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A Guide to Underwriting and Advisory Services

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To my family

Preface

From a historical point of view, the main activity of investment banks is what today we call security underwriting. Investment banks buy securities, such as bonds and stocks, from an issuer and then sell them to the final investors. In the eighteenth century, the main securities were bonds issued by governments. The way these bonds were priced and placed is extraordinarily similar to the system that investment banks still use nowadays. When a government wanted to issue new bonds, it negotiated with a few prominent "middlemen" (today we would call them investment bankers). The middlemen agreed to take a fraction of the bonds: they accepted to do so only after having canvassed a list of people they could rely upon. The people on the list were the final investors. The middlemen negotiated with the government even after the issuance. Indeed, in those days governments often changed unilaterally the bond conditions and being on the list of an important middleman could make the difference. On the other hand, middlemen with larger lists were considered to be in a better bargaining position. This game was repeated over time, and hence, reputation mattered. For the middlemen, being trusted by both the investors on the list and by the issuing governments was crucial. In case of problems with a bond, investors would have blamed the middlemen, who naturally became advisors in distressed situations. For example, in the nineteenth century, the accumulation of capital in America was not sufficient to finance the increasing investments in railroads and other infrastructure. The nascent investment banking industry imported capital from the old Europe through the issuance of bonds. In 1842, a spectacular crash in the price of cotton reduced eight American states to default on their bonds. A firm and immediate reaction by investment bankers followed. All the attempts by any American state (even the non-defaulting ones) and by the Federal Government to raise new capital were frustrated. James de Rothschild said to the representatives of the Federal Government: "*You may tell your government that you have seen the man who is at the head of the financiers of Europe, and that he has told you that they cannot borrow a dollar, not a dollar*" (Reported in "Investment Banking. Institutions, Politics, and Law" by A.D. Morrison and W.J. Wilhelm, 2007, Oxford University Press). The European

investment banking industry orchestrated the recovery through a lobbying activity that convinced the defaulting states to meet their obligations. This was a clear signal that the quality of a security was also related to the investment bankers that placed it. Many investment banks did not survive the crisis stemmed from the crash in the cotton market, but a number of newcomers emerged. Few years later, several railroad companies defaulted on their bonds, and investment banks were again engaged in reorganizations. Some of the bondholders ended up converting their claims into equity. They mostly exerted their voting rights through a voting trust created and coordinated by investment bankers, who thus indirectly controlled the company. The words of John Pierpont Morgan to the owner of a distressed railroad company are enlightening: "*Your railroad? Your railroad belongs to my clients!*" (Morrison and Wilhelm, 2007). It was the rise of the advisory services, the natural evolution from security underwriting. Since then, a number of crises hit the financial system, reshaping the investment banking industry.

Today investment banking comprises a rather heterogeneous and complex set of activities, including underwriting and advisory services, trading and brokerage, and asset management. Nonetheless, underwriting and advisory activities are still considered the traditional or "core" investment banking functions. With underwriting services, an investment bank helps firms to raise funds by issuing securities in the financial markets. These services are labeled "underwriting" because investment banks actually purchase securities from the issuer and then resale them to the market, like the middlemen in the eighteenth century. Investment banks also provide advisory services to help their client firms with mergers and acquisitions and corporate restructuring in general, somehow similarly to the function performed with the reorganization of distressed railroads in the nineteenth century.

This book aims at providing an overview of these traditional investment banking activities. It basically covers equity offerings (IPOs, SEOs, rights issues), debt offerings (bond issues and syndicated loans), and advisory on M&As, LBOs, and other restructuring transactions. I started to use these notes in the Investment Banking course I lecture in the M.Sc. in Finance at Università Bocconi. Three main features of this guide should be pinpointed. First, it is not a corporate finance book: the focus here is on the role of the investment banks in the different transactions. Although the technical aspects of each investment banking deal are covered, all the corporate finance concepts (including company valuation) are considered pre-requisites. Second, this book blends practical tools and academic research. However, I decided to include research findings only if they have direct implications in real-life situations. Finally, this guide is intended to be used in graduate courses on investment banking to complement a set of case studies. Therefore, it should be considered as a quick reference guide, rather than a comprehensive handbook on investment banking.

I am grateful to many friends, colleagues, and students who have contributed to this book. I wish to thank all the colleagues from the Department of Finance at Università Bocconi and from the Banking & Insurance Department at SDA Bocconi –School of Management. I am particularly grateful to Giancarlo Forestieri and Stefano Gatti, with whom I have co-taught the Investment Banking course

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Suggestions and comments on this first edition will be greatly appreciated.

Milan, November 2009 Giuliano Iannotta

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Introduction to Investment Banking

1.1 Introduction

Investment banking is the banking activity not classifiable as commercial banking. Commercial banking in turn can be defined very shortly, but effectively, as "deposits taking and loans making". In other words, commercial banks simply borrow money mainly in the form of deposits (checkable or time deposits) and lend money to families (to buy a car, an apartment, etc.) and to firms (to finance new plants/equipments, to pay employees, etc.). Since commercial banks are mostly financed through deposits, they are sometimes called "depository institutions". Of course commercial banking is a little bit more complicated than this: banks raise money in many ways (other than deposits) and the types of loan they make is limitless. Nonetheless, the core commercial banking activity is still "deposits taking and loans making".

Within banking, whatever is not commercial can be roughly defined investment banking. Differently from commercial banking, investment banking includes a rather heterogeneous set of activities, which can be classified into three main areas:

1. Core or traditional investment banking, which can be further broken down into: (a) underwriting services, which consist in assisting firms raising capital on financial markets and (b) advisory services, which consist in assisting firms in transactions such as mergers, acquisitions, debt restructuring, etc.
2. *Trading and brokerage*: it consists in purchasing and selling securities by using the bank's money (proprietary trading) or on behalf of clients (brokerage).
3. *Asset management*: it is a very heterogeneous area itself. Generally speaking, it consists in managing investors' money. It can be broken down into two main categories: (a) traditional asset management (i.e., open end mutual funds) and (b) alternative asset management, which includes real estate funds, hedge funds, private equity funds, and any other vehicle investing in alternative asset classes.

Relevant to all the three areas is the research activity, which support investment decisions (trading & brokerage, and asset management), as well as the core

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investment banking business. However, because of the possible conflicts of interests (e.g., recommending an issuer simply because it is a client), the research activity is normally organizationally separated by the core investment banking (by the so called "Chinese walls").

This book covers the traditional investment banking activity, that is underwriting and advisory services. This chapter provides the reader with a general description of the investment banking business. Section 1.2 further explores the difference between commercial and investment banking. Section 1.3 is a picture of the current players in industry. Section 1.4 concludes.

1.2 Definitions

1.2.1 Commercial Banking

Commercial banks can be defined as financial intermediaries with a high leverage, i.e., a relatively small fraction of equity and a relatively large proportion of short term debt in the form of deposits. These deposits are often payable on demand and are issued to a large number of different individuals and firms. The commercial banks' funds are used primarily to make loans to firms and individuals. Many of these firms and individuals that borrow from banks do not have access to other sources of funds, such as publicly traded bonds and stocks. Moreover, their ability to repay loans may not be publicly-available information. In that sense, if credit were to be provided to these borrowers, it would be hard to value or "opaque". Opaque borrowers are more likely to be small businesses and individuals rather than large firms. In the absence of commercial banking, potential markets for providing credit to these opaque firms and individuals would be subject to adverse selection and moral hazard problems. Specifically, if a lender were to offer credit at a given loan interest rate, higher risk borrowers would have a greater incentive to apply for a loan than would lower risk borrowers. If the lender could not distinguish risks, the result would be that loans were made to a borrowers having higher credit risk than average. In addition, if borrowers had the ability to choose the risk of their investments that are funded with their loans, due to limited liability they would have a moral hazard incentive to choose excessively risky investments. If the lender could not distinguish the risks of the borrowers' investments, then these loans would have excessive default rates. If adverse selection and/or moral hazard incentives are sufficiently severe, markets for credit could completely break down (Akerlof 1970). In less-severe cases, a credit market may exist but credit to borrowers may be rationed (Stiglitz and Weiss 1981). Such dysfunctions could be corrected if a lender had better information regarding potential borrowers and borrowers' investment activities. This information could be acquired by *screening* the quality of prospective borrowers and by *monitoring* borrowers' investments. However, credit screening and monitoring are costly.

Diamond (1984) and Ramakrishnan and Thakor (1984) show that when credit screening is costly, the most efficient way to accomplish it is through a financial structure resembling that of a commercial bank. A bank's manager can pool the deposits of many different small investors and use these funds to make loans to borrowers whose credit risk is screened by the bank manager. This process is efficient because, rather than each of the small investors performing the credit screening for each loan applicant, the credit screening is performed just once per loan applicant by the bank managers. Delegating screening to managers reduces redundancy in loan screening if it were performed by multiple small investors. The small investors (depositors) can verify that bank managers are screening efficiently because by making loans to a large, diverse set of borrowers, loan defaults should be predictable because idiosyncratic default risks are diversified away. Costly monitoring of borrowers' investments also can be performed most efficiently via the financial structure of a bank. On the behalf of many small investors (depositors), bank management can repeatedly monitor the performance of a borrower's investments. Rajan (1992) shows efficient monitoring can be accomplished by a bank making a relatively short-maturity loan and checking the borrower's performance prior to renewing the loan. Similarly, Berlin and Mester (1992) show that bank loans will tend to include covenants that give bank management discretion over whether loans should be continued or not. In many cases, bank management will waive covenants if a violation by the borrower is viewed as temporary. This flexibility in the loan agreement provides benefits, especially to relatively risky borrowers. The repeated interactions between bank management and a borrower and the credit information that management acquires during this process gives rise to a long-term bank–borrower relationships. One potential downside to banks making "relationship" loans is that banks may acquire excessive power over the interest rates that it can charge to a borrower on future loans. However, Von Thadden (1995) shows that commitments to make future loans at pre-agreed rates can mitigate this problem. For this reason, many bank loans tend to be made under prior loan commitments.

To summarize, the very existence of commercial banks stems from a problem of information asymmetry, or, to use another term, opaqueness. If firms and individuals were able to access the financial markets by issuing bonds and stocks, commercial banks' role would be pointless. Frictions due to informational asymmetries are also the reason for the existence of investment banks.

1.2.2 Investment Banking

In the Introduction I provided a "residual" definition of investment banking: investment banking is whatever is not commercial banking. However, investment banking comprises a rather heterogeneous set of activities, most of which can be classified in: (a) underwriting and advisory services, (b) trading and brokerage, and (c) asset management (both traditional and alternative).

Underwriting and advisory services are the "core" investment banking activities, i.e., the object of this book.

With underwriting services an investment bank helps firms to raise funds by issuing securities in the financial markets. These securities can include equity, debt, as well as "hybrid" securities like convertible debt or debt with warrants attached. Investment banks structure the transactions by verifying financial data and business claims, performing due diligence and, most importantly, pricing claims. These services are labeled "underwriting" because investment banks actually purchase securities from the issuer and then resale them to the market.

In the case of equity, this is done through Initial Public Offerings (IPOs). IPO is a rather generic term, but there are several alternative offering structures depending on the kind of shares being sold, where the company is listed, to whom the offer is addressed, etc. Investment banks also structure seasoned equity offerings (SEOs) and rights offerings, which are transactions through which listed firms can raise equity capital.

Turning to debt offerings, it must be noted that a bond offering is not really different from an equity offering. The players involved are the same and also the process is pretty similar. However, a relevant task in the underwriting business is pricing the securities being offered. Indeed, the way the price is set is crucial, being the price the key variable of any offering. The role of the investment bank itself is strictly related to the price-setting mechanism. As mentioned above the process of a bond issue is not really different from that of an equity issue. Though, how difficult is pricing a bond issue compared to an equity issue? And within equity issues is it that difficult to price a SEO, for which a publicly available market price already exists? This is also why investment banking fees are much higher in IPOs than in any other security offering. Therefore, the real difference between bond and stock offerings becomes clear. On average bonds are much easier to price relative to equity. One of the reasons explaining why bonds are easier to price relative to stocks is related to credit ratings, which are opinions about the creditworthiness of a firm (or its debt securities) expressed by independent and reputed agencies. The presence of ratings facilitates remarkably the job of the investment banks when pricing bonds. Despite the process similarities, the difference between bonds and stocks is also reflected in the organizational structure of investment banks: indeed, equity offerings are usually managed by the Equity Capital Market (ECM) division, while the debt capital market (DCM) division covers the debt issues.

Investment banks also help firms to use their assets to issue debt. This process is labeled "securitization" and the securities issued are called "asset backed securities" (ABS). Many commercial banks securitize their loans. Indeed, in the last years the traditional commercial banking activity has been moving from an "originate-to-hold" model (banks make loans and keep these loans on their balance sheets) to an "originate-to-distribute" model (banks make loans and then sell them to the market, through the securitization process). In this respect, although commercial and investment banking are still two very different types of business, the "originate-to-distribute" model of commercial banking somehow resembles the underwriting services provided by investment banks. Indeed, when helping firms to raise capital

in the financial markets, investment banks do not take a debt or equity position in the issuing firm. In other words, at the end of the transaction the investment bank does not run any risk related to the issuer. This is exactly what happens when a commercial bank grants to a borrower a loan that is then securitized.

While apparently loan syndication seems quite similar to securities offerings, in fact it is quite different. The most relevant difference is the absence of investors. Indeed, a rather raw definition of a syndicated loan is the following: it is a loan too big to be granted by a single bank, and for which it is therefore necessary to assemble a pool of banks (i.e., the syndicate), coordinated by a lead. As a result, each single bank of the syndicate is lending money to the borrower, whereas in a bond offering the securities are ultimately bought by investors. Although bonds and syndicated loans are different, they have some features in common. For example, bond pricing reflects the models used for the lending business. This also explains why commercial banks started moving into bond underwriting and investment banks are active lenders on the syndicated loan markets.

All the topics related to the underwriting services will be discussed in Chaps. 3–6.

Investment banks provide advisory services to help their client firms with mergers and acquisitions (M&As) and corporate restructuring in general. Investment banks perform different tasks as advisers. First of all, they take care of many technical aspects related to the transactions. In a M&A deal, for example, they collect and process information about the companies involved in the transaction, provide an opinion about the price payable, suggest the best way to structure the deal, assist their clients in the negotiations, etc. The extant empirical evidence suggests that investment banks play a relevant role in designing, structuring, and executing M&As, as their experience, reputation, and relationship with clients significantly affect the wealth of the shareholders involved in the transaction. However, investment banks provide advisory services not only for M&As. Indeed, a firm can be seen as a combination of contracts. Sometimes these contracts need to be restructured. Restructuring might be triggered by a condition of financial distress. However, sometimes firms re-contract preemptively, to avoid a crisis, or simply to enhance value creation. The main type of restructuring transactions can be roughly classified into two main categories: (a) asset restructuring and (b) debt restructuring. Asset-side transactions either consist in selling a subsidiary (or a given asset) to a third party (divesture) or in creating new stock classes. This latter type of transactions, also known as stock break-ups, includes equity carve-outs, spin-offs, targeted stocks, etc. Debt restructuring consists in changing the features of outstanding debt contracts (e.g., extending the maturity, reducing the amount, converting into equity, etc.).

The topics related to advisory services will be discussed in Chaps. 7–10.

As mentioned in the introductory section, private equity is part of the (alternative) asset management activity, which is not part of the "core" investment banking business. Nonetheless, Chap. 2 deals with private equity. One may wonder why a book about investment banking includes private equity. I can provide two different answers. First, private equity funds are increasingly important clients of investment banks, both in the underwriting and advisory services. Second, investment banks

are increasingly important players of the private equity industry. Virtually all major investment banks manage some private equity funds. These two reasons also explain the increasing mobility of human resources from investment banks to the private equity industry.

From the organizational point of view, most of the investment banks provide their services though a "3D matrix" model: basically each deal, an IPO or an acquisition, a right issue or a bond offering, is generated and managed by the interaction of three groups: (a) the *country group* [e.g., Italy, Germany, UK, etc., and a higher level EMEA (Europe, Middle East, Africa), USA, etc.], which assures a geographical coverage, (b) the *industry group* [e.g., Telecommunications, FIG (Financial Institutions Group), Media, Energy, etc.] which contributes the industry-specific knowledge, and (c) the *product group*, which has the skills for the specific deal [e.g., M&A, ECM (Equity Capital Markets), DCM (Debt Capital Markets), etc.].

In conclusion, it is worth noting that, despite commercial and investment banks perform totally different activities, their economic rationale stems from the same type of "friction". Why do commercial banks exist? If firms and individuals were able to access the financial markets by issuing bonds and stocks, there would be no need of commercial banks. Commercial banks acquire and process information about prospective borrowers (screening) and control their activities (monitoring). Why does a firm need an investment bank to sell its securities in the market? Why is an investment bank needed to handle a complex acquisition or to execute the restructuring plan of a distressed firm? It is still a matter of information asymmetry. If a firm were able to credibly approach the financial markets and market its own bonds or stocks without any third party "certifying" the quality of its securities, investment banks would not exist. Things are similar with advisory: the role of investment banks is collecting and processing information, and, based on this information, credibly certify to the market participants the "quality" of the deal. Different roles, same problem: information asymmetry.

1.2.3 Universal Banking and Conflict of Interests

Banks that perform both commercial and investment banking activities are labeled "universal banks". While in the past universal banking was prohibited in several jurisdictions (e.g., in the US from the Glass–Steagall Act of 1993 to the Gramm–Leach–Bliley Act of 1999), it is now allowed virtually everywhere. Since both commercial and investment banking are based on information production and processing, performing both activities at the same time is certainly more efficient. For example, the information generated in the course of a lending relationship may be reused in an investment banking transaction. The vice-versa is also true, although investment banking transactions (such as IPOs or M&As) are discrete episodes, corresponding to a relatively short time. In contrast, commercial bank lending is a continuous type of activity, requiring the monitoring of the borrowing firms. In this respect, universal banks should have a sort of competitive advantage

relative to "pure" investment banks. Indeed, when providing investment banking services (both underwriting and advisory) banks certify the quality of deals. With underwriting services banks basically market the issuer's securities to investors. As advisors to both targets and acquirers, banks produce information to ascertain the reservation price of the merger counterparty, the value of potential synergies, as well as the risks of the transaction. Being commercial banks better informed about their clients, their "certification effect" should be enhanced. In extreme, since the cost of collecting and processing information is higher for investment banks, they might produce less information, despite the potential negative reputational consequences due to "uninformed" certification (Puri 1999).

However, the stronger certification effect provided by universal banks might be countervailed by a "conflict of interests effect". A comprehensive taxonomy of the potential conflicts of interests in the financial services industry is beyond the scope of this section. Although pure investment banks are faced with conflicts "within" the investment banking activities (some of which will be discussed throughout the book), the focus here is on the potential conflicts arising when investment banking and commercial banking activities are performed by the same institution (therefore, an universal bank).

The main source of conflict within universal banking is undoubtedly the potential misuse of private information. For example, a bank might (privately) know that the default risk of one of its client has increased or will be increasing. This bank might have an incentive to assist the firm in issuing securities to the investors, in order to fund the firm to pay-down its debt. The Glass–Steagall Act of 1933 was aimed at preventing exactly this type of behavior, which was considered one of the causes of the financial market crashes. Even when providing advisory services, universal banks might misuse their private information. For example, a universal bank exposed (as a commercial bank) to a financially troubled firm might recommend (as an investment bank) the acquisition of a target with a sizable cash flow, with the only purpose of paying down the debt. Also, a commercial bank may use the private information on a given client in ways that harm the interest of that client, e.g., advising another firm in a contested acquisition.

Universal banks might also face with another type of conflict of interests, not related to the misuse of private information. A commercial bank might use its lending power to force a firm to use its underwriting or advisory services, or, it might refuse to grant a loan unless the firm buys other investment banking services. This type of behavior (called tying) is very similar to cross-subsidization, in which a bank lends at favorable conditions in order to be considered for investment banking services. The real difference is that cost of cross-subsidization strategy are borne by the bank, not by the client. Nonetheless the line between tying and cross-subsidization is often blurred.

Puri (1996) analyzes bond and preferred stock issues during the 1927–1929 period, hence before the Glass–Steagall Act of 1933, that forced the separation between commercial and investment banking in the US. The idea is simple: since universal banks face a potential conflict of interests, pure investment banks should provide a more credible certification effect, when assisting firms in issuing securities.

If rational investors anticipate which type of bank (universal bank versus pure investment bank) has a higher net certification effect (that is, the certification effect net of any conflict of interest), they should price securities accordingly. In particular, if investors perceive the risk a conflicted certification, the securities issued by universal banks should be priced lower (resulting in higher yields) than comparable securities underwritten by pure investment banks. In contrast, if the conflict of interests effect is perceived to be negligible, issues underwritten by universal banks should be priced higher. Puri (1996) show that universal banks provide a stronger certification effect compared to investment banks. In other words, in the absence of any regulation, a sort of market discipline limits the misuse of private information by universal banks. However, if the yields of issues underwritten by universal banks are lower, one may wonder why an issuer should hire a pure investment bank at all? A possible explanation is that yields may be poor proxies for the overall cost of issuing securities, which includes the underwriting fees.

More recent empirical evidence confirms that concurrent lending and underwriting is beneficial to both firms and banks (Drucker and Puri 2005). Firms, particularly those with a lower credit quality (for whom informational advantages are more relevant), benefits from reduced fee and yields. Banks benefit from a stronger relationship with clients, which increases the likelihood of receiving current and future business. These results also suggest that the concern about tying practices is not that worrying.

As a matter of fact, most of the investment banks, if not universal banks, are at least actively involved in the lending business. In conclusion, it seems that the problem of conflicted interests, rather than heavily regulated by forcing the separation of commercial and investment banking, should be left to the market. Of course episodes of exploitation of conflict of interests occur (and will ever do), but the benefits from informational economies of scope seem to outweigh the costs.

1.3 League Tables (2007–2008)

To have an idea of the players in the investment banking industry, one should give a look to the "league tables". League tables are rankings of investment banks in a given business: for example the 2008 IPOs global league table, is the ranking of the investment banks based on the proceeds of the IPOs they managed worldwide in the year 2008. Of course, one can build league tables according to more specific criteria: for example, we can build the league tables based on the proceeds of the IPOs occurred in the US, in the first quarter of 1998, and just in a specific industry (e.g., Internet companies). With the same reasoning, one can build the league tables for M&A advisory, for bond issues, for syndicated loans, etc.

Investment banks give a tremendous importance to league tables, as they are an effective marketing tool. Arguably, when an investment bank claims to be a leading player in a given segment, league tables are the only objective instrument to prove (or disprove) it. League tables tend to be quite stable over the short-medium term,

especially in the top positions: in other words, leading banks persistently rank in the first positions. Nonetheless, major changes do happen, especially in concomitance with major financial crisis, when some banks disappear or merge, and some new top players emerge. The remainder of this section illustrates the (global) league tables in IPOs, bond offerings, syndicated loans, and M&As advisory for the years 2007 and 2008. The analysis will be limited to the first 25 banks in each area of activity. There are three possible criteria to build a league table: (a) deal value (e.g., proceeds of security offerings and loan syndication, and the entity value – equity plus net debt – of the target company in M&As), (b) fee, and (c) number of deals. The most used criterion is definitely the first one.

1.3.1 IPOs

Table 1.1 reports the global IPOs league tables for the years 2007 and 2008 based on proceeds. The market seems quite concentrated as the top three banks take about 27% of the market in both years. In 2007 among the top ten banks, six banks could be classified as universal banks (UBS, Credit Suisse, JP Morgan, Citi, Deutsche Bank, and Bank of China), while the remaining four could be considered as "pure" investment banks (although, as mentioned above, no bank can be actually classified as a pure investment bank). Noticeably, among the top-10 only one bank is headquartered in an emerging economy (Bank of China), while others are ranked in lower positions (China International Capital, Samba Financial Group, Banco Itau Holding Financeira, SHUAA Capital, CITIC, and Zhongxin Jianton Sec Co). Not surprisingly, the average issue size for these banks tend to be much higher relative to that of banks based in developed economies (where large corporations are already listed, and therefore only smaller companies go public). The 2008 ranking appears pretty similar to the 2007, with some differences. The top 10 positions present the same group of banks, with three exceptions: (a) due to the 2008 financial crisis, Merrill Lynch was merged into Bank of America (not even ranked among the top-25 in the previous year) and Lehman (that after filing for Chap. 11 was absorbed in part by Barclays and in part by Nomura) is not ranked anymore; (b) again, because of the financial crisis the volume of business results quite decreased: the first bank in 2007 (UBS) managed 123 IPOs raising about €24.5 bl, while the first bank in 2008 (JP Morgan) managed only 13 IPOs raising only €5.7 bl; (c) there is still only one "emerging market" bank, that is the Arabic bank Samba Financial Group, but many others are ranked in the top 25 positions. The average fee (not reported) was equal to 2.9% (of the proceeds) in 2007 and 2.7% in 2008.

