

Wiley Finance Series

Corporate Valuation

*Measuring the Value of Companies
in Turbulent Times*

MARIO MASSARI
GIANFRANCO GIANFRATE
LAURA ZANETTI

WILEY

Corporate Valuation

The Wiley Finance series contains books written specifically for finance and investment professionals as well as sophisticated individual investors and their financial advisors. Book topics range from portfolio management to e-commerce, risk management, financial engineering, valuation and financial instrument analysis, as well as much more. For a list of available titles, visit our website at www.WileyFinance.com.

Founded in 1807, John Wiley & Sons is the oldest independent publishing company in the United States. With offices in North America, Europe, Australia and Asia, Wiley is globally committed to developing and marketing print and electronic products and services for our customers' professional and personal knowledge and understanding.

Corporate Valuation

*Measuring the Value of Companies
in Turbulent Times*

MARIO MASSARI
GIANFRANCO GIANFRATE
LAURA ZANETTI

WILEY

Copyright © 2016 by Mario Massari, Gianfranco Gianfrate, and Laura Zanetti.
All rights reserved.

Published by John Wiley & Sons, Inc., Hoboken, New Jersey.
Published simultaneously in Canada.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning, or otherwise, except as permitted under Section 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 646-8600, or on the Web at www.copyright.com. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at <http://www.wiley.com/go/permissions>.

Limit of Liability/Disclaimer of Warranty: While the publisher and author have used their best efforts in preparing this book, they make no representations or warranties with respect to the accuracy or completeness of the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives or written sales materials. The advice and strategies contained herein may not be suitable for your situation. You should consult with a professional where appropriate. Neither the publisher nor author shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

For general information on our other products and services or for technical support, please contact our Customer Care Department within the United States at (800) 762-2974, outside the United States at (317) 572-3993 or fax (317) 572-4002.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media such as a CD or DVD that is not included in the version you purchased, you may download this material at <http://booksupport.wiley.com>. For more information about Wiley products, visit www.wiley.com.

Library of Congress Cataloging-in-Publication Data is available:

ISBN 9781119003335 (Hardcover)

ISBN 9781119003359 (ePDF)

ISBN 9781119003342 (ePub)

Cover Design: Wiley

Cover Image: © Alicia_Garcia/iStockphoto

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

Contents

Preface	xi
Acknowledgments	xiii
About the Author	xv
CHAPTER 1	
Introduction	1
1.1 What We Should Know to Value a Company	1
1.2 Valuation Methods: An Overview	2
1.3 The Time Value of Money	4
1.4 Uncertainty in Company Valuations	5
1.5 Uncertainty and Managerial Flexibility	9
1.6 Relationship between Value and Uncertainty	15
CHAPTER 2	
Business Forecasting for Valuation	18
2.1 Introduction	18
2.2 Key Phases of the Business Plan Elaboration	18
2.3 What Drives the Preparation of a Business Plan?	27
2.4 The Main Methodological Issues	49
CHAPTER 3	
Scenario Analysis	54
3.1 Introduction	54
3.2 What Is Scenario Analysis?	56
3.3 Difference between Scenario and Sensitivity Analysis	56
3.4 When to Perform Scenario Analysis	57
3.5 Worst and Best Cases and What Happens Next	58
3.6 Multi-Scenario Analysis	59
3.7 Pros and Cons	61
3.8 How to Perform Scenario Analysis in Excel	62
3.9 Conclusions	71

CHAPTER 4		
Monte Carlo Valuation		72
4.1	Introducing Monte Carlo Techniques	72
4.2	Monte Carlo and Corporate Valuation	74
4.3	A Step-by-Step Procedure	76
4.4	Case Study: Outdoor Inc. Valuation	80
4.5	A Step-by-Step Guide Using Excel and Crystal Ball	100
CHAPTER 5		
Determining Cash Flows for Company Valuation		125
5.1	Introduction	125
5.2	Reorganization of the Balance Sheet	126
5.3	Relationship between a Company's Balance Sheet and Income Statement	134
5.4	From the Economic to the Financial Standpoint	137
5.5	Cash Flow Definitions and Valuation Models	141
5.6	Business Plan and Cash Flow Projections	142
CHAPTER 6		
Choosing the Valuation Standpoint		151
6.1	Debt and Value	151
6.2	First Problem: The Relationship between Leverage and Value	152
6.3	Second Problem: Alternative Valuation Techniques When Debt Benefits from a Fiscal Advantage	162
6.4	Third Problem: The Choice between an Asset-Side versus an Equity-Side Perspective	165
6.5	From the Asset Value to the Equity Value	167
CHAPTER 7		
Leverage and Value in Growth Scenarios		168
7.1	Growth, Leverage, and Value	168
7.2	Nominal and Real Discounting	169
7.3	Problems with the Discount of Tax Benefit	172
7.4	Cost of Capital Formulas in Growth Scenarios	173
7.5	The WACC: Some Remarks	178
7.6	Real Dimension of Tax Benefits	180
Appendix 7.1:	Derivation of the Formulas to Calculate the Cost of Capital	183
Appendix 7.2:	Pattern of K_{el}^* in a Growth Context: Some Remarks	190

