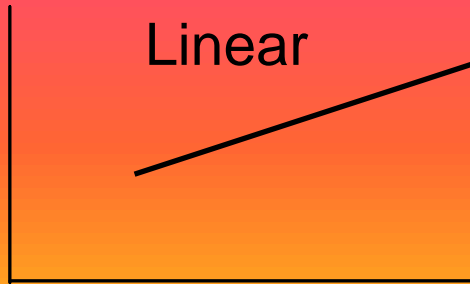
Projecting trends from analysing historical data

Prices of fertilisers 20 years prior to introduction of the project



Projected Growth Patterns

Growth Pattern



Formula

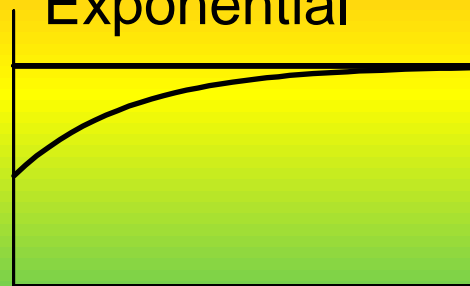
$$y = a + bx$$

Input parameters



- Value Year 0
- Growth rate

Exponential

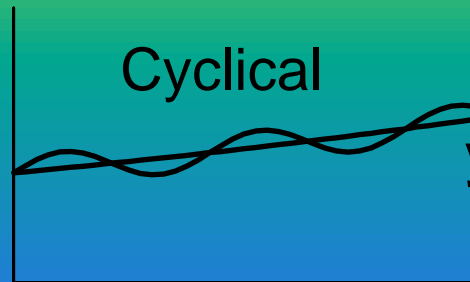


$$y = a + (b-a) (1-e^{-x/t})$$



- Starting value
- Growth margin
- Time scale

Cyclical



$$y = y_0(1+r)^x + \frac{1}{2} a \sin \frac{2\pi(x+b)}{T}$$

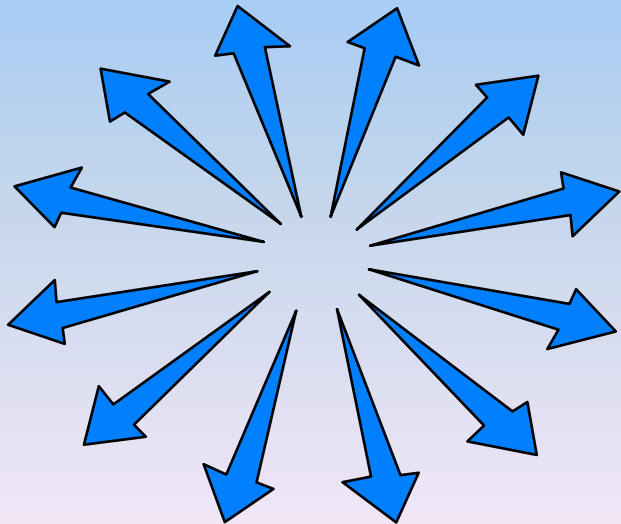


- Value Year 0
- Growth rate
- Amplitude
- Period
- Shift

The impact of market structure

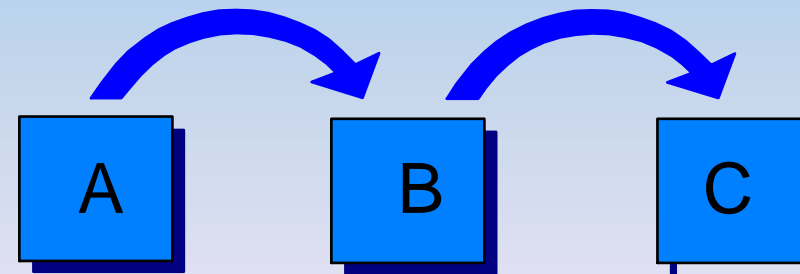
Market Forces

What are the driving competitive forces in the market that the project will compete in?



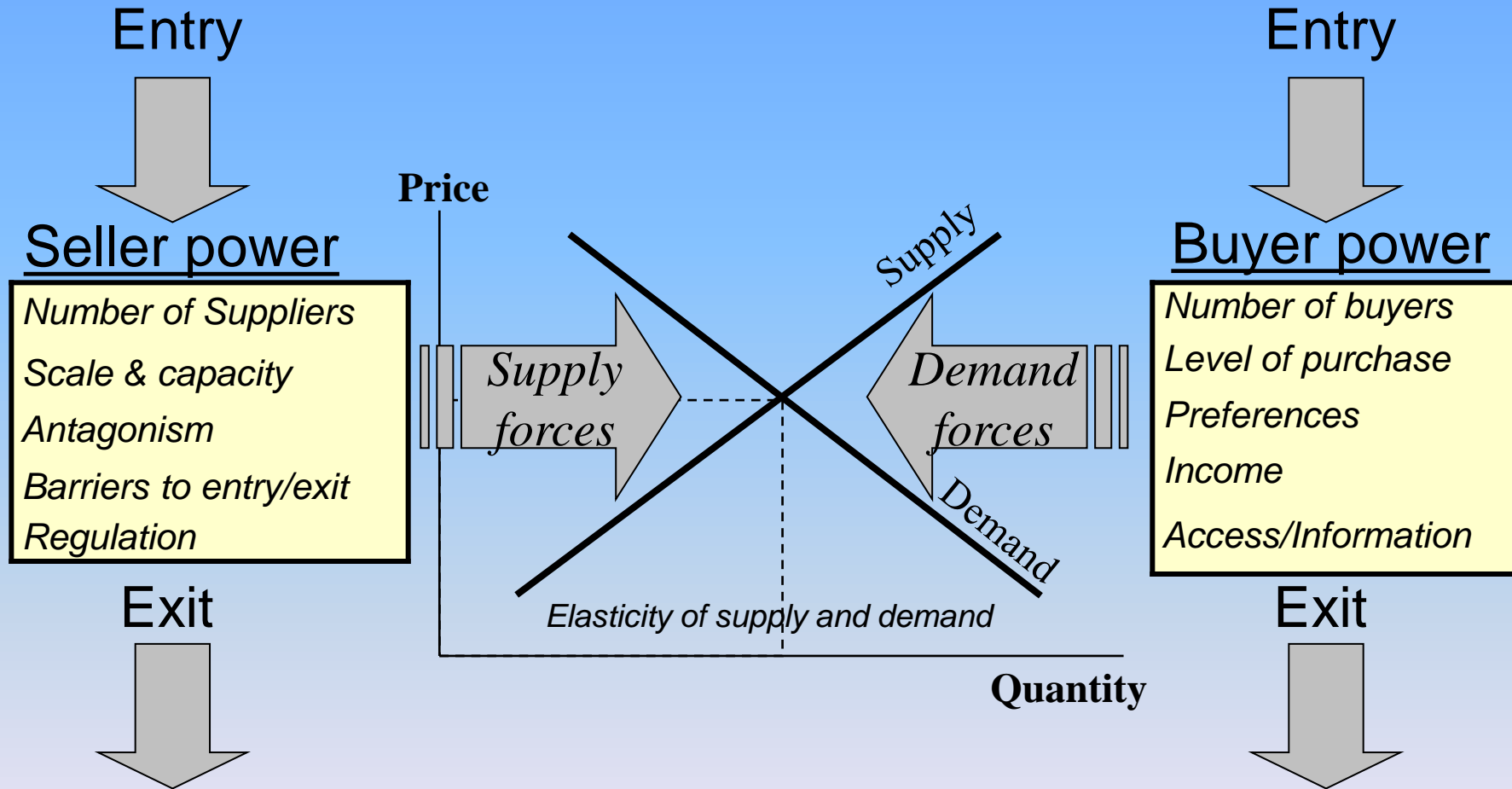
Competitive Position

What is the role and relative bargaining position of intermediaries in the Value Chain?



Market Structure

The conditions that determine the type, extent and intensity of competition in a market



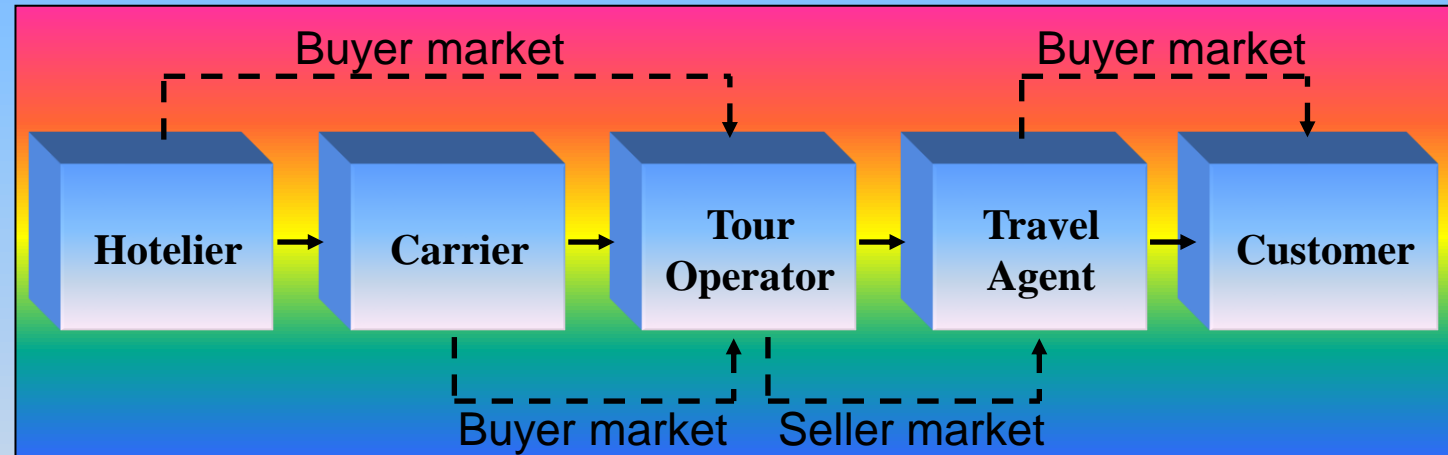
Competitive structure of the European Tourist Market

(The dominant market position of the European Tour Operator)

Supply side

<i>Number of Suppliers</i>	Many	Fair number	Few	Many
<i>Scale & capacity</i>	Small	Large	Large	Small
<i>Antagonism</i>	Intense	Intense	Intense	Intense
<i>Barriers to entry/exit</i>	Low/High	Moderate/High	Moderate/Low	Low/Low
<i>Regulation</i>	Moderate	High	Moderate	Moderate

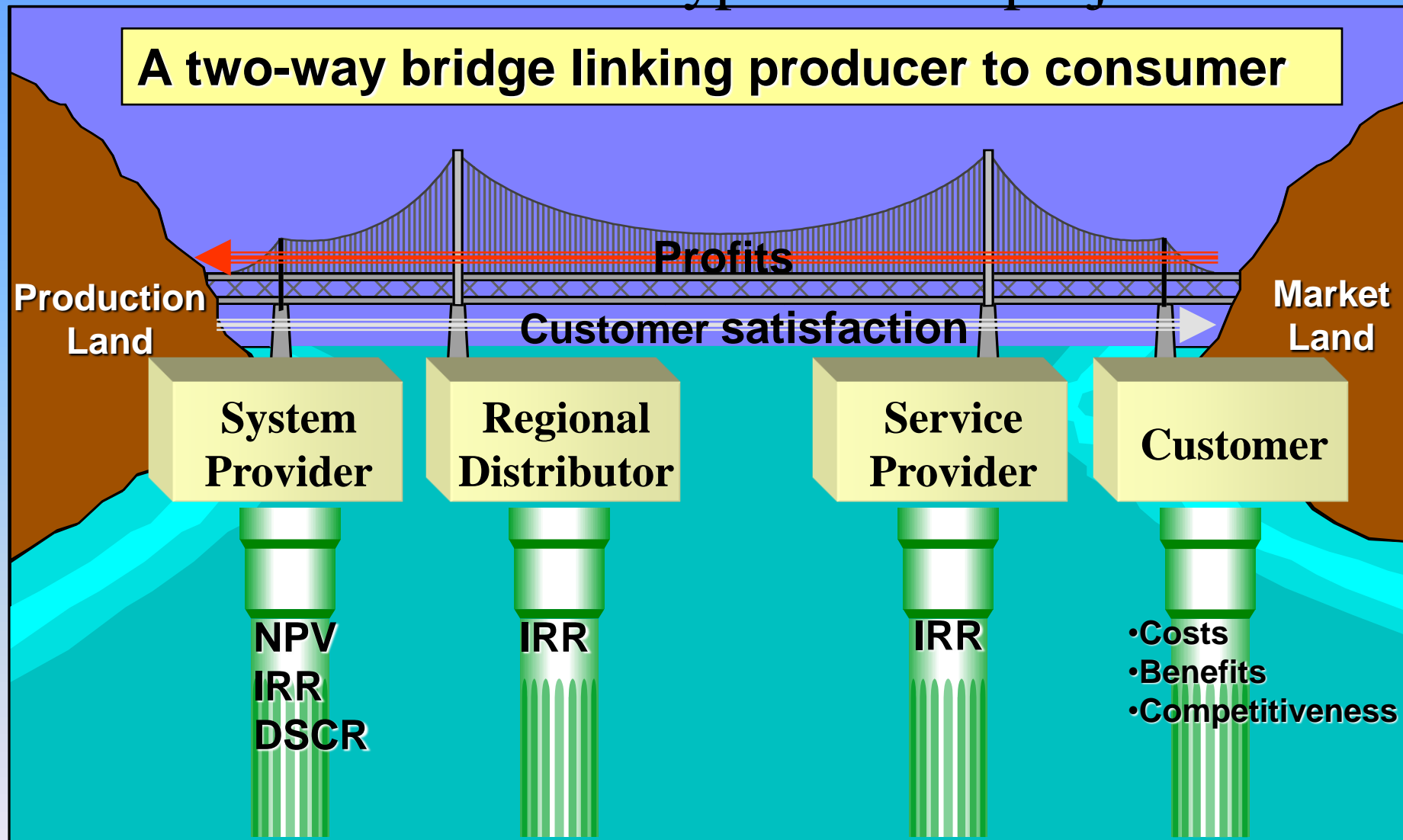
The value chain *Supply Intermediaries*



Demand side

<i>Number of buyers</i>	Many
<i>Level of purchase</i>	Significant
<i>Preferences</i>	Differentiated
<i>Income</i>	High/growing
<i>Access/Information</i>	Easy/Available

The Value Chain-Cyprus GEM project



Sources of market change

- ✓ Changes in consumer tastes or lifestyles
- ✓ Emergence of substitute products
- ✓ New uses or re-targeting of existing products to new markets
- ✓ National Trade Agreements
- ✓ New technology applications
- ✓ Mergers and acquisitions
- ✓ Government regulation and deregulation of the market
- ✓ Changes in the importance of distribution channels
- ✓ Changes in sources and types of raw materials

Market Expectations

Who are the customers?

Market segments

What are the main customer groups within the relevant market?



What do they want?

Market Needs

What are the principal needs they seek to satisfy by taking part in this market?



Market segmentation

Segmentation can be based on:

Customer characteristics

Demographic

Geographic location, sex, age

Socio-economic

Income, marital status, family size, occupation, education, religion

Psychographic

Lifestyle, personality traits

Situation characteristics

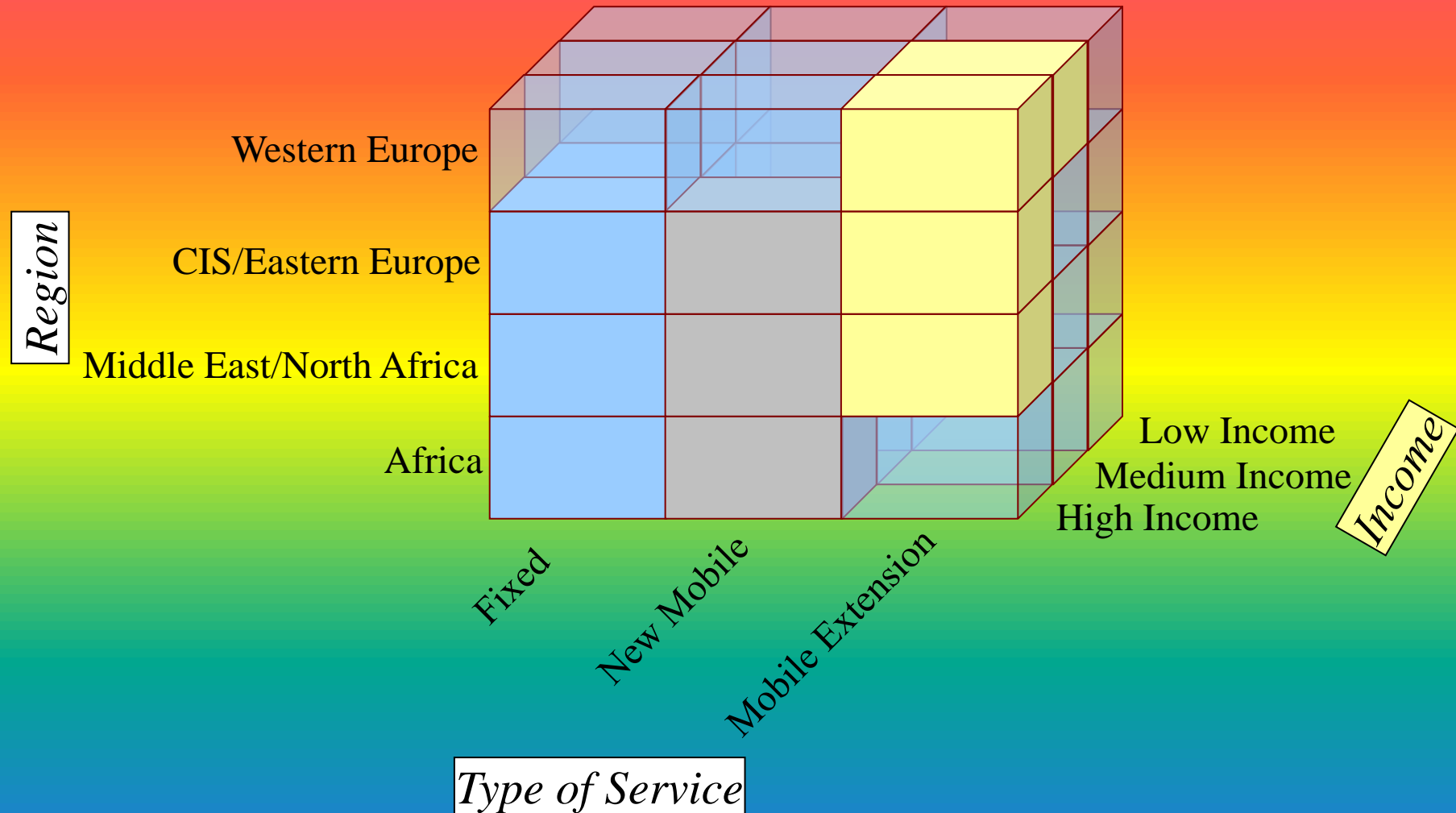
Behavioural

Perceived product benefits, user status and user rate (volume segmentation), brand or store loyalty, seasonality preference (time segmentation)