1.3.2 Debt: Bond Offerings and Loan Syndication

Table 1.2 reports the league tables for global bond offerings for the years 2007 and 2008 based on proceeds. The top 3 banks have more than 20% of the market in both

Table 1.1 League Tables 2007–2008: Global IPOs (Proceeds)

2007							2008						
Rank	Bank	Proceeds (EUR, ml)	Mkt. Share Ind.	Mkt. Share Cum.	Issues #	Issues Avg. Size	Rank	Bank	Proceeds (EUR, ml)	Mkt. Share Ind.	Mkt. Share Cum.	Issues #	Issues Avg. Size
1	UBS	*24.589,57*	11,00	11,00	123	199,92	1	JP Morgan	*5.742,71*	10,40	10,40	13	441,75
2	Credit Suisse	17.575,68	7,80	18,80	103	170,64	2	UBS	5.013,19	9,10	19,50	24	208,88
3	Morgan Stanley	17.408,17	7,80	26,60	102	170,67	3	Citi	4.131,73	7,50	27,00	20	206,59
4	JP Morgan	16.226,87	7,20	33,80	90	180,30	4	Bank of America Merrill Lynch	4.022,90	7,30	34,30	24	167,62
5	Goldman Sachs & Co	16.087,22	7,20	41,00	73	220,37	5	HSBC Holdings PLC	3.929,48	7,10	41,40	11	357,23
6	Merrill Lynch	13.166,84	5,90	46,90	94	140,07	6	Goldman Sachs & Co	3.425,29	6,20	47,60	11	311,39
7	Citi	12.682,57	5,70	52,60	88	144,12	7	Morgan Stanley	3.228,44	5,90	53,50	22	146,75
8	Deutsche Bank AG	12.553,10	5,60	58,20	62	202,47	8	Credit Suisse	2.737,58	5,00	58,50	20	136,88
9	Lehman Brothers	6.478,29	2,90	61,10	57	113,65	9	Deutsche Bank AG	2.428,76	4,40	62,90	13	186,83
10	*Bank of China*	*5.100,10*	*2,30*	*63,40*	*11*	*463,65*	*10*	*Samba Financial Group*	*2.052,85*	*3,70*	66,60	*3*	*684,28*
11	*China International Capital Co*	*4.153,76*	*1,90*	*65,30*	*4*	*1.038,44*	*11*	Wells Fargo & Co	1.901,78	3,40	70,00	*3*	633,93
12	Renaissance Capital Group	3.182,46	1,40	66,70	13	244,80	12	Calyon	1.162,62	2,10	72,10	2	581,31
13	ABN AMRO	3.020,12	1,30	68,00	29	104,14	13	Macquarie Group	1.000,16	1,80	73,90	7	142,88
14	HSBC Holdings PLC	2.812,16	1,30	69,30	17	165,42	14	*Banco Itau Holding Financeira*	*884,52*	*1,60*	75,50	1	*884,52*
15	*Samba Financial Group*	*2.639,09*	*1,20*	*70,50*	*4*	*659,77*	*15*	*Danatama Makmur*	*848,93*	*1,50*	77,00	*1*	*848,93*
16	Nomura	2.530,55	1,10	71,60	38	66,59	16	*CITIC*	*565,82*	*1,00*	78,00	1	*565,82*
17	*Banco Itau Holding Financeira*	*2.252,12*	*1,00*	*72,60*	*15*	*150,14*	*17*	*Garanti Bank*	*490,94*	*0,90*	78,90	*1*	*490,94*
18	La Caxia	2.186,19	1,00	73,60	1	2.186,19	18	Nomura	478,66	0,90	79,80	18	26,59
19	*SHUAA Capital Plc*	*1.874,58*	*0,80*	*74,40*	*3*	*624,86*	*19*	BNP Paribas SA	444,16	0,80	80,60	*4*	111,04
20	BNP Paribas SA	1.675,63	0,70	75,10	14	119,69	20	*Vietnam Intl Sec JSC*	*383,41*	*0,70*	81,30	1	*383,41*
21	*Zhongxin Jianton Sec Co Ltd*	*1.528,20*	*0,70*	*75,80*	*4*	*382,05*	*21*	*ICICI Bank Ltd*	*366,65*	*0,70*	82,00	*4*	*91,66*
22	*CITIC*	*1.471,87*	*0,70*	*76,50*	*6*	*245,31*	*22*	Dexion Capital Plc	317,28	0,60	82,60	*1*	317,28
23	Mediobanca	1.434,49	0,60	77,10	8	179,31	23	UniCredit Group	314,60	0,60	83,20	3	104,87
24	Santander Global Banking	1.415,04	0,60	77,70	7	202,15	24	RBS	309,36	0,60	83,80	2	154,68
25	Meinl Bank AG	1.300,00	0,60	78,30	2	650,00	25	*Kotak Mahindra Bank Ltd*	*300,45*	*0,50*	84,30	5	*60,09*

Source: Thomson One Banker

Table 1.2 League Tables 2007–2008: Global Bond Offerings (Proceeds)

		2007							2008						
Rank	Bank	Proceeds	Mkt. Share		Issues		Rank	Bank	Proceeds	Mkt. Share		Issues	
		(EUR, ml)	Ind.	Cum.	#	Avg. Size			(EUR, ml)	Ind.	Cum.	#	Avg. Size
1	Citi	425.726,54	8,50	8,50	1.514	281,19	1	JP Morgan	270.574,10	9,40	9,40	1.108	244,20
2	JP Morgan	366.342,92	7,30	15,80	1.403	261,11	2	Bank of America Merrill Lynch	264.280,69	9,20	18,60	1.278	206,79
3	Deutsche Bank AG	359.200,47	7,20	23,00	1.422	252,60	3	Barclays Capital	262.558,70	9,10	27,70	1.037	253,19
4	Merrill Lynch	292.329,06	5,80	28,80	1.305	224,01	4	Deutsche Bank AG	229.835,82	8,00	35,70	774	296,95
5	Lehman Brothers	289.170,78	5,80	34,60	962	300,59	5	Citi	183.914,52	6,40	42,10	903	203,67
6	Morgan Stanley	282.923,76	5,60	40,20	1.159	244,11	6	RBS	144.127,56	5,00	47,10	684	210,71
7	Barclays Capital	269.514,33	5,40	45,60	1.030	261,66	7	Goldman Sachs & Co	130.775,01	4,50	51,60	497	263,13
8	Goldman Sachs & Co	237.879,01	4,70	50,30	806	295,14	8	Credit Suisse	127.441,34	4,40	56,00	609	209,26
9	Credit Suisse	220.218,07	4,40	54,70	943	233,53	9	Morgan Stanley	124.674,65	4,30	60,30	556	224,23
10	Banc of America Securities	219.748,17	4,40	59,10	878	250,28	10	UBS	120.506,68	4,20	64,50	763	157,94
11	Royal Bank of Scotland Group	216.841,92	4,30	63,40	843	257,23	11	HSBC Holdings PLC	120.362,22	4,20	68,70	725	166,02
12	UBS	196.079,10	3,90	67,30	975	201,11	12	BNP Paribas SA	97.886,17	3,40	72,10	466	210,06
13	HSBC Holdings PLC	147.380,65	2,90	70,20	869	169,60	13	Societe Generale	50.097,98	1,70	73,80	149	336,23
14	Bear Stearns & Co Inc	123.613,46	2,50	72,70	460	268,72	14	RBC Capital Markets	47.055,61	1,60	75,40	333	141,31
15	Wachovia Corp	116.567,89	2,30	75,00	442	263,73	15	UniCredit Group	43.288,41	1,50	76,90	167	259,21
16	ABN AMRO	111.371,83	2,20	77,20	379	293,86	16	Calyon	40.130,53	1,40	78,30	134	299,48
17	BNP Paribas SA	107.822,35	2,10	79,30	572	188,50	17	Nomura	35.598,22	1,20	79,50	217	164,05
18	Societe Generale	77.244,30	1,50	80,80	258	299,40	18	Daiwa Securities SMBC	32.919,23	1,10	80,60	279	117,99
19	RBC Capital Markets	57.229,96	1,10	81,90	494	115,85	19	Natixis	27.682,80	1,00	81,60	113	244,98
20	Calyon	55.911,02	1,10	83,00	188	297,40	20	Wells Fargo & Co	27.464,81	1,00	82,60	263	104,43
21	Countrywide Securities Corp	51.246,84	1,00	84,00	268	191,22	21	TD Securities Inc	26.135,89	0,90	83,50	217	120,44
22	UniCredit Group	48.515,74	1,00	85,00	240	202,15	22	Mizuho Financial Group	25.289,13	0,90	84,40	318	79,53
23	Natixis	47.650,22	0,90	85,90	188	253,46	23	Mitsubishi UFJ Financial Group	24.159,80	0,80	85,20	202	119,60
24	Nomura	36.362,25	0,70	86,60	340	106,95	24	Commerzbank AG	21.725,56	0,80	86,00	89	244,11
25	Dresdner Kleinwort	33.974,10	0,70	87,30	152	223,51	25	Intesa SanPaolo	16.830,34	0,60	86,60	29	580,36

Source: Thomson One Banker

years. The relative proportion of universal banks to pure investment banks in the top 10 positions is comparable to that of the IPOs league tables: in 2007 four investment banks among the top 10 (Merrill Lynch, Lehman Brothers, Morgan Stanley, and Goldman Sachs) are ranked together with six universal banks (Citi, JP Morgan, Deutsche Bank, Barclays, Credit Suisse, and Bank of America). No banks from emerging economies is ranked in the top 25 positions, as bond issues are a source of financing more common for developed countries. As already mentioned for IPOs, in 2008 Bank of America and Merrill Lynch merged and Lehman disappeared from league tables. Also, in 2008 there is a remarkable drop in the number of transactions, albeit lower relative to the IPOs market. Indeed, it is much easier to postpone an IPO than a bond issue, that might be needed for the firm's operations or simply to refinance previously issued debt: the first bank in 2007 (Citi) managed 1,514 bond issues raising about €425 bl, while the first bank in 2008 (JP Morgan) managed 1,108 raising €270 bl. The average fee (not reported) was equal to 0.31% in both 2007 and 2008. As mentioned above, although the process of issuing bonds and stocks are identical, the relative profitability for investment banks is very much different: this is due to the fact that pricing and placing bonds is, on average, much easier than pricing and placing stocks of private firms.

Table 1.3 reports the league table for global loan syndication for the years 2007 and 2008 based on proceeds. The market appears slightly more concentrated than that of bond offerings: the top 3 banks have about 30% of share in both years. Relative to equity and bond underwriting (an investment banking service), in the top 10 positions there some commercial banks with little or no investment banking activity (e.g. Wachovia or Wells Fargo). In general, among the top-10 positions there is only one pure investment bank in 2007 (Goldman Sachs) and none in 2008: this result clearly suggests that loan syndication is a commercial banking activity. Despite the greater complexity relative to a traditional loan and some features that resembles the issue of public debt (i.e., bonds), it is still "loans making". The reduction of transactions in 2008 is greater than that observed in the bond market: the top-bank in 2007 (JP Morgan) arranged 1,042 loans raising about €430 bl, while the top-bank in 2008 (still JP Morgan) nearly halved the number of transactions to 646 with only €202 bl raised. Overall, the average fee (not reported) was equal to 0.31% in 2007 and 0.28% in 2008.

1.3.3 M&As Advisory

The league table for M&As advisory are usually built looking at the entity value (equity plus the net debt) of the company being acquired (i.e., the target), regardless of whether the specific bank is advising the bidder or the target. It often happens than a firm (target and/or bidder) hires more one advisors for a given transaction, especially for the more complex ones: in such cases, each bank is normally given full credit in the league tables, that is the entire value of the transaction is credited to each bank involved in that deal. As a result, it is very difficult to build a measure of

Table 1.3 League Tables 2007–2008: Global Loan Syndication (Proceeds)

2007							2008						
Rank	Bank	Proceeds (EUR, ml)	Mkt. Share Ind.	Mkt. Share Cum.	Issues #	Issues Avg. Size	Rank	Bank	Proceeds (EUR, ml)	Mkt. Share Ind.	Mkt. Share Cum.	Issues #	Issues Avg. Size
1	JP Morgan	430.559,98	12,90	12,90	1.042	413,21	1	JP Morgan	202.658,80	11,50	11,50	646	313,71
2	Citi	389.377,07	11,60	24,50	841	462,99	2	Bank of America Merrill Lynch	143.352,11	8,10	19,60	814	176,11
3	Banc of America Securities LLC	261.866,25	7,80	32,30	1.120	233,81	3	Citi	131.288,60	7,40	27,00	305	430,45
4	Royal Bank of Scotland Group	161.965,70	4,80	37,10	367	441,32	4	RBS	96.315,84	5,50	32,50	362	266,07
5	Deutsche Bank AG	134.612,49	4,00	41,10	237	567,99	5	BNP Paribas SA	80.500,14	4,60	37,10	405	198,77
6	BNP Paribas SA	133.973,96	4,00	45,10	518	258,64	6	Sumitomo Mitsui Finl Grp Inc	76.217,51	4,30	41,40	744	102,44
7	Barclays Capital	133.010,49	4,00	49,10	277	480,18	7	Mitsubishi UFJ Financial Group	73.681,15	4,20	45,60	765	96,32
8	Goldman Sachs & Co	98.680,18	2,90	52,00	193	511,30	8	Mizuho Financial Group	68.432,69	3,90	49,50	649	105,44
9	Wachovia Corp	88.716,06	2,70	54,70	428	207,28	9	Wells Fargo & Co	52.353,62	3,00	52,50	407	128,63
10	Credit Suisse	87.795,18	2,60	57,30	210	418,07	10	Barclays Capital	51.559,01	2,90	55,40	171	301,51
11	Calyon	86.200,47	2,60	59,90	290	297,24	11	Deutsche Bank AG	44.380,98	2,50	57,90	104	426,74
12	ABN AMRO	77.360,71	2,30	62,20	191	405,03	12	Calyon	43.914,71	2,50	60,40	210	209,12
13	Societe Generale	72.387,41	2,20	64,40	201	360,14	13	HSBC Holdings PLC	37.094,84	2,10	62,50	161	230,40
14	Lehman Brothers	66.638,03	2,00	66,40	147	453,32	14	Goldman Sachs & Co	34.331,09	1,90	64,40	58	591,92
15	UBS	62.890,20	1,90	68,30	155	405,74	15	Societe Generale	32.522,82	1,80	66,20	149	218,27
16	Merrill Lynch	62.558,17	1,90	70,20	125	500,47	16	ING	31.381,26	1,80	68,00	199	157,69
17	Mizuho Financial Group	59.675,49	1,80	72,00	682	87,50	17	RBC Capital Markets	30.031,34	1,70	69,70	101	297,34
18	Morgan Stanley	55.503,48	1,70	73,70	102	544,15	18	Commerzbank AG	29.157,36	1,70	71,40	125	233,26
19	HSBC Holdings PLC	55.262,48	1,70	75,40	206	268,26	19	UBS	23.386,83	1,30	72,70	51	458,57
20	Mitsubishi UFJ Financial Group	53.966,60	1,60	77,00	792	68,14	20	Santander	21.062,03	1,20	73,90	69	305,25
21	Sumitomo Mitsui Banking Corp	51.114,73	1,50	78,50	724	70,60	21	Morgan Stanley	20.893,21	1,20	75,10	38	549,82
22	RBC Capital Markets	37.232,52	1,10	79,60	130	286,40	22	Lloyds Banking Group	20.511,00	1,20	76,30	90	227,90
23	ING	36.959,10	1,10	80,70	169	218,69	23	Fortis	17.601,98	1,00	77,30	99	177,80
24	Commerzbank AG	29.252,17	0,90	81,60	142	206,00	24	CIBC World Markets Inc	16.312,68	0,90	78,20	63	258,93
25	Dresdner Kleinwort	28.211,12	0,80	82,40	76	371,20	25	BMO Capital Markets	15.296,29	0,90	79,10	70	218,52

Source: Thomson One Banker

market concentration as the same deal is credited to several banks: for example, suppose that in a given M&A transaction the target firm hires two investment banks, while the bidder company hires three investment banks. It is just one deal, but its value is credited to five banks.

League tables for underwriting services are built by looking at the proceeds raised; however, the ranking is not that different with the league table based on the number of transactions rather than on the value. In this respect, the league table for advisory services are different: reputed investment banks are involved only in large transactions, while smaller ones normally involves less important financial institutions or even non-banking consulting firms: to sum up, M&As league tables based on values are different from those based on number of transactions.

Table 1.4 reports the global M&As league tables for the years 2007 and 2008 based on both the entity value of the target firms and the number of transactions. In 2007, according to the value-based criterion in the top 10 positions we find the "usual suspects", i.e., the major investment banks (Goldman Sachs, Morgan Stanley, Merrill Lynch, and Lehman Brothers) plus the universal banks that most actively compete in the investment banking market (Citi, JP Morgan, UBS, Credit Suisse, and Deutsche Bank). Rothschild and Lazard, which are pure investment banks mostly focused on advisory services, are also in the top positions (in 2007 10th and 11th, respectively). Since the advisory services do not require any capital commitment, many "boutiques", not even competing in the underwriting services are instead well ranked in M&A advisory (e.g., Gresham or Evercore). Looking at the ranking based on the number of transactions, it clearly emerges that other firms compete in the advisory segment, albeit with a different strategy. In 2007, for example, KPMG is the top-advisor worldwide for number of transactions and other consulting firms, such as Deloitte & Touche or Ernst & Young are well positioned. Nonetheless, the aggregate value of their deals suggests that these firms focus on transactions that are much smaller compared to those of the major financial institutions. In 2008 we find a pattern similar to that observed in the other league tables: beside the merger of Merrill Lynch into Bank of America and the disappearance of Lehman, there is a clear drop both in the number and the value of the transactions: in particular, the drop in the value is due in part to a decreased number of deals and in part to a crash in financial markets that drove down the prices.

1.4 Conclusions

This chapter provided some introductory definitions of investment banking. Investment banking consists of all the banking services that are not classified as commercial, which in turn is "deposits taking and loans making". Investment banking includes a rather heterogeneous set of activities, which can be classified into three main areas: (a) core or traditional investment banking (underwriting and advisory services), (b) trading and brokerage, and (c) asset management. This book is

Table 1.4 League Tables 2007–2008: M&As Advisory (Target Entity Value and Number)

Value				Number			
Rank	Bank	Value (EUR, ml)	# of Deals	Rank	Bank	# of Deals	Value (EUR, ml)
2007							
1	Goldman Sachs & Co	1.047.049	498	1	Citi	549	834.785
2	Morgan Stanley	979.418	433	2	Goldman Sachs & Co	498	1.047.049
3	Citi	834.785	549	3	KPMG Corporate Finance	471	45.833
4	JP Morgan	789.204	440	4	UBS	461	723.495
5	UBS	723.495	461	5	JP Morgan	440	789.204
6	Merrill Lynch	713.322	366	6	Morgan Stanley	433	978.775
7	Credit Suisse	643.437	400	7	Credit Suisse	400	643.437
8	Deutsche Bank AG	624.271	290	8	PricewaterhouseCoopers	395	35.250
9	Lehman Brothers	571.224	280	9	Rothschild	393	399.232
10	Rothschild	399.232	393	10	Merrill Lynch	366	713.322
11	Lazard	378.651	293	11	Deloitte & Touche	311	21.140
12	BNP Paribas SA	267.931	204	12	Lazard	293	378.651
13	HSBC Holdings PLC	217.129	112	13	Deutsche Bank AG	290	624.271
14	ABN AMRO	196.127	211	14	Lehman Brothers	280	571.224
15	Macquarie Bank	188.249	117	15	Ernst & Young LLP	254	28.899
16	Greenhill & Co, LLC	174.627	35	16	ABN AMRO	211	196.127
17	Societe Generale	157.130	74	17	IMAP	205	5.245
18	Banc of America Securities LLC	152.055	104	18	BNP Paribas SA	204	267.931
19	Gresham Partners	143.211	26	19	Nomura	171	34.435
20	RBC Capital Markets	131.423	154	20	RBC Capital Markets	154	131.492
21	Santander Global Banking	121.791	45	21	Jefferies & Co Inc	151	25.020
22	Royal Bank of Scotland Group	105.880	3	22	Houlihan Lokey Howard & Zukin	147	36.585
23	CIBC World Markets Inc	105.756	106	23	M&A International	145	2.783
24	Evercore Partners	94.810	44	24	Daiwa Securities SMBC	133	11.414
25	Mediobanca	86.326	66	25	Grant Thornton LLP	121	1.323
2008							
1	Goldman Sachs & Co	573.065	360	1	KPMG	408	38.761
2	JP Morgan	532.978	386	2	JP Morgan	386	532.978

(*continued*)

Table 1.4 (continued)

Value				Number			
Rank	Bank	Value (EUR, ml)	# of Deals	Rank	Bank	# of Deals	Value (EUR, ml)
3	Citi	473.198	345	3	Goldman Sachs & Co	360	573.065
4	Bank of America Merrill Lynch	428.936	350	4	UBS	353	388.036
5	UBS	388.036	353	5	Bank of America Merrill Lynch	350	428.936
6	Morgan Stanley	378.843	346	6	Morgan Stanley	346	378.843
7	Deutsche Bank AG	331.594	291	7	Citi	345	473.198
8	Credit Suisse	327.593	333	8	Credit Suisse	333	327.593
9	Barclays Capital	207.267	107	9	PricewaterhouseCoopers	308	23.798
10	BNP Paribas SA	194.491	125	10	Rothschild	297	135.147
11	Lazard	176.069	222	11	Deutsche Bank AG	291	331.594
12	Rothschild	134.363	297	12	Deloitte & Touche	243	8.346
13	Centerview Partners LLC	127.578	11	13	Ernst & Young LLP	228	25.870
14	Nomura	91.239	159	14	Lazard	222	176.069
15	RBS	78.672	116	15	IMAP	160	881
16	Societe Generale	62.594	44	16	Nomura	159	91.239
17	Moelis & Co	60.765	12	17	Houlihan Lokey Howard & Zukin	140	15.151
18	Wells Fargo & Co	60.337	40	18	BNP Paribas SA	125	194.491
19	Mediobanca	57.892	95	19	M&A International	122	1.871
20	Commerzbank AG	57.363	60	20	RBS	116	78.672
21	HSBC Holdings PLC	52.234	77	21	Barclays Capital	107	207.267
22	Evercore Partners	47.257	29	22	Macquarie Group	105	29.802
23	Greenhill & Co, LLC	44.892	21	22*	Global M&A	105	732
24	KPMG	38.761	408	24	RBC Capital Markets	102	24.308
25	Santander	38.754	44	25	BDO International	100	1.594

Source: Thomson One Banker

entirely focused on traditional investment banking. While Chaps. 3–6 deal with underwriting services, Chaps. 7–10 discuss the advisory services. Chapter 2 illustrates the main feature of the private equity industry: the choice of including private equity is motivated by the fact the, at least in the recent past, a increasingly relevant part of traditional investment banking business has been generated by private equity funds; moreover, virtually all major investment banks are active players in the private equity industry.

This chapter also provided an overview of the investment banking players, through a look to the global league tables for the underwriting services (equity and bond offerings, and loan syndication) and M&A advisory. To conclude, from the big picture of the league tables the following major players seem to emerge: Goldman Sachs, Morgan Stanley, Credit Suisse, UBS, Deutsche Bank, Citi, JP Morgan, and Bank of America – Merrill Lynch. In addition to these banks, Lazard and Rothschild also seem to be very competitive in the advisory services.

In conclusion, it must be noted that the global financial system has been recently shocked by a major crisis that has contributed to reshape the financial industry. The medium-term effects of these changes are unforeseeable. Arguably, there will be always a demand for the services provided by investment banks: nonetheless the characteristics of the suppliers and profitability of the business itself might change.

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Chapter 2
Private Equity

2.1 Introduction

> A rather broad definition of private equity might sounds like this: "a professionally managed pool of money raised for the sole purpose of making actively-managed direct equity investments in private companies and with a well defined exit strategy (sale or IPO)" (Megginson 2004).

One may wonder why a book about investment banking includes a chapter on private equity.

I can provide two different answers. First, private equity funds are increasingly important clients of investment banks. Fruhan (2006) reports that private equity firms account for about 25% of total revenues for major investment banks. In 2005 about 20% of total US M&As volume was related to private equity. In Germany the percentage was even higher (about 35%). In the 2001–2006 period out of the 701 US IPOs about 70% were private equity backed.[1] Second, investment banks are increasingly important players of the private equity industry. Virtually all major investment banks manage some private equity funds. For example, Morrison and Wilhelm (2007) reports that Goldman Sachs has more capital invested in private equity than any other private equity player. These two reasons also explain the increasing mobility of human resources from investment banks to the private equity industry.

This chapter aims at analyzing the main technical aspects of the private equity business. The chapter proceeds as follows. Section 2.2 provides a classification of the private equity activity. Section 2.3 analyzes the agreement between the investors, who put the money, and the professionals who manage that money. Section 2.4 describes how to measure the performance of private equity funds. Section 2.5 summarizes the main features of the term sheet that regulate private equity investments. Sections 2.6 and 2.7 illustrate the valuation methods used by private equity professionals to decide about their investments. Section 2.8 concludes.

[1]The data are from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/ipodata.htm.

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2.2 Definitions

Within the private equity industry it is possible to classify two main areas: (a) venture capital (VC) and (b) buy-out.

The key feature defining VC is expected rapid "internal growth" of the backed companies: that is proceeds are used to build new business, not to acquire existing business. The VC industry can be further broken down into: (a) early-stage, (b) expansion-stage, and (c) late-stage.

Early-stage investments include everything through the initial commercialization of a product. A company might not even be existent yet. Within the early stage two kinds of investments are usually identified: (a) seed investments through which a small amount of capital is provided to prove a concept and to qualify for start-up financing; (b) start-up investments, aimed at completing the product development, market studies, assembling key management, developing a business plan. Truly early stage investments are generally financed by "angels" rather than venture capitalist. Angels are wealthy individuals who, differently from venture capitalists, use their own money and are not formally organized. Megginson (2004) reports that less than 2% of VC investments are truly early-stage. Expansion investments finance fixed and working capital. The company may or may not be showing a profit. Finally, at late stage, fairly stable growth should be reached. Again, it may or may not be profitable, but the likelihood of profit is higher than in previous stages. Moreover, at this stage a plausible exit should be visible on the horizon.

Buy-out investing is the largest category of private equity in term of funds under management. Buy-out investors pursue a variety of strategies, but the key feature is that they almost always take the majority of their companies. In contrast VCs usually take minority stakes. In large buy-outs of public companies investors usually put up an equity stake and borrow the rest from banks and public markets, hence the term leveraged buyout (LBO). Most buy-outs firms are engaged in purchasing "middle-market" firms. Usually buy-out firms have stable cash flows and limited potential for internal growth, although this is not always true. Some buy-out funds focus on distressed companies.

Notice that there is a definitional difference between Europe and the US. In the US the term venture capital refers to all kind of professionally-managed equity investments in growth firms. In Europe the term venture capital tends to indicate just early and expansion investments.

Also note that the private equity activity is often overlapping with hedge fund activity. Hedge funds are flexible investing vehicles that share many characteristics of private equity funds. The main difference is that hedge funds tend to invest in public securities. Moreover, in contrast to other pooled investment vehicles, hedge funds make extensive use of short-selling, leverage, and derivatives. The greatest overlap with private equity is on the buy-out area, in particular distress investments. However, while private equity funds tend to gain control of the distressed company, restructure it and resell, hedge funds usually trade securities of distressed companies with the intention of making a profit by quickly reselling these securities.

Nonetheless, the difference between hedge funds and private equity funds is increasingly blurred. For now, hedge funds are not still involved in VC investing.

2.3 The Agreement

Most private equity funds are organized as limited partnership sponsored by a private equity firm. Private equity firms are small organizations (averaging ten professionals) who serve as the general partners (GPs) for the private equity fund. A fund is a limited partnership with a finite lifetime (usually 10 years). The limited partners (LPs) of the fund are the investors (pension funds, banks, endowments, high-net-worth-individuals, etc.).[2] When a fund is raised the LPs promise to provide a given capital, either on a set schedule or at the discretion of the GP: the capital infusions are known as *capital call*, *drawdown*, *or takedown*. The total amount of promised capital is called *committed capital*: once the committed capital is raised, the fund is *closed*. The typical fund will draw down capital over its first five years (the investment period or commitment period). A successful private equity firm will raise a new fund every few years and number its successive funds.

The compensation of the GP is usually divided into: (a) *management fee* and (b) *carried interest* (or just *carry*).

2.3.1 Management Fee

The typical arrangement is for LPs to pay a given percentage of committed capital every year, most commonly 2%. Sometimes the fee is constant over time, sometimes it drops after the first five years. *Lifetime fees* are the sum of the annual management fees for the life of the fund. The *investment capital* is the committed capital less the lifetime fees. An example might be of help. Consider a fund with committed capital equal to €100 ml and 2% management fee for all the 10 year life of the fund. The lifetime fees are €20 ml and the investment capital is €80 ml.

[2]The limited partnership form is the standard organizational form in the US (and the UK). In other European countries investment companies manage close-end funds. In other words it is the same organizational form of mutual funds. It is important to notice that the agreement (especially in term of compensation) that ties the GPs/Investment companies to the LPs/Investors is pretty much the same. I will refer to the limited partnership model henceforth. Beside the organizational form, there other three differences between the US and European private equity industry. First, the source of funds. In the US the most important investor category (LPs) is represented by pension funds, whereas in Europe banks play the key role. Second, the investment stage. Both in the US and Europe, buyout investments represent the largest part of the private equity investment value. Though, in the US venture capital investments play an important role, whereas they are limited in Europe. Finally, the exit strategy. The typical exit strategy in the US is an IPO, whereas in Europe it tends to be a trade sale, i.e., the sale of the company to a competitor.