CHAPTER 8

Estimating the Cost of Capital	194
8.1 Defining the Opportunity Cost of Capital	194
8.2 A Few Comments on Risk	194
8.3 Practical Approaches to Estimate K_{EU}	197
8.4 Approach Based on Historical Returns	197
8.5 Analysis of Stock Returns	198
8.6 Analysis of Accounting Returns	201
8.7 Estimating Expected Returns from Current Stock Prices	201
8.8 Models Based on Returns' Sensitivity to Risk Factors	204
8.9 The Capital Asset Pricing Model	205
8.10 Calculating R_f	206
8.11 Calculating R_P	208
8.12 Estimating β	212
8.13 Dealing with Specific Risks	218
8.14 Conclusions on the Estimation of the Opportunity Cost of Capital	221
8.15 Cost of Debt	222
8.16 Cost of Different Types of Debt	224
Appendix 8.1: CAPM with Personal Taxes	227

CHAPTER 9

Cash Flow Profiles and Valuation Procedures	229
9.1 From Business Models to Cash Flow Models	229
9.2 Cash Flow Profiles of Business Units versus Whole Entity	230
9.3 Examples of Cash Flow Profiles	231
9.4 Problems with the Identification of Cash Flow Models	236
9.5 Cash Flow Models in the Case of Restructuring	237
9.6 Debt Profile Analysis	237
9.7 Debt Profile beyond the Plan Horizon Forecast	239
9.8 The Valuation of Tax Advantages: Alternatives	239
9.9 Guidelines for Choosing Debt Patterns for Determining Valuations	245
9.10 Synthetic and Analytical Procedures Valuation	246
9.11 The Standard Procedure	247

CHAPTER 10

A Steady State Cash Flow Model	249
10.1 Value as a Function of Discounted Future Results	249
10.2 Capitalization of a Normalized Monetary Flow	250
10.3 The Perpetual Growth Formula	264

10.4	Formulas for Limited and Variable (Multi-Stage) Growth	275
10.5	Conclusions	279
CHAPTER 11		
	Discounting Cash Flows and Terminal Value	280
11.1	Explicit Projections	280
11.2	Estimation of the Terminal Value	281
11.3	Evaluation of Gas Supply Co.	283
CHAPTER 12		
	Multiples: An Overview	295
12.1	Preliminary Remarks	295
12.2	Theory of Multiples: Basic Elements	299
12.3	Price/Earnings Ratio (P/E)	303
12.4	The EV/EBIT and EV/EBITDA Multiples	307
12.5	Other Multiples	311
12.6	Multiples and Leverage	312
12.7	Unlevered Multiples	316
12.8	Multiples and Growth	320
12.9	Relationship between Multiples and Growth	325
12.10	PEG Ratio	326
12.11	Value Maps	327
	Appendix 12.1: P/E with Growth	330
CHAPTER 13		
	Multiples in Practice	332
13.1	A Framework for the Use of Stock Market Multiples	332
13.2	The Significance of Multiples	335
13.3	The Comparability of Multiples	339
13.4	Multiples Choice in Valuation Processes	340
13.5	Estimation of “Exit” Multiples	343
13.6	An Analysis of Deal Multiples	344
13.7	The Comparable Approach: The Case of Wine Co.	349
	Appendix 13.1: Capital Increases and the P/E Ratio	358
CHAPTER 14		
	The Acquisition Value	361
14.1	Definitions of Value: An Overview	361
14.2	Value Created by an Acquisition	364
14.3	Value-Components Model	367
14.4	Further Considerations in Valuing Acquisitions	372

14.5	Acquisition Value of Plastic Materials Co.	375
14.6	Acquisition Value of Controlling Interests	377
14.7	Other Determinants of Control Premium	382
14.8	Acquisition Value in a Mandatory Tender Offer	384
14.9	Maximum and Minimum Exchange Ratios in Mergers	386
14.10	Exchange Ratio and Third-Party Protection	389
	Appendix 14.1: Other Value Definitions	390
CHAPTER 15		
	Value and Prices in the Market for Corporate Control	393
15.1	Price Formation in the Market for Control	393
15.2	Benefits Arising from Acquisitions	396
15.3	From the Pricing Model to the Fair Market Value	399
15.4	Fair Market Value Estimated Adjusting Stand-Alone Cash Flows	401
15.5	Premiums and Discounts in Valuation	408
15.6	The Most Common Premiums and Discounts	410
15.7	Value Levels and Value Expressed by Stock Prices	415
15.8	Estimating Control Premiums	417
15.9	Estimating Acquisition Premiums	420
15.10	Acquisition and Control Premiums in a Perfect World	422
15.11	Estimating the Value of Controlling Stakes: An Example	426
15.12	Minority Discount	427
15.13	Discount for the Lack of Marketability	429
15.14	Definitions of Value and Estimation Procedures	431
CHAPTER 16		
	Valuation Considerations on Rights Issues	432
16.1	Introduction to Rights Issues	432
16.2	Setting the Subscription Price	433
16.3	Value of Preemptive Rights	437
16.4	Conclusions	446
CHAPTER 17		
	Carbon Risk and Corporate Value	448
17.1	Why Carbon Risk Matters	448
17.2	From Carbon Risks to Carbon Pricing	450
17.3	Incorporating Carbon Risks in Corporate Valuation	453
17.4	Carbon Beta	466
	Index	471