Market segment selection criteria

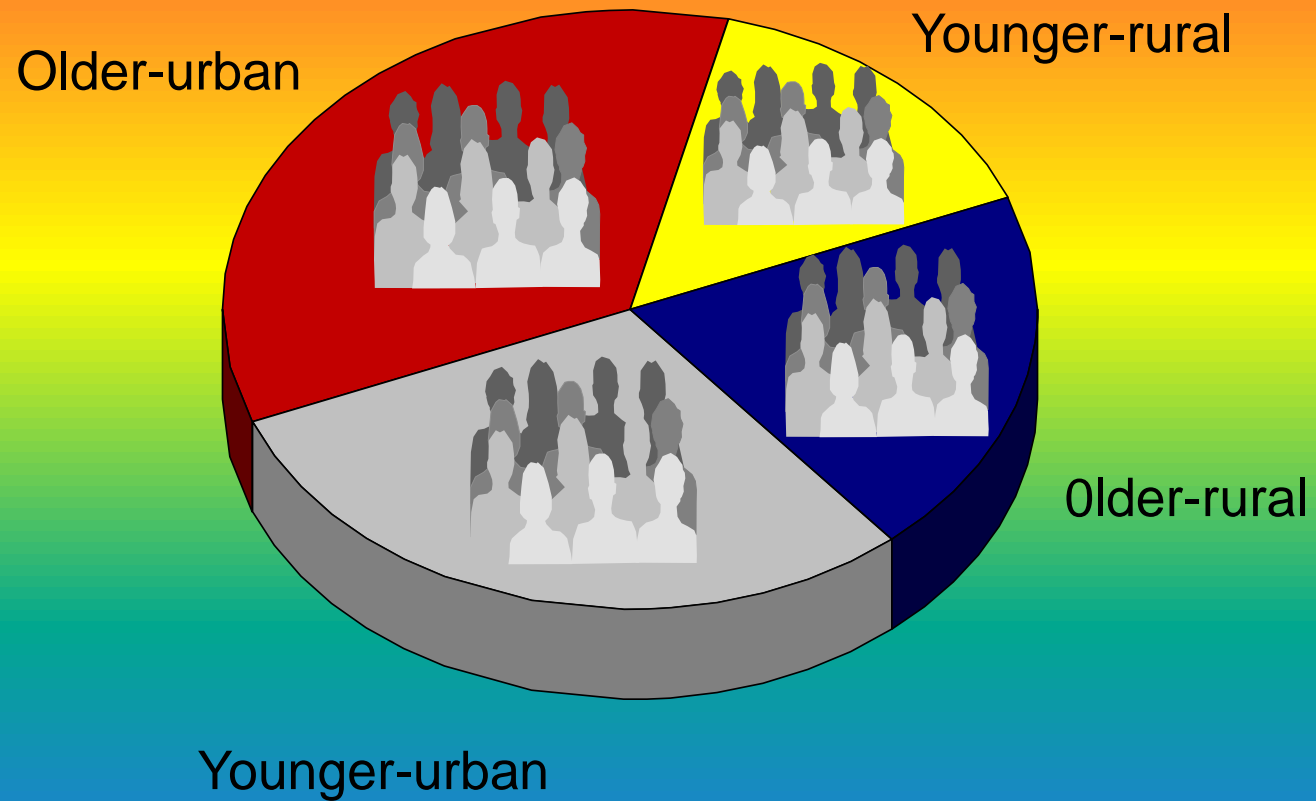
- Only define a few market segments (3-5).
- Members of the same segment should have similar market need (and behavioural) profiles.
- Market segments should be characterised by distinctly different market need profiles.
- Market segments should be:
 - ❑ *measurable*
 - ❑ *predictable*
 - ❑ *accessible*
 - ❑ *substantial*
- At least one primary criterion should apply to all segments. Secondary
criteria should not cause:
 - ❑ *definition gaps - non-memberships (un-accounting)*
 - ❑ *definition overlaps - multiple memberships (double counting).*

Market Definition basis for geo-stationary satellite mobile telephone services project



Cross market segmentation

By age group and place of residence



Market segmentation for holiday package users

Distinctive motivations



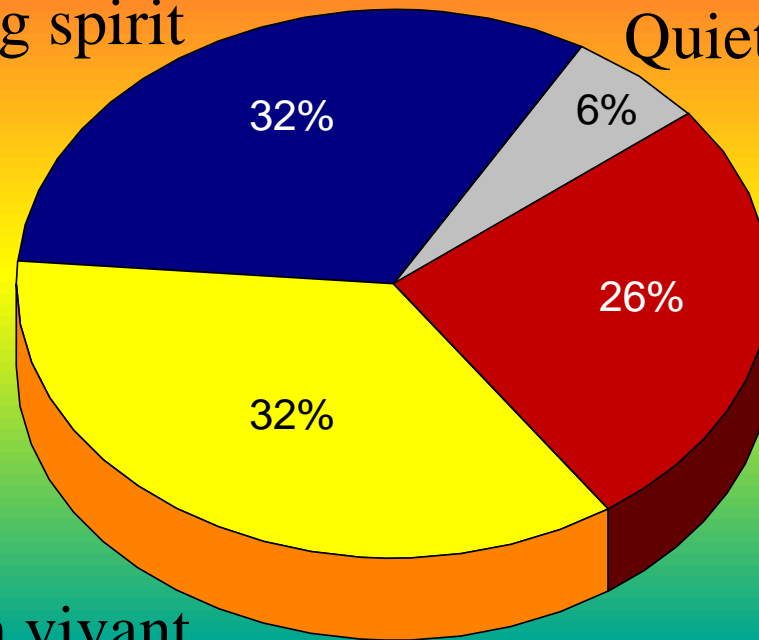
- Healthy life
- Sport
- Hobbies
- Sun bathing
- Flirting, falling in love
- Nightlife
- Chatting about it



- Good meals
- Shows
- Shopping
- Good hotels

Young spirit

Bon vivant



- Meet their people
- Rest a lot
- Relax
- Reading books

Discovery



- Change in atmosphere
- Other cultures
- Disconnect
- New people
- Travel intensity
- Adventure
- Intense life

Source: McKinseys analysis

Human Needs

Culture



Trends and lifestyles



Internationalism
Leisure/Pleasure
Escapism (Young Vs Old)
Materialism
Female careerism
Independence
Simplification of Life

Secondary Needs
(Learned)

Self fulfilment
Exploration
Acceptance
Affection
Power
Status
Possession
Ambition

Primary Needs
(Physical)

Sex
Shelter
Health
Hunger
Thirst

Hierarchy of effects



Social Institutions

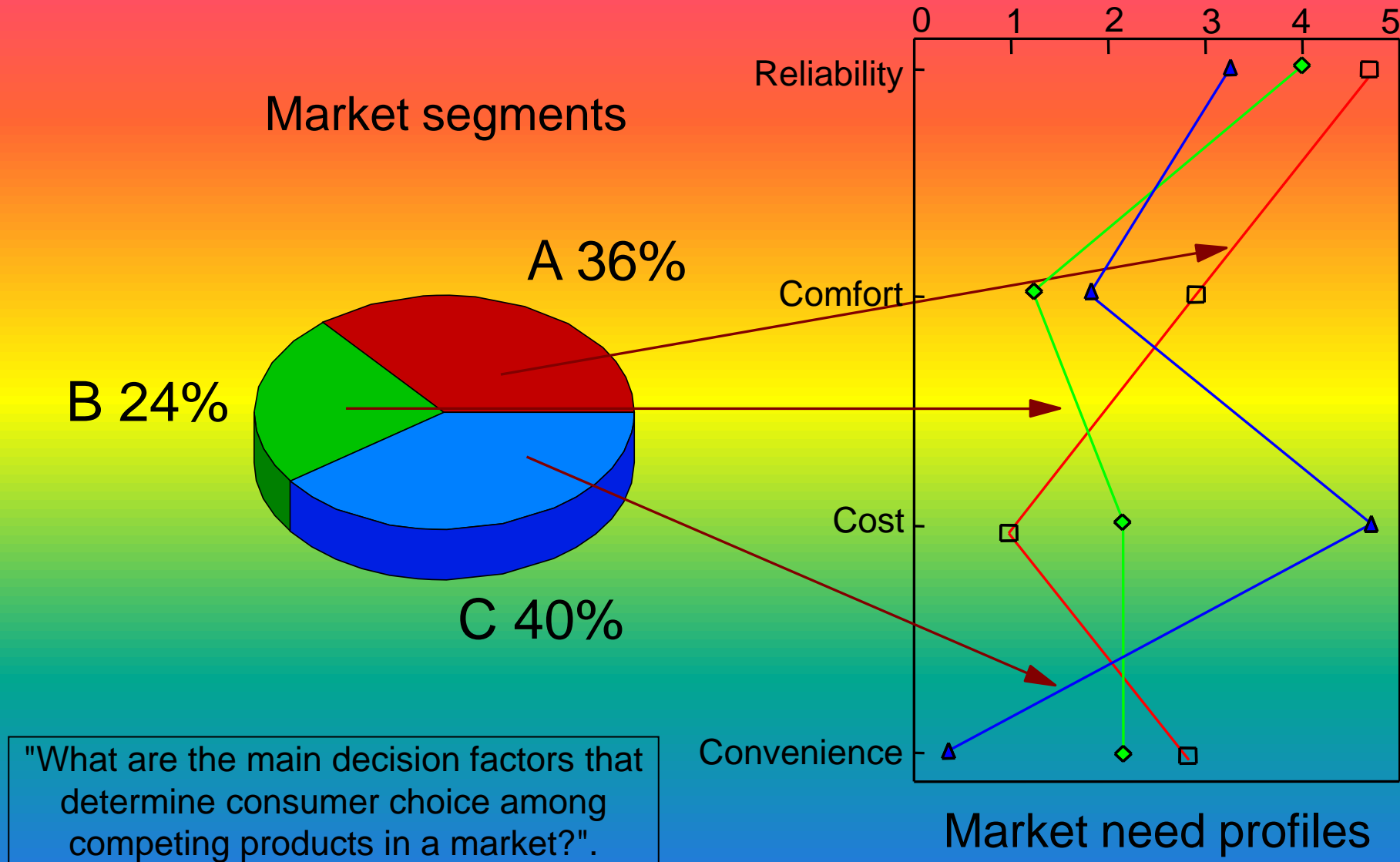


Family
Church
School

Personality



Market segmentation and Market Need Profiles

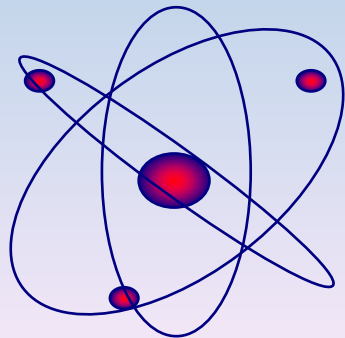


Project Capability Analysis

What are the resources
available to the project?

Available resources

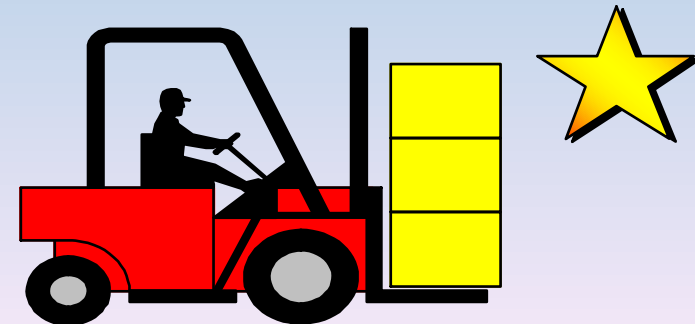
What are the key resources
and expertise that the
project can attain?



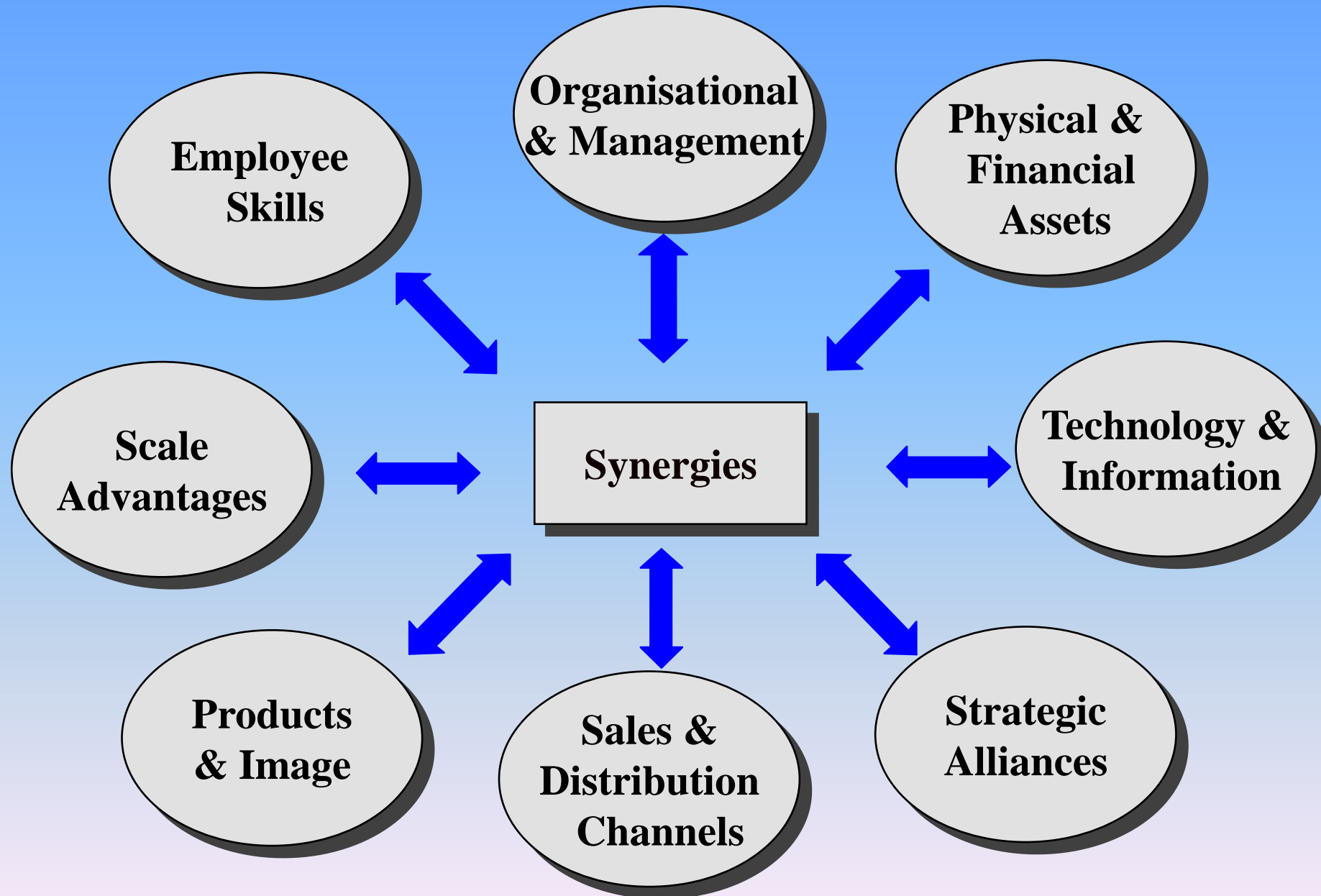
What are the project
capabilities?

Project capabilities profile

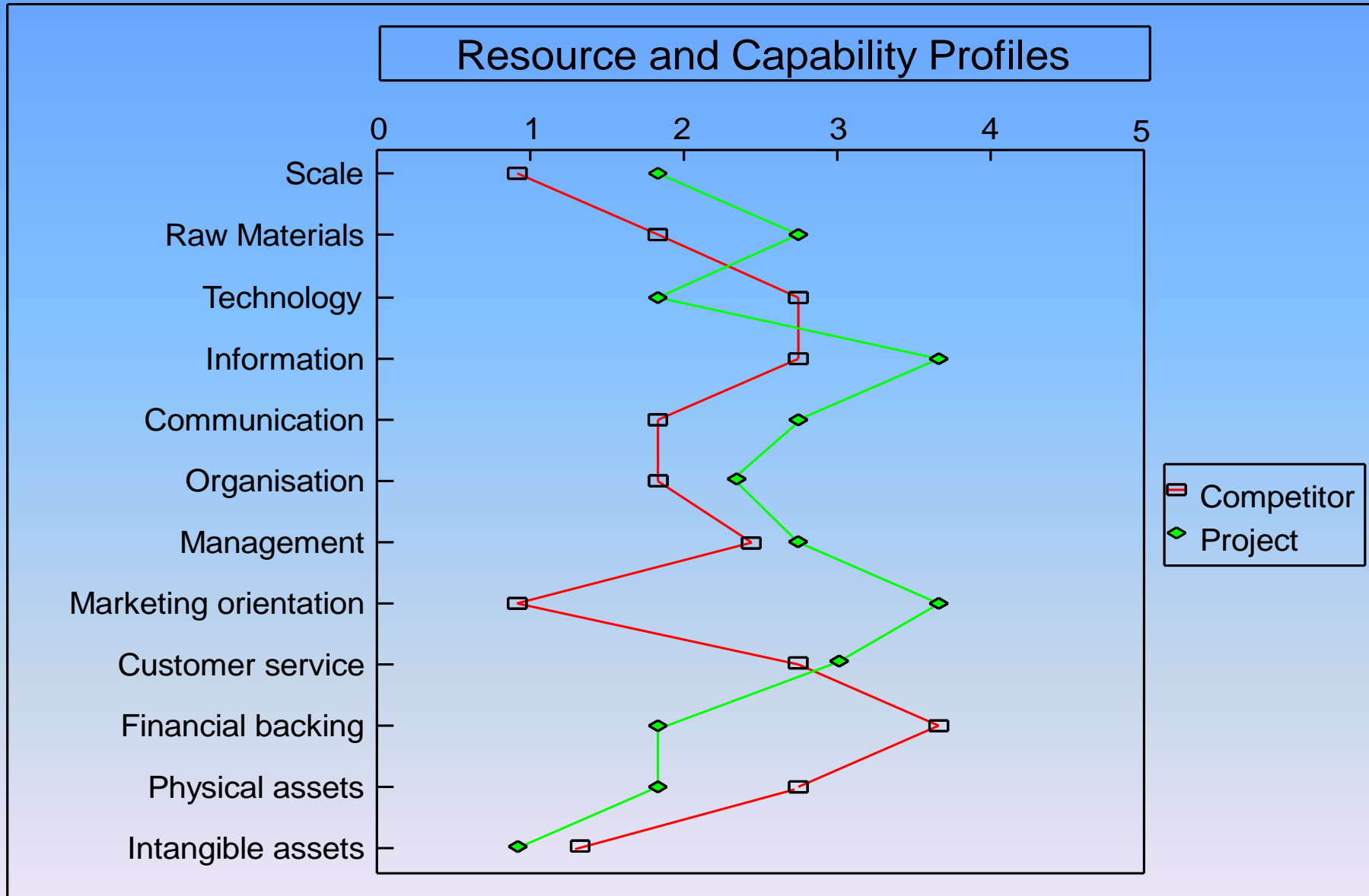
Can the available resources
be employed to generate
project capabilities?