Therefore, the fund needs to earn at least a 25% of lifetime return on its investment just to offset the management fee.

The industry-standard practice is to compute the management fee on committed capital,[3] but there is also another method. First, let's define the difference between *realized* and *unrealized investments*: the former are those investments that have been exited (or those in companies that have been shut down), while the latter are those investments that have not yet been exited in companies that still exist. The *cost basis* of an investment is the value of the original investment. The *invested capital* is the cost basis for the investment capital that as has been deployed. The *net invested capital* is the invested capital minus the cost basis of realized investments. Sometimes the management fee base changes from committed to net investment capital after the five-year investment period is over. Since funds tend to realize investments (i.e., to cash in) in the second part of their life, the net invested capital is typically decreasing in this period. Consider this simple example. Suppose a €100 ml fund has management fee of 2% per year. This fee is paid on committed capital in the first 5 years and on net invested capital in the remaining 5 years. Assume that at year-end 5 the fund is fully invested. Given this structure, management fees will be equal to €2 ml for each of the first 5 years. At year-end 5 the invested capital would then be €90 ml. Suppose that the fund realizes 20% of its invested capital in each of the remaining 5 years, i.e. €18 ml per year. Hence, at year-end 6 the net invested capital is €72 ml and the corresponding management fee is €1.44 ml. At year-end seven, investment capital and management fee are €54 ml and €1.08 ml, respectively, and so on. In other words, the management fee is constant in the first 5 years and decreasing in the following 5 years.

Notice that the management fee usually does not cover all operating expenses. Moreover contracts allow reinvestment rights, subject to given requirements (e.g., the original investment has been exited within 1 year). When reinvestment does occur, the sum of investment capital and lifetime fees would be greater than committed capital.

2.3.2 Carried Interest (Carry)

The basic idea is simple: if the committed capital is €100 ml and total exit proceeds are €200 ml, the total profit is €100 ml. A 20% carried interest would produce €20 ml. The standard carried interest is indeed 20%. There are many variations of the basic story.

Carried interest basis: It is the threshold that must be exceeded before the GPs can claim a profits: the majority of funds use the committed capital, but sometimes

[3]Notice that, differently from the "traditional" asset management industry, in private equity the management fee is not computed on the market value of the portfolio. This is because is quite difficult to compute the market value of private equity firms.

the investment capital is used. Consider two different carried interest structures for a €100 ml. fund. Both structures have management fee of 2% per year (on commitment capital) for all ten years. Under structure I, the fund would receive a 20% carry with a basis of all committed capital. Under structure II, the GPs would receive a 18% carry with a basis of all investment capital. Suppose the total exit proceeds from all investments are €200 ml over the entire life of the fund. Under structure I carried interest would be 20%·(200 – 100) = €20 ml. Under structure II, lifetime fees are 2%·€100 ml·10 years = €20 ml. The investment capital is therefore €80 ml. The carry is hence 18%·(200 – 80) = €21.6 ml. For what amount of exit proceeds would these two structures yield the same amount of carried interest? The answer is €280 ml (carry equal to €36 ml).

Timing: The portion of committed capital that has already been transferred from the LPs to the GPs is called *contributed capital*. Many funds require the return of (at least a portion of) the contributed before any carried interest can be returned. Clearly, this timing is more GP-friendly than requiring the return of the whole basis.

Hurdle return: Sometimes a given rate of return is promised to the LPs before the GPs can get the carried interest. This rate is called *hurdle return* (or *priority return*). Most hurdle return also have a *catch up provision*, which provides the GPs with a greater share of the profits once the priority return has been paid and until the preset carry percentage has been reached. Consider a €100 ml fund with a 20% carry on commitment capital, a priority return of 8%, and a 100% catch-up. Imagine that all committed capital is drawn down on the first day and that there are total exit proceeds of €200 ml, with €108 ml of these proceeds coming one year after the first investment, €2 ml. coming one year later, and €90 ml. coming the year after that.

Under this rule all €108 ml would go to the LPs, satisfying the 8% priority return. On year later the catch up provision implies that the whole €2 ml would go the GPs, thus receiving the 20% of the profits. The final distribution would be split €72 ml for the LPs and €18 ml for the GPs. The presence of a priority return and a catch-up provision affect the timing of the carry, but not the amount. In contrast, the absence of catch up provision would have meant that the GP would have received only 20%·(200 – 108) = €18.4 ml.

Clawback: The early payment of carried interest can cause complications if the fund begins well, but performs poorly afterwards. The refund of carried interest is accomplished with a contractual provision known as *clawback*. This provision is complicated by many factors: e.g., the GPs do not have the money (usually there is a guarantee by individual GPs), or specification of whether clawback will be net or gross of taxes already paid by the GPs. Suppose that a €100 ml fund has a 20% carry with a basis of all committed capital, but allows carried interest to be paid as long as contributed capital has been returned to LPs. Imagine that at the third year, contributed capital is €50 ml and the first exit produces €60 ml. Given the carry rules, the fund would return the first €50 ml. to its LPs, and the remaining €10 ml would be split as €8 ml for the LPs and €2 ml for the GPs. Now, suppose that at the end of the fund (seven year later) there is no more exit. Contributed capital is now €100 ml, but the LPs have only received back the €58 ml from the first and only exit. With a clawback provision they will get back the carry already paid.

2.4 Fund Returns

The standard measure in private equity performance reporting is the internal rate of return (IRR). However, IRR can be problematic. Standard IRR reporting does not make a distinction between realized and unrealized investments. Unrealized investments are usually considered as a positive cash flow equal to their cost basis. Of course, this is a strong assumption, as unrealized investment could produce a great return as well as no return at all. The IRR is then particularly misleading in first few years of a fund. Even for a fund that eventually has a good IRR, a plot of the IRR will be negative for the first few years, and then increasing rapidly in later years. This typical pattern is called *J-curve* or *hockey stick*.

The IRR is a mathematically-formal measure of performance. However, most investors want just an easy answer to the following easy question: "How much money did you make?". The answer is the *cash multiple*. The cash multiple is the sum of the realized cash multiple and unrealized cash multiple.

Consider the following example. A €100 ml fund is 8 years into its ten-year life. The management fee is 2% per year and carry is 20% payable only after all committed capital is paid back to LPs. The pattern of investments, portfolio value, fees and distribution are reported in Table 2.1.

Notice that there is no distribution of carry to the GPs because distributions to LPs equal the committed capital only at year-end 8: the carry will hence be distributed only in the last two years.

To compute the IRR at year-end 8 we need to determine the amount of money that goes out and in LPs' pockets. The cash flow to LPs is equal to distributions to LPs less the investments and management fees. The cash multiple is a ratio: the

Table 2.1 Fees and distribution

Year	1	2	3	4	5	6	7	8	Total
Investments	16	16	16	16	16	0	0	0	80.0
Portfolio value	16	40	80	120	150	160	170	180	
Total distributions	0	0	0	20	20	20	20	20	
Carried interest	0	0	0	0	0	0	0	0	
Distribution to LPs	0	0	0	20	20	20	20	20	100.0
Cumulative distributions to LPs	0	0	0	20	40	60	80	100	
Portfolio value after distributions	16	40	80	100	130	140	150	160	
Management fee	2	2	2	2	2	2	2	2	16.0
Cash flow to LPs	−18	−18	−18	2	2	18	18	18	
							IRR	1%	
							Cash multiple	2.71	
							Realized cash multiple	1.04	
							Unrealized cash multiple	1.67	

numerator is the value of total distributions to LPs (100) plus unrealized investments (160). The denominator is invested capital plus management fees. The cash multiple ate year-end 8 is 2.89. Notice that unrealized investments are considered as a positive cash flow. To understand how much of the cash multiple is depends on liquidated investments, we can compute the realized cash multiple (1.04), considering only realized investments, i.e. total distributions to LPs (100). The unrealized cash multiple (1.67) considers only unrealized investments.

Generally, cash multiples are computed considering the net cash flow to LPs plus unrealized investments. It is also possible to compute a *gross cash multiple*, where the carry is also included. In other words the numerator of the gross cash multiple is equal to total distributions plus unrealized investments.[4] Not considering carry distribution the gross cash multiple represents a measure of pure performance.

2.5 The Term Sheet

Buy-out funds usually make a single investment in a target firm taking the majority stake. In contrast VC funds make lumpy investments organized into sequential round. A first-round investment is designated as Series A, a second-round of investment as Series B, and so on. In some cases the investment is spread across multiple payments, knows as *tranches*, which may be contingent on achieving some milestones (e.g., a patent or a prototype). Tranching is much more frequent in first rounds (Series A). Moreover, VC funds usually take a minority stake. As such, an important aspect of VC investments is the corporate governance of the target firm. The *term sheet* regulates the relationship between the VC fund and the controlling shareholder who is almost invariantly the founder/entrepreneur.

In a nutshell, the term sheet describes the basic structure of a transaction and provides a set of protections against expropriation. The purpose of a term sheet is illustrated by this example.[5] Mario Web has a tremendous business idea and goes to a VC, Frank Fund. Web and Fund agree that €3 ml will fund the project and they further agree to a 2/3–1/3 split, with Web holding the majority stake. Suppose that Fund agrees to an all common stock structure. Immediately after the closing, the company has an implied value of €9 ml (Fund is paying €3 ml for 1/3 of the company). It is important to know the difference between *pre-money* and *post-money* valuation (also known as pre-financing and post-financing). The post-money valuation is simply that value of the company once the initial investment has been made. Subtracting the amount invested in this round from the post-money valuation yields to the pre-money valuation. Hence the post-money valuation is €9 ml, whereas the pre-money valuation is €6 ml. The pre-money valuation at the first

[4]In this example total distributions and distributions to LPs coincide. This is because in the first 8 years there is no distribution In out example of carry to GPs.

[5]This example is based on that reported in Lerner et al. (2005).

round is sometime referred to as *sweat equity*, because it reflects the hard work of the founder.

The following day, Web receives a €3.6 ml offer for his company (which basically consists in cash and Mario Web's idea). What is the result? Web and Fund get €2.4 ml and €1.2 ml, respectively. Web's wealth rises from €0 to €2.4 ml, whereas Fund's wealth drops from €3 ml to €1.2 ml. And all this happens in just one day. Moreover, someone else can buy Web and his tremendous idea for €0.6 ml: indeed the company has €3 ml cash, hence the net price is just €0.6 ml. How could Fund have avoided this disaster? The answer is threefold: (a) *preferred stock*, (b) *vesting of founder's shares*, and (c) *shareholders' agreement*.

2.5.1 Preferred Stock

Preferred stock (PS) has a *liquidation preference* over common stock: that is, in the event of sale or liquidation of the company, PS gets paid prior than common stock. Generally the face value of PS is the cost basis the VC fund pays for the stock. In the example, if Fund had invested in the form of PS, then he would have been returned €3 ml. But how would have the remainder €0.6 ml been divided? The answer depends on the type of PS and on the resulting *exit diagram*.

2.5.1.1 Convertible Preferred Stock (CPS)

CPS can be converted at the shareholder's option into common stock. Shareholders are then forced to choose whether they will get money through the liquidation feature (redemption) or through the underlying common equity position. Figure 2.1 shows the exit diagram of CPS. Clearly, if the value being offered for the company (W) exceeds the implied total value at the time of the investment, then shareholders will convert the preferred stock to common stock. In the example the conversion value of CPS is equal to 1/3 W. The redemption value of CPS is min [3, W]. Hence, the condition for shareholders to convert (conversion condition) is 1/3 W $>$ 3 or W $>$ 9.

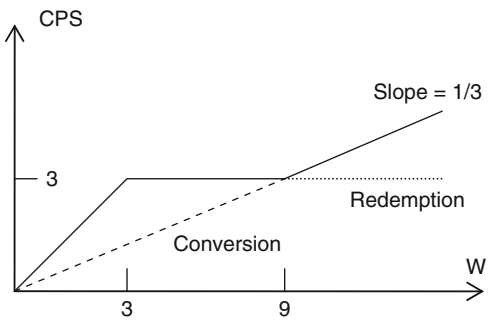

Fig. 2.1 Exit diagram for CPS

In our example, Fund would have left his CPS unconverted and Web would have got the residual €0.6 ml. CPS allows the entrepreneur to "catch up" to the investor after the investor's initial investment is secured.

2.5.1.2 Redeemable Preferred Stock (RPS)

RPS is preferred stock with no convertibility into equity. Although a VC fund would never accept RPS by itself, some transactions combine RPS with common stock or CPS. Suppose for example Fund agreed with Web to the same 2/3–1/3 split, but in the form of RPS plus common stock. Figure 2.2 reports the exit diagram of Fund's position. Fund would have received €3 ml for its RPS and 1/3 of the remainder €0.6 ml. In other words, he would get his money back and keep the investment in the firm. Of course this double gain penalizes Mario Web.

2.5.1.3 Participating Convertible Preferred Stock (PCPS)

Basically PCPS mimicks a position in RPS plus common stock. In other words, PCPS gets the redemption value and receives any additional proceeds that would have been generated by a conversion into common stock. It is important to remember that this liquidation preference only applies if the company is sold or liquidated. In contrast, if PCPS is converted it becomes like common stock. PCPS tend to penalize entrepreneurs. This is why they often try to include in the term sheet one of the following two provisions: (a) mandatory conversion (contingent on a given event) and (b) cap on liquidation preference.

Suppose for example that the sale of the company for more than €24 ml triggers a mandatory conversion. See Fig. 2.3 for the exit diagram. In our example, Fund would have received the same amount of money as a CPS. In recent years, it has become common for VC fund to ask for liquidation preferences in excess of their original investment. For example, a 2x or 3x liquidation preference requires that the

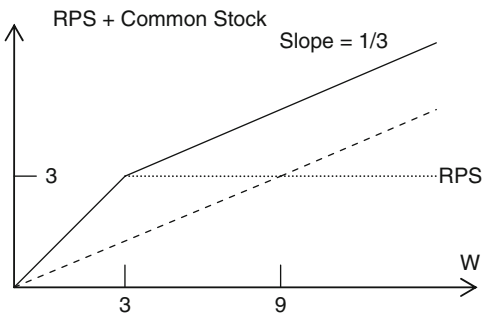

Fig. 2.2 Exit diagram for RPS + Common Stock

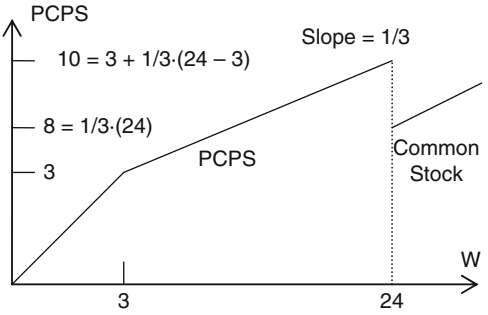

Fig. 2.3 PCPS with mandatory conversion

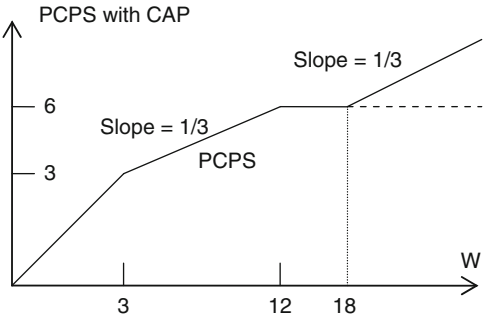

Fig. 2.4 PCPS with cap

VC be paid back double or triple, respectively, of their original investment before any of the other equity claims are paid.

An alternative mechanism to limit the fund's gain with PCPS is a *cap* on liquidation preference of PCPS. Suppose that Fund accepts to be capped at 2 times its initial investment. With a PCPS, Fund would receive €3 ml plus 1/3 of any remaining proceeds, until this total reaches €6 ml (2·€3 ml).

The cap point is then: $1/3 \cdot (W - 3) + 3 = 6$ or $W = €12$ ml. Figure 2.4 reports the exit diagram for this case. Given this cap, Fund will choose to convert the PCPS for a lower value than the one which triggers the mandatory conversion (24).

Indeed, Fund will voluntarily convert when $1/3\ W > €6$ ml or $W > €18$ ml (that is before the mandatory conversion at €24 ml).

Notice that listed companies usually issue preferred stock with a minimum cash dividend, but this is not the case in VC. Portfolio companies are usually cash poor and dividends may further limit the ability to raise capital. Nonetheless, in some term sheets you may find something about dividends. In general dividends may be either paid cash or through the issuance of new stock (*payment-in-kind, PIK*). In general it is common to find a *dividend preference* to PS (that is, dividends to common stock can be only paid after PS). Dividends rights may be cumulative or non-cumulative, the difference being that cumulative dividends accrue even if

not paid. Non-cumulative dividends in turn can accrue by simple interest or by compound interest.[6]

2.5.2 Anti-Dilution Protection

Many CPS and PCPS contain anti-dilution provisions that automatically adjust the conversion price down if the company issues stock below the share price that VC fund originally paid. This condition is known as *down round*, indicating that the company has been performing poorly. The share price of the VC investment is known as *original purchase price* (*OPP*). By having an automatic adjustment, the VC is less likely to oppose a dilutive financing (when it is most needed).

The adjustment mechanism is a negotiated term and can range from complete adjustment (*full ratchet*) to one based on the size of the round and the size of the price decrease (*weighted-average*). In this latter case we further distinguish between *broad-base* and *narrow-base*.

With a *full ratchet* adjustment the adjusted conversion price (CP_2) is set to the lowest conversion price of any later stock issue. If a *weighted-average* adjustment is negotiated the formula would be:

$$CP_2 = CP_1 \cdot \frac{(A+B)}{(A+C)}$$

where CP_2 is the adjusted conversion price, CP_1 is the conversion price in effect before the new issue, A is the number of shares of common stock (fully diluted), B is the value of the new issue divided by CP_1, and C is the number of new shares issued. With a weighted average adjustment the price is "more" adjusted the larger the round size and the price decrease. In *broad-base* adjustment A includes all shares of outstanding common and PS (as it was converted). In *narrow-base* A includes just PS as it was converted: in other words, it considers just the Series A investment, but not the common stock outstanding. An example might help. Suppose that Frank Fund makes a €3 ml Series A investment in Newco for 1 ml shares at €3 per share (the OPP). Newco underperforms and after a while receives a €3 ml Series B financing from another VC fund (Desperate Inv.) for €3 ml shares at €1 per share. The founder (and the employee) holds 2 ml shares of common stock.[7] Now consider the following cases.

[6]For details about PS valuation see Metrick (2007).

[7]Usually the founder and employees has stock option as an incentive compensation. The computation is done on a fully diluted basis, which assumes that all PS is converted and options are exercised.

2.5.2.1 Series A Has No Anti-Dilution Protection

Fund has 1 ml shares out of a fully diluted count of 1 ml (Fund) plus 3 ml (Series B) + 2 ml (Founder) or 6 ml shares. Hence Fund controls 16.67% (1/6) of the company. Series B investors pay €1 per share, hence the post-money valuation is €6 ml (6 ml·€1), and the pre-money valuation is €3 ml (€6 ml – €3 ml).

2.5.2.2 Series A Has Full-Ratchet Anti-Dilution Protection

The adjusted conversion price (CP_2) for Series A investors would be €1 (the price of Series B), and Fund would control 3 ml shares out of a fully diluted count of 3 ml (Fund) + 3 ml (Series B) + 2 ml (Founder) or 8 ml shares. Fund would then controls 37.5% of the company. The post-money valuation is €8 ml (8 ml·€1), and the pre-money valuation would be €5 ml (€8 ml – €3 ml).

2.5.2.3 Series A Has a Weighted-Average Anti-Dilution Protection (Broad-Base)

The inputs of weighted-average formula are the following:A = 3 ml, that is 1 ml (Fund) plus 2 ml (Founder), B = €3 ml/€3 = 1 ml, and C = 3 ml. These inputs result in:

$$CP_2 = €3 \cdot \frac{(3+1)}{(3+3)} = €2$$

Fund would then control €3 ml/€2 = 1.5 ml shares of a total of 1.5 ml (Fund) plus 3 ml (Series B) + 2 ml (Founder) = 6.5 ml. Fund would hence be controlling 23.08%. The post-money valuation would be €6.5 ml (6.5 ml·€1), and the pre-money valuation would be €3.5 ml (€6.5 ml – €3 ml).

2.5.2.4 Series A Has a Weighted-Average Anti-Dilution Protection (Narrow-Base)

The inputs of weighted-average formula are the following:A = 1 ml (Fund), B = €3 ml/€3 = 1 ml, and C = 3 ml. These inputs result in:

$$CP_2 = €3 \cdot \frac{(1+1)}{(1+3)} = €1.5$$

Fund would control €3 ml/€1.5 = 2 ml shares of a total of 2 ml (Fund) plus 3 ml (Series B) + 2 ml (Founder) = 7 ml. Fund ownership would then be 28.57%.

Table 2.2 Anti-dilution protection

	No protection	Full-ratchet	Weighted average	
			Broad-base	Narrow-base
Adjusted conversion price (CP_2)	€3	€1	€2	€1.5
Fund's ownership	16.67%	37.5%	23.08%	25%
Post-money value	6	8	6.5	7
Pre-money value	3	5	3.5	4

The post-money valuation would be €7 ml (7 ml·€1), and the pre-money valuation would be €4 ml (€7 ml – €3 ml).

Table 2.2 summarizes the results.

Clearly, a full-ratchet adjustment is the best protection against dilution. The weighted-average adjustment takes into account the impact of the down round on pre-existent price and ownership structure. Hence, the higher the number of new shares and the lower the issue price, the greater the price adjustment. Differently from the broad-base approach, the narrow-base does not consider all the pre-existent shares, but only those of Series A. As such, the effect of the dilutive round is amplified and so is the adjustment.

2.5.3 Vesting and Shareholders' Agreement

The idea of vesting is simple. The entrepreneur does not really own his stock until a given date or a pre-identified event (e.g., the sale of the company). Typically vesting is implemented over a time period (*step vesting*); alternatively, it takes place all at one time (*cliff vesting*). Vesting prevents the entrepreneurs (or key employees) from leaving before a certain time. Consider again the example about Mario Web and Frank Fund. With vesting Web would not be able to sell his shares to the bidder until a certain period of time, during which Fund is protected. Vesting is sometimes also used for founders' shares owned before the first VC investment. In other words, the founder is asked to "suspend" his ownership stake for a while.

The most basic way VCs protect their investments is through a shareholders' agreement. Usually VCs are concerned about changes in control. The term sheet may state that the founder cannot sell his stake without the approval (or supermajority voting rule for shareholders or board) of the VC fund. In other words the VC fund has a veto power. Alternatively, a supermajority voting rule might be established for a change in control, meaning that a percentage higher than 51% is needed. Other common covenants state that the founder cannot sell his shares without offering them to the VC fund before anyone else (*right of first offer*) or without offering the VC fund to buy at the price offered by third parties (*right of first refusal*). The right of first refusal is often confused with the right of first offer. The right of first refusal is the right to make an offer *after* other offers are considered. In contrast, the right of first offer is the right to make an offer *before* offers from others

are considered. An example might clarify. Suppose you are the entrepreneur and you are looking to sell your shares. The VC fund has a right of first refusal on them. If a third party now comes along and offers €100 for the shares, you have to reveal that price to the VC fund. If the fund chooses to execute his right, it can pay €101 and walk away with the shares. Now suppose that you are looking to sell your shares and the VC fund has right of first offer. The first step is to make an offer to the fund to buy the shares for say €100. If the fund refuses, then you can go to the market and sell your shares for €100. If you do not find any buyer, you cannot just sell the shares for a lower price. You have to re-run the process and offer the shares to the VC fund first.

The term sheet may also allow the VC fund to sell together with the founder (*take-me-along* or *tag-along right*) or to force the founder to sell his stake at the same price (*drag-along right*), the latter being particularly useful to funds that need to force a sale of the whole firm.

2.6 The Venture Capital Method

The VC method is a valuation tool commonly applied in the private equity industry. The company value is projected for some years (say 5 years from the present), based on a "success scenario". Usually the relative approach is used (i.e., multiples of comparable companies). This terminal value is then converted to a present value by applying a very high discount rate, typically between 35 and 80% per year. The resulting figure is the estimated current total value. Given the investment requested to the VC fund, it is easy to compute the percentage of ownership it will ask. To sum up, three variables are needed: (a) the terminal value, (b) the discount rate, and (c) the investment size. If a company is expected to issue additional shares in the future, thus diluting the ownership of original investors, the VC method becomes more complex. We will see this extension of the VC method in the second part of this section.

2.6.1 The Basic VC Method (No Dilution)

Consider a VC fund evaluating a €1 ml investment in a company that expects to require no further capital through 5 years. The company is expected to earn €2 ml in year 5 and P/E for comparable companies is 10. The VC fund requires a 50% rate of return. The stake of the VC fund at year-end 5 must be large enough to realize 50% annual return on the investment: at that time the final stake must be worth $(1 + 50\%)^5 \cdot$€1 ml, or €7.6 ml. At that point the whole company will be worth €20 ml (10·€2 ml). The required percent ownership is then 7.6/20 or 37.97%.

When a VC fund invests in a company additional shares are issued, diluting the ownership of previous investors, e.g., the founder. The required percent ownership

refers to the portion of total stocks after the new shares are issued (i.e., post-money). Suppose there are 1 ml shares outstanding pre-money. The final percent ownership (38.0%) should then be equal to:

$$38\% = \frac{New - Shares}{New - Shares + 1\,\text{ml}}, \text{hence}$$
$$New - Shares = 1\text{ ml} \cdot \frac{37.97\%}{(1 - 37.97\%)} = 612,091$$

The share price is the price paid (€1 ml) divided by the number of shares purchased (612,091), i.e. €1.6. It is now quite easy to infer the implicit value of the whole company. The fund gets 37.97% investing €1 ml. The whole company is therefore valued €2.6 ml (or €1 ml/37.97%). This is the post-money valuation. An alternative approach to determine the post-money valuation is to discount the projected terminal value:

$$\frac{\neg 20\text{ ml}}{(1 + 50\%\ )^5} = \neg 2.6\text{ ml}$$

The computation of the VC method is usually done on a fully diluted basis, i.e., assuming that all convertibles are converted and all options are exercised.

To wrap it up, the key elements of the VC method are the terminal value, the discount rate, and the proposed investment. The valuation method used by VC funds is usually the relative approach. Of course the challenging task is to predict the future net income of the company. The investment size is the most certain variable. The total amount of funding to be raised depends on the company's needs. However, what fraction of that amount the VC fund will invest depend on the specific funds' needs. For example, for diversification purposes VC funds set a maximum investment level. They also have a minimum level for any investment, determined either by the size of the investment (e.g., no less than €1 ml in any given investment) or by the expected return (e.g., the expected exit must exceed €5 ml, regardless the investment size).