A ROADMAP FOR THIS BOOK

The value of a business is essentially related to three main factors: its current operations, its future prospects, and its embedded risk. The advent of globalization, new technologies, and the consequences of the recent financial crisis completely reshaped these elements, thus making more elusive the definition of company “value” and of the metrics to measure it.

Firstly, firms do business in a context becoming progressively faster, more diverse, and more interconnected so that also valuing their current operations is a task less straightforward than in the past. Secondly, forecasting future macro and business related dynamics is getting less standardized in a business environment characterized by inherent difficulty in predicting changes—both on the upside and on the downside—and by constant innovation for companies that are more and more exposed to hyper-competitive industry dynamics. Thirdly, new types of risks and competition, so far unknown (think for example of climate change risks), are shaping both the operational and the financial side of enterprises, redefining the importance of managing uncertainty as a key element to achieve success.

In this context, the book is organized in three parts. In the first part of the book (Chapters 1 to 4), the main focus is on the relationship between value and business/economic uncertainty. In an environment characterized by an increased complexity where the concept of value itself is challenged, we provide a definition of corporate value based on a holistic approach, thus encompassing both the accounting and the financial perspective (Chapter 1).

Moving to relationship between uncertainty and value, we focus on the business modeling tools available to forecast corporate results and determine company value. Depending on the level of uncertainty, on the information available, and the time and effort investable in the analysis, it is possible to pick one out of three possible approaches. We start from a standard situation when uncertainty is limited and there is a clearly dominant, likely scenario (Chapter 2).

When there is a significant amount of uncertainty and there is one or more scenario(s) that are alternative to the most likely one and that could

have extreme—either positive or negative—consequences for company's value, the scenario-based approach is to be preferred (Chapter 3).

Stochastic simulation (Chapter 4) is to be used when detailed data is available (or assumed) regarding the probability distributions of key variables affecting future cash flows. This approach, as discussed, is mathematically complex but it can be handled by software packages easily available.

Having tackled the uncertainty modeling aspects, the second part of the book is focused on the main valuation approaches that can be used in practice. The chapters from 5 to 13 present therefore the main principles of corporate valuation starting from the reorganization of the financial statement data and business plan figures (Chapter 5). The relationship between financial leverage and corporate value is then presented (Chapter 6), followed by the discussion of how corporate growth and, financial leverage are interrelated (Chapter 7).

Chapter 8 presents the main techniques and tools to estimate the cost of capital. From Chapter 9 to Chapter 11, the discounted cash flow analysis is presented in depth highlighting the various approaches that can be used in practice.

Moving to relative valuation, Chapters 12 and 13 present respectively the theory and practice of multiple-based valuation for companies.

The third and final section of the book comprises Chapter 14 and 15, which introduce the main elements of valuations in the market for corporate control and models to structure corporate valuations in the framework of M&A transactions.

Chapter 16 features a topic, the valuation of right issues, seldom mentioned by corporate finance handbooks but which is becoming crucial in many financial markets.

Chapter 17 closes by introducing a topic that is receiving increasing attention by investors and policymakers, namely the incorporation of environmental risks in corporate valuation.

The key message of the book is that standard business planning and valuation, which assume high visibility of firms' future performances, tend to prove more and more inadequate. In the context of high market volatility and recurring disruptive economic events associated with the post-financial crisis business world, companies' operations face systematically new points of discontinuity and increased risks. As a consequence, traditional standard valuation techniques may provide insufficient information in an economic environment characterized by high uncertainty. This book treats risk not as one of the input variables used in the valuation process but as the main driver to be considered when approaching the estimation of corporate value.

Acknowledgments

Of course, we owe a very great debt of thanks to friends, colleagues, and students who have contributed to this work. First, we thank greatly Marco Villani, a valuation expert who read and commented on chapters. Second, Federico D'Agruma provided extensive and invaluable assistance for the preparation and revision of the manuscript. We would like to also thank Marco Ghitti who prepared the supporting materials for the book. We are also grateful to John Carusone, Alberto Maria Ghezzi and Kim Salvadori, who helped in the revision of some sections of the manuscript. We are immensely grateful to the Wiley team—especially to Meg Freeborn, Bill Falloon, and Caroline Maria Vincent—who assisted us in the book preparation and showed incredible patience with our consistent missing of deadlines.