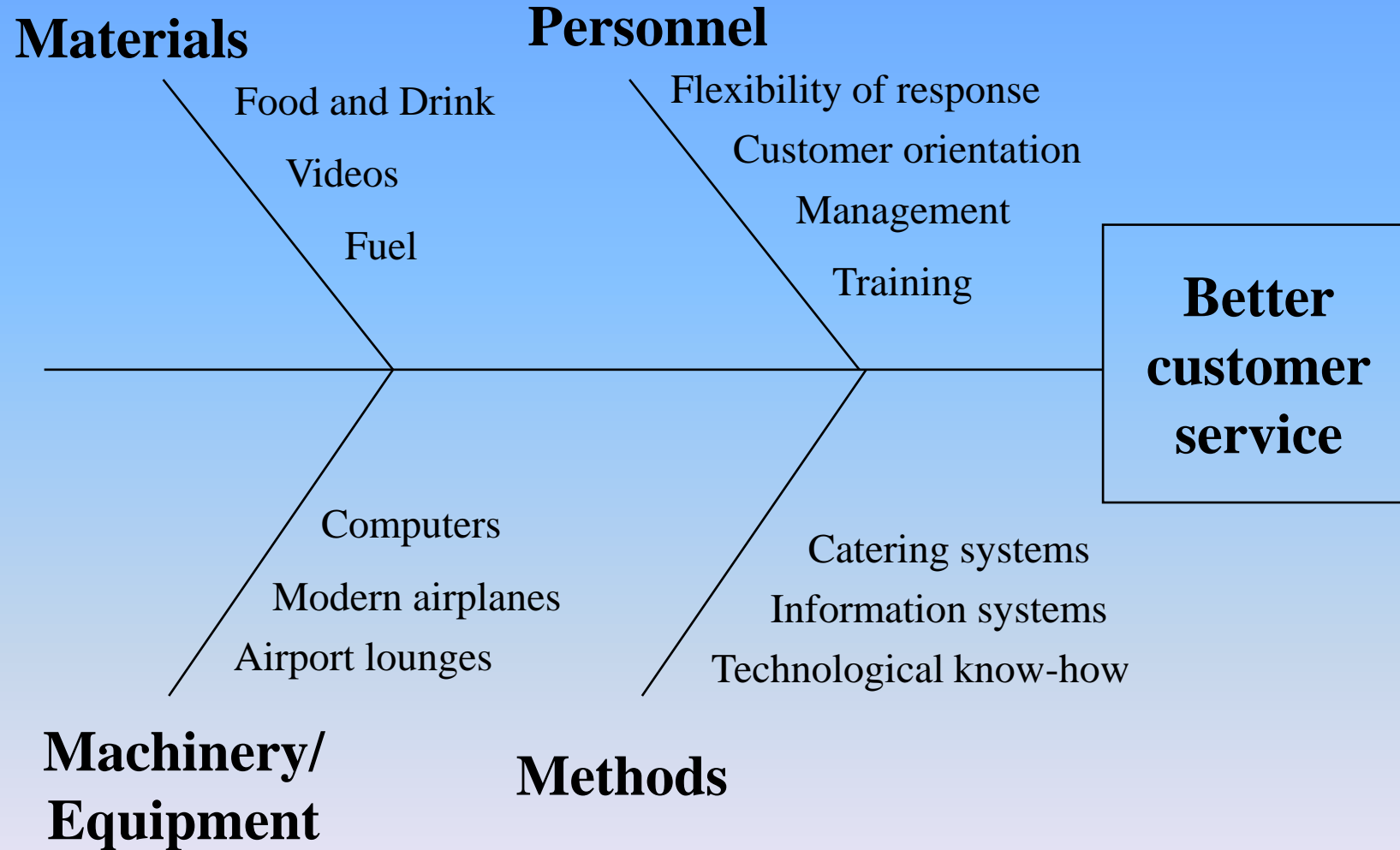
Sources of Project Capabilities



How do we compare vis-à-vis our competitors

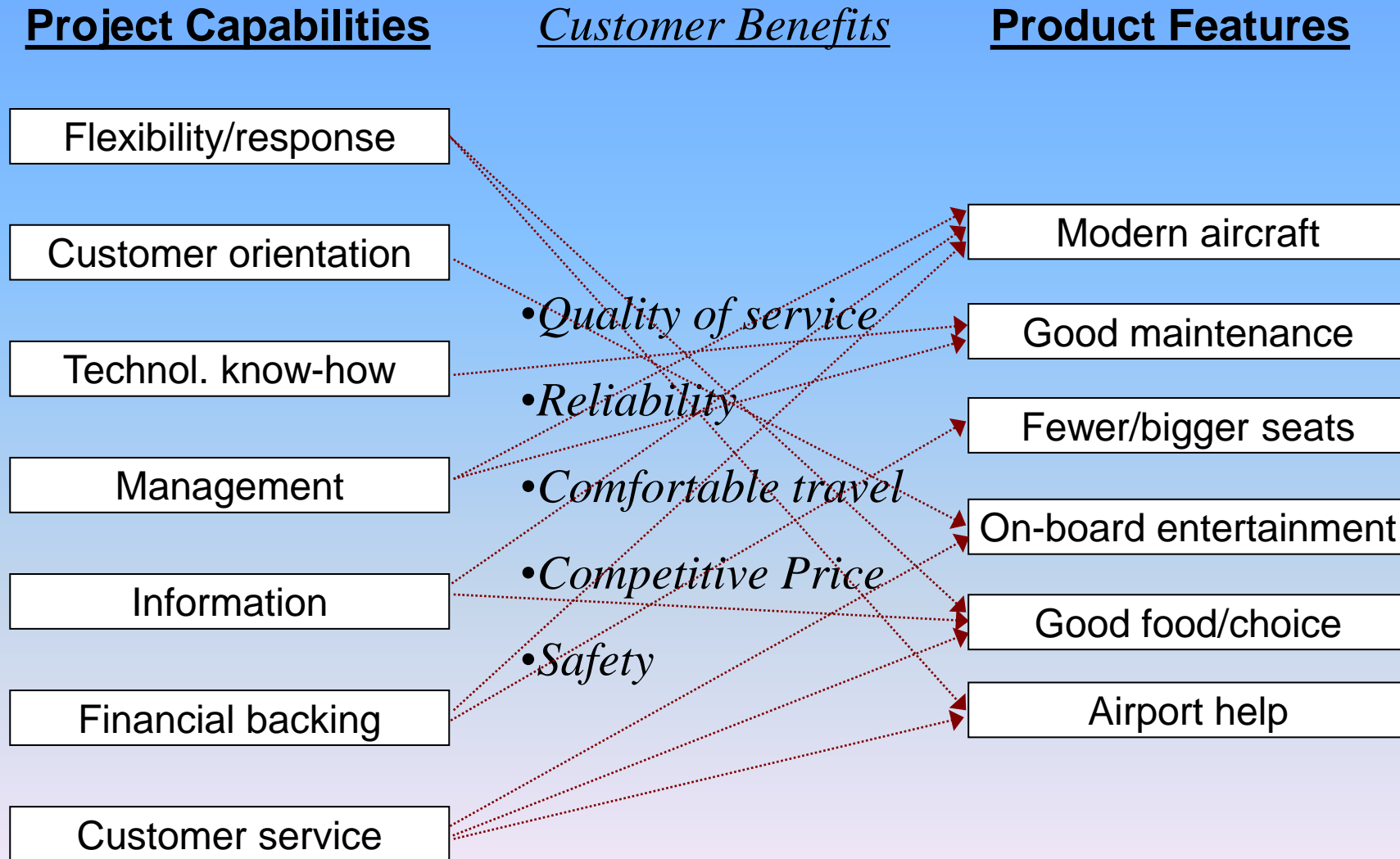


Using Resources and Capabilities to develop competence to serve market needs - Fishbone diagram



Turning project capabilities into product features

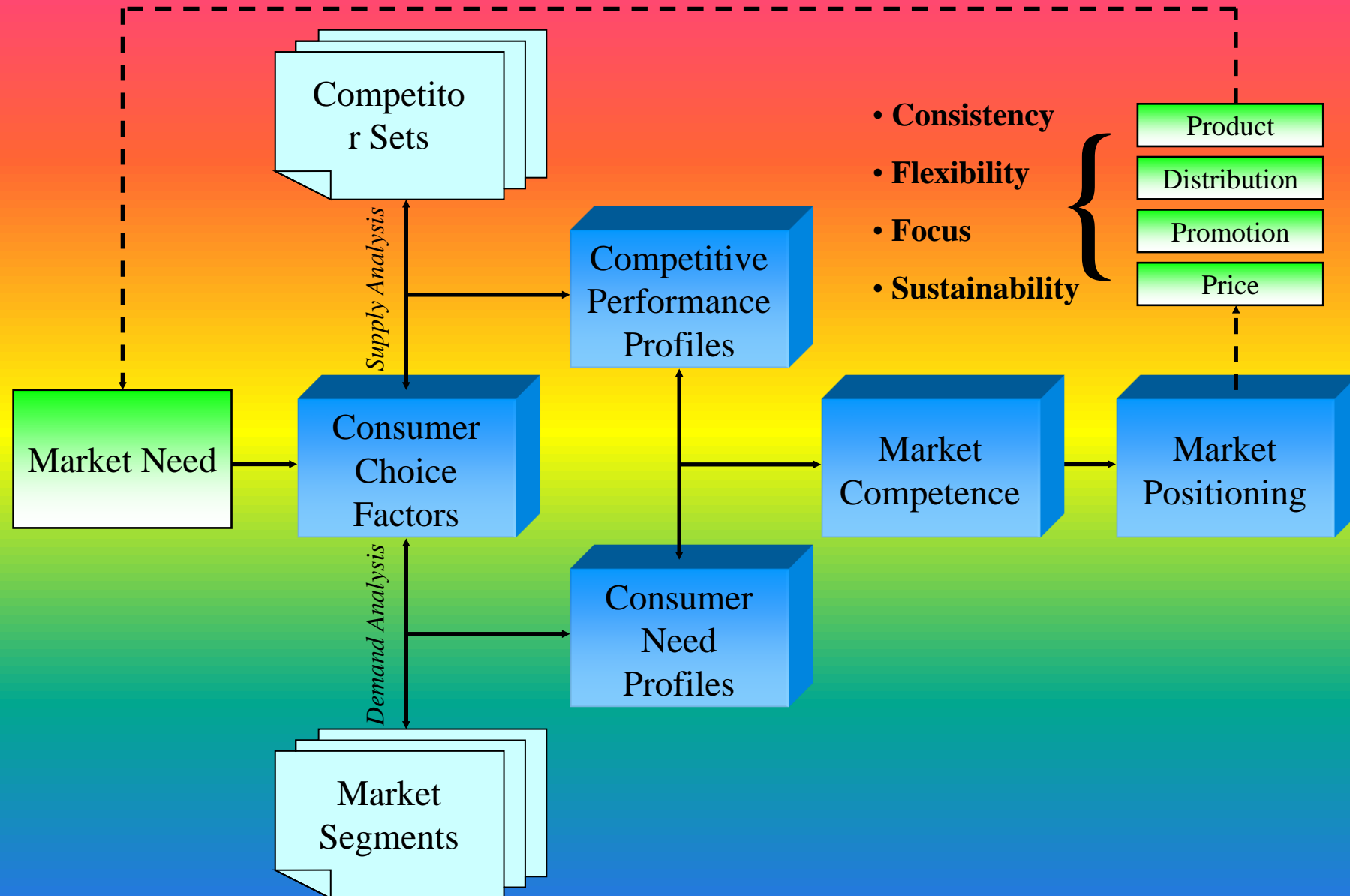
British Airways: "Putting people first" - Colin Marshall.



III. Project Competitiveness

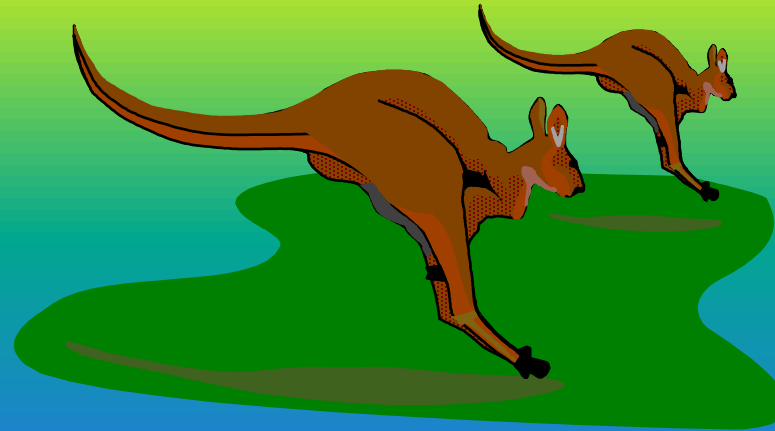


The Market Analysis and Competitive Strategy framework



Identifying and responding to market performance gaps

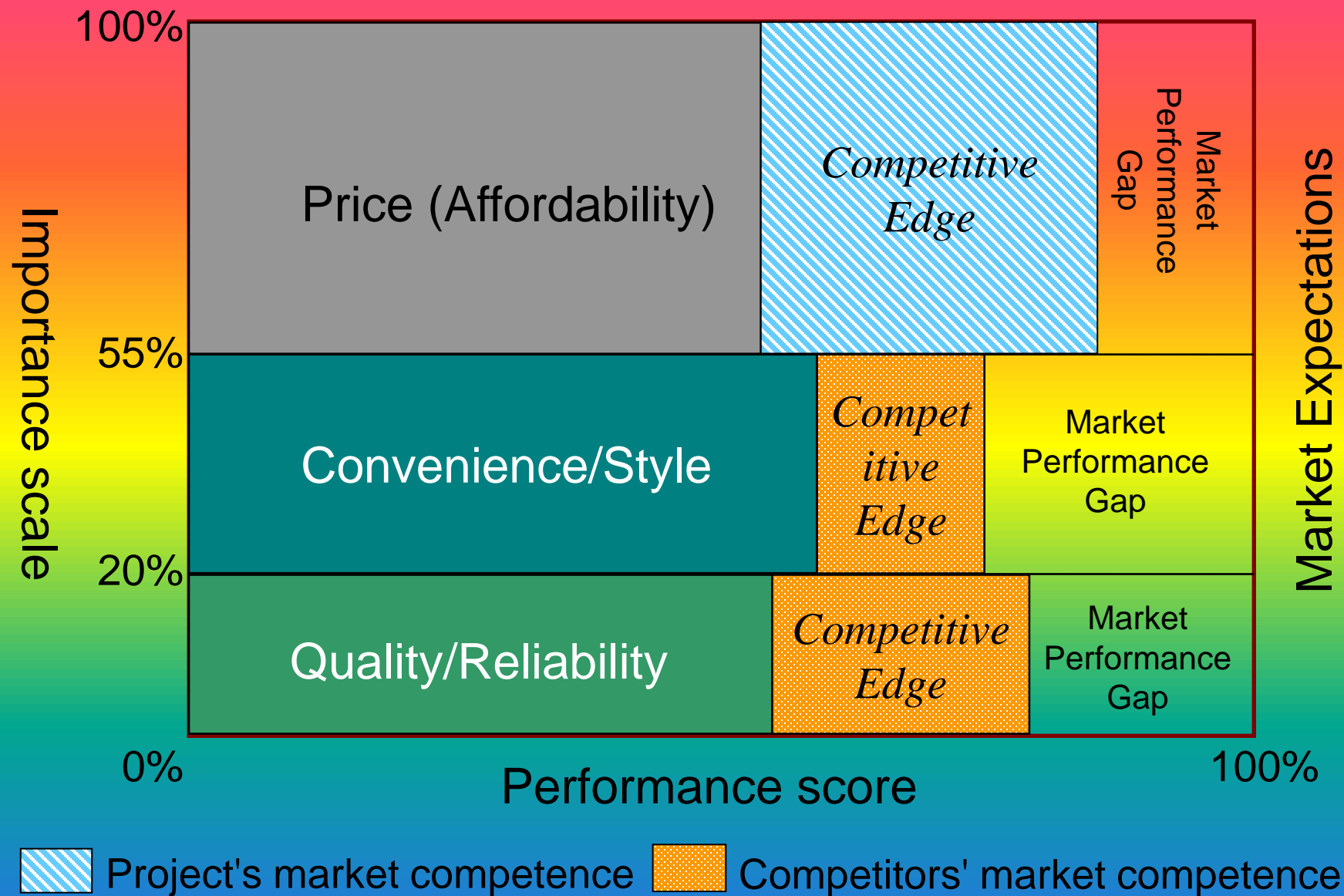
Market Expectations and
Winning Market Propositions



A Competitive Product

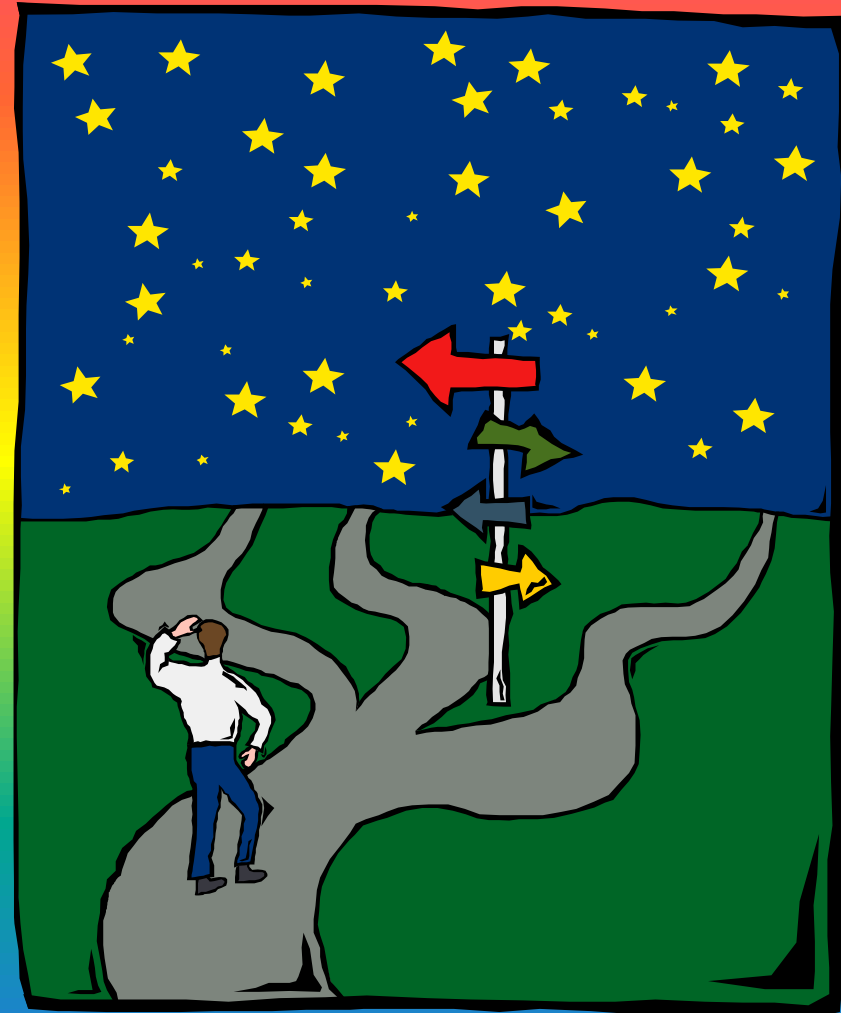
- One should seek a "winning marketing proposition" (WMP) and consider whether the project can mobilise those resources that can bring about a viable economic implementation.
- Henry Ford: "I can sell a million cars if the price is \$500 each".
- He identified a market performance gap and he invented the car assembly line to fulfil it.
- A project should identify relevant WMPs and build viable project scenarios around them.