The question is how the discount rate is determined. It clearly depends on the stage of financing: an early-stage investment is riskier relative to a late-stage investment and will thus require a much higher discount rate. Moreover, the lack of liquidity of private equity investments needs to be compensated. However, a 50% like in the previous example seems far too large. In fact, there is another explanation for such a high discount rate. Suppose that the VC fund expects a lower terminal value than the projected one. A high discount rate would simply incorporate this expectation. Indeed, the projected terminal value is not the expected terminal value, but the terminal value in case of success. In other words, if the fund expects the terminal value to be lower than the projected one, by increasing the discount rate it takes into account this expectation (without arguing with the entrepreneur about the "real" terminal value). A higher discount rate simply adjusts

Table 2.3 Adjustment factors

Discount rate (%)	Required return (%)					
	15	20	25	30	35	40
20	1.24	1.00	0.82	0.67	0.55	0.46
30	1.85	1.49	1.22	1.00	0.83	0.69
40	2.67	2.16	1.76	1.45	1.20	1.00
50	3.78	3.05	2.49	***2.05***	1.69	1.41
60	5.21	4.21	3.44	2.82	2.34	1.95
70	7.06	5.71	4.65	3.82	3.17	2.64

the estimation about the terminal value. Table 2.3 reports the "adjustment factors" for different combinations of required return and discount rate. Suppose for example the VC fund requires a 30% return. A 50% discount rate would adjust the projected terminal value by halving it. Indeed, $(1 + 50\%)^5 = 2.05 \cdot (1 + 30\%)^5$.

As an alternative approach, it is possible to consider three (or more) possible scenarios about the terminal value, with each scenario weighted according to the expected probability. In this case an expected terminal value would be estimated, rather than a projected one. It would be therefore possible to use a lower discount rate.[8]

2.6.2 The VC Method Assuming Dilution

As new stock is issued to investors in later rounds, Series A investors suffer dilution, i.e., a loss of ownership due to the issuing of additional shares. As such, Series A investors will have to buy a higher ownership percentage in order to achieve a given final ownership. However, if more stocks are issued to Series A investors, future investors will have to get more stock to have a given percent ownership. Thus, to determine the necessary current ownership, the Series A fund must estimate the amount of new stocks that will be issued in the future, but this amount depends in part on the amount of stocks that are issued now. This is a circularity problem that can be solved through a two-step approach. Consider again the example of €1 ml investment in a company that expects to earn €2 ml at year-end 5. The P/E ratio for comparables is 10. The projected terminal value is therefore €20 ml. How much will be available to investors and management? The first step is to calculate the terminal value. The company is expected to earn €2 ml in year 5 and P/E for comparables is 10. At that point the whole company will be worth 10·€2 ml = €20 ml.

[8]This approach was first developed at First Chicago Corp.'s venture capital group and this is why is also known as the "First Chicago" method.

The second step consists in projecting the timing and amount of future equity issues. Suppose that a total of two rounds are expected: €1 ml, the Series A investment and another €1 ml at year 2 (Series B). A 50% rate is appropriate for the first round, whereas 40% is the fair rate for the second round. As such, Series A investors will need a final ownership of 37.97% (7.6/20). At year-end 5, Series B investors will need of value of $(1 + 40\%)^3 \cdot$€1 ml, or 13.72%.

These are the final ownership fractions that investors require. The sum of the two final percent ownerships is far from 100%. If the sum of required ownerships is higher than 100%, it indicates that there is no enough value to justify the planned investments.

Given the ownership levels, one can get the current ownerships, the number of new shares, and the share prices for each round. The ratio of the final percent ownership to the current percent ownership is called *retention ratio*. For example, an investor's retention ratio will be 75%, if a later investor purchases 25% of the company. The retention ratio can be thought of as the portion of the final ownership available to the current investor. Thus, because the second-round investors will hold 13.72%, the first-round investors will only retain 1 – (13.72%) = 86.28% of their original holding. Second-round investors will retain 100% of their original stake, since there will be no further dilution through years 3, 4, and 5. The current percent ownership is equal the ratio of the final percent ownership to the retention ratio. Therefore, Series A investors should ask 44.01% (37.97/86.28%). Series B investors has a retention ratio of 100%, hence the current ownership of 13.72% will not be diluted. Using the formula presented earlier we can compute the number of shares investors must purchase (assuming 1 ml shares outstanding before the first round) and the corresponding price. For Series A, it will be:

$$New - Shares = 1 \text{ ml} \cdot \frac{44.01\%}{(1 - 44.01\%)} = 785,919$$

corresponding to a per share price of €1.3 (€1 ml/785,919). For Series B the number of shares is

$$New - Shares = 1.785 \text{ ml} \cdot \frac{13.72\%}{(1 - 13.72\%)} = 283,992$$

corresponding to a per share price of €3.5 (€1 ml/283,992).

Notice that for Series B the number of shares outstanding pre-money is the sum of 1 ml of founder's shares and 0.785 ml of Series A investors.

The final year there will be 2,069,911 (1,785,919 + 283,992) shares outstanding. If the market value is equal to that projected (€20 ml), the price per share will be €9.6 (€20 ml/2,069,911).

2.7 Leveraged Buy-Out (LBO)

In a LBO a group of *sponsors* undertakes the acquisition of a company (or its assets) mainly by borrowing against the target's assets or future cash flows. Beside the buy-out fund, a management team (incumbent, external, or both) is usually involved as sponsor. The sponsors create a Newco (i.e., a company created *ad hoc*), which purchases all of the target's shares. Target is then merged into the Newco. This is known as the *KKR method*, after the US private equity firm that first introduced this approach. It is also possible that Newco acquires just the Target's assets. This approach is also known as the *Oppenheimer method*, after the investment bank that first introduced it. Newco is usually financed through 25–50% equity and 75–50% debt. Buy-out funds tend to acquire private companies, but this is not always true. When a listed company is acquired and subsequently delisted, the transaction is referred to as a public-to-private or going-private transaction. These kinds of transactions (which make extensive use of debt) were originally called "bootstrap" acquisition and then LBO. As a matter of fact LBOs comprise both private and listed firms. Moreover sponsors do not necessarily include a private equity fund: a strategic bidder (i.e., a competitor of the target company) is not unusual. However, management-led deals backed by a buy-out fund represent the majority of LBOs. When the incumbent management team takes over the firm, the LBO is called management-buy-out (MBO). When an external management team acquires the firm, it is management-buy-in (MBI). When the sponsor group includes both members of the incumbent management and external managers it is a buy-in-management-buy-out (BIMBO). Finally, when the sponsor group includes only private equity funds (i.e. "institutions") the LBO is termed institutional buy-out (IBO).

A common exit strategy for buy-out funds is an IPO. Such a "secondary" IPO is usually called *reverse* LBO, referring to the public-to-private transactions.

2.7.1 The Financing Structure

The total amount to be financed is the enterprise value (EV) of the target company. The financing structure is usually not related to the outstanding debt of the target company, which is refinanced once the transaction is closed. LBO financing is generally expressed in terms of debt-to-EBITDA ratio. The typical financing structure is reported in Fig. 2.5: for a purchase price of 6.5 times EBITDA, about 5 times EBITDA is debt and about 1.5 times EBITDA is equity. Moreover the debt is usually structured in senior debt (supplied by banks) for about 4 times EBITDA and high-yield bonds for about 1 times EBITDA. Notice that the feasible debt structure changes over time depending on the market.

When high-yield debt is not available (either because of the small transaction size or due to the scarce liquidity of the market) the gap is filled by so-called

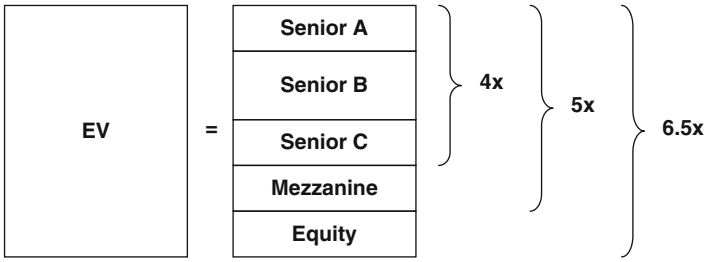

Fig. 2.5 LBO financing structure

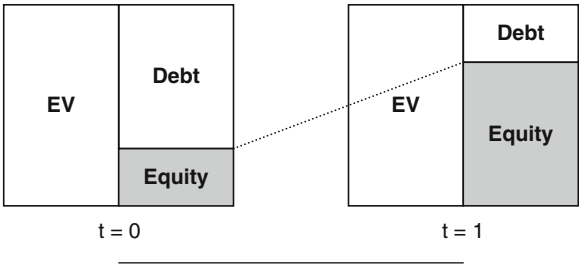

Fig. 2.6 LBO candidate: The "stable-cash-flow" firm

mezzanine financing, provided by specialized investors, the mezzanine funds. These funds demand higher compensation, which involves warrants or other equity-linked instruments (known as the *equity kicker*) in addition to interest (usually below market) on subordinated debt, which is repaid only after all senior debt is reimbursed. Notice that LBO financing contracts typically provide that any excess cash generated by the business shall be used to repay (senior) debt. This provision is known as *cash sweep*.

2.7.2 Candidates and Motives

There are two possible candidates for a LBO: the "stable-cash-flow" firm and the "high-growth" firm.

2.7.2.1 Stable Cash Flow

The idea is simple: stable cash generation reimburses debt. There is no growth in the EV, which at exit is unchanged. The equity value increases juts because of the reduced debt (Fig. 2.6). It is generally a long term LBO (5 years) with high leverage.

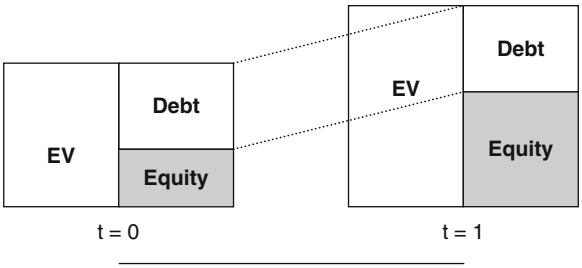

Fig. 2.7 LBO candidate: The "high-growth" firm

2.7.2.2 High Growth

The gains result from the company's growth, i.e. the EV increases over time. The EV increase can be due to improved profitability, growth, etc. or simply to change in the market price. At exit the debt is unchanged. It is generally a shorter term LBO (3 years) with lower leverage. Since the outstanding debt is not reimbursed in the first years, it is more difficult to convince banks to finance this kind of LBO (Fig. 2.7).

A similar result is obtained through "cycle" investments, where the strategy simply consists in buying the target firm at a low price (i.e., a low EV/EBITDA multiple) and sell it few years later at a higher price.

Regardless the candidate, there are several sources of wealth gains that may motivate a LBO. The most commonly cited are:[9]

Tax benefit: The increased leverage increases the tax shield. However, the question is whether target company can obtain the tax benefit without a LBO.

Agency cost: According to this motive, wealth gains derive from reunification of ownership and control in an "owner-manager". This would produce a more competitive firm, whose performance would be further fostered by the pressure of the buy-out fund and by the discipline function of debt.

Undervaluation: In this case the wealth gains result from developing an alternative higher-valued use for the firm's assets.

2.7.3 Valuation

The price of a LBO depends on three factors: (a) the terminal value of the target firm, (b) the debt capacity of the target firm, and (c) the return required by the sponsors (primarily the buy-out fund). Debt capacity determines how much is left to sponsors (equity holders) at exit time. The present value of exit equity plus debt capacity is the affordable price for the LBO. Debt capacity is the maximum amount

[9]For a careful review of LBO theoretical motivations see Renneboog and Simmons (2005) and Wright and Renneboog (2006).

of debt the company can borrow, being able to pay debt service and interest expenses of subordinated debt. Debt capacity is measured as a multiple of EBITDA.

Since a cash sweep provision is usually in effect, shareholders do not get any cash until full senior debt repayment. Indeed, buy-out funds are capital gain oriented. They get their gain by selling their stake either through an IPO or a trade sale. To compute the affordable LBO price, funds compute the projected EV of the target firm at exit time by using EV/EBITDA or EV/EBIT multiples. Using the debt capacity and the terminal EV, funds estimate the equity value at the exit year. Given the return (i.e., the discount rate) required by the buy-out fund, it is easy to compute the present value of exit equity. The present value of exit equity plus debt capacity is the affordable price for the LBO.

An example might help. Consider a target firm with debt capacity equal to 4 times EBITDA and current EBITDA equal to €100 ml. In other words, the LBO can borrow €400 ml. Suppose also that senior debt represents 25% (€100 ml) of total debt and can be amortized at the end of year 5. By construction, at that time only the subordinated debt will be left (€300 ml): this is because the debt capacity multiple is computed assuming full senior debt repayment at exit time.

The fund expects to exit the investment in 5 years at 5 times EBITDA. The projected EBITDA for the 5th year is €120.00 ml; the exit EV is therefore €600 ml. This implies an exit equity value equal to €300 ml. Assume that the sponsor requires 30% return on its investment. Equity cannot exceed €80.8 ml, i.e., the present value of €300 ml discounted at 30% for 5 years. The affordable price is then the sum of debt capacity and present value of exit equity,[10] i.e., €480.8 ml (400 + 80.8), or 4.8 times EBITDA. Notice that the calculation implies an exit multiple close to the purchase multiple. It is actually a conservative assumption, since it implies that value creation stems from improved profitability and not on an increasing multiple.

It is not difficult to compute the exit multiple equal to the affordable entry multiple. Let q be the debt capacity multiple with respect to first-year EBITDA. Assuming that cash is negligible, the value of equity when senior debt has been fully repaid is equal to:

$$Exit\ Equity = M_X \cdot EBITDA \cdot (1+g)^n - Exit\ Debt,$$

where: M_X is the exit multiple

$$Exit\ Debt = (1-f) \cdot q \cdot EBITDA$$

Let M_E be the entry multiple. For a required IRR it will be:

[10]The actual affordable price should also consider fee and expenses to mount the transaction (here assumed to be null).

$$M_E = \frac{EV}{EBITDA} = \frac{\frac{Exit\ Equity}{(1+IRR)^n} + q \cdot EBITDA}{EBITDA} = \frac{M_X \cdot (1+g)^n - (1-f) \cdot q}{(1+IRR)^n} + q$$

Let $M_E = M_X = M$ and solve for it:

$$M = \frac{[(1+IRR)^n - (1-f)] \cdot q}{(1+IRR)^n - (1+g)^n}$$

Given the data of the previous example, the exit multiple that equates the affordable entry multiple is:

$$M = \frac{\left[(1+30\%)^5 - (1-25\%)\right] \cdot 4}{(1+30\%)^5 - (1+3.7\%)^5} = 4.716$$

Given an expected EBITDA at year-end 5 equal to €120 ml and a multiple equal to 4.716 the expected EV is equal to €566.0 ml, implying an exit equity value of €266.0 ml. Thus the entry equity value is €71.6 ml. The affordable price is therefore €471.6 ml, or 4.716 times EBITDA.

2.7.4 Debt Capacity

To compute a firm's debt capacity a cash flow projection is needed. Given the cash flow projection, it is easy to determine how long it will take to pay back all senior debt: if it takes longer than banks require, the debt capacity of the firm is lower than initially assumed. With a spreadsheet the problem simply consists in finding the maximum amount of debt that would result in zero senior debt at the given year. Tables 2.4 and 2.5 report the solution of this problem for company ABC. Table 2.4 reports the assumption about revenues, costs, capital expenditure, etc. Table 2.5 shows the cash flow projections. With total debt is €439.27 ml, of which 35% of senior debt (€153.75) and 65% of subordinated debt (285.53), senior debt is equal to zero at year-end 5. Debt capacity is therefore equal to €439.27 ml, or 4.39 times EBITDA. Of course this debt capacity depends on the assumptions. Assume for example the growth rate of revenues to be 1% (rather than 5%). All else being equal, a lower debt capacity is expected. Indeed, debt capacity would be 4.07 times EBITDA. Also the financing conditions affect debt capacity. Suppose the growth rate is again 5%, but senior debt needs to be reimbursed at year 3 (rather than 5): debt capacity drops to 3 times EBITDA.

Arzac (2005) reports an analytical solution for the debt capacity problem. When a cash sweep equal to 100% is assumed, debt capacity (q) is equal to (symbols are reported in Table 2.4):

Table 2.4 Company ABC: Assumptions

Growth of sales (g)	5.0%
EBITDA margin (m)	10.0%
Depreciation/sales (Dep)	1.5%
Other non-cash/sales (Onc)	0.2%
(CAPEX+DWC)/sales (Inv)	2.0%
Cash balance/sales (Cash)	0.2%
Interest on cash balance (R_{Cash})	4.5%
Tax rate (t)	40.0%
Debt financing:	
(f) Senior @8.5% (R_{Sen})	35%
(1-f) Subordinated @10% (R_{Sub})	65%
Amortization of senior by year (n)	5
Net cash to senior amortization (Sweep)	100%
First year sales	1,000
First year EBITDA	100

$$Debt\ capacity = \frac{x_2 \cdot m^{-1} \cdot \left[x_1^n - (1+g)^n\right]/(x_1 - 1 - g)}{x_1^n \cdot f + (1-t) \cdot R_{sub} \cdot (1-f) \cdot (1-x_1^n)/(1-x_1)}$$

with

$$x_1 = 1 + (1-t) \cdot R_{sen}$$

$$x_2 = (1-t) \cdot m + t \cdot dep + onc - inv + (1-t) \cdot R_{cash} \cdot cash/ (1+g) - cash \cdot g/(1+g)$$

2.8 Conclusion

In this chapter I have analyzed the main technical aspects of the private equity business. The reason for including private equity in a book dedicated to investment banking is twofold: (a) a remarkable fraction of investment banking revenues comes from private equity firms and (b) investment banks are important players of the private equity industry. The private equity industry can be classified into two main segments: (a) venture capital and (b) buyout. Buyout funds usually make a single investment in a target firm taking the majority stake. In contrast VC funds make lumpy investments organized into sequential rounds and usually take a minority stake. The organizational form (limited partnership), the agreement between LPs and GPs and the way performance is measured are equal in both segments. However, VC and buyout investments have different specificities. Of particular relevance in venture capital is the term sheet, which protect the fund investments via the use of (a) preferred stock, (b) vesting, and (c) shareholders'

Table 2.5 Cash flow projections for company ABC

	Year										
	0	1	2	3	4	5	6	7	8	9	10
Sales		1,000.00	1,050.00	1,102.50	1,157.63	1,215.51	1,276.28	1,340.10	1,407.10	1,477.46	1,551.33
EBITDA		100.00	105.00	110.25	115.76	121.55	127.63	134.01	140.71	147.75	155.13
Depreciation		15.00	15.75	16.54	17.36	18.23	19.14	20.10	21.11	22.16	23.27
Interest income		0.09	0.09	0.09	0.10	0.10	0.11	2.10	4.28	6.66	9.26
Senior interest expense		13.07	11.11	8.86	6.27	3.33	0.00	0.00	0.00	0.00	0.00
Subordinated interest expense		28.55	28.55	28.55	28.55	28.55	28.55	28.55	28.55	28.55	28.55
Income before tax		43.46	49.67	56.40	63.67	71.54	80.04	87.45	95.33	103.69	112.57
Provision for tax		17.39	19.87	22.56	25.47	28.62	32.02	34.98	38.13	41.48	45.03
Net income after tax		26.08	29.80	33.84	38.20	42.92	48.02	52.47	57.20	62.22	67.54
Depreciation and oth. non-cash		17.00	17.85	18.74	19.68	20.66	21.70	22.78	23.92	25.12	26.37
(CAPEX+DWC)/sales		20.10	21.10	22.16	23.26	24.43	25.65	−17.14	−64.12	−115.55	−171.71
Cash flow before debt amort.		22.98	26.55	30.43	34.62	39.16	44.07	92.40	145.24	202.88	265.63
Debt amortization:											
Senior		22.98	26.55	30.43	34.62	39.16	0.00	0.00	0.00	0.00	0.00
Subordinated		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cash balance:	1.90	2.00	2.10	2.21	2.32	2.43	46.63	95.08	148.06	205.84	268.73
Senior debt	153.75	130.76	104.21	73.78	39.16	0.00	0.00	0.00	0.00	0.00	0.00
Subordinated debt	285.53	285.53	285.53	285.53	285.53	285.53	285.53	285.53	285.53	285.53	285.53
Total debt	439.27	416.29	389.74	359.31	324.69	285.53	285.53	285.53	285.53	285.53	285.53
EBITDA/Net interest expense		2.41	2.65	2.95	3.33	3.83	4.49	5.07	5.80	6.75	8.04

agreement. Also relevant is the VC method, i.e., the valuation approach used by venture capital professionals to determine the structure of a given investment. Buyout investments are extensively financed by debt. As such a crucial step in evaluating a buyout transaction is to determine the debt capacity of the target firm.

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Chapter 3
Equity Offerings: Structure and Process

3.1 Introduction

This chapter analyzes the main features of equity offerings, primarily initial public offerings (IPOs). An IPO is the first sale of a company's shares to the public and the listing of the shares on a stock exchange. There are several different aspects of an IPO that might be explained. I will not analyze in deep the reasons for going public and the implications of an IPO for the issuing firm, as these are more "corporate finance" topic, while the focus here is on the investment banking perspective. Moreover, while extensive academic research has been dedicated to IPO waves, short-run underpricing, and long-run underperformance, these topics will not be specifically addressed in this chapter.[1] This chapter covers three main topics. First, the offering structure: IPO is a rather generic term, but there are several possible alternatives depending on the kind of shares being sold, where the company is listed, to whom the offer is addressed, etc. Second, how the offering price is set. The price is probably the most important variable in an offering. It is therefore necessary to give a look to different price-setting mechanisms to understand IPOs. Third, how the process of going public works. This means answering several questions, such as: How long does it takes? Who are the actors? How the offer price is determined?

At the end of the chapter a section is devoted to seasoned equity offerings (SEOs) and rights offerings, which are transactions through which listed firms can raise equity capital.

The chapter proceeds as follows. Section 3.2 analyzes the reasons for going public and the related drawbacks. Section 3.3 discusses the offering structure. Section 3.4 describes the price-setting mechanisms. Section 3.5 illustrates the IPO process while Sect. 3.6 describes SEOs and rights offerings. Section 3.7 concludes.

[1] For a careful review of these topics see Ritter and Welch (2002).

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DOI 10.1007/978-3-540-93765-4_3,

3.2 Why Do Companies Go Public?

The answer to this question might change depending on firm's versus shareholders' perspective, but probably the most important reason (for both the firm and its shareholders) is "cash." In the firm's perspective an IPO is the mean to get an equity capital infusion to fund new projects, to improve credit standing, etc. Cash is also a key factor for shareholders, regardless of the type. For example the IPO of a firm is a way through which its founder can get liquidity. It might also be a good way to deal with the succession of the first entrepreneurial generation, where a second is not available or willing to manage the firm. Even in this case it is a way to sell the company, i.e., a cash reason. Zingales (1995) argues that by going public entrepreneurs help facilitate the acquisitions of their company for higher value than what they would get from a trade sale. For private equity firms, IPO is one of the favorite exit strategies, i.e., a way to cash out their investments. Finally, even when the shareholder is the government, IPOs mean privatization and cash injection. In the 1990s the privatization process was indeed the main driver of the IPO activity in many European countries.

Since cash is the most relevant motivation for an IPO, going public is an alternative to get money from a private sale. Indeed, recently a trend has emerged: the "dual-track process." In a dual track process indications of bidders in a private sale are obtained simultaneously with preparation for an IPO. The dual-track process allows IPO candidates to explore all exit options and, therefore, to pursue the highest value strategy. It can also help to solicit bids from private bidders within a time frame established by the IPO process. Of course the dual track process results in higher cost, effort, and commitment.

There are though at least other three "non-cash" reasons for an IPO, especially in the firm's perspective: (a) acquisition currency, (b) reputation, and (c) management compensation. As far as acquisition currency, note (as we will see in Chap. 7) that a company can buy another company either paying cash or stock, i.e., paying with the shares of the acquiring firm. In general, for a stock payment to be accepted, the shares of the acquiring firm need to be listed. In this case indeed, a public valuation is available, and, most importantly, the shares can be liquidated in any moment. Hence, if a company wants to pursue a strategy of external growth (i.e., through mergers and acquisitions), an IPO is a way to enhance the payment alternatives. A company might also decide to go public to produce a positive image. Finally, the "management compensation" reason: in most of the cases (not always, however) stock options and other similar performance-based compensation provide the right incentive to the management. Of course these kinds of compensation structure are only possible if a company is listed.

Whatever the motivation for going public, IPOs do not come without drawbacks. An example is the resulting burden of disclosure requirements and compliance costs. Once the company is public it is like "living in a fishbowl" with authorities, analysts, institutional investors screening the firm activities. Also the corporate governance might be more problematic. But above all, IPOs are not free of both

direct and indirect costs. The direct costs of IPOs are the fees paid to lawyers, accountants, consultants, but most importantly, investment banks. Investment banking fees vary according to country, the IPO size, and many other factors. However, a 2–7% of the amount raised (i.e., the proceeds) is a reasonable range. Indirect costs, are probably more relevant, at least because more subtle. IPOs are usually underpriced, i.e., the first-day return is in general positive. Although there are exceptions, the presence of an average underpricing is consistent across country and over time. Underpricing is a cost because it is "money left on the table." The amount of money that the issuer "loses" can be computed as the number of share issued times the first-day capital gain. Put it this way: if you sell 10 shares on the market for €10 and the very same day the price goes up to €11, this 10% underpricing represents for you a cost, albeit indirect. You have left on the table €10, you could have gained by selling the shares at what the market deemed was a fair price, on the very same day. Underpricing is closely related to price-setting mechanisms, that will be discussed in the next chapter.

3.3 The Offering Structure

Offerings can be classified according to different criteria, which might be seen as four alternative questions.

3.3.1 Which Shares?

If newly issued shares are sold (and hence the proceeds go the company) it is a *primary* offering. If existing shares are for sale (and hence the proceeds go to the shareholders) it is a *secondary* offering. Primary and secondary offerings are international terms which translate differently in different jurisdictions. For example in the UK a primary offering is an "offer for subscription" while a secondary is an "offers for sale." In Italy an "Offerta Pubblica di Sottoscrizione" (OPS) is a primary offering, while an "Offerta Pubblica di Vendita" (OPV) is a secondary one. In general, financial markets tend to prefer primary offerings, as the proceeds finance the company, while in a secondary offerings the money ends up in the shareholders' pockets. Moreover, in a secondary offering the existing shareholders are actually selling their shares: an investor may wonder why, if the company is so good, its shareholders want to sell it. Nonetheless an IPO is a way to get cash, also for the shareholders. This is why most of the IPOs are a combination of primary and secondary offerings, that is, part of the shares are newly issued, and part are old shares of the existing shareholders. The proportion of primary versus secondary shares changes considerably and there is no standard market rule. Note that sometime seasoned equity offerings (SEOs), i.e., offerings of shares issued by an already listed firm, are also called secondary offerings.