About the Author

Mario Massari is Full Professor of Corporate Finance and former Head of the Finance Department at Bocconi University (Milan). He has written extensively on business valuation and corporate finance topics, and he is considered one of the leading experts in Italy in the field of Business Valuation. He serves as board member at several listed and unlisted companies and he is a member of the Executive Committee of the OIV (the Italian valuation principles setter).

mario.massari@unibocconi.it

Gianfranco Gianfrate is a Giorgio Ruffolo Fellow at the Harvard Kennedy School (Cambridge, MA) and a research affiliate of Tufts University (Medford, MA). He has authored several books and articles on business valuation and corporate governance issues.

Previously, he was a consultant at Deloitte (Milan), a manager at Hermes Fund Managers (London), and served as member of the Investment Committee at Eumedion (Amsterdam). He has also been a member of the IPO Best Practice Committee at the Italian Stock Exchange, co-authoring the official Listing Guide for going public companies.

g_gianfrate@hks15.harvard.edu

Laura Zanetti is Associate Professor of corporate finance at Bocconi University (Milan), where she teaches company valuation and is research fellow within CAREFIN, centre for applied research in finance.

She has been the director of the Master of Science in Finance at Bocconi, visiting scholar at Massachusetts Institute of Technology (Cambridge, MA) and London School of Economics and Political Sciences (London).

She published several books and articles on corporate governance, valuation, M&A, and industrial performance. She is a Certified Public Accountant, Certified Auditor in Italy, and board member of listed and private companies.

laura.zanetti@unibocconi.it

Introduction

1.1 WHAT WE SHOULD KNOW TO VALUE A COMPANY

This book is based on the idea that mastering valuation techniques is possible only after having gained a sound theoretical knowledge. But theory is not enough. In order to evaluate an enterprise or an acquisition, an analyst should have enough first-hand experience: such experience usually does not depend on the quantity of the previous valuations carried-out but on the quality of the work done.

A distinguishing feature of the valuation process is that to produce convincing valuations, analysts should master various areas of expertise, and three in particular:

1. *Industrial economics and business strategy* with reference to the analysis of the industry and competitive context devoted to understanding the validity of the company's business model, its past results, and its future plans
2. *Theory and techniques of finance* with regard to the basic principles of net present value, to the underlying links between leverage and value, to models that explain stock prices on financial markets, and finally to the techniques which correctly depict the business plan in terms of cash flow
3. *Economic theory*, in particular with regard to the relationship between uncertainty and value¹ in all those cases in which the simplifications assumed in the standard models presented in the finance textbooks do not permit the development of convincing valuations

Despite the fact that theoretical contributions in all three disciplines are widely known, valuation is more than a collage of knowledge and technique.

¹One of the limitations of such models is the assumption of normal distributions of results. In such a case, the highest probable expected output is the average output. Quite often, though, prospective results are mutually exclusive, thus making expected "average" results unlikely. The very idea of *average* thus loses its significance.

In a valuation, critical drivers are so bound together that the real distinguishing element is the “glue” that holds them together. This glue consists of the ability to balance the different choices made in each phase of which the evaluation process is composed, of correctly weighing the empirical evidence, and of the ability to perform coherent estimates within the final objectives of the valuation work.

1.2 VALUATION METHODS: AN OVERVIEW

Finance textbooks offer several different options to perform the valuation of a firm or of an acquisition. Furthermore, financial institutions and consulting firms typically work out tailor-made models expanding the spectrum of available techniques. In the end, in assessing value of firms belonging to particular industries, several empirical techniques have gained quite a standing among practitioners.

Given the number of methodologies made available by theorists and practitioners, we find it useful, before getting into the core of this book, to explore a classification of the most widely used methodologies (Exhibit 1.1).