The Market Performance Box



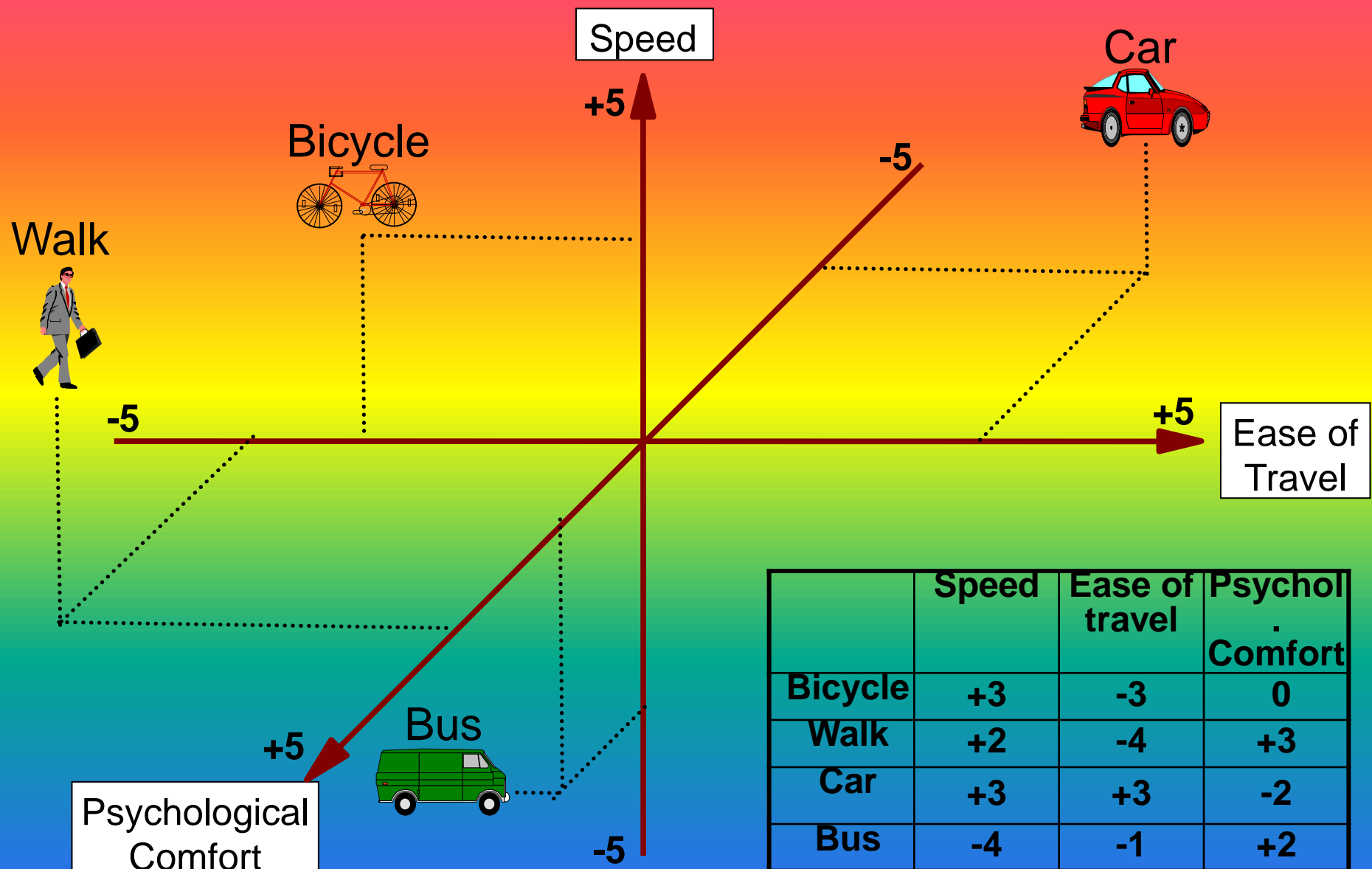
Market positioning

- A new product should be positioned on a consumer perceptual map at a strategic location which may serve as the basis for attaining competitive advantage.
1. Identify and describe the main dimensions that best explain consumer behaviour in the relevant market.
 2. Locate the position of existing products across these dimensions.
 3. Find locations or gaps in the perceptual map which the products of the project may successfully attempt to fill.
 4. Determine the physical features that can generate the consumer benefits corresponding to the selected perceptual positioning.



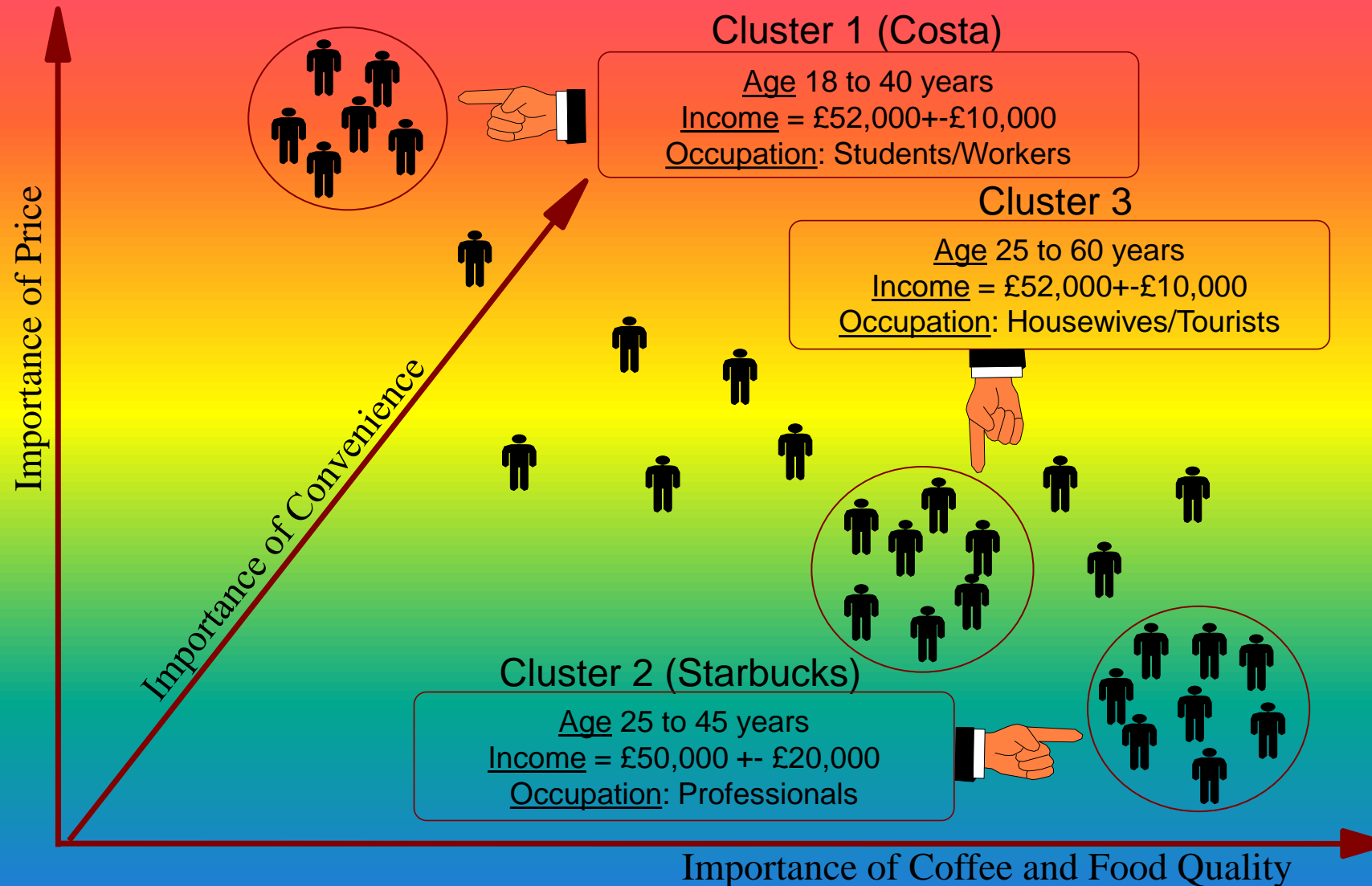
Mapping Consumers' Product Perceptions

Consumer perceptions of city commuting services



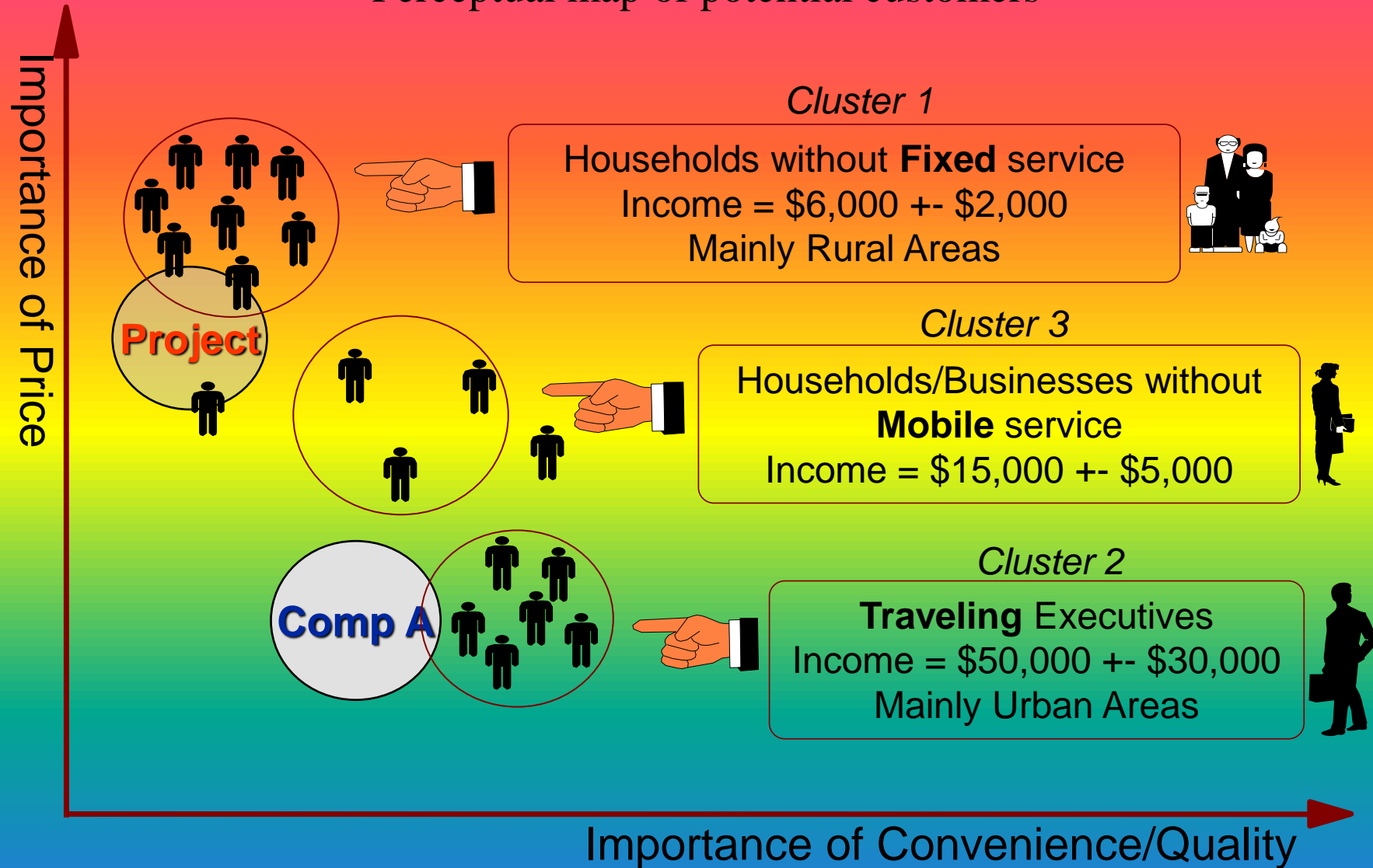
Illustrative Clusters of Customers of Coffee Bars

Perceptual map - Preferences for Coffee Bars



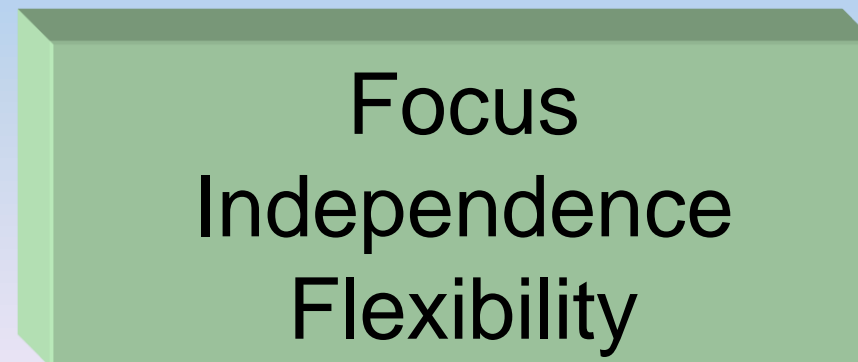
Illustrative Clusters of Consumers for Mobile Telephony

Perceptual map of potential customers

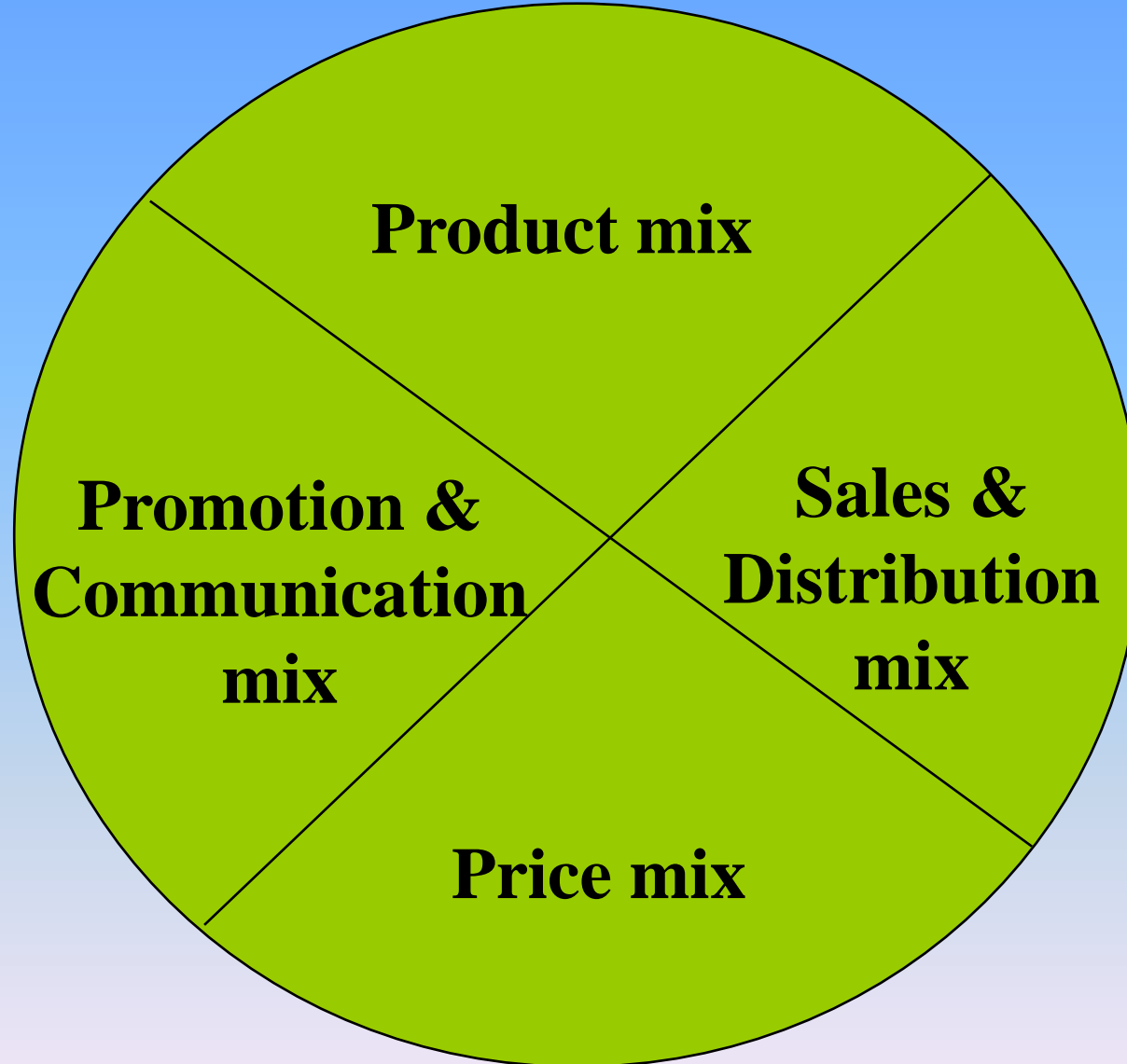


Selecting a Target Market and Optimising Market Position

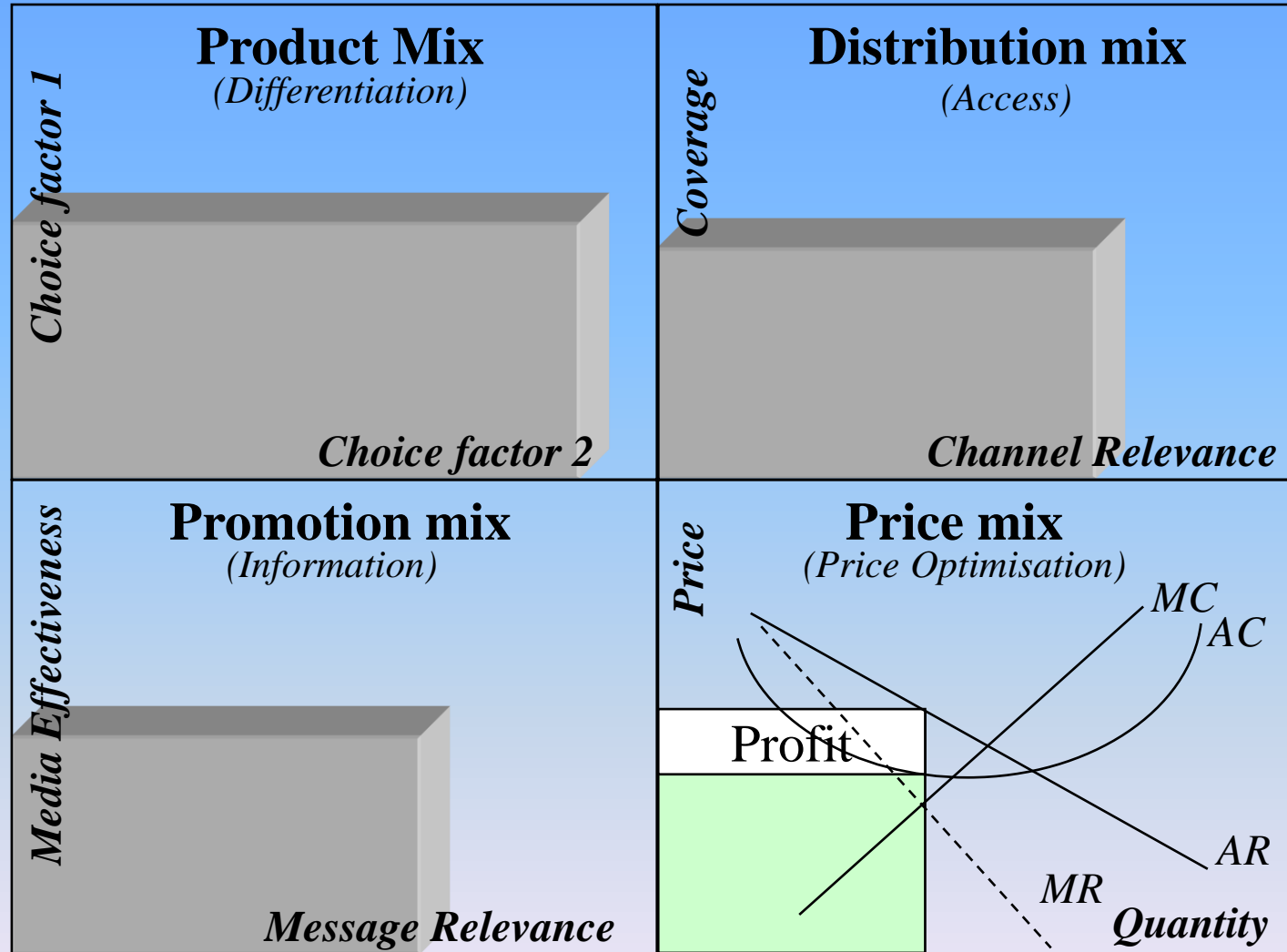
- A project should set clear targeting priorities by concentrating its resources and efforts on serving, primarily, those market segments that attach the highest value to the customer benefits for which it can develop a market competence.
- In selecting a target market the project market offerings should maintain:



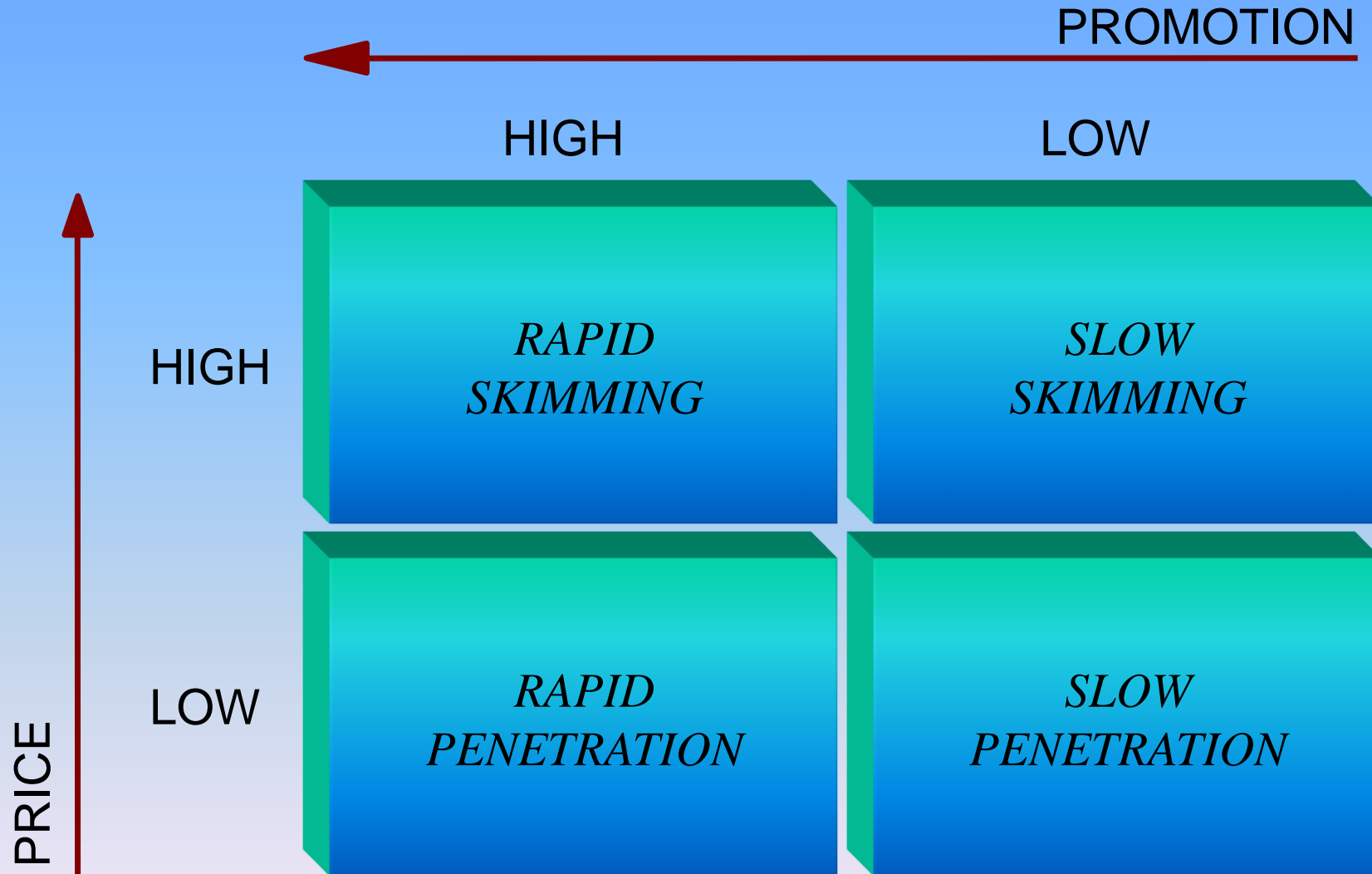
The Marketing Mix



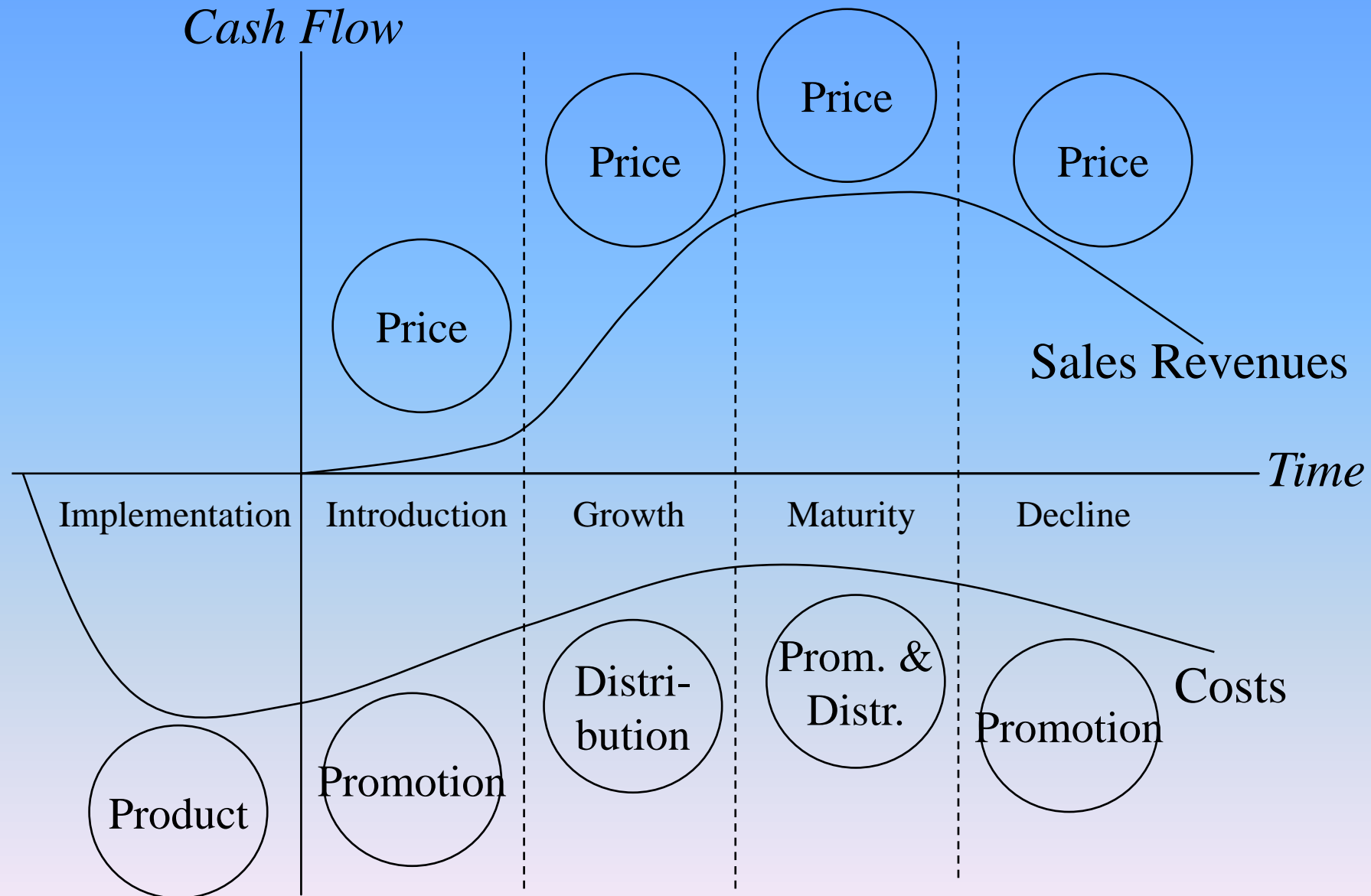
Factors of effectiveness of the marketing mix elements



Introductory Marketing Strategies



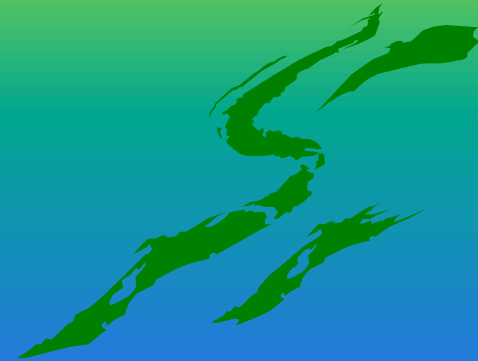
The Product Life Cycle and the dominant marketing mix variables



A competitive system

As a system, a competitive project should form part of an organisation with:

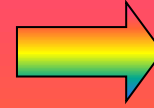
- A clearly defined business mission.
- A learning system/mentality.
- A management leadership.
- A responsiveness to market needs through innovation.
- Marketing orientation.