3.3.2 To Whom?

A relevant distinction is related to the type of investors the offering is addressed to. If it is directed to all investors it is a *public* offering, while if it is targeted just to institutional investors (banks, mutual funds, insurance companies, pension funds, etc.) it a *private* offering. The term IPO thus refers to a public offering, where all investors are addressed. Note that the vast majority of IPOs are divided into tranches, each one directed to a different class of investors. The typical IPO will then have an retail tranche (i.e., a public offering to retail investors) and an institutional tranche (i.e., targeted just to the institutional investors). Even though the proportion of retail tranche versus institutional tranche varies, the latter is usually 70–80% of the total offerings. Sometimes (especially in privatizations) a "clawback" mechanism is used if substantial retail demand is generated. In these cases, the investment bank managing the issue reduces the institutional offering in favor of the retail offering (e.g., if the retail tranche is more than 3 times over-subscribed).[2] Moreover, as we will see later in this chapter, the institutional tranche is crucial in the price-setting process. Usually retail tranche requires much more detailed information (the so-called "prospectus"), while for the institutional tranche, being the investors more sophisticated, lighter documentation is required (the "offering circular"). Sometimes, especially for larger IPOs, there might be also a "friends and family" tranche or an "employees tranche:" in this case the shares are dedicated to a selected investor category (friends, employees, etc.). In general the offer price is the same for all tranches, but sometimes, depending on the jurisdiction, there might be different prices. In many privatizations for example, there is an employee tranche, whose shares are offered at a slight discount.

3.3.3 Where?

Equity offerings might be *domestic* or *international* depending on where the shares are offered. Note, that this distinction is not related to the market of listing. In other words, an Italian company might complete an international offering (i.e., selling shares to Italian as well as to foreign investors), being listed only on the Milan stock exchange. International offerings tend to be dedicated to foreign institutional investors, because only few issuers can afford the compliance costs of a retail foreign offering. The most common structure is therefore a domestic public offering and an international private offering. However, for larger firms the structure is

[2]One may think that if the investment bank has discretion in setting the institutional versus retail proportion, institutional investors might be favored with larger allocations of good IPOs. The empirical evidence does not confirm this hypothesis: Hanley and Wilhelm (1995) find that the percentage of total shares allocated to institutional investors is not statistically different for good IPOs (positive initial return) versus bad IPOs (negative initial return).

a combination of multiple public offerings (i.e., directed to all investors in more than one country) and an international private offering. When tapping US investors there might be a particular type of placement: Rule 144A. In the US (like in other countries) a private placement involves the sale of securities in a transaction that is exempt from registration requirements imposed by federal securities law. In a private placement the investment bank arranges for the sale of securities to a restricted group of "accredited investors" who are individual or institutions that meet certain income and wealth requirements. However the securities must be registered before they can be resold or the subsequent sale must also qualify as a private placement. Rule 144A, adopted in 1990, provides a private placement exemption for institutions meeting particular requirements ("qualified institutional buyers" – QIB) and allows them to freely trade privately placed securities among themselves. Rule 144A attracts large foreign issuers unable or unwilling to conform to US registration requirements.

3.3.4 Which Market?

A firm might be listed in its *home market*, in a *foreign market*, or even in more the one market (*dual/multiple listing*). The vast majority of issuers list in their home country. It is easier and, in most of the cases, it is less expensive; in short, it is the most convenient thing to do. Nonetheless, especially in the past, many firms decide to list in markets other than their home one. Then the question is "why should a firm list in a foreign market?". I can provide four different answers.

1. The issuer is operating in a specific niche, and all competitors are listed in a given market (e.g., a high tech firm on NASDAQ): investors, analysts, trading activities for that niche are concentrated in that market, hence it is worth being listed there.
2. The issuer is pursuing a M&A strategy in a foreign country. As we have seen, listed shares are an acquisition currency. Shares listed in the country where the issuer want to make acquisitions are even better. Many European firms decided to list in the US also to realize stock acquisitions (i.e., acquisition completed paying shares).
3. The domestic market is small and without credibility. This reason explains why foreign listing was more popular in the past than today: as the domestic market develops there is no reason to go abroad to list. However, still many firms from developing economies list either in London or New York for this reason.
4. The issuer does not meet the listing requirements of the home market.

Notwithstanding the above mentioned motivations, the trend towards dual/multiple listings has reversed, most probably due to greater depth of domestic markets and to institutional investors becoming global. However, if a company decide to list (also) in a foreign market, that market will most probably be London or New York.

3.3.5 American Depository Receipts (ADRs)

Disclosure requirements have historically discouraged from "direct" listing in the US. Most European issuers tap US investors by issuing ADRs. These dollar-denominated claims issued by US banks represent ownership of shares of a foreign company's stock held on deposit by the US bank in the issuer's home country.[3] For US investors it is a low-cost diversification: the ADR are covered by the US security law and pay dividend in dollars (dividends are converted from the local currency into US Dollar). ADRs can be either sponsored or unsponsored. A sponsored ADR is one for which the issuing company absorbs the cost of creating the securities. In an unsponsored ADR the issuing firm is not involved in the issue and may even oppose it; in 1983 the US Security and Exchange Commission (SEC) required registration of the unsponsored ADR, thus making them less convenient. There are four different levels of ADR programs, corresponding to possibility of raising capital and to different level of disclosure and tradability (level I allows home country accounting standards, but the shares offered cannot be traded on the major US markets). It is worth mentioning a typical problem of ADR (and more in general of foreign listing): over time liquidity tend to migrate to the "home" market. This effect is known as "flow back."

To illustrate how ADRs are created, assume that ABC SpA, a listed Italian firm wishes to establish a ADR program for its shares on the NYSE. The firm asks Citi to handle the issue.

Consider the following data:

- ABC's shares trade on the Borsa Italiana at €2.00 per share.
- The $/€ exchange rate is 1.25 (i.e., 1.25 dollars for one euro).
- Citi believes the ideal price to trade on NYSE is $5.

Given the "target" ADR price and the $ equivalent ABC price per share ($2.5, i.e., €2 times 1.25) the ADR ratio (# of shares per ADR) is 2 (5/2.5).

Assume further the ABC wants to raise through the ADR program €100 million, which corresponds to 50 million shares (which in turn corresponds to 25 million ADRs, i.e., 50 million divided by 2).

Citi would implement this ADR program by taking the following steps:

1. Purchase 50 million shares issued by ABC at €2 per share, paying €100 million. This represents an investment worth $125 million to Citi.
2. Create 25 million ADRs for listing on the NYSE, each ADR representing ownership of 2 ABC shares.
3. Sell the 25 million ADRs to American investors at a price of $5 per ADR. This is the dollar price implied by ABC's price in €, the current $/€, and the fact that each ADR is worth two ABC shares: €2 × $/€ 1.25 × 2 = $5.

[3]Given the success of ADRs, many issues use this form for sale outside the US. These instruments are called Global Depositary Receipts (GDRs).

To illustrate how ADRs reflect changes in ABC's stock price, assume that ABC's shares increase by €1.00 per share (to 3.00 each) in early-morning trading in Italy. We can compute that the ADRs should rise by $2.5 each (€1.00 per share × 2 shares per ADR × $/€1.25) to $7.5 per ADR when they begin trading in New York later that day. To demonstrate how ADRs reflect exchange rate movements, assume that ABC's price remains unchanged at €2 per share but that the € appreciates from 1.25 to 1.5 immediately before trading begins in New York. The ADRs should begin trading at $6.00 (€2 × $/€1.5 × 2). In other words, either an increase in ABC's stock price (holding exchange rates constant) or an appreciation of the € can cause the price of each ABC's ADR to rise.

3.4 Price-Setting Mechanisms

The IPO process takes on average four to six months. The steps of this process, in particular the final ones, are strictly related to the price-setting mechanism chosen by the issuer and its investment banks. Therefore, let's first take a look to the different mechanisms to price an equity offering and then discuss the whole IPO process. Further details about price-setting mechanisms will be discussed in Chap. 5.

There are three main mechanisms to price and distribute securities: (a) open price (book-building), (b) fixed price, and (c) auctions. In open-priced offerings the investment bank canvasses potential investors and then sets an offer price. In contrast, in fixed-price offerings the offer price is set prior to requests of shares being submitted. In auctions a market clearing price is set after bids are submitted.

Open price (Book-building): The issue is presented to institutional investors during a "roadshow," that takes on average a couple of weeks. A price range is suggested to investors. Based on the roadshow presentation, investors are asked to provide non-binding indications of interest (bids). The book is built from the bids, and, based on the information provided by the book, the terms of the offerings are finalized shortly before allocation of shares. One of the key features of the open price approach is that allocation of shares among institutional investors is decided by the investment bank on a discretionary basis. In their pitch book (i.e., the presentation investment banks prepare to get the mandate) investment banks claim that this discretion helps to allocate shares only to selected "buy and hold" investors, that is investors who do not "flip" the shares the very next day. At the closing of the book-building period, the investment banks underwrite the shares. Therefore, they are at risk for a short period (usually 24 h), between the closing and the allocation of shares. The bids are non-binding; however, because of the repeated nature of the relationship between investors and the investment bank, it is very rare for any investor to renege on a bid. Moreover, the book is closed only when there is sufficient demand at the offer price.[4] The offer would be pulled otherwise

[4]In a hard-underwritten IPO the investment bank commits to guarantee a minimum offer price at the beginning of the book-building period. A hard-underwritten IPO offers the issuers the

(i.e., abandoned). To summarize, there is very little underwriting risk. Nonetheless, to protect themselves from adverse change, banks use the clause "force majeure," which allows them to cancel the transaction under certain conditions.

The open price mechanism is the US standard approach, but it has become increasingly used worldwide.

Fixed price: It was the standard practice in Europe, but it has been in decline for many years, especially for larger offerings. The key feature of the fixed price approach is that the issuer and its investment bank set the price before bids are submitted. In other words, the price is fixed with information about the market demand. There are two kind of fixed-priced offerings: (a) firm commitment (or underwritten) and (b) best effort (non-underwritten). In the first case (the most common case) the investment bank underwrites the offer, thus guaranteeing the full proceeds to the issuer, regardless of the actual demand. In the second case, the bank just puts its best effort to sell the shares, with no underwriting. Often a minimum offer size is set and if at closing there is no sufficient demand, the offer is pulled. It is evident that the "firm commitment" is much riskier for the investment bank in terms of underwriting risk.

Auction: Historically, it is the least common price-setting mechanism. It was frequently used only in France. Nonetheless, an increasing number of issuers decide to use this approach (note the remarkable case of Google's IPO in 2004). In an auction investors are invited to bid for shares, and once the offering is covered, shares are allocated at a single clearing price. As for book-building, the price is set after bids are submitted. The crucial difference between the two techniques, is that in book-building the price and allocation rules are not transparent (because they are discretionary): the bank does not have to allocate to highest bidders and may also ignore them at all.

Currently the most used price-setting mechanism is book-building, at least for institutional tranches. Retail investors are frequently allowed to place orders in the retail tranche, but the price is set by the institutional tranche. In other words, most IPOs use a hybrid approach, combining fixed-price retail offers with book-building. This hybrid approach can be either sequential or simultaneous. In the sequential hybrid approach the price is set with book-building prior than retail offer is opened: retail investors thus know exactly the price they will pay. In the simultaneous hybrid approach institutional and retail offerings are run at the same time, thus retail investors bid without knowing the exact price they will pay. A mid-way solution is also possible. During book-building (before the book is closed) a maximum price is announced and the retail offer is launched: retail investors do not know the exact price, but just the maximum they will pay. The next paragraph describes the typical IPO process where this approach is employed.

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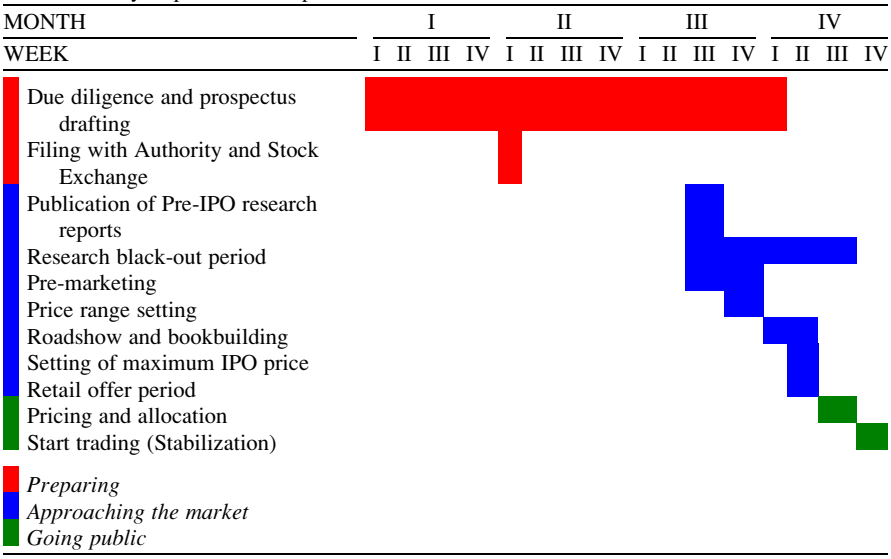
advantage of reducing the uncertainty, but because of the increased risk for the bank, it would usually be linked to higher fees and a more conservative price range. Moreover, the minimum price may serve as a pricing benchmark for investors, limiting their willingness to pay higher prices. Hard underwritten IPOs seem likely to remain a rarity.

3.5 The Key Steps of the IPO Process

Table 3.1 summarizes the key step of the typical IPO process, where the open price approach is used. There are three main phases: (a) preparation, (b) approaching the market, and (c) going public.

Preparation: Immediately after the decision of going public is taken, the preparation of the *prospectus* and the related "due diligence" begins. The prospectus is basically a document containing all the information regarding the issuer and the issue. The prospectus provides full disclosure of the firm's business and it is a key marketing and protection tool for retail investors. A simplified version of the prospectus, the *offering circular*, is addressed to institutional investors. In order to prepare the prospectus two kinds of due diligence are conducted. First, business due diligence, analyzing the feasibility and sustainability of the business plan (in other words, crafting the "equity story"). Second, legal due diligence, taking care of the prospectus structure and content.[5] The correct representation of facts and risks is crucial for lawsuits avoidance. Indeed, in many jurisdictions the issuer, its investment bank, and sometimes also the auditing firm are liable for prospectus content. In summary, the typical prospectus contains information about risk factors that might affect future performance, the strategy of the company, its competitive advantage, the quality and experience of the management, and the use of proceeds

Table 3.1 Key steps of the IPO process



[5]In the US the issuer may file several amended prospectuses with the SEC. The first, or preliminary prospectus, is often called "red herring", because it has a standard legal disclaimer printed in red across its cover, stating that the securities are not yet being offered.

(growth, debt reduction, acquisition, etc.). In this phase the issuer also applies for listing to the market authority[6] and to the stock exchange.[7]

Approaching the market: This phase starts with the publication of the pre-IPO research report. Before this report is released, the prospective IPO is undisclosed to the public. The research report is prepared by the analysts of the investment bank managing the offering. A quite period (or black-out period) usually follows this release. In other words, the investment bank does not release any other report about the issuer, until several days after closing. This rule, which is compulsory in the US, is more a market practice in other countries. The purpose of the quite period is to avoid *booster-shoots*, i.e., analysts recommendations aimed at increasing market demand and driving up the price. Once the research report is released and the IPO is hence disclosed, the investment bank starts a pre-marketing step, informally canvassing institutional investors to get their "feelings" about the issue. Sometimes, these informational talks might happen even before the release of report, usually with selected and trusted investors: this is called "*pilot fishing*." With this practice the bank conducts a confidential pre-sounding of a planned IPO with some key investors. After the pre-marketing step, a price range is set. The width of the range is quite variable, ranging from a 10 to 20% or more of the mid-price. The valuation will reflect the sentiment assessed during the pre-marketing step. Once the price range is set, the *roadshow* begins. It takes usually just a couple of weeks, but it is a quite intense time. For small European offerings it might take even less than one week, hitting the major European centers, while for larger offerings it usually takes one week in Europe and one week in the US. The management of the issuing company and the investment bank present the issue to institutional investors. The *roadshow* combines presentations to an audience of potential investors with meeting with small groups and "one-on-one" with the most important investors. Usually only investors who are most likely interested in the issue will be invited to presentations (investor targeting). A potential drawback of the big presentation is when one person has a valid concern and stands up and voices it, all of a sudden all the other people who never would have thought of it are worried. In contrast, many investors prefer to ask their questions in the private one-on-one, to prevent other investors to free ride on the info they get.

During the roadshow period non-binding bids are requested and the book is built. In a sequential hybrid approach, once the book is closed, the price is set and the retail offer begins. In many cases, however, when the investment bank already collected enough information from the institutional investors, but the book is still open, a maximum IPO price is announced and retail offer begins.

[6]In the US firms with more than $150 million in outstanding common stock can use a procedure known as "shelf registration" under Rule 415: the firm files a "master" registration which is a single document summarizing planned financing for 2 years. After the SEC approval, it is placed "on the shelf", and the firm can issue new securities as needed anytime over the 2-year period.

[7]Many stock exchanges require the prospective issuer to compile the QMAT (Quotation Management Admission Test). The QMAT provide information about the issuer, allowing the exchange to analyze the business model, identify the relevant shareholders, etc.

Going public: Once the book is closed, the issuer and the investment bank set the offer price during the so-called "price meeting." It is a crucial moment: the issuer wants to maximize the proceeds (and in part leave a "good taste" to the market), the investors want to make a good deal and the investment bank is in between. European IPOs usually price within the price range established at the beginning of the book-building period. On average less than 20% of European IPOs price outside the range, in contrast to US where about 50% of all IPOs have priced outside the range (Citigroup 2005). This result might be due to the greater relevance given to the pre-marketing step in Europe. In other words, the price range is already set in accordance to the market feedback. Within the institutional tranche the allocation is made on a discretionary basis. In contrast, within the retail tranche the allocation is usually made on a non-discretionary basis: depending on the jurisdiction it will be a scale down allocation on a pro-rata basis or a random allotment using a ballot. After pricing and share allocation, trading begins. However, the work of the investment bank is not over, as it tries to maintain or stabilize the price of shares during the first days of trading: this is called stabilization, which will be illustrated in Chap. 4.

3.6 Seasoned Equity Offerings (SEOs) and Rights Offerings

3.6.1 SEOs

SEOs or follow-on offerings are surprisingly rare both in Europe and US. Nonetheless, in the US when a SEO is launched it tends to be much larger than the typical IPO. SEOs can be either primary (new shares, thus raising fresh capital) or secondary (old shares, thus reducing the existing shareholders' position). In most of the cases SEO's are completed through either a bought deal or an accelerate book-building. A bought deal involves a bank buying shares, then selling the shares as quickly as possible to institutional investors. The difference between the buying and the selling price is the investment bank's profit. The issuer does not pay any fee. A bought deal entails greater risk for an investment bank (compared to a marketed offering). Accelerated book-building involves targeted marketing to a small group of investors: the book-building occurs over a shortened interval. SEOs logically follow a period of strong stock performance by the issuer (in the US about 40% cumulative abnormal return during the two years prior to the offering) as well as the market as a whole. However, share price usually drops of about 3% when an equity offering is announced. SEOs convey negative message to investors: a manager will launch an equity offering when he believes the firm's current stock price is too high. In the US the average dollar value of the price drop is equal to about 30% of the dollar value of the issue itself. For example imagine a firm with a market capitalization of $1 billion announces a $100 million SEO. Assume its share price declines by the average 3%. This would cut $30 million from the firm's market

capitalization. Note that $30 million is 30% of the new offering. This result implies that a substantial portion of the proceeds of an equity issue comes out of the pockets of old shareholders. It is quite easy to understand that in secondary SEO (where existing shareholders sell) the market reaction is even worse: the average drop in market capitalization is about 80%, and in many cases the firm's value fell by more than the proceeds of the offering.

3.6.2 Rights Offerings

In many jurisdictions a capital increase requires the company to issue the new capital in the form of rights to protect existing shareholders from the dilution of their ownership stake.[8]

Shareholders are therefore entitled to purchase new shares in the proportion that they hold at the time of the offering. The rights are issued to the existing shareholders at a certain ratio and at discount relative to the current market price. Moreover, the rights trade on the same stock exchange as the shares. If a shareholder does not exercise his rights during the subscription period (usually two weeks), the issuer will still receive some proceeds through the so called "rump placement," where unexercised rights are sold to investors. The rump is priced at current prevailing market levels and not at the subscription price. The firm receives proceeds up to the subscription price and the investors who did not exercise their rights will receive the balance.

It should be noted that existing shareholders are not sensitive to the discount of the rights to the theoretical ex-right price (TERP). The TERP is the price at which the shares should trade at announcement of the terms of right issue, after detachment of the rights (ex-rights date). Intuitively, the TERP should be equal to the old market capitalization plus the amount of money raised divided by the additional number of shares:

$$\frac{(n \times P) + (N \times S)}{(n + N)}$$

n: number of shares outstanding
N: number of new shares issued
P: current stock price
S: subscription price

The gross discount is the percentage difference between the current market price and the subscription price. The discount to TERP is the percentage difference between the TERP and the subscription price.

[8]In some jurisdiction a given percentage (usually 5–10%) of market capitalization can be raised before a right issue becomes mandatory.

Table 3.2 A fictional rights issue

Pre-right issue		
Stock price	€2	A
Number of shares outstanding	1.000	B
Market capitalization	€2.000	C = A × B
Right issue		
Exchange ratio	1	D
Subscription price	€1.5	E
New shares issued	1.000	F = B × D
Gross proceeds	€1.500	G = E × F
TERP	€1.75	I = (C = G)/H
Gross discount	25.00%	(A – E)/A
Discount to TERP	14.29%	(I – E)/I
Right price	€0.25	J = (I – E) × D
Post-right Issue		
Number of shares outstanding	2.000	H = B + F
Market capitalization	€3.500	K = I × H

Consider the fictional rights issue reported in Table 3.2.

There is an analytical way to determine the appropriate discount to TERP: the discount needs to be material enough so that the rights trade at a positive value throughout the subscription period. In other words, the discount is used in order to prevent the risk of a price fall during the relatively long period from the pricing date to the end of the subscription period

The discount needs to be priced such that, at any time, rights still have a positive value (stock price is not below the subscription price). At the same time, the discount needs to be "reasonable" enough to avoid delivering a "lack of confidence" message.

As mentioned before, the level of discount is theoretically neutral to existing shareholders' wealth, which is only related to the stock price pre-right issue. Indeed, this price can be interpreted as the combination of the TERP and the right price: the former decreases with the discount, while the latter increases.

The price at which the stock should theoretically trade on the 'ex-rights' date is the TERP. Shareholders who exercise their rights to subscribe new shares will not suffer from dilution (i.e., their percentage ownership will be unaffected). Shareholders who do not subscribe continue to own shares (trading at TERP) and receive rights (trading at their theoretical value) which can be sold at their market price.

Consider the previous example: suppose a shareholders holds 100 shares, with €2 per share. He can either subscribes 100 new shares at €1.5 per share or sell the rights at €0.25 each. In either case his wealth is unaffected, as reported in Table 3.3.

Finally, notice that the laws of most American states grant shareholders the pre-emption right, unless the right is removed. The vast majority of listed US companies have removed this right from their corporate charter. This is why rights offerings are quite rare in the US.

Table 3.3 Shareholders' wealth in rights issues

	Subscription	No subscription	
Subscription of new shares	−€150	€0	A
Value of rights sold	€0	€25	B
Number of shares held	200	100	
Value of shares held	€350 (2 = 00 × €1.75)	€175 (= 100 × €1.75)	C
Shareholders' wealth	€200	€200	A + B + C

3.7 Conclusion

In this chapter we have analyzed the main features of equity offerings, focusing primarily on IPOs.

The main motivation for an IPO is usually cash-related. Nonetheless non-financial aims can also motivate an IPO, such as getting an acquisition currency (to purchase other companies), reputation of the firm, and better compensation mechanisms for the management. Whatever the motivation of an IPO, it is not a costless transaction: beside disclosure requirements and related compliance costs, the transaction itself implies both direct and indirect costs. The former is the fee to be paid to the investment bank and other advisor. The latter is "the money left on the table" due to underpricing.

We can classify an equity offering by answering the following four questions. Which shares are sold? To whom? Where? In which market? We have also analyzed the three mechanisms used to price a security offering: (a) book-building, (b) fixed price, and (c) auction. The most used approach is with no doubt book-building. As such, we have described the typical process of a book-built IPO. In the last section we examined equity offerings launched by listed firms: (a) SEOs and (b) right offerings.

So far we have not really described the role investment banks play in designing and managing an equity offering. The next chapter takes a closer look to the functions performed by investment banks in equity offerings.

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Chapter 4
Equity Offerings: Syndicate Structure and Functions

4.1 Introduction

In Chap. 3, when describing IPOs and other equity offerings, I referred to a single investment bank managing the issue. Although the whole process is usually managed by one or two banks, generally much more banks are involved to form a syndicate. In this chapter we will see how the syndicate is formed, what is its role and how the banks are compensated (Sect. 4.2). We will also take a deeper look to a peculiar function performed by investment banks once trading begins, i.e., after the IPO is actually concluded: stabilization of the stock price (Sect. 4.3).

4.2 The Syndicate

4.2.1 Structure

So far I have been talking of a single investment bank managing the issue. However, more than one bank is involved in an equity offering. Issuers select a book-runner (or lead manager) of their equity offering and the book-runner (in consultation with the issuer) forms a syndicate of banks to assist in the pricing, underwriting, and distribution of the offering. The syndicate is bound by a set of formal contracts ("inter-syndicate agreement"): upon the completion of the offering, the syndicate is dissolved.

While the functions of the syndicate members are the same in every country, the title given to each role might change. However, rather than the title, what really matters is the bank's relative position within the syndicate.

In a multi-tranche offering, each tranche has usually a syndicate. An overall manager is appointed, called *global coordinator*. The global coordinator is normally part of the syndicate in every tranche (not necessarily as book-runner).

G. Iannotta, *Investment Banking*,
DOI 10.1007/978-3-540-93765-4_4,

Table 4.1 Syndicate structure

Syndicate	Underwriting group	Managing group	Book-runner (Lead manager)
			...
			Joint book-runner (Joint lead manager)
		Non-managing underwriters	Manager
			Manager
			...
			Manager
	Selling banks		Co-manager
			Co-manager
			...
			Co-manager

The typical syndicate, is composed of three parts: (a) the managing group, (b) the underwriting group, and (c) the selling group. Table 4.1 reports the typical syndicate structure.

The managing group is composed by the book-runner and other joint book-runner(s) (if any). The book-runner is responsible for due diligence, roadshow, book-building, allocation, and, not surprisingly, gets the largest portion of fees. It is not uncommon to see multiple book-runners, especially for largest IPOs. The joint book-runner(s) might be selected by the book-runner indirectly, setting a lower bound on the portion of the fees, thus limiting the number of banks.[1]

The underwriting group is composed by the managing group and non-managing underwriters, the latter usually called managers. Managers underwrite part of the shares, the proportion of which is determined by the managing group.

Finally, selling banks (co-managers) just put their best effort in selling the shares, but they do not underwrite shares; in other words, they do not guarantee the allocation.

The syndicate concentration differs depending on the tranche: the retail tranche is usually more crowded and includes a selling group (up to 20 banks), while the institutional tranche has usually 4/6 banks and seldom has a selling group.

4.2.2 Functions

Syndicates can potentially perform four different functions: (a) information, (b) certification, (c) research, and (d) market making.

[1]As reported by Corwin and Schultz (2005) an US investment banker told: "*If we're the lead, the best number of co-managers is zero*". Notice that in the US syndicate titles are usually different from the international jargon. Indeed, in a US syndicate a co-manager is a joint book-runner.