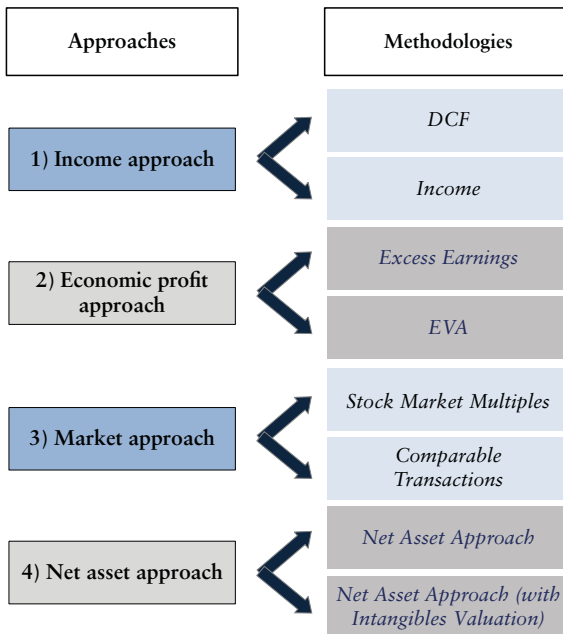


Exhibit 1.1 An overview of the main valuation methodologies/approaches

Exhibit 1.1 shows that the methodologies available (excluding simplistic empirical approaches) can be grouped into four fundamental approaches, each a function of the relevant link between corporate value and relevant value driver. A methodology is then a choice of the relevant driver, chosen out of the above-mentioned four approaches in order to assess value:

1. Income approach
2. Economic profit approach
3. Market approach
4. Net asset approach

The first approach expresses the value of a company or an investment as a function of the expected returns it generates. The so-called financial method (or, better, discounted cash flow, or DCF) falls into this approach and is the methodology most consistent with those found in standard finance textbooks.

The second approach is based on the idea that the value of a company is determined by two components: net asset value and earnings that exceed the “normal” return of the assets (economic profit is then the difference—when positive—between realized returns and “normal” industry returns).

The third approach is empirical: valuations are performed through a comparison with comparable assets traded on the market.

Finally, the fourth approach determines value from the estimation of the assets (tangible and intangible) that, net of the liabilities, constitute the net invested capital of the firm.

1.2.1 Common Practices in the Accounting and Financial Communities

Often, professionals separate methodologies into two main approaches to valuation: the first is the standard practice adopted by the financial community; the second one is the most widely used by accounting professionals.

The common practice in the financial community can be traced back to the methodologies adopted by investment and merchant banks—in particular:

- The DCF method based on the discounting of future cash flows derived from the company’s business plan or assumed by the analyst
- Stock market multiples or multiples derived from comparable transactions

In other professional fields, the other methods set forth in Exhibit 1.1 seem to be preferred, partly because of cultural affinities and partly because of the specific goal of the valuation.

Indeed, some methods (particularly those based on excess earnings):

- better fit into some economic and accounting environment;
- follow, therefore, a logic more understandable to the actors for whose benefit the valuation is performed; and
- allow one to effectively and convincingly deal with special valuation problems, such as third-party interests or tax benefit valuations.

1.2.2 Approach of This Book

Despite the widespread use of alternative methodologies, most of this book will be devoted to the DCF analysis.

The reason for this choice is that DCF valuation processes allow a clear focus on the fundamental principles underlying valuation conditions that need to be met, and also when the professional believes a different methodology to better fit the final valuation objective.

In this chapter, we introduce, following a logical order that teaching experience has shown to be effective, the basic principles and themes that form the pillars of the DCF valuation approach:

- The net present value (NPV) principle
- How to deal with uncertainty
- The relationship between uncertainty and value
- The need for preventing, when possible, subjective judgments in value determination

1.3 THE TIME VALUE OF MONEY

Irving Fisher is considered the founding father of modern finance theory, not only for his market equilibrium model, which explains investment and consumption decisions, but also because of his almost-obsessive insistence on the need to determine any asset value exclusively as a function of its expected discounted cash flows.

Thanks to Fisher, since the early 1920s the main building block of valuation has been identified as follows: any asset value (financial or real) is a function of the cash flows it can generate and of the time distributions of the cash flows.²

Through Fisher's contribution, the concept of *time value of money* became solidified, thus building the rationale for the universally agreed need for a present value approach to valuation.

²Irving Fisher, *The Rate of Interest* (New York: Macmillan 1907) and *The Theory of Interest* (New York: Macmillan 1930).

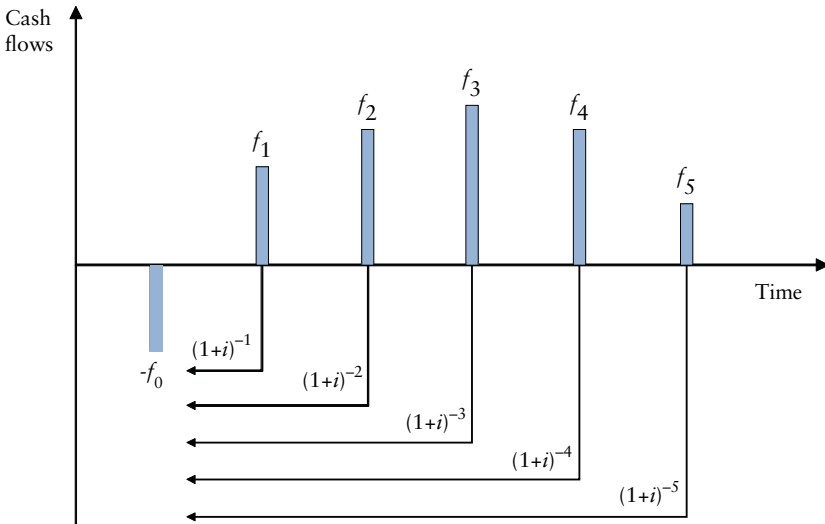


Exhibit 1.2 Investment cash flow profile and mechanics of discounting

So, without uncertainty, or, as it is often said, in a deterministic framework, an investment, firm, or more generally any asset value can be obtained by the following:

- Calculate the asset relevant cash flows and their time distributions.
- Discount any cash flows at a rate expressing the time value of money.