Business mission definitions of marketing oriented companies

Xerox

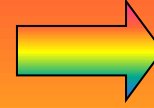
We make copiers



We improve office productivity

BP

We sell petrol



We service car owners

MGM

We make movies



We entertain people

Revlon

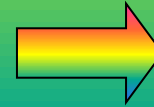
We make cosmetics



We sell hope

McGraw Hill

We sell books



We provide information

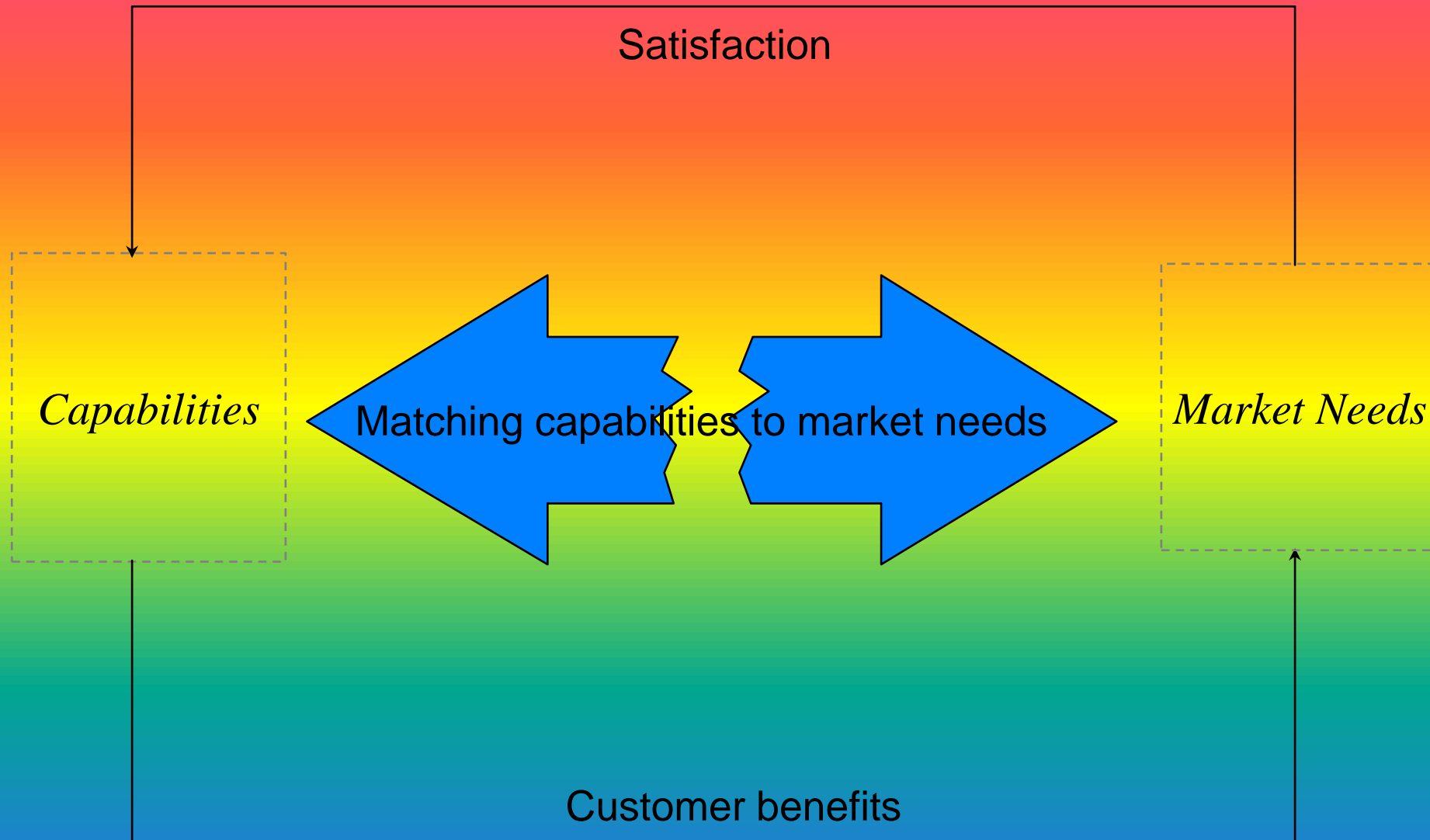
TUI

We sell holiday packages

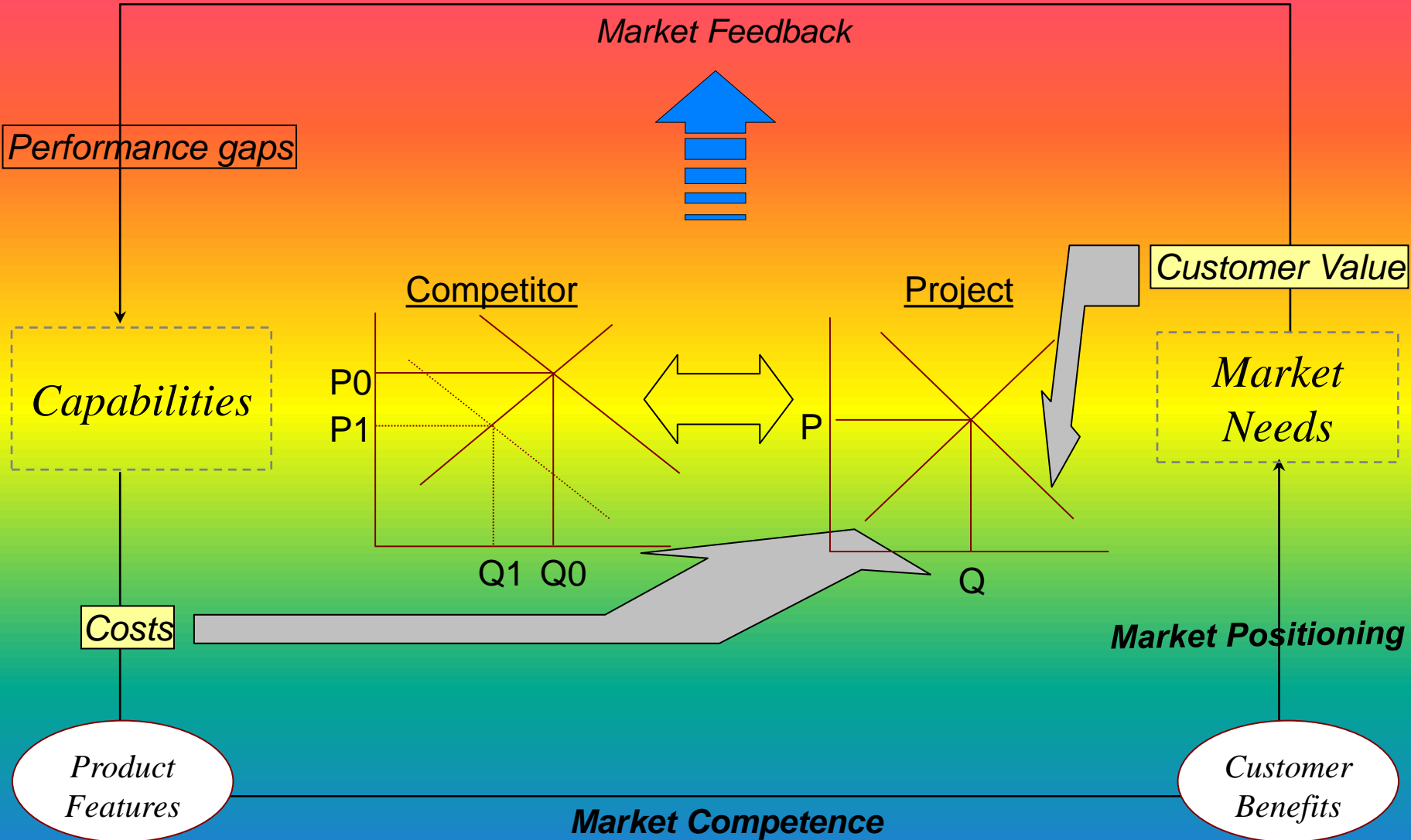


We realize people's dreams

The market competitive framework as a process

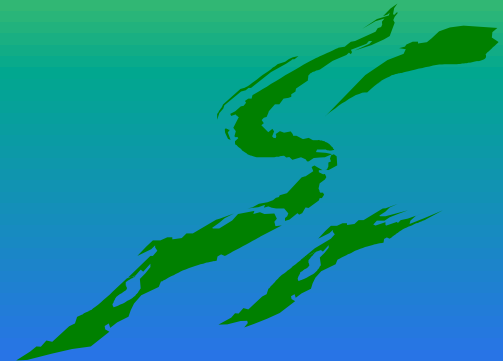


The project competitiveness system



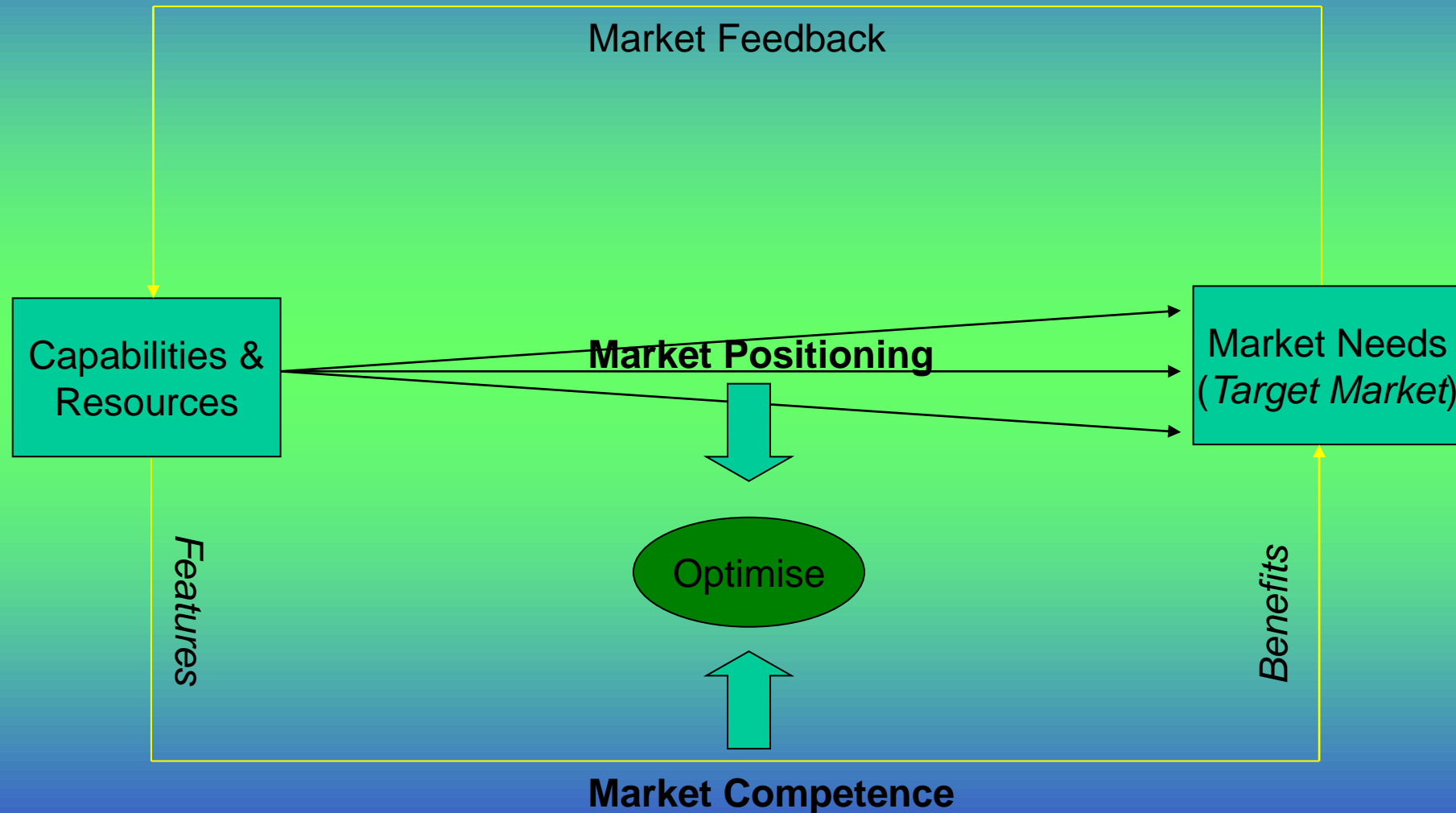
Characteristics of a potentially successful project which can not be easily quantified.

- Customer orientation
- Imagination/Creativity/Innovativeness
- Market responsiveness
- Job enthusiasm/Pursuit of excellence
- Strategic flexibility
- Executive decision making
- Market feedback systems
- Leadership



Viability and sustainable competitiveness

The Competitive Organisation





The key research question

*The strategic appraisal of the project must answer
two fundamental questions:*

- What is the project's competitive advantage?
- Is it sustainable over the life of the project?

IV. Conclusion



Checklist of questions to test the robustness of the projections

- ✓ What is the market need the projects aims to satisfy?
- ✓ What is the project relevant market?
- ✓ What is the market size?
- ✓ How is the market segmented?
- ✓ Who are the project's prime competitors?
- ✓ Which are the project capabilities?
- ✓ What is the target market of the project?
- ✓ What is the market performance gap the project will fill?
- ✓ How is the project positioned in the market?
- ✓ What is the competitive advantage of the project?
- ✓ Is the competitive advantage sustainable?
- ✓ Will the project generate a market expansion?
- ✓ Are the cash flow projections consistent with the marketing analysis and strategic positioning of the project?

Great Predictions by Market Experts

1. "Heavier-than-air flying machines are impossible." (Lord Kelvin, president, Royal Society, 1895)
2. "I think there is a world market for maybe five computers." (Thomas Watson, chairman of IBM, 1943)
3. "There is no reason for any individual to have a computer in their home." (Ken Olsen, president, chairman and founder of Digital Equipment Corp., 1977)
4. "The telephone has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us." (Western Union internal memo, 1876)
5. "Airplanes are interesting toys but of no military value." (Marshal Ferdinand Foch, French commander of Allied forces during the closing months of World War I, 1918)
6. "The wireless music box has no imaginable commercial value. Who would pay for a message sent to nobody in particular?" (David Sarnoff's associates, in response to his urgings for investment in radio in the 1920's)
7. "Who the hell wants to hear actors talk?" (Harry M. Warner, Warner Brothers, 1927)
8. "Everything that can be invented has been invented." (Charles H. Duell, commissioner, US Office of Patents, 1899)

Risk Analysis in Investment Appraisal



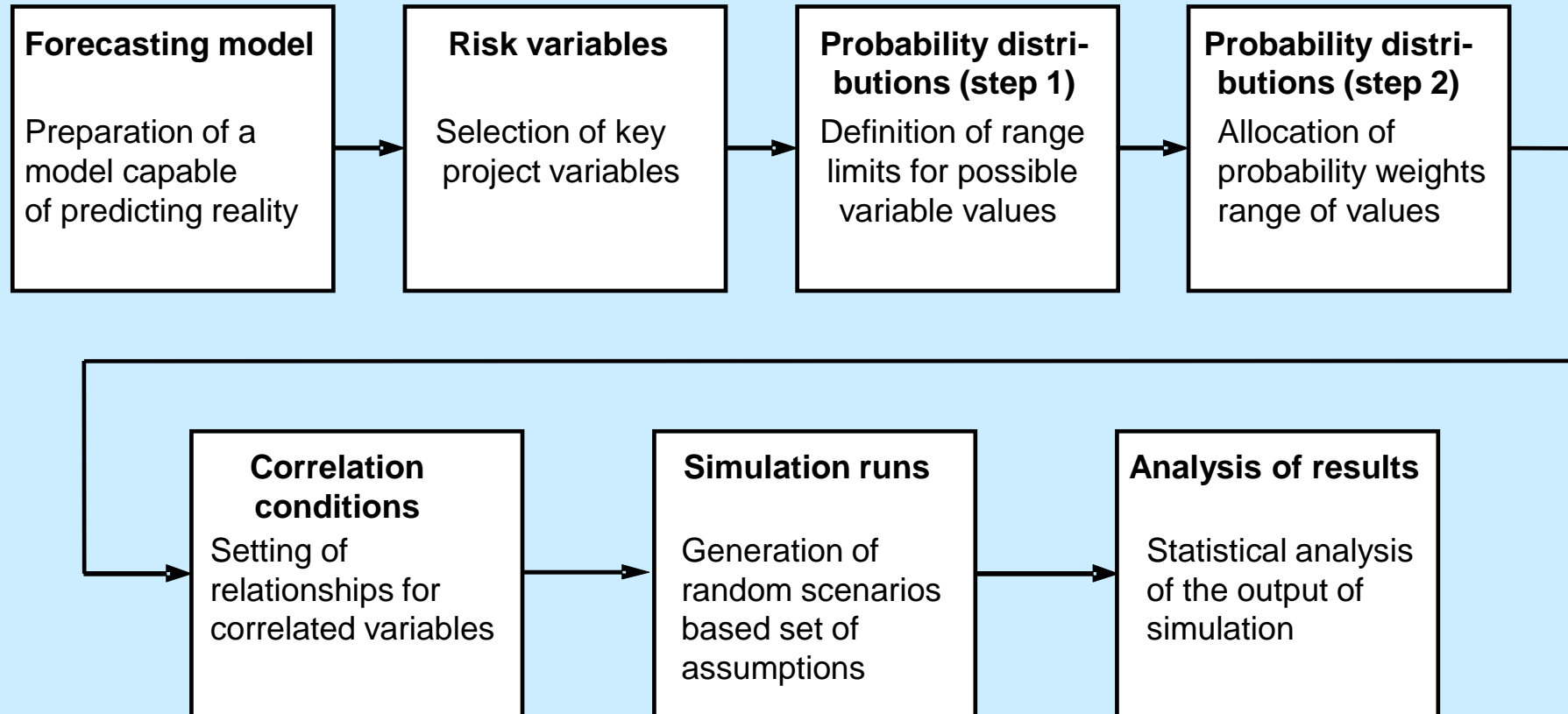
Using the Monte-Carlo Simulation Methodology



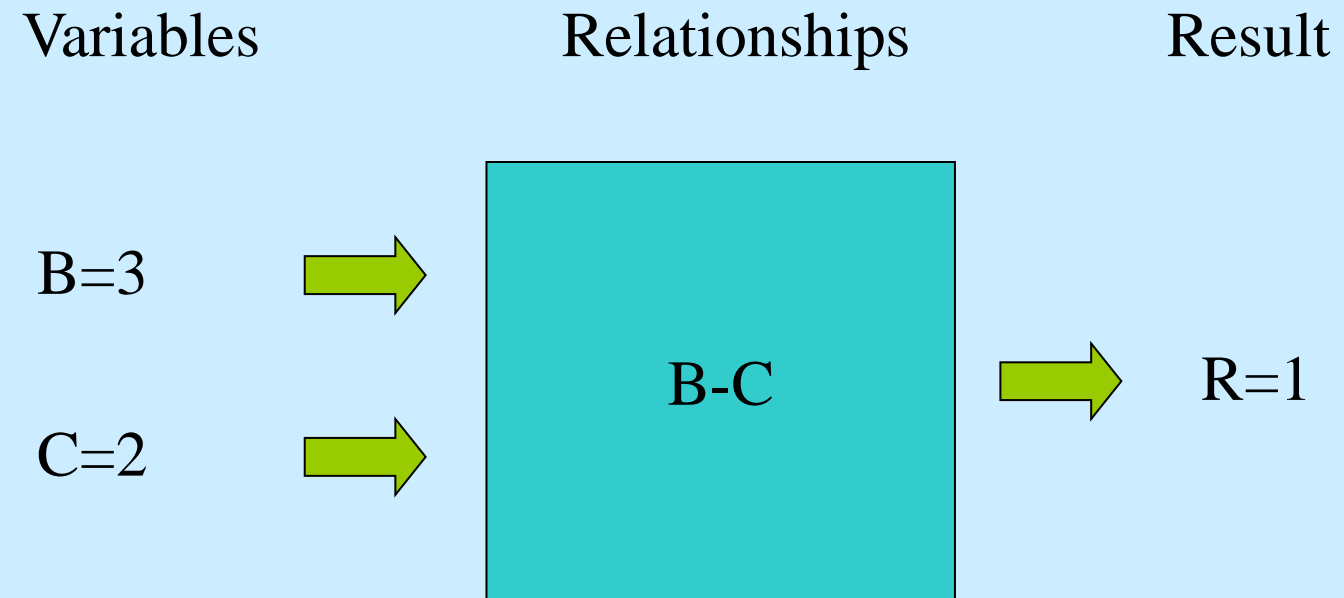
The Monte-Carlo Simulation Methodology

1. Identify the critical/most uncertain input variables in a projected model – **risk variables**.
2. Substitute single-value assumptions with **probability distributions** which tend to express the possible variability for each of the identified risk variables.

The Risk Analysis Process



A very simple model

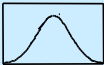
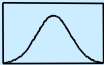
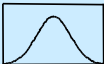


Forecasting Model

Distinguishing between input variables and formulae

Forecasting Model			
	\$	<u>Variables</u>	<u>Formulae</u>
Sales price	12	V1	
Volume of sales	100	V2	
Cash inflow	1,200		$F1 = V1 \times V2$
Materials	300		$F2 = V2 \times V4$
Wages	400		$F3 = V2 \times V5$
Expenses	200	V3	
Cash outflow	900		$F4 = F2 + F3 + V3$
Net Cash Flow	300		$F5 = F1 - F4$
Relevant assumptions			
Material cost per unit	3.00	V4	
Wages per unit	4.00	V5	

Identify **Risk Variables** and Set **Probability Distributions**

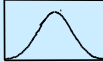
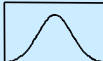
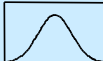
Simulation model			
	\$	<u>Risk variables</u>	<u>Prob. Distributions</u>
Sales price	12	→ V1	
Volume of sales	100	→ V2	
Cash inflow	1,200		
Materials	300		
Wages	400		
Expenses	200		
Cash outflow	900		
Net Cash Flow	300		
Relevant assumptions			
Material cost per unit	3.00	→ V4	
Wages per unit	4.00		

The Monte-Carlo Simulation process

3. Set **correlation conditions** to limit the possibility of generating internally inconsistent scenarios during a simulation.
4. Identify the critical calculated results you wish to apply the analysis on – **model results**.

Set correlation conditions

Simulation model

	\$	<u>Risk variables</u>	<u>Prob. Distributions</u>
Sales price	12	→ V1	
Volume of sales	100	→ V2	
Cash inflow	1,200		
Materials	300		
Wages	400		
Expenses	200		
Cash outflow	900		
Net Cash Flow	300		
Relevant assumptions			
Material cost per unit	3.00	→ V4	
Wages per unit	4.00		

$r = -0.8$

X

Y

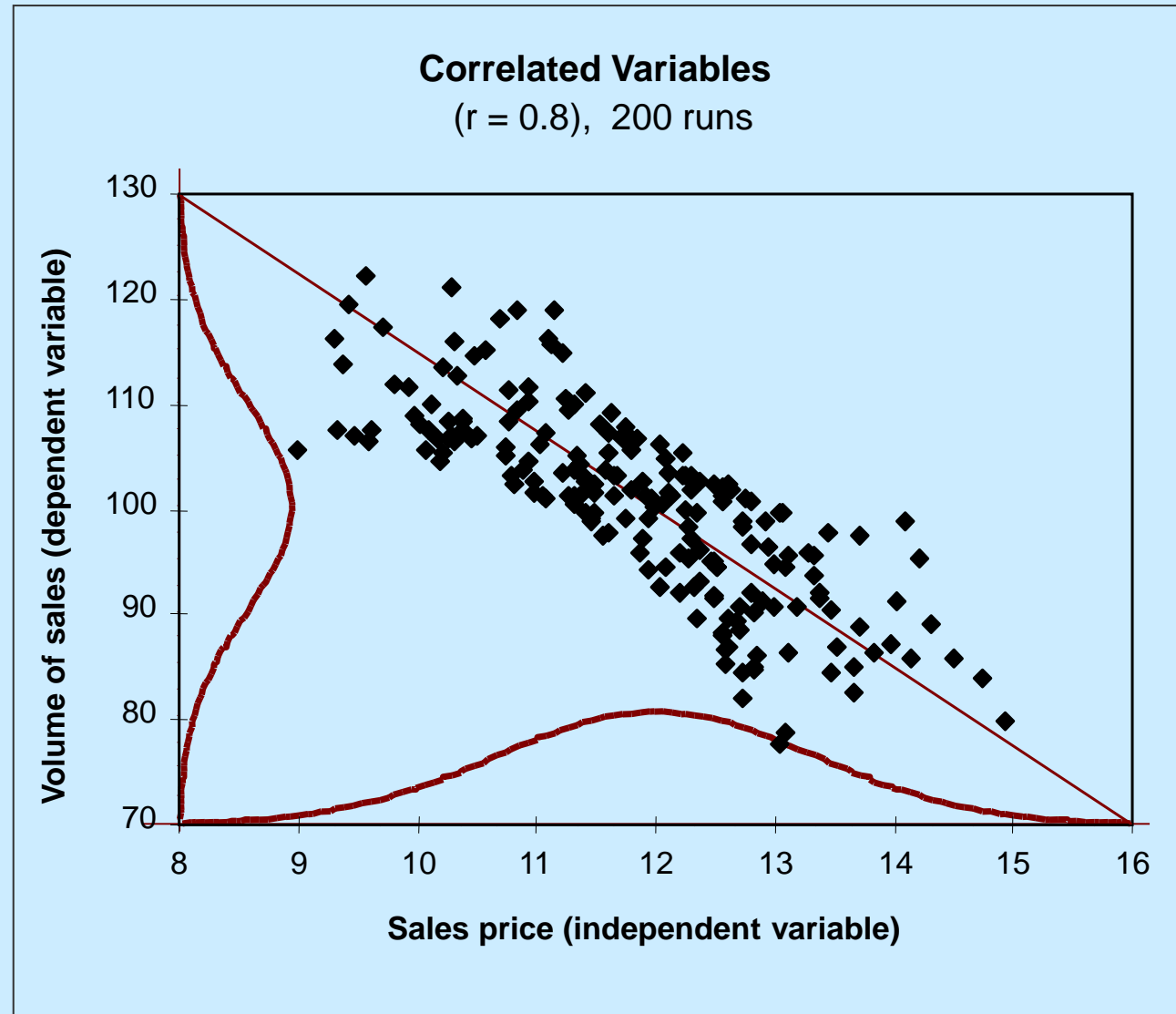
The range limits of values possible for the independent variable (sales price) were set at 8 to 16 and for the dependent variable (volume of sales) at 70 to 130. Thus, the intercept and the slope of the regression line are:

$$a \text{ (intercept)} = 130$$

$$b \text{ (slope)} = \frac{130-70}{16-8} = -7.5$$

where:
 a is the maximum Y value and b is expressed as a negative number because the relationship between the two variables is negative.