Information: Pricing an IPO is "part art and part science". The science part is based on valuation methods. The art consists in determining the market's interest in the offering. Different banks have different clients, thus conveying different information. Banks involved in the syndicate might provide information also indirectly: members of the managing group can affect IPO pricing "*whispering in the issuer's ear*" (e.g., telling the issuer that the book-runner mispriced the IPO and that "*we would have done better for you*"), in order to become book-runner in future underwriting business. There is evidence that offer prices are more likely to be adjusted up (down) in response to positive (negative) information in larger syndicates (and managing group). As a proxy for information the total return from the midpoint of the filing price range to the closing price on the first day of trading is used. The finding that syndicate structure affects both upward and downward price revisions suggests that joint book-runner(s) release information directly to the book-runner in at least some cases (info conveyed by joint book-runner(s) "whispering in the issuer's ear" will more likely lead to upward revision). It must be noted that the role of syndicate members varies considerably depending on the book-runner: some book-runners accept cooperation by other syndicate members, discussing the price and other issue characteristics, while other book-runners simply ignore their syndicate.

Certification: The certification hypothesis suggests that reputable underwriters are associated with reduced uncertainty and thus better pricing (i.e., less underpricing). As we will discuss in Chap. 5, underpricing is usually associated with the degree of information asymmetry between the issuer and investors. The reasoning goes like this: the reputation of an investment bank is damaged if it is involved in mispriced IPOs. Thus the book-runner and other banks involved in the managing group have an incentive to correctly price the offering, reducing underpricing. Reputation is usually proxied by two alternative measures. The first is based on the investment bank's market share in the underwriting business. Market shares are used to build league tables, and investment banks gives crucial importance to their rankings in league tables. A second, alternative measure is the Carter-Manaster ranks.[2] Carter-Manaster ranks range from zero to nine (nine being the most prestigious) and are based on the relative placement of underwriter names in tombstones.[3] In a given year, banks with the rank of nine were never dominated in the tombstone announcement (i.e., no other banks was ever ranked above them). Banks with the rank of zero never ranked above any other firms. This is more an academic measure, as it is used by many researchers analyzing investment banks' reputation. The empirical research on the certification hypothesis provides conflicting evidence. Carter and Manaster (1990) and Carter et al. (1998) find that more reputed banks are associated with lower underpricing. In contrast, Beatty and Welch (1996) find the reputation effect reversed in the 1990s: top-tier investment banks are associated with higher underpricing.

[2]It is possible to download Carter-Manaster ranks from Jay Ritter's webpage at http://bear.cba.ufl.edu/ritter.

[3]In the financial jargon, a tombstone is a written advertisement placed by investment bankers in a security offering. It gives basic details about the issue and, in order of importance, the underwriting groups involved in the deal.

Research: Among the services provided by syndicate members, aftermarket analyst coverage is one the most cited. Analysts' coverage is beneficial to firms, as it increase trading activities and liquidity. Corwin and Schultz (2005) find that each additional joint book-runner increases the number of analysts covering the issuer by 0.8. Also, the quality of analyst coverage is important. Indeed, investment banks with top-ranked analyst are more likely to be included in a syndicate.[4] The involvement of research analysts was extended beyond the syndicate members. This strategy (used in some European IPOs) can surely help in cases of complex and less understood businesses. However, too many different views can add considerable noise and confusion.

Market making: The number of market makers trading a given security is important for its liquidity. If the firm going public will be listed in a quote-driven market, then the number of syndicate members positively affects the number of banks making a market in the stock once trading begins. In particular, Corwin and Schultz (2005) find that for most IPOs on NASDAQ, the book-runner is the dominant market maker, and other syndicate's members play a key role in market making. Each additional joint book-runner results in 1 additional market maker.

From the standpoint of the issuer, these results suggest that a large syndicate (particularly more joint book-runners), provides several benefits. However, the ability of the issuer to include as many book-runners as possible, might be limited by several factors. First, there is some evidence that larger syndicates charge higher fees. Also, top-tier banks impose allocation requirements. In other words, syndicate size may be limited by the issue size. Moreover, as we will shortly see, underwriting relationships among investment banks play an important role in determining syndicate participation: hence, issuer cannot simply require a given bank's involvement, as the book-runner has a sort of veto power.

4.2.3 What Does it Take to Participate in a Syndicate?

Corwin and Schultz (2005) also analyze the factors affecting the likelihood of being included in a syndicate. The results are particular interesting for practitioners.

Investment bank's reputation seems to be an important variable: more prestigious banks are more likely to be involved in a syndicate (in any role). Interestingly enough, this result does not hold for small IPOs, for which the likelihood of top-tier investment banks' involvement is lower. In other words, more reputed investment banks are not willing to participate in small IPO syndicates. Analysts' prestige also affects the probability of syndicate participation. Again, this is true only for largest IPO, while for smaller offerings analysts' ranks do not play any significant role.

[4]As a measure of the analyst quality, Corwin and Schultz (2005) use the rankings provided by the magazine "Institutional Investors", that every October names the top three analysts in each of each industry.

Regional proximity to the issuer is another key variable, especially when the book-runner is based elsewhere. This result is consistent with the information production hypothesis: regional proximity is therefore a proxy for the information the bank can convey. The most important factor affecting syndicate participation is participation in recent syndicates led by the same book-runner and participation of the book-runner in previous syndicates managed by the syndicate member: that is, "reciprocal participation". Relationships among banks play therefore a crucial role in explaining syndicate composition. Just to have an idea, if a bank was in the book-runner's previous syndicate and in 50% of the last ten, the probability of syndicate participation is more than 80%.

Indeed, syndicates draw criticism because they look like exclusive clubs. Although the legal structure is short-lived, the same banks tend to come together repeatedly with the leadership position revolving among a stable, but informal membership. Gaining entry to syndicates appears to be the main way to get underwriting market share, but the exclusivity of syndicates works as a barrier to entry.

4.3 Stabilization

4.3.1 Overallotment and the Green Shoe Option

As defined by the Security and Exchange Commission (SEC), stabilization is "*the buying of a security for the limited purpose of preventing or retarding a decline in its open market price in order to facilitate its distribution to the public*".

To assist in the stabilization effort, the investment bank may "overallot" shares (i.e., sell more shares than are being offered, usually a 15% more) to investors. The bank overallots shares obtained via a stock lending, thus creating a short position: that is it has sold shares that is does not own. The issuer usually grants the investment bank an option to purchase shares from the issuer itself or the selling shareholders in the following 30 days: this is the overallotment option, commonly called "Green Shoe", after The Green Shoe Manufacturing Company (today part of Stride Rite) of Lexington, MA, whose offering in February 1963 pioneered the use of the over-allotment option. To sum up, the investment bank has to give back the shares borrowed, but it holds a call option on those shares. There are two possible scenarios:

1. The price drops: the investment bank buys shares in the market, hoping to slow or reverse the fall. At the end of the stabilization period the investment bank delivers the shares borrowed (the Green Shoe is not exercised).
2. The price rises: the investment bank exercises the Green Shoe: it covers its short without costs.

A more detailed explanation might help. The worst thing that could happen in an IPO is a falling post-IPO price (i.e., overpricing). As we will see in Chap. 5 the investment bank rewards the institutional investors for the information they provide through underpricing, hence overpricing would damage the bank's reputation (also

from the issuer's perspective an overpriced IPO is not that good: it would leave a "bad taste" to the market).

What can an investment bank do in case of falling post-IPO price? To prevent or limit a falling price the only solution is buying (a price drops when everybody wants to sell). In order to be able to buy in case of declining price investment banks use the overallotment option.

A rough and incomplete way to define the over-allotment option is the following: the investment bank has an option to increase the issue size (i.e., the number of shares sold) in case of high demand, and to decrease the issue size in case of low demand. This explanation is not wrong: however the real world is a little bit more complicated.

The investment bank sells in the IPO more shares that it has underwritten (this is why it is called "overallotment"). Underwriting shares means buying those shares. If you don't buy the shares, how can you sell them? In other words, how can the bank sell shares it does not own? Borrowing them from the issuer or its shareholders! This is short-selling, i.e., selling something you do not own, hoping for a price drop so can you buy it at lower price. As the additional shares sold are borrowed, the bank has to give them back to the issuer sooner or later.

If the stock price drops the bank simply buys the shares on the market (remember, to prevent or limit a falling price you have to buy!). Buying shares at a price lower than the IPO price produces three results: (a) contrasting the price decline (which is the original reason for setting all this thing up), (b) leaving less shares in the market (this is why the rough explanation reported above is not wrong), and (c) profit for the investment bank (the bank buys shares at a price lower than the one at which it has sold the shares).

What if the price rises? Well, it means that the IPO is a success. The problem is that the investment bank still has to give the shares back to the issuer. Buying the shares in the market would produce a loss: indeed, the bank would buy at a price higher than the IPO price. Anticipating this possible outcome, the investment bank asks the issuer a call option on the overallotted shares with strike price equal to the IPO price (the investment bank is the holder of the call). The issuer grants this call option for free (after all, it is part of a service provided by the investment bank). Now, if the price rises, the bank simply exercises the call, just giving the proceeds of the overallotted shares to the issuer. Since the issuer pays to the investment bank a fee on the total proceeds, the investment bank make some additional money also in this case (the fee on the additional shares sold).

4.3.2 An Example

To clarify, consider the following fictional IPO:

# of shares: 1.000.000 (these shares are underwritten by the investment bank)
Green Shoe: 100.000 (these shares are borrowed to the investment bank)
IPO price: €10
Fee: 5% (of the total proceeds)

The investment bank sells 1.100.000 shares at €10 per share. The total proceeds are then 1.100.000 × €10 = €11.000.000

Scenario 1 – Price drops to €9: The investment bank buys 100.000 shares in the market (thus contrasting the price decline) and gives these 100.000 shares back to the issuer. The bank makes a profit equal to (€10–€9) × 100.000 = €100.000

The shares left floating in the market are 1.000.000. The total proceeds for the issuer are €10 × 1.000.000 = €10.000.000. The fee paid by the issuer is 5% × 1.000.000 × €10 = €500.000

Scenario 2 – Price rises to €11 (or whatever price higher than €10): The IPO is a success. The investment bank exercises the call option, meaning it does not need to give the shares back to the issuer. However, exercising the call option the bank has to pay to the issuer the 100.000 shares at €10 per share (the strike price). The shares left floating in the market are 1.100.000. The total proceeds for the issuer are €10 × 1.100.000 = €11.000.000. The fee paid by the issuer is 5% × 1.100.000 × €10 = €550.000

The example suggests that the book-runner will exercise the Green Shoe option whenever the market price is above the issue price (underpricing). In contrast, if the first day price is below the issue price (overpricing), the investment bank will cover the short position by purchasing shares on the market (thus stabilizing the price). Actually, this is not necessarily true. Indeed, if the investment bank covers the short, it loses the fee. If the market price is only slightly below the issue price, the trading profit from short covering might not be high enough to offset the opportunity cost of forgoing fees. The profit from exercising the Green Shoe option is:

$$\text{Green Shoe Size} \times \text{Fee}$$

where Green Shoe Size is the number of the Green Shoe shares times the issue price.

The profit from short covering the Green Shoe is

$$\text{Green Shoe Size} \times (-\text{UP})$$

where UP is the level of underpricing, that is the percentage change in issue price. If the issue is overpriced UP is negative (the market price is lower than issue price): the investment bank can make a profit by short covering the Green Shoe shares, but doing so it forgoes the fee on those shares. Of course, the investment bank will try to maximize its profits. Whenever the level of overpricing is lower than the gross spread, the investment bank will just exercise the Green Shoe option, albeit the market price is lower than issue price. Therefore, the Green Shoe mechanism is not always effective in stabilizing the market price. Consider the previous example. Suppose that the price slightly drops to €9.80. If the investment bank short cover the Green Shoe shares, the profit would be (€10–€9.80) × 100.000 = €20.000. However, by short covering the investment bank bears the opportunity cost of €50.000 (the fee on the Green Shoe shares). Even though the market price is below the issue price, the Green Shoe option will be exercised.

Theoretically, the Green Shoe mechanism has also another drawback. The investment bank might have an incentive to overprice issues, to maximize its trading profits. This incentive is counterbalanced by a reputation incentive. Investment banks tend to avoid overpricing to protect their reputation. Nanda and Yun (1997) find that when an investment bank brings IPOs with initial first-day return lower than 5%, its own shares experience negative abnormal returns. If we rule out the incentive to overprice, the investment bank will just tend to underprice the issue, thus favoring its institutional clients.[5]

Is there any way to limit the investment bank's incentive to underprice? The answer is naked short position. Sometimes the investment bank creates a short position which is not covered by the Green Shoe option. This position is therefore not protected by price increase. A naked short position provides a counterbalance to the incentive to underprice. Moreover, naked shorts need to be covered by market purchases, at any level of market price. Also this feature is beneficial to issuers.

If the issue is underpriced the investment bank will exercise the Green Shoe option (for any level of undepricing). The investment bank will still exercise the Green Shoe option for any level of overpricing lower than the gross spread, for which the mechanism fails to sustain the price. The pure monetary incentive will lead the investment bank to heavily overprice: however this strategy would produce a loss in reputation capital. The incentive is therefore to underprice, favoring the institutional investors and earning additional fees. However, if a naked short position is set, underpricing produces losses. To summarize, the presence of a naked short position is beneficial to issuers for at least two reasons: (a) it counterbalances the incentive to underprice and (b) it forces the investment bank to sustain the price even when the market price is only slightly below or at the issue level. The problem is that the investment bank has no incentive to take a naked short position: indeed they are not that common. Section 4.4 reports a description of how naked short works and how it affects the fee distribution.

4.3.3 Two Other IPO Features: Lock Up and Bonus Share

There are two other IPO features related to the post-closing trading activity: (a) lock up and (b) bonus share. Lock up provisions are contractual agreements between the issuer's pre-IPO shareholders and the investment bank that restrict the shareholders from selling shares for a certain period (usually 180 days) following the IPO. Such provisions constraint the supply of shares (thus helping stabilization) and convey a credible signal that insiders will not cash out. A longer lock up period (e.g., 1 year) signals that the shareholders and/or management (for whom a 1-year lock up period is typical) are committed to the longer term success. However, there

[5]Of course, excessive underpricing might not be optimal, because the amount of fees depends on proceedings.

is no evidence that a longer lock up period results in more favorable pricing of an IPO. In contrast, there is strong evidence that when lock up expires the share price declines (indeed sometimes the investment bank releases a "booster-shot" just prior to the expiry). In order to attract retail investors and reduce selling pressure in the after market, sometimes bonus shares are awarded on the expiry of fixed intervals (e.g., each year). Albeit totally different from a lock up provision, the aim of a bonus share program is pretty much the same. They both aim at limiting the sale of shares post-IPO.

4.4 Fees

4.4.1 Distribution

In equity offerings the syndicate is paid a fee (or "gross spread"). The gross spread varies across countries and depends on the issue characteristics. In general, the riskier the securities being offered, the higher the spread charged by the underwriter (equity vs. debt, IPO vs. SEO). Banks also charge significantly lower spreads on fixed-price offerings than on book-building offerings. In fixed price offerings, banks set the price in advance. This imposes more risk on the bank, which must either charge higher spreads (higher direct cost) or price the shares far below the expected post-offer price (higher indirect cost). Indeed, bookbuilding offerings are less underpriced.

During the 1990s in the US the gross spread has tended toward 7%. In particular in the 1995–1998 period for the IPOs raising between $20 and $80 million about 91% of issuers paid a gross spread of exactly 7%. Among several explanations provided in Chen and Ritter (2000), one is related to implicit collusion.

A banker once said "*For every minute we spend negotiating the gross spread with client, we probably spend well over 20 times negotiating the split of the gross spread among the various underwriters and co-managers*". (reported in Geddes (2003)). We will shortly understand why.

Fees in equity offerings typically have three components: management fee (20%), underwriting fee (20%), and selling concession (60%). Although the 20–20–60 rule is a standard market practice, occasional deviations are observed. The management fee compensates the book-runner and other joint book-runner(s) (the managing group) for structuring the offering, conducting due diligence, drafting the prospectus, dealing with regulators, organizing the syndicate, managing the roadshow, etc. Occasionally a *praecipium* (from 20 to 50% of the total management fee) is paid to the book-runner to compensate it for the extra-effort. The underwriting fee is meant to compensate the underwriting group for the underwriting risk, which anyway is minimal in bookbuilt offerings. After deducting all expenses, this fee is shared according to the number of shares underwritten. The selling concession is divided among syndicate members (including selling banks, if any)

based on the number of shares each is credited with selling. In its purest form, the selling concession is paid to the bank that brings in an investor's order. In fact, the book-runner has significant discretion on the allocation of shares and hence the selling concession among syndicate members.[6] This is why the book-runner is usually credited with much more sales than the corresponding underwritten share (about 40% more), whereas other underwriters are credited with selling concession of about 10% relative to their share of underwriting (Corwin and Schultz 2005). Note that part of the shares is usually "pre-credited" ("pre-agreed economics") to the book-runner, and hence syndicate members compete only for a fraction of the total amount of shares: this fraction is sometimes called "jump ball", a term of basketball indicating that credits for selling these shares are left to competition. Some institutions split their order among the syndicate members in order to secure a decent allocation and to keep good relationships with all banks. To limit allocations to "flippers" (i.e., investors who sell the shares immediately after receiving them) some US offerings permit the book-runner to impose a "penalty bid". Penalty bids permit the book-runner to reclaim the selling concession when shares originally sold by a syndicate member are purchased by the book-runner as part of the stabilization.

4.4.2 Designation

Recently, European offerings adopted a US practice known as "designation". The designation can be either prior the allocation of shares (ex ante) or afterwards (ex post).

With the ex ante designation, the investor places one order (usually, but not necessarily with the book-runner) and tells the book-runner how it wants to split the fee on its order. The book-runner is then tempted to give larger allocations of shares to investors who have favored the book-runner itself.

Under the ex post designation, the distribution of the fee is defined by the investors after having received the shares. In the 24 or 48 h following allocations, the sales force from all syndicate members beg for favorable designations, and of course the book-runner's discretion decreases.

The top-tier banks would not accept an ex post designation. An alternative solution to limit the book-runner "power" is to cap the fee for the book-runner to a given level. Again, the acceptance of this kind of provision will depend on the relative bargaining power of syndicate members. To illustrate how the designation mechanism works, consider the following IPO: total shares offered are 11 million, of which 1 million are Green Shoe shares. The offer price is €10, corresponding to

[6]As it will be discussed in Chap. 5, placing a bid with the book-runner increases remarkably the likelihood of receiving shares. The mechanism of distribution of selling concessions clearly explains why.

€110 million of total proceeds. Fees are equal to 5% of total proceeds or €5.5 million. There €0.5 million of syndicate expenses, hence €5 million have to be distributed among syndicate members Syndicate members and fee distribution under different assumptions are reported in Table 4.2.

Each syndicate member guarantees the proceeds related to the number of shares it underwrites. However the underwriting risk is quite limited in the book-building procedure, because the book-runner assesses market demand before the offering. Notice that the number of shares allocated to each syndicate members is determined by the book-runner in accordance with the joint book-runners. More prestigious banks have minimum requirements about their role in a syndicate: in other words, they might refuse to join a syndicate if their portion of shares is not large enough. Suppose the fee structure is the standard 20–20–60%. The 20% of management fee, corresponding to €1.1 million, is distributed between the book-runner and the joint book-runner, after subtracting the praecipium, which goes directly in the book-runner's pocket. Suppose there is no praecipium. The two managing banks would then get €0.550 million each. The 20% underwriting fee (another €1.1 million) is distributed among the underwriting group members according to the proportion of underwritten shares after deducting syndication expenses (€0.5 million), meaning about €0.218 million for each managing member and about €0.032 million for each of the other underwriter. Note that distribution of the underwriter fee is totally independent from the number of shares actually sold by each syndicate members.

Finally, the selling concession (€3.3 million) is distributed according to sales credited to each bank of the syndicate, including selling banks. Usually, not all the shares are attributed based just on sale credits. Part of the shares is pre-credited to the managing group and to the underwriter group. In the example, this initial retention is equal to 5 million shares to managing group (3.5 million to the book-runner and 1.5 million to the joint book-runner). To the book-runner directly are also credited the 0.1 million shares of the friends & family tranche. Another 1 million shares are pre-credited to non-managing underwriters (evenly to each bank). Hence, 4.9 million shares are left. This is the so called "jump ball", indicating that credits for selling these shares are left to competition (at least officially).

To simulate the effect of designation on credited shares imagine two kinds of proposed distribution submitted along with the bid: (a) 50% to book-runner and 50% evenly to all other syndicate members; (b) 10% to book-runner and 90% evenly to all other syndicate members.

If bidders make designation before actual allocation of shares, the book-runner will certainly allocate shares to bids of type (a), thus increasing its own fee. Suppose also that if bidders decide the fee distribution after share allocations, the typical designation would be an average of type (a) and type (b), i.e., 70% to book-runner and 30% evenly to all other members.

As a result, with ex ante designation the amount of selling concession that goes in the book-runners' pockets is higher relative to ex post designation. This effect, however, is quite limited because a large part of the selling concession is already secured by the pre-agreed economics.

Table 4.2 Fee distribution with designation

	Underwritten shares	Management fee	Underwriting fee	Ex ante			Ex post		
				Allocated shares	Selling concession	Total fees	Allocated shares	Selling concession	Total fees
Book-runner	4,000,000	€550,000	€218,182	6,050,000	€1,815,000	€2,583,182	5,070,000	€1,521,000	€2,289,182
Joint book-runner	4,000,000	€550,000	€218,182	1,745,000	€523,500	€1,291,682	1,843,000	€552,900	€1,321,082
Manager	600,000		€32,727	445,000	€133,500	€166,227	543,000	€162,900	€195,627
Manager	600,000		€32,727	445,000	€133,500	€166,227	543,000	€162,900	€195,627
Manager	600,000		€32,727	445,000	€133,500	€166,227	543,000	€162,900	€195,627
Manager	600,000		€32,727	445,000	€133,500	€166,227	543,000	€162,900	€195,627
Manager	600,000		€32,727	445,000	€133,500	€166,227	543,000	€162,900	€195,627
Selling bank				245,000	€73,500	€73,500	343,000	€102,900	€102,900
Selling bank				245,000	€73,500	€73,500	343,000	€102,900	€102,900
Selling bank				245,000	€73,500	€73,500	343,000	€102,900	€102,900
Selling bank				245,000	€73,500	€73,500	343,000	€102,900	€102,900
Total	11,000,000	€1,100,000	€600,000	11,000,000	€3,300,000	**€5,000,000**	11,000,000	€3,300,000	€ **5,000,000**

Of course, this is just a "mechanical" and simplified example. However, it helps understanding the way things actually go.

4.4.3 Naked Short and Fee Distribution

Sometimes investment banks create a short position which is not covered by the Green Shoe option. This position is therefore not protected by price increase. A naked short position provides a counterbalance to the incentive to underprice. Moreover, naked shorts need to be covered by market purchases, at any level of market price. Also this feature is beneficial to issuers.

If the issue is underpriced the book-runner will exercise the Green Shoe option (for any level of underpricing). The book-runner will still exercise the Green Shoe option for any level of overpricing lower than the gross spread, for which the mechanism fails to sustain the price. The pure monetary incentive will lead the book-runner to heavily overprice: however this strategy would produce a loss in reputation capital. The incentive is therefore to underprice, favoring institutional investors and earning additional fees. However, if a naked short position is set, underpricing produces losses. To summarize, the presence of a naked short position is beneficial to issuers for at least two reasons: (a) it counterbalances the incentive to underprice and (b) it forces the book-runner to sustain the price even when the market price is only slightly below or at the issue level.

The problem is that the syndicate as a whole has no incentive to take a naked short. The presence of naked shorts can be explained if we separate the interests of the book-runner from those of other underwriters (Jenkinson and Howard, 2007). Indeed, the profit from selling concession depends on the sales they are credited, the loss (or profit, if any) from the stabilization account are split according to the underwriting shares. The book-runner is usually credited with much more sales than the corresponding underwritten share (about 40% more), whereas other underwriters are credited with selling concession of about 10% relative to their share of underwriting (Corwin and Schultz (2005)). Profits and losses from short positions (both Green Shoe and naked short) are split according to underwriting shares: however, profits from short positions can only arise if the issue is overpriced. The book-runner has the incentive, on reputation grounds, to avoid overpricing. If the issue is underpriced two effects result. First, the Green Shoe option will be exercised and additional fees will be split according to credited sales (thus favoring the book-runner). Second, the naked short position will produce a loss: this loss will be split according to underwriting shares (thus penalizing other underwriters). This explains why book-runners are sometime willing to set naked shorts: they can meet the issuer's wishes, without fully internalize the cost of the naked short position. Consider the following example:

# of shares: 1.000.000 (these shares are underwritten by the syndicate)
Green Shoe: 100.000 (these shares are borrowed to the syndicate and covered by a call option)

Naked short: 50.000 (these shares are borrowed to the syndicate and not covered)
IPO price: €10
Fee: 5% (of the total proceeds)

Also suppose that if the price is below or at the issue price the syndicate covers (i.e., buys back) the Green Shoe shares.[7] Table 4.3 reports the profit/loss for the book-runner and other underwriters when a short naked is set and under the following assumptions about the underwritten shares and credited sales:

	Underwriting share (%)	Credited share (%)
Book-runner	40.0	80.0
Other undewriters	60.0	20.0

If the offer is underpriced additional selling concession will go for 80% to the book-runner and only for 20% to each underwriter, whereas the losses from stabilization account will be borne for 40% by the book-runner and for 60% to each underwriter. The book-runner therefore does not fully internalize the cost of naked shorts.

Suppose for example that the market price drops to €9. The syndicate will cover the Green Shoe position by purchasing shares in the market, realizing a capital gain of €100.000 (100.000 shares sold at €10 and bought back a €9). The syndicate will also realize a €50.000 capital gain on the naked short position. The total profit from stabilization (Geen Shoe plus naked short) is therefore €150.000. The book-runner will get 40% (its underwriting share) of this profit, which is €60.000, while €90.000 will accrue to the other underwriters. The book-runner tends to avoid overpricing for reputational reasons. Consider a 10% underpricing, i.e., the price rises to €11. The syndicate will leave the Green Shoe shares in the market, getting an additional selling concession of €30.000, that is 100.000 Green Shoe shares times the issue price (€10) times 3% (the selling concession). The naked short position will be covered with a capital loss of €50.000. The net result for the whole syndicate is therefore a loss of €30.000. Let's see how this loss is distributed. The additional selling concession stemming for the Green Shoe will accrue to the book-runner for 80% (its credited share) or €24.000. Moreover, only 40% of the loss due to the naked short, or €20.000, will be borne by the book-runner. The net result for the book-runner is therefore a profit of €4.000 (€24.000–€20.000). All the other underwriters will get only 20% of the additional selling concession (€6.000), while they will bear 60% of the naked short loss (€30.000): the net result for them is therefore a loss of €24.000. Three results emerge from Table 4.3. First, when the issue is overpriced the naked short is less valuable to the book-runner. However, the

[7]This is a simplistic assumption. We have seen that the syndicate might not short cover if the level of overpricing is not larger than the gross spread. However this assumption does not change the general conclusion of the example.