Typically, this rate is the return rate of investments whose issuers are virtually free of any insolvency risk, such as government bonds (so-called *risk-free* rate). Exhibit 1.2 shows the concept.

1.4 UNCERTAINTY IN COMPANY VALUATIONS

In order to set forth in an organized fashion the crucial problem of every evaluation, it is necessary to understand the reasoning that guides the process of valuation in a context in which the results of an investment, or of a business, cannot be certainly determined in advance, but can only be estimated.

In order to introduce the problem of uncertainty with the pragmatic approach more suitable to the needs of a business or financial analyst, it is useful to start from some basic concepts:

- *The performance of industries is characterized by different degrees of predictability and, therefore, uncertainty.* For example, trend in demand

in the public utilities sector shows a significant correlation with the trend in the GDP, or the total family income. In other sectors, demand is a function of different macroeconomic variables, such as industrial investments, interest rates, etc. Generally, though, these correlations are more weak because some factors, such as lifestyle evolution or consumer behaviour, can have a great influence on the demand. Further, some other industries are extremely sensitive to economic trends (typically, the intermediate sectors, investment goods sectors for which demand is formed by other industries). Finally, some industries are less cyclical (e.g., some food sectors, and the pharmaceutical industry).

- *New ventures, or firms that develop innovative strategies, face a different kind of uncertainty than traditional or consolidated industries.* In fact, in traditional industries historical information helps to identify systematic correlations between the economic environment and a firm's expected results. In innovative ventures lacking significant historical comparisons, uncertainty can be associated with the idea of probability as an expectation of future events: therefore, estimates are largely subjective (uncertainty = belief).³ Such a concept of uncertainty, in general, is contrasted by academics with the notion of probability that past events repeat themselves (in such case, the concept of probability is associated with that of frequency).
- *Firms, as organizations of individuals competing on the market, generate evolutionary phenomena that constitute risk factors for other firms, which in turn react by generating new changes.* Therefore, we must abandon the idea, implicitly accepted by finance theorists, that uncertainty is a situation passively faced by firms. In the real world, uncertainty is managed by firms that seek to exploit favorable opportunities and limit the downside of unfavorable events. Management, indeed, by its own decisions continuously molds the risk profile characteristic of its core activity. That is, management style, interaction with the economic environment, and adopting innovative approaches rather than passive adaptation are fundamental factors in adjusting the degree of uncertainty associated with external factors, common to all the firms belonging to the same strategic business area.

³It's well known that the different phases of the life cycles of firms and industries are characterized by different levels of uncertainty. Scholars are of the opinion that there exists a stable and demonstrated relationship among the risk profile type of industry and life cycle of the very same industry. In the initial phases of the cycle (so-called "introduction" and "development"), the risks are particularly elevated, with the consequent possibility of huge losses of invested capital. In general, in the innovative sectors uncertainty and the difficulty of forecasting are well-known risk factors.

In the valuation of investments, acquisitions, or businesses, different forms of uncertainty can coexist—although, generally, one form tends to prevail over the others.

On the one hand, there are valuations of companies that operate in highly stable macroeconomic contexts, in highly predictable industry, and whose future performance is characterized by high visibility. Such cases of “easy” valuations become less and less frequent in the current context of erratic economies and turbulent financial markets.

1.4.1 Organizing the Analysis

Financial analysts approach the issue of uncertainty in forecasting by adopting logical tools and models developed in the area of industrial economics and of strategy. Exhibit 1.3 shows a simplified description of a typical analysis workflow.

Business Model Analysis Typically, analysts use the expression *business model* to assess the characteristics of the products or services offered by a firm, the marketing choices adopted, and the production decisions. In the business model analysis, analysts seek to understand the cost/revenues structure of the firm or of the investment project. An example can help clarify the concept.

Alpha is the European leader in automated equipment for manufacturing and packaging for the pharma industry (blisters, boxes, wrappers, case packers, and palletizers). In the pharma industry, a fundamental feature of production equipment is reliability while price is a secondary issue. Alpha has consolidated its leadership position by systematically investing a significant portion of its revenues in improving equipment for specific functions and researching innovative technical solutions. Non-core components production has been assigned to different companies. Equipment is marketed by a European and North American distribution network. Technical support, spare parts sales, and equipment updates represent a significant fraction of the overall gross margin.