Correlated variables – Generating Relationship Data



The correlation problem

$$Y = a + bX + e$$

where:

Y

= **dependent variable,**

X

= **independent variable**

a (intercept)

= the minimum Y value (if relationship is positive) or,
= the maximum Y value (if relationship is negative),

b (slope)

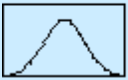

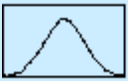

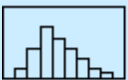

=
$$\frac{(\text{maximum } Y \text{ value} - \text{minimum } Y \text{ value})}{(\text{maximum } X \text{ value} - \text{minimum } X \text{ value})}$$

e (error factor) = **independently distributed normal errors.**

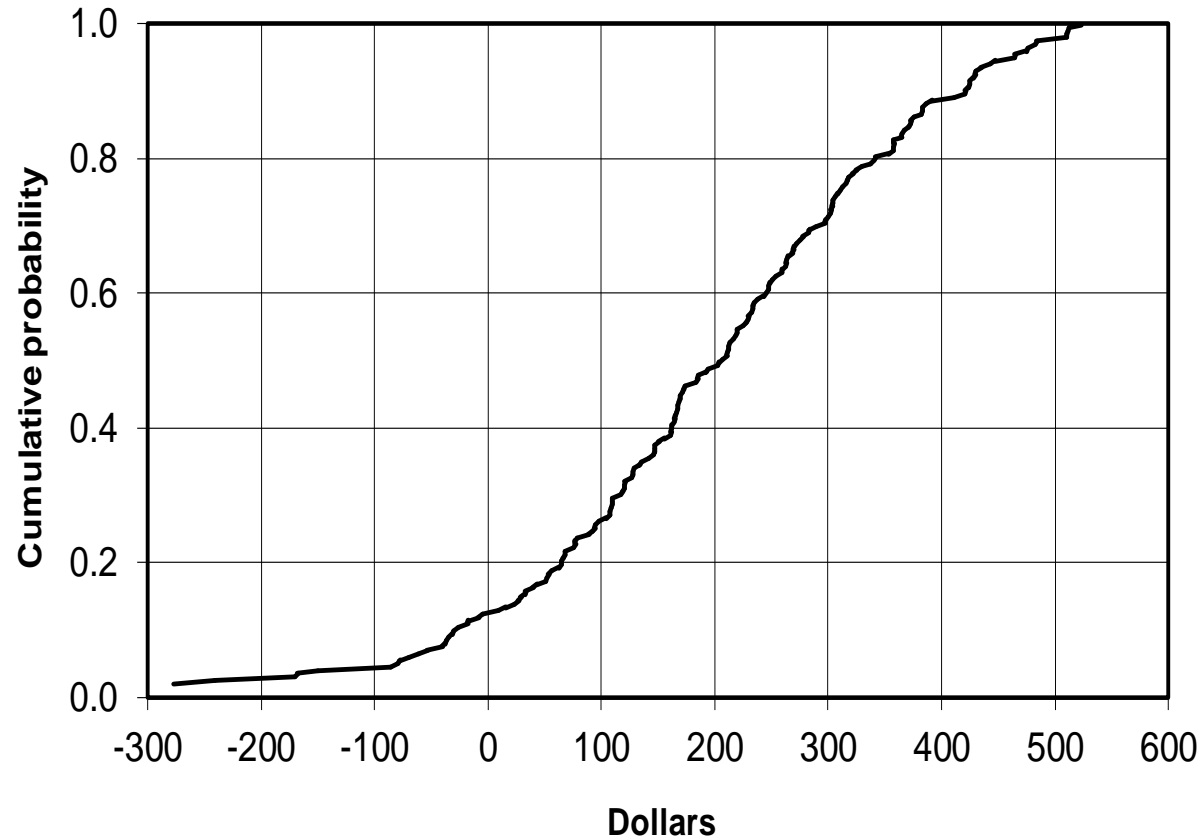
The Monte-Carlo Simulation process

5. **Run simulation** creating a sample of computer scenarios based on inputs from the probability distributions and with respect to any correlation conditions set.
6. **Analyse results** generated in the simulation run, calculating statistical measures and plotting probability distribution graphs of the results, which indicate all the potential outcomes and their likelihood of occurrence.

Simulation Runs

Simulation run 1						
	\$	2	3	...		
  Sales price	12	\$				
  Volume of sales	100	9	\$			
Cash inflow	1,200	110	11			
Materials	300	990	102			
Wages	400	440	1,122			
Expenses	200	400	357			
Cash outflow	900	200	400			
Net Cash Flow	300	1,040	200		Results	300
		-50	957			-50
<u>Relevant assumptions</u>			165			165
  Material cost per unit	3.00					
Wages per unit	4.00	4.00				
		4.00	3.50			
			4.00			

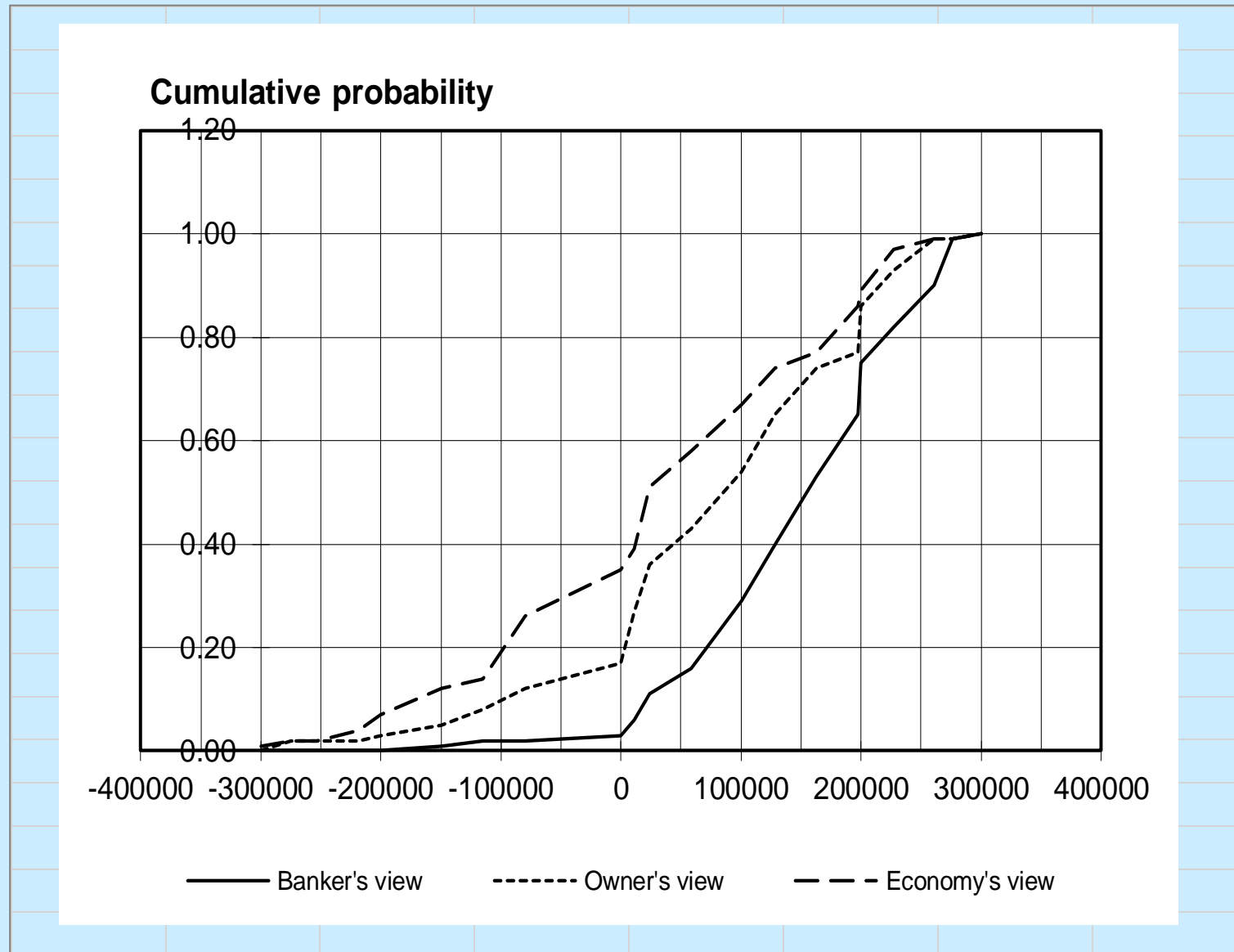
Cumulative Probability Distribution of results



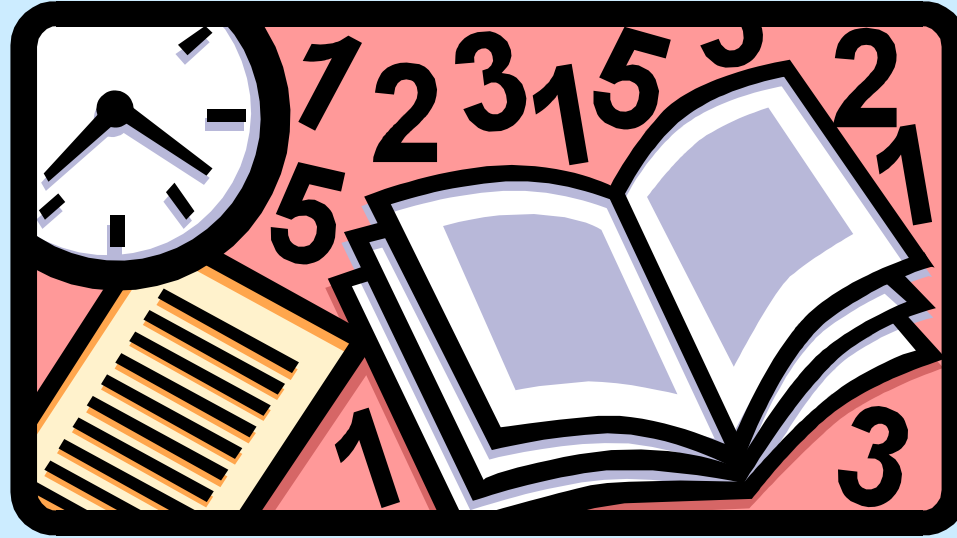
$$p = \frac{1}{n}$$

where: p = probability weight for a single run
 n = sample size

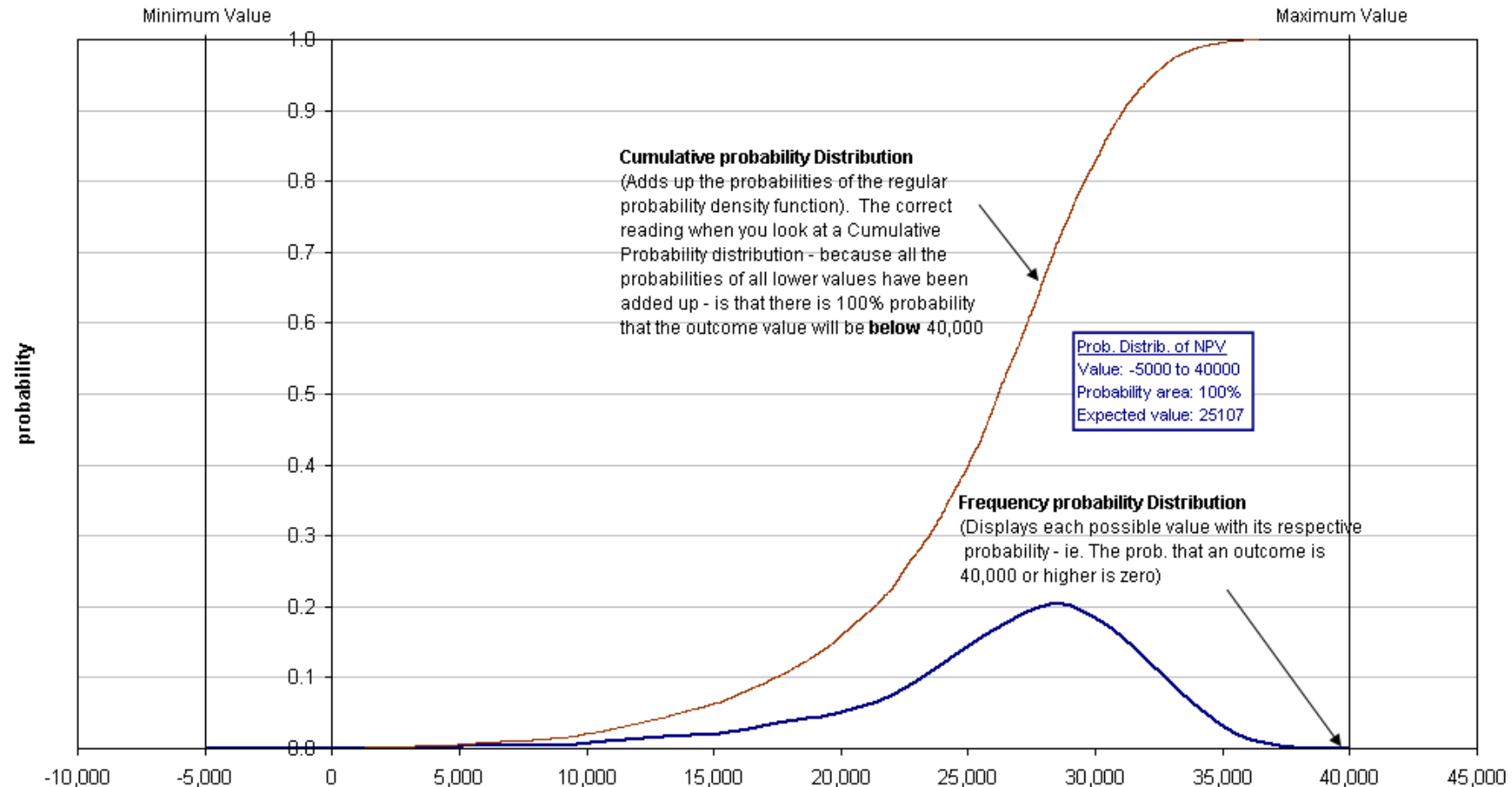
Net present value distribution (different project perspectives)