Table 4.3 Fee distribution with Green Shoe and naked short

UP(+)/OP(-)	Mkt price	Whole syndicate				Book-runner			Other underwriters		
		Green Shoe		Naked short	Net result	Green Shoe	Naked short	Net result	Green shoe	Naked short	Net result
		Ex./Cover	Profit								
−10%	9,00	Cover	100.000	50.000	150.000	40.000	20.000	60.000	60.000	30.000	90.000
−9%	9,10	Cover	90.000	45.000	135.000	36.000	18.000	54.000	54.000	27.000	81.000
−8%	9,20	Cover	80.000	40.000	120.000	32.000	16.000	48.000	48.000	24.000	72.000
−7%	9,30	Cover	70.000	35.000	105.000	28.000	14.000	42.000	42.000	21.000	63.000
−6%	9,40	Cover	60.000	30.000	90.000	24.000	12.000	36.000	36.000	18.000	54.000
−5%	9,50	Cover	50.000	25.000	75.000	20.000	10.000	30.000	30.000	15.000	45.000
−4%	9,60	Cover	40.000	20.000	60.000	16.000	8.000	24.000	24.000	12.000	36.000
−3%	9,70	Cover	30.000	15.000	45.000	12.000	6.000	18.000	18.000	9.000	27.000
−2%	9,80	Cover	20.000	10.000	30.000	8.000	4.000	12.000	12.000	6.000	18.000
−1%	9,90	Cover	10.000	5.000	15.000	4.000	2.000	6.000	6.000	3.000	9.000
0%	10,00	Cover	0	0	0	0	0	0	0	0	0
1%	10,10	Exercise	30.000	−5.000	25.000	24.000	−2.000	22.000	6.000	−3.000	3.000
2%	10,20	Exercise	30.000	−10.000	20.000	24.000	−4.000	20.000	6.000	−6.000	0
3%	10,30	Exercise	30.000	−15.000	15.000	24.000	−6.000	18.000	6.000	−9.000	−3.000
4%	10,40	Exercise	30.000	−20.000	10.000	24.000	−8.000	16.000	6.000	−12.000	−6.000
5%	10,50	Exercise	30.000	−25.000	5.000	24.000	−10.000	14.000	6.000	−15.000	−9.000
6%	10,60	Exercise	30.000	−30.000	0	24.000	−12.000	12.000	6.000	−18.000	−12.000
7%	10,70	Exercise	30.000	−35.000	−5.000	24.000	−14.000	10.000	6.000	−21.000	−15.000
8%	10,80	Exercise	30.000	−40.000	−10.000	24.000	−16.000	8.000	6.000	−24.000	−18.000
9%	10,90	Exercise	30.000	−45.000	−15.000	24.000	−18.000	6.000	6.000	−27.000	−21.000
10%	11,00	Exercise	30.000	−50.000	−20.000	24.000	−20.000	4.000	6.000	−30.000	−24.000

book-runner will avoid overpricing for reputational reasons. Second, considering both the Green Shoe and the naked short position, the book-runner's break even is higher relative to other underwriters. The break even for other underwriters is at 2% underpricing, whereas the book-runner can still make profit with a 10% underpricing (and more[8]). Third, if the issue is underpriced the loss from the stabilization account grows more slowly for book-runner compared to other underwriters.

Overall, the presence of a naked short position seems to align the book-runner's and issuer's incentives (at the expenses of other underwriters) producing a more accurate pricing.[9]

4.5 Conclusion

In this chapter we have analyzed the role played by investment banks in equity offerings and the structure and distribution of the fee paid by the issuer. A single variable emerged as the crucial one: the offering price. The wealth of the issuer and its shareholders, the return for investors, the functions performed by the syndicate, are somehow related to the offering price. The information asymmetry and the resulting difficulties in prices explain why investment banking fees are much higher in IPOs than they are in SEOs (where new shares are perfect substitutes for the existing traded shares) or in bond offerings (where pricing is easier, at least when the issue is rated). Moreover, extensive research focuses on IPO underpricing, which is clearly related to price-setting mechanisms. The next chapter takes a closer look to the price-setting mechanisms.

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[8]The break even for the book-runner is at an underpricing level of 12%.

[9]Notice that separating the book-runner's incentive from that of other underwriters another interesting result emerges. To the book-runner is convenient to exercise the Green Shoe option at a lower price than the syndicate as a whole. This is because exercising the option additional fees are split according to credited sales, which favor the book-runner itself.

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Chapter 5
Price Setting Mechanisms

5.1 Introduction

This chapter analyzes the main price-setting mechanisms in security offerings, focusing on the most common practice, i.e., the open-price approach, better known as book-building. The price-setting mechanism is just a step in the whole offering process. However, the way the price is set is crucial, being the price the key variable of any offerings, both for debt and equity. The role of the investment bank is strictly related to the price setting mechanism. Indeed the process of a bond issue is not really different from that of an equity issue. Though, how difficult is pricing a bond issue compared to an equity issue? And within equity issues is it that difficult to price a seasoned equity offering (SEO), for which a publicly available market price already exists? In other words, the role of the investment bank tends to be even more crucial in IPOs, where the price is more "uncertain". This is also why investment banking fees are much higher in IPOs than in any other security offering. The IPO process, the role of the investment banks involved in the transaction, the fee they get paid and many other aspects of an IPO depend on the kind of price-setting mechanism used.

The discussion about price-setting mechanisms will also shed some light on the short-run underpricing in IPOs, which is an empirical pattern that attracted a large academic literature: on average, the closing market price on the first day of trading of an IPO is higher than the offer price. In other words the first-day return is positive.[1] This effect seems to be consistent over time and across countries, albeit to different extents.[2] IPO underpricing has a negative effect on the wealth of pre-issue shareholders, so the first question should be why issuers are willing to leave

[1]The terms underpricing and first-day return are used interchangeably.

[2]The figure in Appendix reports the average first day return for several countries. Data are from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/ipodata.htm.

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"money on the table". A number of different economic explanations for IPO underpricing have emerged: some of them are directly related to the price-setting mechanism used to take the company public. Empirical evidence also documents that the average first-day return varies systematically with the price-setting mechanisms used.

The remainder of this chapter is organized as follows. Section 5.2 focuses on book-building, whereas Sect. 5.3 describes auctions. Section 5.4 analyzes the pathology of book-building. Section 5.5 concludes.

5.2 The Book-Building Approach

As I mentioned in Chap. 4, there are three price-setting mechanisms: (a) open-price (book-building), (b) fixed price, and (c) auctions. Despite the growing criticism it attracts for lack of transparency, the most common approach is undoubtedly book-building. It has been for a long time the standard method in the US, but during the 1990s it has become increasingly used in the rest of the world. There are at least two explanations for this pattern. First, during the 1990s the US top investment banks begun penetrating the European market, attracted, among other reasons, by the privatization process. Many of the privatized firms were too big to be sold in a single market, thus creating a demand for US investment banks, in order to tap US investors. It is therefore clear that an increasing presence of US investment banks in Europe and Asia can easily explain the increased use of the book-building approach elsewhere than US. Second, according to some economists, the book-building approach is simply the best approach, because, as we will see later, it allows the investment bank to extract private information from investors. As a matter of fact the book-building approach is currently the most common way to take companies public. What we need to know, however, is how it works, and why some scholars consider it the best one. Some other scholars, though, do not think the book-building approach is flawless. We all also see their comments. Let us first analyze in a more detailed fashion how the book-building process works. I first compare book-building to fixed price. I then describe auctions, illustrating their pros and cons.

5.2.1 The Process

As we have seen, while the company's management is presenting the issue during the roadshow, the book-runner collects non-binding bids from institutional investors. The roadshow normally takes one to two weeks depending on the issue size. During this period the sales force of syndicate banks solicit orders from investors. Each investor can submit different kind of orders, at different points in time, revising some precedent bids, or even withdrawing them. When the book is closed,

Table 5.1 An example of book

#	Bid quantity	Bid type	Limit price
1	20,000,000 USD	Strike (currency)	
2	10,000,000 EUR	Strike (currency)	
	6,000,000 EUR	Strike (currency)	
	1,000,000 EUR	Strike (currency)	
3	10,000 Shares	Step 1	€9
	5,000 Shares	Step 2	€11
4	20,000 Shares	Limit	€10
5	20,000 Shares	Strike	

the book-runner negotiates with the issuer the price. Shares are then allocated among investors in a selective way. Bankers claim that allocating shares on a discretionary basis allows them to put shares in "good hands". However, there are other information-related explanations.

Institutional investors can submit three main types of bid:

1. *Strike bid*: is a request for shares (or amount of money, in case of a "*currency*" strike bid) regardless of the issue price.
2. *Limit bid*: specifies the maximum price that the bidder is willing to pay for the shares.
3. *Step bid*: the bidder submits a demand schedule as a step function.

An example might help. Consider the simplified book reported in Table 5.1.

The first bid is a strike bid of the "currency" type: the bidder basically states the amount of money he is willing to spend for this issue, regardless of the offer price. Also the second bid is a currency strike bid, but it is revised twice. Bid 3 is a step bid: the bidder presents its own demand curve, specifying the different amount of shares he is willing to buy at different prices. Number 4 is a limit bid: the bidder just states the maximum price he wants to pay for a given number of shares. Finally, bid 5 is again a strike bid, but non-currency this time: the bidder only demand a given amount of shares.

The key variable in an IPO is the price and information is crucial to set the price. While the common perception suggests that roadshows are realized to release to potential investors information about the issuers, things are actually the other way around: during the roadshow (through book-building) the firm and its investment bank get information from potential investors. Investors have information crucial to resolve the uncertainty to set the price. When the company approaches the market its investment bank releases a price range, which is a reasonable set of values that are considered to be correct for the firm going public. The width of this range is variable, nonetheless the range itself is a proof of the uncertainty. Institutional investors have two types of information: (a) hard information and (b) soft information.

Hard information reflects insights about the firm; it may seems unlikely that an investor would have info not held by the firm's management, but usually they are more objective. They are also likely to have relatively more access to information about firm's competitors. Soft information can be more relevant. Each investor

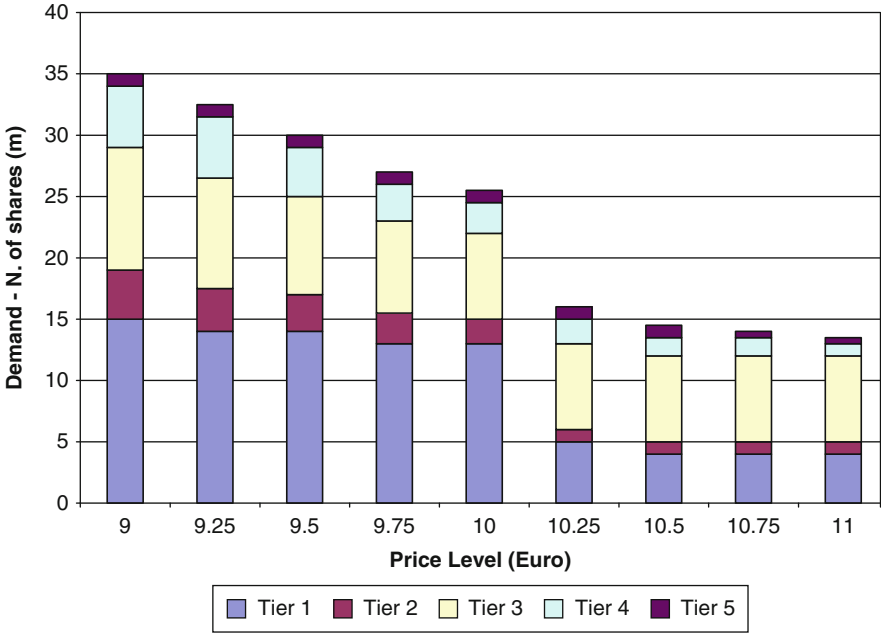


Fig. 5.1 Institutional investors' demand at various price levels

knows his own demand for the issue, which, in aggregate, represents the market demand for the issue; moreover, there are reasons to believe that some investors have market power, in that their level of interest can influence the demand of other investors.[3]

By building the book the bank attempts to get information by potential investors. The problem is that potential investors have an incentive to understate their interest in an offering in order to depress the price at which they purchase shares. Why would investors cooperate by providing fair indication of interest? The use of strategic pricing and allocation policy can offset the investors' incentive to understate their interest in an IPO. This is done simply favoring with larger allocations of underpriced shares investors providing strong indications of interest. Underpricing is therefore a necessary evil. It is a discount[4] that rewards the investors for truthfully revealing their information.

At the closing of the book, bankers analyze the demand curve not only in terms of quantity and price, but also in terms of quality. Figure 5.1 reports the demand curve built from the book of an actual IPO. The institutional offering size is 5 ml shares. As expected, fewer shares are demanded for higher price. Notice that in

[3]For example, some institutions condition their demand on the interest in the issue by some reputed competitors.

[4]Later in this chapter a dark side of underpricing will be discussed.

some IPOs the demand curve looks inelastic (i.e., approximately same amount of shares for any price level). This is the case of very "hot" IPOs, for which investors just want the shares, regardless of price. For any price level, the demand is classified according to the bid quality. The ranking criteria are related to the information content of the bid (strike, limit, or step), the bidder's identity and nationality, previous relationship with the book-runner, etc. All else being equal, tier-1 investor should be favored in allocations. Moreover, some level of underpricing is needed to reward investors; not too much, though, otherwise the issuer will leave an excessive amount of "money on the table". Suppose that during the price meeting the issuer and its investment bank decide to set the price at €11. In this case, just a small amount of bids would be excluded, thus reducing the expected underpricing. Moreover, shares would be allocated to a heterogeneous group of investors, including lower-tier bidders. Consider now a price at €9. A large amount of bids would be excluded; the expected underpricing would therefore be much higher. Also, the shares would be allocated only to a fraction of the tier-1 investors, disappointing the others. A price of €10.25 seems to be a good compromise.[5] All tier-1 investors' bids would be allocated. A reasonable amount of bids are excluded, thus triggering a "fair" underpricing.

Also fixed-priced offerings are underpriced and often more than book-built offerings (Ljungqvist et al. 2003). The economic rationale in this case is different, as we will see in the next section.

5.2.2 A Simple Model[6]

Consider an IPO where the issuer is willing to sell $S = 100$ shares.

Assume that the issuer and its bank know that true value is with equal probability either $V_H = €11$ or $V_L = €9$ (thus, the best estimate is €10 per share). Institutional investors know the true value and their maximum demand is $D_I = 100$ shares. Retail investors know just the price range and their maximum demand is $D_R = 70$ shares. Finally assume that the true value of the issuing firm becomes clear at the closing of the offering.

5.2.2.1 Fixed Price

The price is set to €10 (i.e., the best estimate).There are two alternative scenarios.

Scenario 1: The true value is $V_H = €11$. Institutional investors therefore buy all 100 shares. A 10% underpricing would result in this case.

[5]The reason for using this particular demand curve is that there is clear-cut solution to the pricing problem. In many other real-life situations things are not this simple.

[6]This is a simplified version of the model in Benveniste and Spindt (1989).

Scenario 2: The true value is $V_L = €9$. Institutional investors do not buy. A 10% overpricing results. What will retail investors do? They face with a winner's curse. Indeed, retail investors receive 70 shares if the issue is overpriced, whereas they are scaled back in underpriced offerings. Hence, they will participate only if they believe they will break even on average.

Retail investors' condition is:

$$(V_H - P) \cdot D_R \cdot [D_R/(D_I + D_R)] = (P - V_L) \cdot D_R$$

The first term of the condition is the profit for retail investors when the issue is underpriced ($V_H > P$). The second term is the loss for retail investors when the issue is overpriced ($P > V_L$). If there is no threat of being crowded out by institutional investors ($D_I = 0$) the condition is satisfied with $P = €10$. Though, given the assumptions, retail investors expect to break even at an offer price of €9.58, or about 4% discount from the estimated €10. In Scenario 2 the institutional investors will not participate. Since retail demand is insufficient, the assumption is that the bank takes up the remainder of the offer.

5.2.2.2 Book-Building

The goal of book-building is to induce institutional investors to cooperate. Institutional investors have an incentive to represent V_L as the true value, attempting to drive the price below the initial estimate of €10. The bank should credibly commit to price and allocate the offering in such a way that the institutional investors' expected profit from truthfully revealing the true value when it is V_H is at least as great as falsely claiming that the true value is V_L.

Given A the institutional investors' share allocation:

$$A_H \cdot (V_H - P_H) > A_L \cdot (V_H - P_L)$$

Now the price depends on institutional investors bidding strategy. P_H (P_L) is a bid price indicating a high (low) value. To make this condition true the investment bank can maximize the first term ($A_H \cdot (V_H - P_H)$), but that would be at expense of the issuer (i.e., lower offering price). The investment bank can alternatively minimize the second term ($A_L \cdot (V_H - P_L)$). In order to do so however there are two options. First, setting $P_L = €11$. ($V_H - P_L$) would then be equal to zero. A problem would arise in this case: the institutional investors will not participate when the value is actually V_L. The only possible response is then $P_L = €9$. Second, setting $A_L = S - D_R = 30$ and $A_H = S = 100$. It means simply to give priority to retail investors when institutional investors say P_L. It will then be:

$$100 \cdot (11 - P_H) > 30 \cdot (11 - 9) \text{ that is } P_H < €10.4$$

The expected price is then: 50%·€10.4 + 50%·€9 = €9.70

The expected proceeds are higher with book-building (€970 versus €958). Given the indication of interests, a credible bank is able to assess the true value. When the value is €11, the bank is willing to offer shares at a €0.60 discount (€10.4) to ensure that institutional investors will be truthful with their indication of interest. Failure to do so will damage the investment bank's credibility with investors, undermining its ability to present future offerings. This example also highlights the importance of discretionary allocations. Notice also that the expected underpricing is not €0.60, but €0.30 which is the difference between €10.00 and €9.70. The preferential treatment institutions enjoy in underpriced issues implies the expectation that they will participate in less-attractive issues as well.

5.2.3 The Empirical Evidence

Theory suggests that book-building is actually designed to induce investors to reveal their private information in return for preferential allocations of underpriced shares.

To understand which criteria are followed by the bank in allocating shares, a definition of rationing is needed. A simple definition of a bidder's rationing is the following: the ratio of shares allocated to the shares requested. This is a raw measure, as it is not really informative. Indeed the raw rationing measure changes considerably depending on oversubscription. Oversubscription is the ratio of total demand to total supply. Consider an IPO with total demand equal to 40 million shares and total supply equal to 10 million shares. This IPO is four times oversubscribed. All IPOs are oversubscribed to some extents. Otherwise the bookrunner would simply pull the offer. Suppose bidder A requests 200,000 shares, receiving just 50,000 shares. Bidder A is rationed at 25% (i.e., he receives 25% of the shares he demanded). One might think that the bidder has been penalized, but actually this allocation corresponds to a pro-rata distribution. To check whether a bidder is favored or penalized, we need to compare the raw rationing measure with the level of oversubscription. Let's define the percentage bid and the percentage allocation. The percentage bid is the bid quantity over the total demand for shares in the issue. The percentage allocation is the quantity allocated to a bidder over the total supply in the issue. A normalized measure of rationing is the ratio of percentage allocation to percentage bid. It is easy to prove that this measure is equal to the raw rationing measure multiplied by the oversubscription level. If allocations are on a pro-rata basis, the normalized measure of rationing is equal to one. When normalized rationing is above (below) one, it indicates that that bidder is favored (penalized) compared to a pro-rata distribution. In the previous example the normalized rationing measure is indeed 1 or 25% × 4.

Consider two other bidders in the same fictional IPO: bidder B and bidder C. Bidder B requests 100,000 shares and receives 50,000 shares. Bidder C requests

Table 5.2 Raw and normalized rationing

	Bid	Allocation	Percentage		Rationing	
	# of shares		Bid (%)	Allocation (%)	Raw (%)	Normalized (%)
Bidder A	200,000	50,000	0.50	0.50	25	100.00
Bidder B	100,000	50,000	0.25	0.50	50	200.00
Bidder C	300,000	60,000	0.75	0.60	20	80.00
Total supply	10,000,000					
Total demand	40,000,000					

Table 5.3 Selected results from Cornelli and Goldreich (2001)

Largest size quartile	+24%
Second largest size quartile	+5%
Step or limit bid	+19%
Currency strike bid	+4%
Early bid (among the first 25%)	−5%
Revised bid	+8%
High frequency (more than 10 issues)	+20%
Medium frequency (between 3 and 9 issues)	+9%
Bidder nationality same as the issuer	+9%
Bid submitted to the book-runner	+34%
Bidder is an asset manager	+10%
Bidder is an insurance company	+25%
Bidder is a pension fund	+26%
Adj. R-squared	13.6%
N.	11,077

300,000 shares and receive 60,000 shares. Even though bidder C receives more shares relative to bidder B, the former is penalized (normalized rationing equal to 80%), while the latter is favored (normalized rationing equal to 200%). Table 5.2 summarizes the rationing for bidders A, B, and C.

Cornelli and Goldreich (2001) empirically analyze the impact of several factors on the normalized rationing measure, with interesting results. Table 5.3 shows some results from their work. The size of the bid positively affects the normalized rationing measure: in other words, larger bids are favored. All else being equal, normalized rationing is 24% higher for bids falling in the largest size quartile (compared to below-median bids). Larger bidders are presumably better informed. Bids that are in the second-largest quartile are also favored compared to below-median bids, but just for a 5%. A step bid or a limit bid increase normalized rationing of 19% compared to strike bids. Even currency strike bids are favored compared to simple strike bids (+4%).

Bids submitted earlier in the book-building period (among the first 25% bids) are penalized (−5%). Early bidders are therefore perceived to be less informed. Information about the issue changes over the book-building period, hence later bids are better informed. The same explanation applies for bid revisions, which are favored (+8%): revisions provide additional information. Book-runners favor high frequency bidders compared to medium-frequency bidders, who are in turn treated

better than low-frequency bidders.[7] Investment bankers thus favor regular investors who participate in many issues. A domestic institution (i.e., same nationality as the issuer) is supposedly better informed than a foreign institution.[8] Indeed the former are favored relative to the latter (+9%). Interestingly enough, the single variable which most affects the normalized rationing measure, is whether the bid was submitted to the book-runner or to another syndicate member. As we have seen in Chap. 4, this is relevant for the distribution of the selling concession. The book-runner decides allocations: it is therefore comprehensible that he would tend to favor bids submitted directly to its own sales force, thus increasing its own fees.

Finally, investors' industry seems to affect normalized rationing. Pension fund and insurance company are particularly favored, as they are probably seen as long-term investors.

5.3 Auctions

It is the least common type of price-setting mechanism. In the past it was occasionally employed in many countries. Currently, it is used (albeit sporadically) only in four: France, Israel, Taiwan, and the US.

The lack of popularity of auctions is not totally clear. It is not a lack of knowledge, since auctions are used successfully in other kinds of security issuance, such as Treasury bonds. Neither is a matter of profits for the investment banking industry: Jagannathan and Sherman (2006) document that fees for fixed price offers are pretty much comparable to those for auctions, but among the two methods the first is prevailing. Moreover, underpricing in fixed priced offerings is usually larger than that in auctions or book-built offerings.

Two main kinds of auctions are used to price securities: (a) uniform-price and (b) discriminatory (or pay-what-you-bid). In uniform price auctions all winning bidders pay the same price. The price is usually set at a market-clearing level: the clearing price is the highest price for which sufficient bids at decreasing prices cover the shares being offered. The price might also be set at a slightly below market-clearing level, thus increasing rationing. In most uniform price auctions, in case of excess demand each investors whose bid is above the clearing price would receive the whole amount of shares demanded, while the bids at the clearing

[7]High frequency (medium frequency) bids are defined as those submitted by a bidder that participate in more than 10 (between 3 and 9) issues.

[8]Although statistically true, this result is not without exceptions. In some countries, domestic investors are traditionally considered less informed than foreign (especially US) investors.

Table 5.4 Auction order book

Bidder	Bid			Allocation (%)
	Price (€)	# of shares (ml)	Cumulative (ml)	
A	13	1	1	100
B	12.5	1.5	2.5	100
C	12	1	3.5	100
D	11.5	2	5.5	100
E	11	2.5	8	100
F	10.5	4	11	50%
G	10	3.5		
H	9.5	4		

price would receive a pro-rata allocation of shares.[9] In discriminatory auctions winning bidders pay the price they bid.

Consider a simplified IPO. The offer size is 10 million shares. The investment bank managing the auction deems a €9–€11 a correct price range. The order book is reported in Table 5.4.

In an uniform price auction the clearing price is 10.5: bids above these price correspond to 8 ml share demanded. The bid at €10.5 is for 4 ml shares but only 2 ml shares are needed to clear. Therefore bidder F just receives 2 ml shares, i.e., a rationing of 50%.

Suppose now it is a discriminatory auction, bidder A would pay €13 per share, bidder B €12.5, and so on up to the last winning bidder (i.e., bidder F), who is rationed.

Theory predicts that under certain assumptions auctions produce very precise pricing. As in book-building, the price generated by auctions impounds information provided by investors, but differently from book-building there is no discretion. Discretion in allocating shares can be beneficial to issuers, but it carries the potential for abuse (as we will see later in this chapter). However, auctions' outcomes prove to be highly uncertain in term of subscriptions (over/undersubscription) and pricing accuracy (over/underpricing) (Jagannathan and Sherman, 2006). This result is primarily due to two reasons: (a) the winner's curse, (b) the free riding problem.

5.3.1 The Winner's Curse

The problem can be described in the following way: "I won, but I wish I hadn't". Winning bidders by definition bid higher than non-winning bidders. However, they

[9]In some auctions in case of the excess demand all the investors whose bids are above the clearing price are rationed on a pro-rata or lottery basis. In some cases larger bids are rationed more than smaller bids.

Table 5.5 Market clearance price for simulated auctions

N. of participants	Standard deviation = €1		Standard deviation = €2	
	Clearing price	Average bid	Clearing price	Average bid
200	€10.09	10.14	€10.17	10.00
500	€10.86	10.04	€11.72	9.94
1,000	€11.31	9.86	€12.52	9.96
5,000	€12.31	10.05	€14.21	10.00
10,000	€12.34	10.02	€14.59	10.03

might bid too high.[10] A solution to this problem is just a downward revision in the bidding strategy, which takes into account the number of other bidders and the information they have. In real-life though is quite difficult to anticipate the number of participant and their information. An example might clarify. Consider the uniform price auction for the following IPO: 100 shares are offered and each investor bids for one share only. The market clearing price would then be the 100th highest bid. Each investors bid according to a normal distribution of mean €10 with standard deviation alternatively equal to €1 or €2. The mean is the true value of shares. The standard deviation is a proxy for the difficulty of pricing the issue and bidders' valuation ability. Each investor bids with "noise", i.e. does not know the true value. Table 5.5 reports market clearance prices for simulated auctions with different number of participants.

The average bid always provides a good estimate of the true value. However, clearing prices range from €10.09 (200 participants with standard deviation equal to €1) to €14.59 (10,000 participants with standard deviation equal to €2). The latter figure (almost 50% more than the true value) definitely captures the concept of winner's curse. The rationale of these results is quite simple. Higher bids are more likely to be winners. The likelihood of extreme positive bids in turn increases with the number of participant and with the information asymmetry (proxied by standard deviation). The higher the number of participants and the degree of information asymmetry, the more severe the winner's curse is.