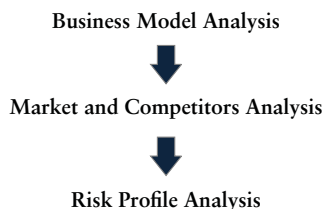


Exhibit 1.3 Uncertainty analysis

This scant information defines the “business model” and lets us understand that the revenue share emerging from equipment sales, being related to the pharmaceutical industry, is only marginally affected by cycles and is complemented by further revenues, with high margins and no cyclicality (as, for instance, in the after-sales support business).

Under the cost structure planning, assembly, setup, and a significant share of the R&D costs are largely inelastic, because they require a highly specialized staff, which is a strategic resource of the company and is fundamental to the growth outlook for Alpha.

Production costs are, on the other hand, relatively flexible: as previously noted, Alpha assigns the manufacturing of noncore components of its own products to a small selected number of suppliers, mostly located in the same geographical area.

Market and Competitors Analysis The next step consists of the analysis of the environment external to the company, in order to understand the firm’s market positioning relative to competitors and therefore the prospects for growth and profit. At this stage the analysis focuses on the business lifecycle and the competitive pressure which characterize the industry, the threat of substitute products, the entry barriers and potential competitors, and the relationship between customers and suppliers.

In the Alpha case, the pharmaceutical industry is characterized by a sustained growth rate, both in Europe and in the USA (over 7% per year in real terms). Industry analysts believe this trend is destined to last in the future.

By examining balance sheets for the most important pharmaceutical firms, one observes a strong correlation between revenue growth rate and spending on technical investments.

Just a small number of competitors are active in Alpha’s market niche. Potential supply is represented by packaging equipment firms, which generally develop less reliable technologies than the standard pharma industry requirements.

Risk Profile Analysis Typically the assessment of risk profile begins with a classical SWOT analysis of the competitive environment and the competitors.⁴

The case under consideration doesn’t show significant risk factors: entry in the industry is limited by specific technical competence needed to produce

⁴The most widely used models are the Porter five forces—Michael Porter, *Competitive Strategy* (New York: The Free Press, 1980)—and the strategies and competitive advantages matrices—M. Porter, *Competitive Advantage: Creating and Sustaining Superior Performance* (New York: The Free Press, 1985).

the equipment targeted for the pharmaceutical industry and by the market reputation of Alpha. Thus, there are no reasons to induce the analyst to delineate alternative competitive scenarios (for instance, the entry of a newcomer with resulting reduction of market share or margin squeezes). Yet, this approach can be easily shared provided Alpha can keep up with a growth rate consistent with the pharma industry rate and can complete its product range by acquiring competitors working in related market niches.

Consolidating Alpha's market share could allow for an extension of the product range offered: from mere equipment sales to planning the whole production cycle as a general contractor. Moreover, Alpha could step into the business machines used in the cosmetic industry that, although not as demanding in terms of the technological specifications as the pharma industry ones, show significant similarities.

1.5 UNCERTAINTY AND MANAGERIAL FLEXIBILITY

In a traditional approach, closer to financial modeling than strategic analysis, estimate of value stems from a passive attitude toward risk. Yet, we have observed that in reality businesses are by far more articulated: in fact, up to a certain level, the phenomena of change can be managed or turned to one's favor through opportune intervention.

1.5.1 Static versus Dynamic Assumption

As a first step, when facing the valuation of an investment plan, acquisition, or firm, it is worth asking which standpoint should be adopted:

- A static view assuming that the current business model will continue to work as it is
- A dynamic view which takes into account the adaptation of the business model to new scenarios

If we want to frame the issue in general terms, the valuation boundaries are determined—with regard to the choice of the correct standpoint—by two main factors:

1. The level of uncertainty, which characterizes the estimate measured as the impact that information unavailable at the time of the valuation can have on the valuation result itself; or, in other words, how far it is from the idea of probability based on the repetition of past results
2. Managerial flexibility—that is, how much the business model allows management to handle unfavourable scenarios or pick new opportunities in favorable situations

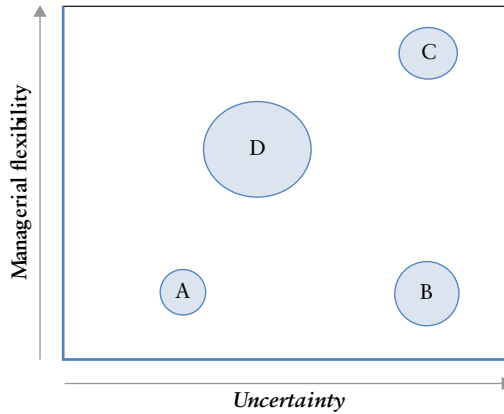


Exhibit 1.4 Valuation framework as a function of uncertainty and managerial flexibility

Exhibit 1.4 presents a graph that permits us to frame the context that drives the valuation with respect to the degree of uncertainty and management flexibility.