Interpretation of Risk Analysis Results

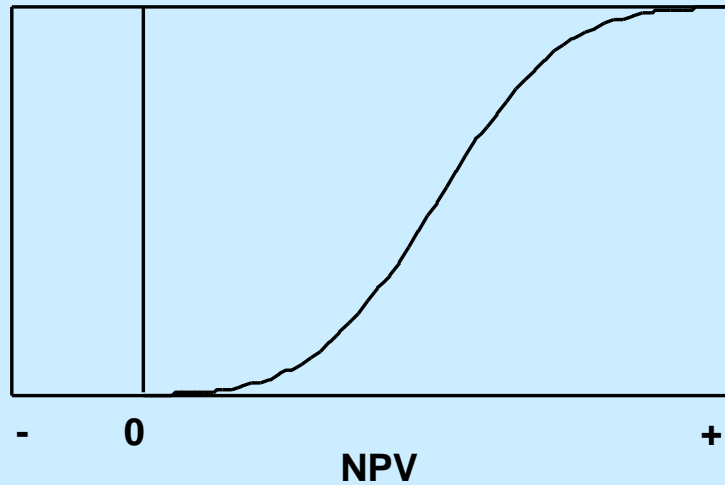


Cumulative versus Frequency Probability Distribution

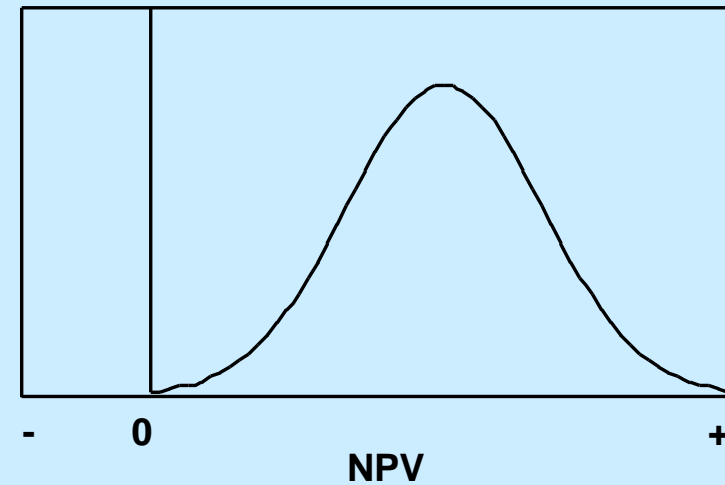


Case 1: Probability of negative NPV=0

Cumulative probability



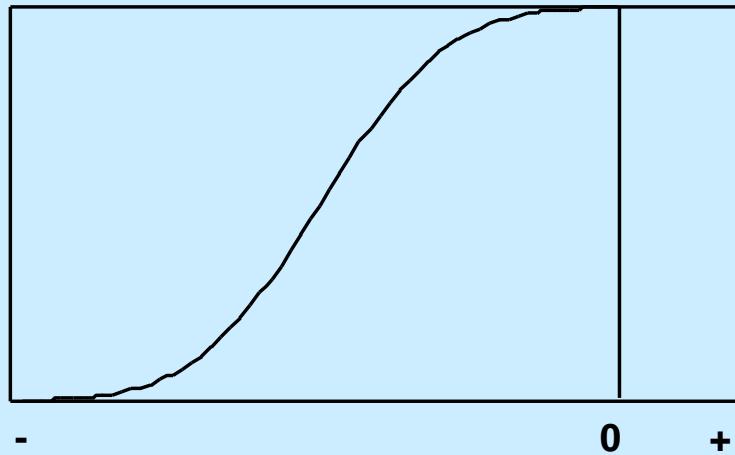
Probability



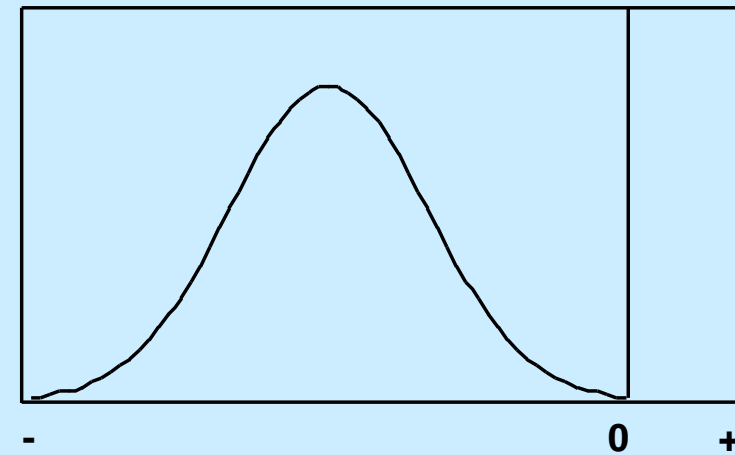
DECISION : ACCEPT

Case 2: Probability of positive NPV=0

Cumulative probability

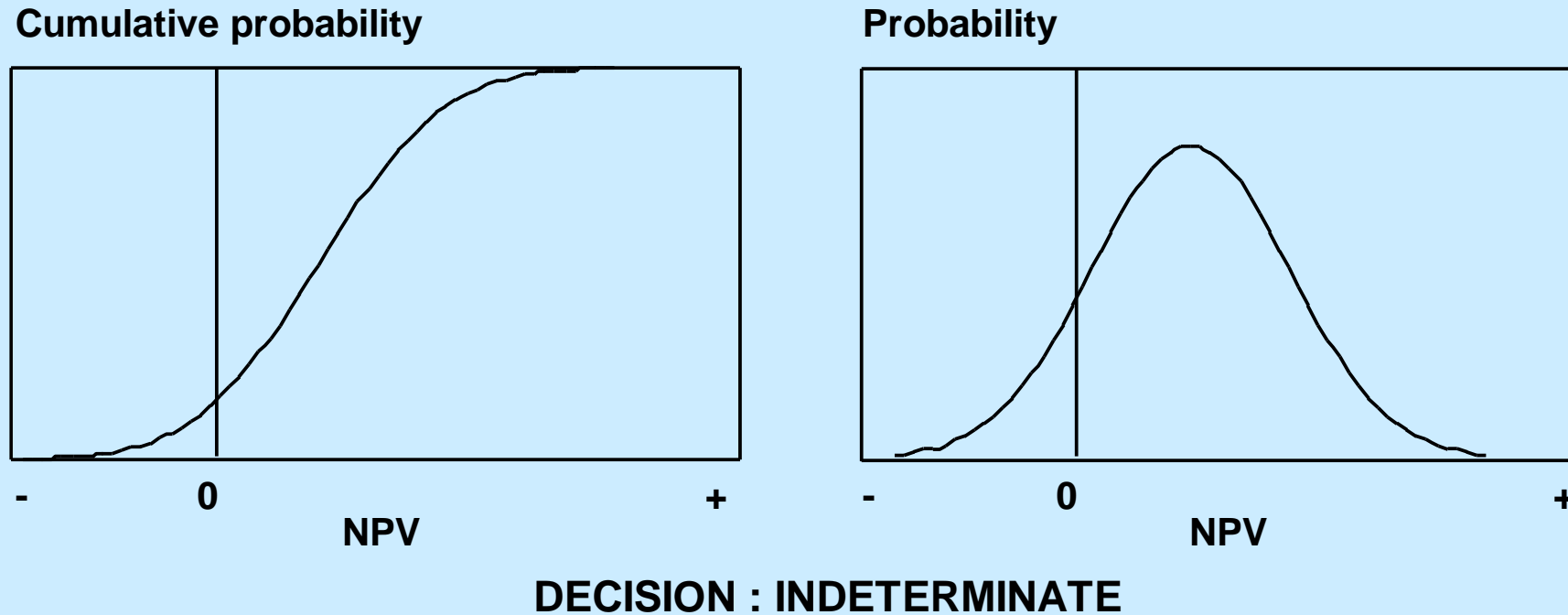


Probability

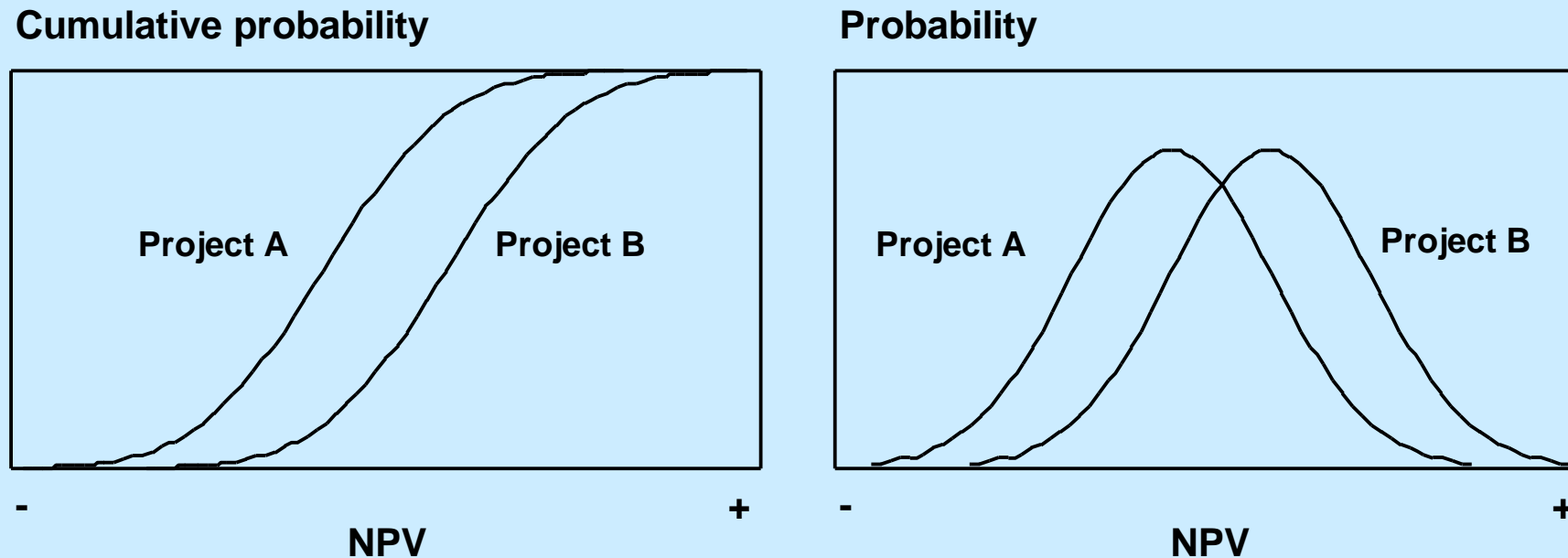


DECISION : REJECT

Case 3: Probability of zero NPV greater than 0 and less than 1



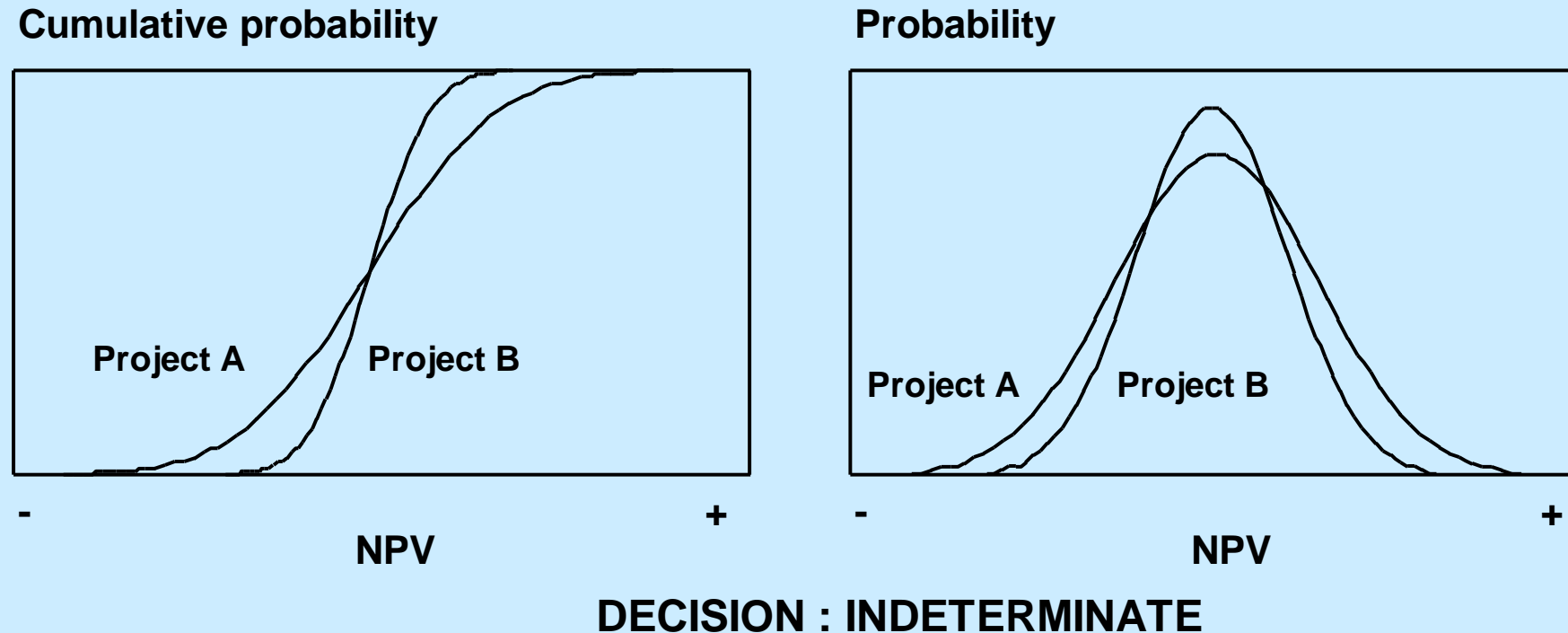
Case 4: Mutually exclusive projects (given the same probability, one project always shows a higher return)



DECISION : CHOOSE PROJECT B

Case 4: Non-intersecting cumulative probability
distributions of project return for mutually exclusive projects

Case 5: Mutually exclusive projects (high return vs. low loss)



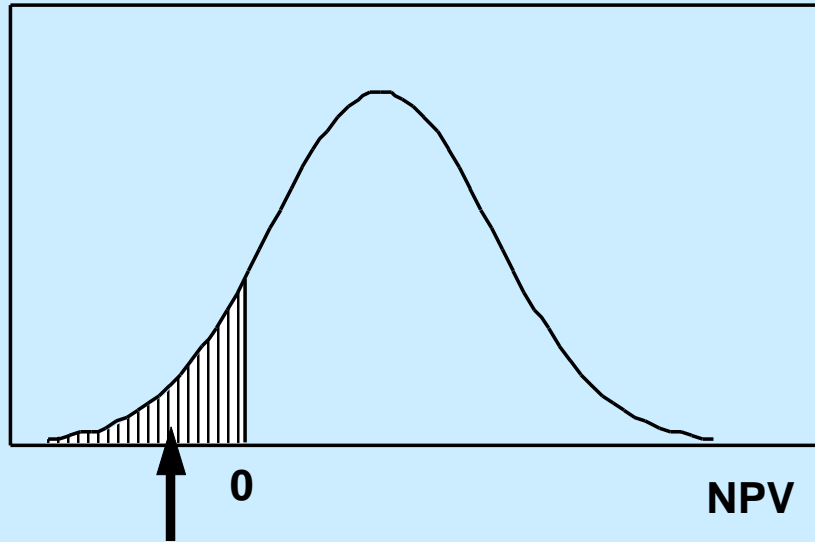
Case 5: Intersecting cumulative probability
distributions of project return for mutually exclusive projects

Expected Value

<u>Return</u>		<u>Probability</u>		<u>Expected Value</u>
-10	x	0.2	=	-2.0
-5	x	0.3	=	-1.5
10	x	0.4	=	4.0
15	x	0.1	=	<u>1.5</u>
Total				<u>2.0</u>

Cost of Uncertainty

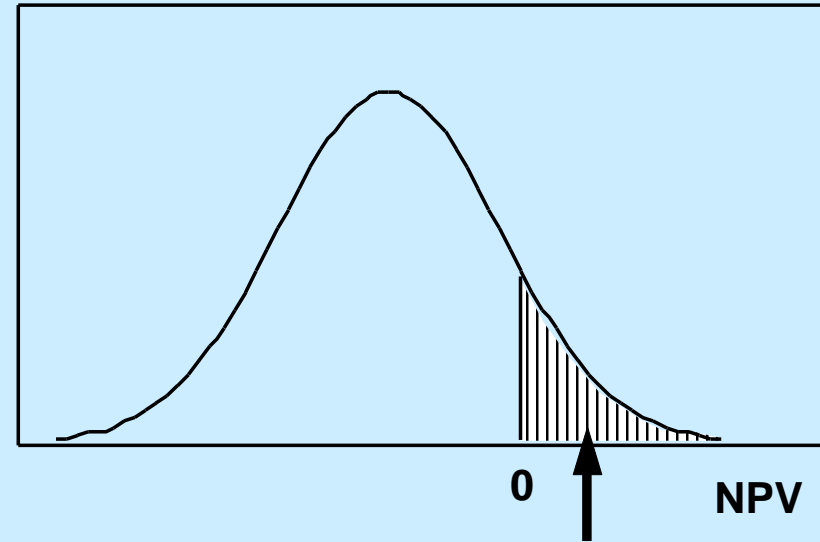
Probability



Expected value of
possible loss

From accepting a project

Probability

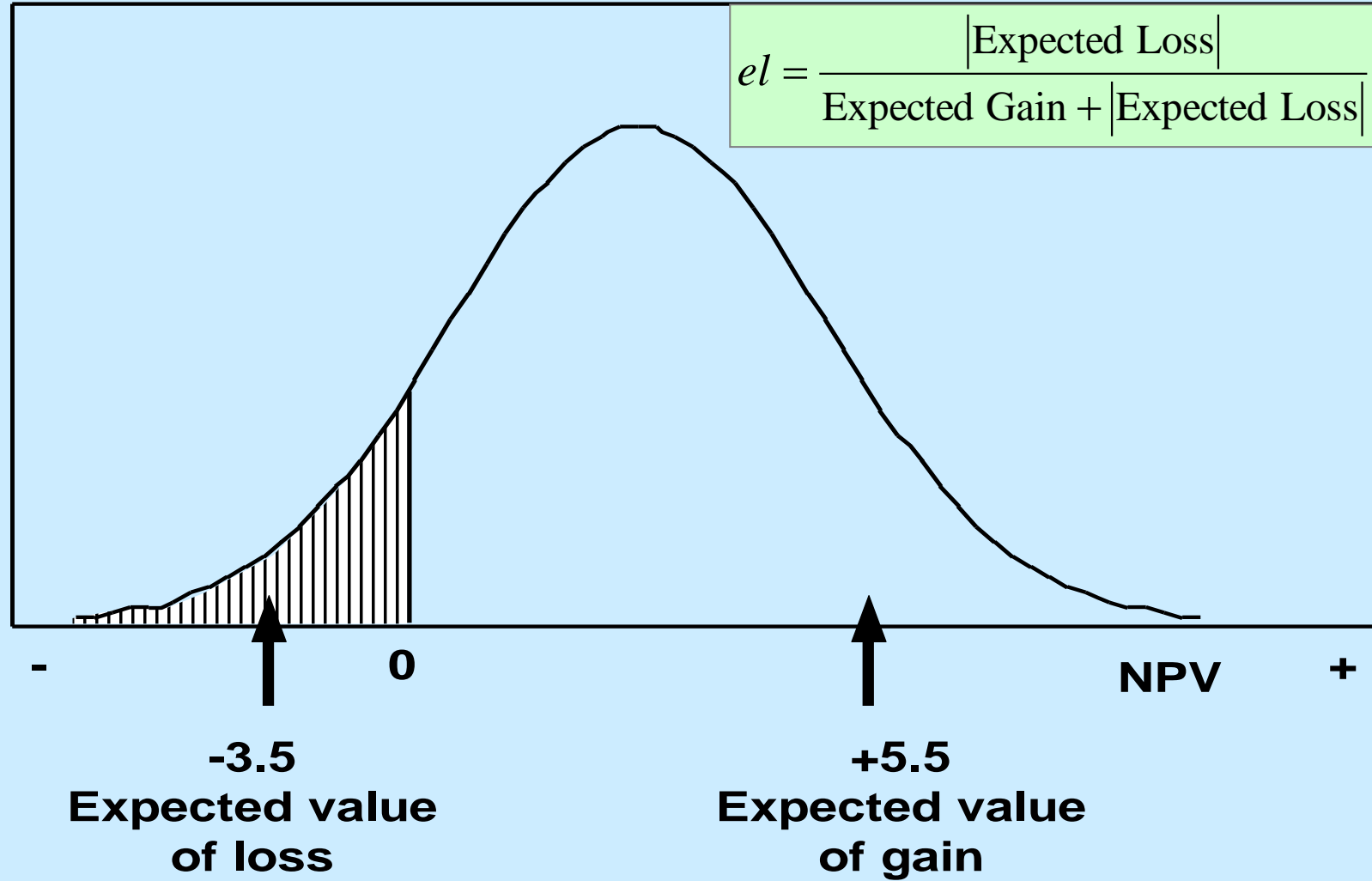


Expected value of
gain foregone

From rejecting a project

Expected Loss Ratio

Probability



Coefficient of variation

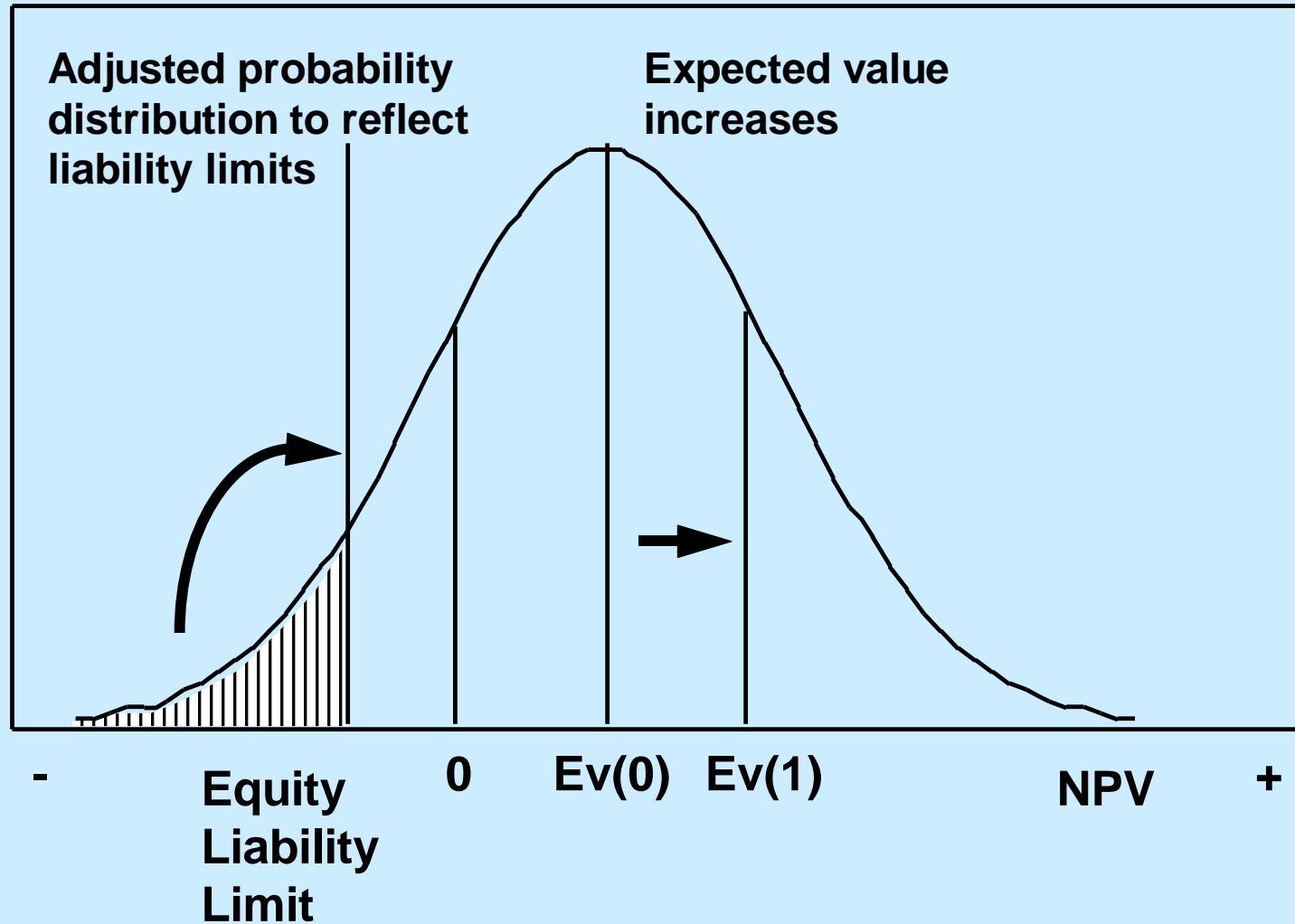
$$C \text{ var} = \sigma \div e(\textit{value})$$

It is the standard deviation of the projected returns divided by the expected value.

Assuming a positive expected value, the lower the coefficient of variation the less the project risk.

Risk under conditions of limited liability

Probability



Advantages of risk analysis

1. It enhances decision making on marginal projects.
2. It screens new project ideas and aids the identification of investment opportunities.
3. It highlights project areas that need further investigation and guides the collection of information.
4. It aids the reformulation of projects to suit the attitudes and requirements of the investor.
5. It induces the careful re-examination of the single-value estimates in the deterministic appraisal.
6. It helps reduce project evaluation bias through eliminating the need to resort to conservative estimates.

Advantages of risk analysis (cont.)

7. It facilitates the thorough use of experts.
8. It bridges the communication gap between the analyst and the decision maker.
9. It supplies a framework for evaluating project result estimates.
10. It provides the necessary information base to facilitate a more efficient allocation and management of risk among various parties involved in a project.
11. It makes possible the identification and measurement of explicit liquidity and repayment problems in terms of time and probability that these may occur during the life of the project.

Finally two words of caution:

- Overlooking significant inter-relationships among the projected variables can distort the results of risk analysis and lead to misleading conclusions.
- The accuracy of the results of risk analysis can only be as good as the predictive capacity of the model employed.