Limited Uncertainty and Flexibility In Exhibit 1.4, area A identifies situations in which the frame of reference of the estimate is delineable in clear terms and the business model does not permit significant room to manoeuvre. A typical example is the business of gas and electricity grids; in these business areas, results emerge from a model in which relationships between macroeconomic variables, tariffs, transported volumes, and costs are definable with a close approximation and can be consistently projected in the future with a high degree of credibility.

Uncertainty factors consist of the evolution of energy consumption that, as is well known, is a function, in the short term, of climate factors and, in the long term, of the general trend of the industry as a whole; changes in industry regulations; and the intensity of competitive pressure from the supply side.

In these businesses, shifts in consumption translate directly into operating margin decreases/increases since the cost structure is extremely rigid and management has very limited flexibility to keep up with unfavorable trends in demand.

In the previously sketched framework, the representation of uncertainty is consistent with the assumptions generally adopted by finance textbooks. In particular, it is possible to forecast different scenarios and to expect credibly that realized results of the business will fall in between the two most extreme cases (the most and the least favorable).

To keep the analysis simple, analysts in general limit themselves to just three scenarios (optimistic, the most probable, and pessimistic). Therefore, uncertainty can effectively be depicted by means of a triangular distribution.

In the case of public utilities, the gap between scenarios is generally quite small; in other industries, the gap can significantly widen. Generally speaking, the scenario expected in average conditions is also the most likely to happen. Exhibit 1.5 graphically depicts the point.

In the framework similar to Exhibit 1.5, it is not unusual for analysts to work out only the most probable scenario⁵ with respect to cash flow projections.

High Uncertainty and Limited Flexibility Area B in Exhibit 1.4 identifies those situations in which information useful to assess the performance of a business is not available at the time of the valuation, and flexibility to manage unfavorable events or to improve favorable ones is very limited.

For example, a company in the waste management industry had assumed the construction of a new landfill in its business plan. The project kickoff, though, was under litigation with the environmental groups that opposed the project, despite the fact that set-aside for dumping was a part of a regional plan.

The legal experts had identified a negligible risk of abandoning the project.

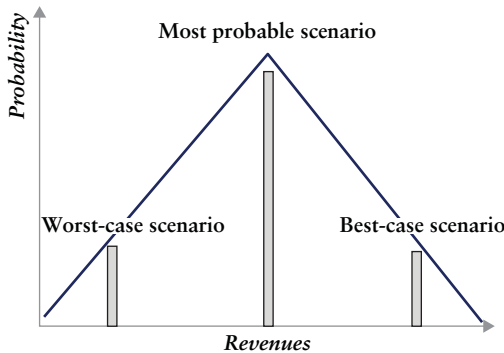


Exhibit 1.5 Moderate uncertainty scenario

⁵With asymmetric probability distributions, the most likely scenario is different from the expected scenario.

In similar situations, the following procedure could be adopted that has the merit of highlighting the risk profile of the venture:

- Delineate the scenarios (in our case, accomplishment of the dumping or abandonment of the venture).
- Calculate the net present value for each of the scenarios.

The procedure described has unquestionable effectiveness in terms of information transparency: it avoids the assessment of an “average” result (the mathematical average of two different scenarios) because this “average” event cannot, by definition, take place.

An example can clarify the idea. The existing landfill can generate returns equal to 400 per year, in the most probable scenario. The construction of the new facility can generate additional returns of 1,200. The total expected returns if the project is completed are therefore 1,600. Yet, the probability of making the second facility is 50 percent. Exhibit 1.6 depicts the situation.

One can see that the representation is very different than that presented in Exhibit 1.5. In this case, the uncertainty framework is closer to a coin toss: as a matter of fact, either you get the favorable scenario or the unfavorable one.

In valuating businesses, similar situations are rather frequent and involve:

- The valuation of start-ups, of ventures in the initial phases of their life cycle, and of innovative businesses
- The valuations with specific risk characters (e.g., license or contract renewals, environmental risks, strategic supplier dependence, high customer concentration, dependence on key persons)

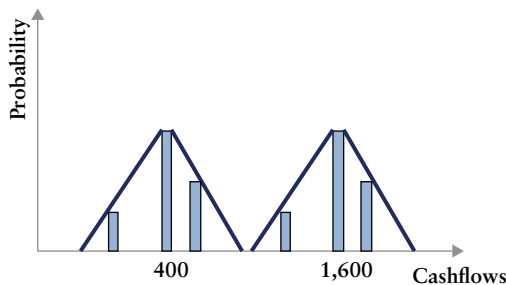


Exhibit 1.6 High uncertainty scenario