Are there any solutions? The answer is yes. Bidders might reduce their bids in order to take into account the upward bias. To do so, however, they need to know the number of participants and the degree of information asymmetry.

Table 5.6 reports the minimum, maximum, and average clearing price for 100 simulated auctions with 200 participants and standard deviation equal to 1. The table also reports same information for 100 simulated auctions with 1,000 participants and standard deviation equal to 2. The average clearing price for auctions with 200 participants and standard deviation equal €1 is €10.01, with quite negligible winner's curse problem (+€0.01 relative to the true value). In contrast, the average clearing price for auctions with 1,000 participants and standard

[10]I have already cited the winners' curse describing fixed-price offerings. Retail investors were scaled back in "hot" IPOs. In auctions the relevant variable to the winners' curse problem is the price, rather than the amount of shares.

Table 5.6 Market clearance prices for 100 simulated auctions

N. of participants	Standard Deviation	Clearing Price		
		Min	Max	Avg
200	€1	€9.82	€10.26	€10.01
1,000	€2	€12.31	€12.86	€12.56

deviation equal €2 is €12.56: the winners' curse is much more severe (+2.56 relative to the true value). Suppose investors can observe these auctions. They could bid adjusting for the upward bias. The bidding strategy though is strictly related to the number of participants and the degree of information asymmetry. Suppose an investor bids in an auction where the presumable number of participants and standard deviation are 200 and €1, respectively. The investors are expected to face with a very little winner's curse problem. Now suppose that the number of participants and standard deviation unexpectedly increase to 1,000 and €2, respectively. The investors would incur a much higher loss.

I have mentioned that auctions are successfully employed in Treasury bond issuance. The reason is twofold. First, in Treasury auctions the degree of information asymmetry is pretty limited: indeed the security being sold are bonds, which are easier to value (relative to stock), especially when the issuer has a high credit standing. Second, the auctions participants are institutional investors, whose number and valuation ability are usually stable and thus fairly predictable.

Where auctions are employed in IPO the number of participants results highly variable, thus leading to unstable outcomes.[11]

5.3.2 The Free Rider Problem

This is a typical problem of uniform price auctions. Since highest bidders receive shares at a single market-clearing price, there is an incentive to submit high bids without actually valuing the issue (at the expense of those who collect information to correctly price the issue). This free riding behavior reduces the incentive of other bidders to collect information. There is also another possible risk due to free riding. The only cost a free rider might incur is overpricing. In other words, if many free riders participate in auction there will be an upward bias, because they will bid high in order to get shares. Now, if free riders are able to coordinate, they will participate in an auction in a number that minimize the risk of overpricing. However, is quite unlikely the free riders coordinate: as a result a sufficiently high number of free riders will produce overpricing. Consider again an IPO where 100 shares are offered and each investor bids for one share only. There are two kinds of bidders: (a) informed and (b) free riders. Informed bidders are 200 and bid according to a

[11]See Amihud et al. (2003) and Kandel et al. (1999) for Israel's auctions; see Lin et al. (2003) and Hsu and Shiu (2004) for Taiwan's auctions; see Jagannathan and Sherman (2006) for Singapore's IPO. The latter paper reports extensive evidence of auction instability from several different countries.

Table 5.7 Auctions with uninformed participants

N. of free riders	Clearing price
0	€10.09
10	€10.16
25	€10.43
50	€10.72
100	€13.30

normal distribution with average equal to €10 (the true value) and standard deviation equal to €1. The number of free riders is variable. If a free riding investor participates, he will bid €14, which he knows it's an excessive price. Table 5.7 reports the clearing prices of uniform price auctions with different numbers of uniformed participants.

Clearly, the clearing price increases with the number of free riders. The free rider problem is reduced with discriminatory auctions, because bidders must pay what they bid. Uninformed investors are thus discouraged to participate in a discriminatory auction. However, uninformed investors might be necessary for liquidity. Jagannathan and Sherman (2006) provide anecdotical evidence about excessive bids, which usually indicate the presence of free riders. For example, the Singapore Telecom IPO in October 1993: the market clearing price was $3.6, but there were bids up to $100. A solution to the free rider problem in uniform price auctions is the one adopted in France, where the issuer and its investment bank negotiate with market authority a maximum price, after the auction is closed. All bids greater than the maximum price are considered "unrealistic" and thus eliminated. More details about this procedure are given in the next section.

5.3.3 The Empirical Evidence

What mechanism is more precise in pricing IPO? To answer this question Derrien and Womack (2003) examine French IPOs. In France all three mechanisms are used (open price, fixed price auctions) thus making possible a direct comparison. They aim at understanding which mechanism minimizes the level of underpricing. They also look at the variance of underpricing. Suppose two approaches produce approximately the same level of underpricing; the best one would be certainly that with minimal variance. In France an IPO can be either: (a) *placement garanti* (PG), which corresponds to the open price approach; (b) *offer a' prix ferme* (OPF), which is a fixed price offer; (c) *offer a prix minimal* (OPM), which is a sort uniform price auction. In particular, in an OPM the issuer and its investment bank set a minimum acceptable price. The day before trading begins investors submit their bids and the market authority (the Societe des Bourses Francaises, SBF) builds a cumulative demand curve. The issuer and its investment bank negotiate with the SBF a maximum price, above which all bids are eliminated, thus preventing free riding. Moreover the issuer and the SBF decide the offer price, which all winning bidders

will pay. If the offer is too hot (e.g., more than 20 times oversubscribed), it can be postponed and switched to an OPF.

Whatever the price-setting mechanism, the first day of trading the SBF collects sell and buy orders and sets the first transaction price, provided this price is not above a given threshold (usually +10% higher than the offer price). If the price is above the threshold, this call market procedure is postponed to the next day, starting at the higher price (+10%).

Derrien and Womack (2003) find that OPM offerings (i.e., auctions) are associated with both less underpricing and lower variance of underpricing. Notwithstanding their potential drawbacks, auctions appear more efficient than the more popular book-building mechanism (at least in France). There is a caveat, however: the kind of auction used in France is not exactly a pure uniform-price auction. First, the free rider problem is resolved by dropping excessive bids. Second, similarly to book-building, the offer price is *negotiated* after investors' bids are collected. In other words, it appears as a hybrid solution.

Jagannathan and Sherman (2005) indeed propose a hybrid approach: non-standard auctions or modified book-building. Book-building attracts criticism because of lack of transparency and discretion in share distribution, but it is flexible. Auctions are more transparent, but their outcomes are unstable. The authors propose an auction where bids are ranked based not only on price, but as in book-building, also on quality and timing of the bid. A small fraction of shares might be still distributed according to the investment bank's discretion, but with transparent criteria. To wrap it up, they propose to bring the transparency of auctions to the book-building process.

The question is: "If auctions (albeit modified) are more efficient than book-building, why is it book-building so popular?". If the issuers were to decide what mechanism adopt, they would probably choose to minimize underpricing, thus opting for auction (or modified auction) approach. However, underpricing is beneficial to investment banks and to their investor clients, who, differently from issuers, are repeated customers. As long as investment banks control the access to institutional investors, they will decide what mechanism to use and it will be book-building, which allow them discretion in allocations. Nonetheless, whenever there is discretion there is a potential abuse, as I will discuss in the next section.

5.4 The Dark Side of Book-Building

Table 5.8 reports the average first-day returns (i.e., underpricing) of US IPOs priced below, within, and above the initial price range in different period of time.[12]

[12]This table is from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/ipodata.htm.

Table 5.8 Underpricing in US IPOs

	Below (%)	Within (%)	Above (%)
1980 – 1989	0	6	20
1990 – 1998	4	11	32
1999 – 2000	8	26	121
2001 – 2005	3	10	27

One might expect the price increase to be lower when offerings are priced above the initial range. If the price range is €9–€11 and the offering is priced at €12, why should the price further increase the first day of trading? The empirical evidence conflicts with this prior. The level of underpricing for IPOs priced above the initial price range is always relatively larger. Why? An explanation of this result is related to the information argument. Book-building is designed to induce investors to truthfully reveal their information about the issue. The simplified model I have illustrated in Sect. 2.2 of this chapter suggests that the reward to institutional investors consists in larger allocations of underpriced shares. The higher the price suggested by investors, the higher the allocations and the "discount". The extra-underpricing can be thus interpreted as a compensation to investors for revealing their heavy demand. In other words, when investors inform the investment bank that the price should be revised positively, the book-runner only partially adjusts the price. The higher underpricing for IPOs priced above the initial price range is therefore perfectly consistent with the "true information" assumption. This is the standard explanation of underpricing. Indeed US practitioners suggest that a 10–20% underpricing is "fair". What happened in 1999–2000 period? It was the Internet bubble period, during which underpricing rose to incredible levels. The obvious suspects for this strange pattern are investment banks. After all, why should an issuer want to deeply underprice its shares? We have a suspect, but what is the motive? There is evidence that during the Internet bubble some investment banks allocated underpriced shares to specific investors in return for business. This practice is called "spinning". A famous case of spinning is that of Frank Quattrone, an investment banker alleged to have distributed hot IPO shares to managers of companies to influence their decision about the investment bank to choose. In other words, underpriced shares work as a bribe at the expense of the issuer. One might wonder why issuers were not complaining of all that money left on the table. Underpricing certainly lowers the pre-issue shareholders' wealth. This is quite obvious in case of a secondary issue (i.e., existing shares being sold): indeed, if the issue is underpriced, pre-issue shareholders are selling their shares at discount. Also in primary issues underpricing produces a negative effect on pre-issue shareholders: it increases shareholders' dilution. Consider the following example. A firm wants to raise €35 million through a primary offering. There are 10 million shares outstanding pre-issue. The firm is considering two alternative strategies. Strategy A consists in selling 5 million shares at €7 per share. Strategy B consists in selling 3.5 million shares at €10. In both cases the proceeds would be €35 million. However the pre-issue shareholders' condition is rather different under the two strategies.

Under Strategy A the number of post-issue outstanding shares would be 15 million, with pre-issue shareholders controlling 66.7% of the company. Under Strategy B the number of post-issue outstanding shares would be 13.5, of which 74.1% would be controlled by pre-issue shareholders. Since the proceeds are identical in both cases, under Strategy A pre-issue shareholders' wealth is lower relative to Strategy B. This example shows that in either primary and secondary offerings, underpricing should be minimized. So why were issuers not complaining with investment banks during the Internet bubble period? Loughran and Ritter (2002) have an answer based on prospect theory. This a behavioral theory developed by Kahneman and Tversky (1979); according to this theory people tend to focus on the wealth change rather than level. Moreover, it assumes that people calculate a gain or loss on two related events by aggregating or separating them, depending on the net result. Suppose a gain and a loss occur. If the net result is positive, people will prefer to aggregate them (like it was just a gain). In contrast, if the net result is negative people will tend to separate the two events: after all, a gain and a loss are better than just a loss. In an IPO existing shareholders base their wealth expectations on the initial price range and on the corresponding midpoint. If the offer price exceeds their expectation they will realize a gain. Of course, underpricing will lower their wealth, but since they focus on their initial expectations they will not complain. Consider a simple example: an IPO with initial price range €9–€11. The midpoint is €10, and to this price is anchored the issuer's expectation. Despite the price range, during book-building the issue proves to be incredibly hot, thus allowing the investment bank to increase the offer price. Suppose investors are willing to pay €20 per share. If the price is set at €16 the issue will result deeply underpriced. Though, given the expected price (€10), a price of €16 will result more than satisfactorily to the issuer. When the first day of trading shares soar to €20, the issuer will realize he left a lot of money on the table. Nonetheless, this loss is more than offset by the wealth "change" from initial expectation. This example might sound a little extreme. It is not. During the Internet bubble much more extreme cases occurred. A couple of them are briefly discussed in the next section. In summary, if the IPO is hot, the investment bank might take advantage of the lack of bargaining effort by the issuer and leave a lot of money on the table. If there is weak demand, very little or no money is left on the table. This is exactly the observed empirical pattern.

5.4.1 Other Explanations of Underpricing

One possible justification for the excessive underpricing of the 1999–2000 period is that investment banks did not want to take advantage of a crazy market. Indeed, during the Internet bubble things went out of hand and the market was willing to overpay every company somehow related to Internet. Investors were willing to pay €50 (or more) for something worth €10 (or less), but this is not a good reason to take advantage of it. It might even sound credible: after all, once the temporary

enthusiasm of the market vanished, the excessive pricing of some IPOs can embarrass the investment bank. This is what Loughran and Ritter (2002) call "leaning against the wind". If this reasoning is true, however, investment banks that "leaned against the wind" by setting a low IPO price should give "strong sell" recommendations when the price soar to excessive level. This is not the case. Ritter (2005) provides an interesting example. The Internet company Corvis went public in July 2000 with an IPO price of $36. The closing price at the end of the first day of trading was $84. At the end of the quite period, 25 days later,[13] the price was at $90 and Credit Suisse First Boston, the book-runner, gave a "strong buy" recommendation. The "leaning against the wind" defense is not credible, at least in this case.

Another explanation for underpricing is based on the assumption that an IPO is more, or at least also, a" marketing" event rather than just a "capital raising" event. In general a large first-day return certainly produces publicity. Demers and Lewellen (2003) also suggest that it might increase revenues via greater brand awareness. Moreover, as Habib and Ljungqvist (2001) note, the cost of underpricing decrease with the fraction of the firm sold. In other words, if the shares being offered in the IPO are just a small percentage relative to those outstanding, the wealth negative effect of underpricing is limited. The question is then whether traditional advertising is more convenient. In some cases the money left on the table appears far too much to be just "advertising". As Ritter (2005) writes referring to the 1999 IPO of VA Linux where over $1 billion was left on the table: "*The company could have bought every advertisement on every televised college and professional football game in 2000 with the money that it left on the table*.". Somehow related to the "marketing event" explanation is the "signaling" hypothesis. Underpricing leaves a "good taste" to investors, allowing the issuer to approach the market in the future at better conditions.[14] If this assumption is true, there should be a relationship between the return of an IPO and that of a SEO by the same firms. Michaley and Shaw (1994) find that this relationship is not existent. More in general, downturns in the equity market reduce noticeably the issuance activity for all firms, despite the "good taste" left to investors by some specific IPOs.

Underpricing might also reduce the issuer's and investment banks' legal liability in the IPO. A IPO with a large first-day return will be certainly less likely sued than an offering with a first-day loss.

[13]In the US the quite period begins on or before a firm files its preliminary registration with SEC and it ends (since July 2002) 40 calendar days after the IPO. Before July 2002 the quite period ended 25 calendar days after the IPO.

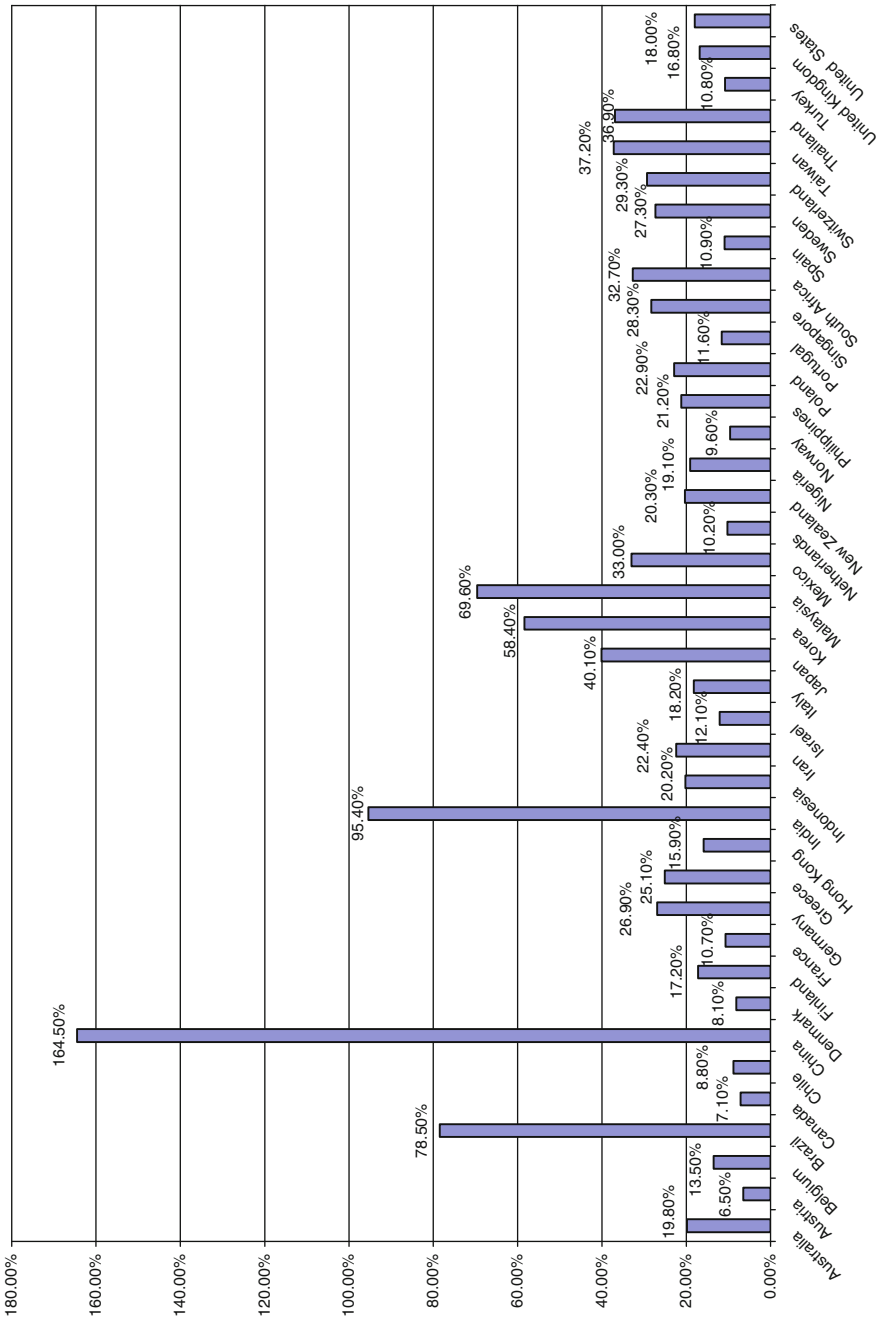
[14]Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch (1989) model the signaling hypothesis.

Finally, another possible explanation for underpricing is related to "informational cascade". If an investor observes that no one is willing to buy, why should he be willing to do so? To prevent this lack of demand, the issuer might decide to underprice its shares, thus inducing some investors to bid and, most importantly, triggering an informational cascade. In an informational cascade investors buy regardless of their own information, just because others are buying. Informational cascade might also generate demand curve with positive slope: during book-building higher bids drive the price up. Investors know that the investment bank will only partially adjust the offer price in response to heavy demand. Higher demand thus triggers new bids, generating a positive-sloped demand curve.

5.5 Conclusion

In this chapter we take a closer look to the different price-setting mechanisms used in equity offerings. The most popular is undoubtedly the book-building approach. Book-building is designed to induce investors to truthfully reveal their information about the issue. Investment banks respond to higher bids adjusting the price only partially, i.e., underpricing the issue. Investors are rewarded through larger allocations of underpriced shares. A crucial feature of the book-building is therefore the investment bank's discretion in allocating shares. Empirical evidence confirms that more informed bidders receive larger allocations. Differently form book-building, in the fixed-price approach there is no way to get investors' information before pricing, and most importantly there is no flexibility in allocating shares. It is therefore clear why book-building results preferable to fixed-price. The lack of popularity of auctions is less clear. In an auction the price is set according to the bids submitted by investors. However, the price-setting rule is transparent, as it is the share allocation. Auction outcomes tend to be very unstable, especially when the number of participants is variable and the issue is more difficult to be priced. However, hybrid solutions (such as the "offer a prix minimal" used in France) provide accurate pricing and stable outcomes. Of course, the flexibility of book-building allows investment banks to take care of their relationships with institutional investors. While useful to this goal, flexibility might also lead to abuses. Underpricing is the reward to investors for providing information. An excessive underpricing, as the one observed during the 1999–2000 Internet bubble, might hide another goal: corruption in return for business, i.e., spinning. While this kind of bribe is at the expense of issuers, they were probably not complaining because issues (albeit deeply underpriced) were priced far above their expectations. Other possible explanations for underpricing cannot justify the huge amount of money left on the table during the 1999–2000 period.

Appendix: Underpricing in Different Countries



Source: Data are from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/ipodata.htm. Data are from a variety of studies by various authors. The sample periods and the number of IPOs differ from country to country. See Loughran et al. (1994) for references.

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Chapter 6
Debt Offerings

6.1 Introduction

A bond offering is not really different from an equity offering. The players involved are the same: an issuer, the investors, and a syndicate in between led by a book-runner. Also the process is pretty much the same. However, a crucial task in the underwriting business is pricing the securities being offered: therefore, the real difference between bond and stock offerings becomes clear. On average bonds are much easier to price relative to equity. Indeed the fee the investment banks charge for managing a typical bond offering is much lower compared to that of an IPO. One of the reasons explaining why bonds are easier to price relative to stocks is related to credit ratings, which are opinions about the creditworthiness of a firm (or its debt securities) expressed by independent and reputed agencies. The presence of ratings facilitates remarkably the job of the book-runner when pricing bonds.

While apparently loan syndication seems quite similar to securities offerings, in fact it is quite different. The most relevant difference is the absence of investors. Indeed, a rather raw definition of a syndicated loan is the following: it is a loan too big to be granted by a single bank, and for which it is therefore necessary to assemble a pool of banks (i.e., the syndicate), coordinated by a lead. As a result, each single bank of the syndicate is lending money to the borrower, whereas in a bond offering the securities are ultimately bought by investors. If bond and loans are different, why are both in the same chapter? Debt securities have much in common with loans: indeed bond pricing reflects the models used for the lending business. This also explains why commercial banks started moving into bond underwriting.

This chapter is organized as follows. Section 6.2 presents an overview of bond offerings. Section 6.3 is dedicated to credit ratings. Sections 6.4 and 6.5 describe the securitization process and hybrid instruments, respectively. Section 6.6 describes loan syndication. Section 6.7 concludes.

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6.2 Bond Offerings

6.2.1 Definitions

Bonds can be classified according to the market of issuance. Bond markets are either on-shore (national) or off-shore (Eurobond market). The on-shore markets can be further broken down into two categories: domestic market and foreign market. A domestic bond is an obligation of a domestic issuer that is offered in the domestic market. For example: a bond issued and traded in Italy by an Italian issuer is a domestic bond. In contrast a foreign bond is bond issued on a given market by a foreign issuer, e.g., a bond issued and traded in the US by a German issuer. Eurobonds are denominated in a particular currency but issued in countries other than the country that issued the denominating currency. They differ from foreign bonds as Eurobonds normally do not have registration requirements. Eurobonds are usually bearer bonds (i.e., possession is evidence of ownership). In contrast foreign bonds tend to be registered (i.e., the owner's name is on the bond and is recorded by the issuer). Bearer bonds tend to be more liquid; as a result they usually have a lower yield relative to registered bonds.

Bonds can be also classified according to the type. Although financial innovation has been generating several different types of debt securities, it is possible to classify bonds in four broad categories:

- Fixed rate: this category includes both straight bond (fixed coupon) and zero-coupon bond.
- Floating rate: coupon payments are indexed to some reference rate. Sometimes coupon payments are capped or floored. More complex structures can be designed: for example in a reverse floater, coupons decreases as interest rates rise.
- Equity related: there are two main types of equity-related bonds: convertible bonds and bonds with equity warrants. In this case also more complex structure can be designed: for example some bonds pay coupon indexed to a stock market benchmark.
- ABS: Asset-backed securities are issued by a vehicle and backed by some assets (mortgage loans, consumer credits, etc.) as part of a securitization process. Section 6.4 provides some details about securitization.

6.2.2 Process

As mentioned above, the syndication process of a bond is not really different from that of equity. A book-runner organizes the syndicate, possibly inviting a small additional group of banks, thus forming the managing group. An underwriting group and a selling group are also invited. Similarly to equity offerings, the fee

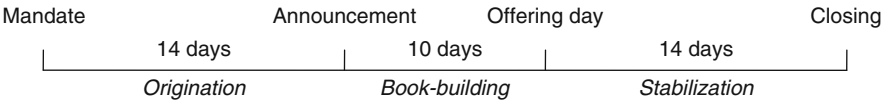

Fig. 6.1 Timing of a bond issue

can be broken down into management fee, underwriting fee, and selling concession. The fee is extracted by discounts on the prices at which bonds are sold to syndicate banks. Consider a bond issue with issue price €1,000 (at par) and gross spread 2%. The book-runner purchases bonds from the issuer at €980 (€20 gross spread) and sells them to underwriters at €985 (€5 management fee) and to sellers at €990. The difference between €990 and €985 is €5 underwriting spread. Sellers can sell the bonds to the final investors at €1,000, getting €10 of selling concession. Interestingly enough, the fee charged by the investment banks seem to be related to the relationship between the book-runner and the issuer, measured as previous transactions made by the issuer with the same investment bank: more intense relationship are associated with lower fee (see Iannotta and Navone 2008 and Burch et al. 2005).

Figure 6.1 reports the time structure of a typical bond issue.

The origination step starts with the book-runner receiving the mandate by the prospective issuer. The book-runner and the issuer discuss the terms of issuance (type, maturity, coupon, etc.). While assembling a syndicate, the book-runner also prepares a credit opinion about the issue, which is particularly relevant when the bond is not rated by an independent agency (see Sect. 6.3 about credit rating). Also, the investment bank starts a pre-marketing activity, informally canvassing investors to get their "feelings" about the issue. Note that the bond features remain provisional until the offering day. The terms, albeit provisional, are announced to the market, usually a couple of weeks after the mandate is given. It is pretty much like setting the price range in an equity offering. The announcement of the issuance terms starts the book-building process. Note that the prospective issuance is announced as soon as the mandate is given to the investment bank. In other words the market is aware of a potential bond issuance since the beginning of the origination phase. However, details about the bond characteristics are still to be defined in the origination phase and are released just before the book-building starts.

At the end of the book-building period, final terms are decided and the bond is priced. The pricing of a bond is usually expressed in terms of credit spread, which is the difference between interest rate paid and the risk-free rate with the same maturity. On the offering day the syndicate purchases the bonds from the issuer, though the issuer will not receive the funds until closing day.

The book-building period is also when gray (or grey) market transactions take place. In the grey market investors trade the bonds, even if the issue has not take place yet: in this respect it can be regarded as a sort of forward market, as the settlement of gray market transactions can only occur after the offering day. The grey market conveys information about the bond being offered: as such the role of the book-runner in canvassing the market to price the bond is somehow diminished.

In bond offerings also the book-runner provides a stabilization service, by influencing the market price of a bond during the time between the offering day and the closing day. Like an equity offering, the mechanism is based on over-allotment of securities.

In bond offerings an alternative issuing procedure, labelled "bought deal" is also used. In bought deals the book-runner buys the entire issue from the issuer, thus setting the terms prior to the announcement. It corresponds to the fixed-price approach of equity offerings. The bought deal approach allows a reduction in the time of issuance, but results in higher uncertainty for the investment bank about the offering outcome, as no book-building is conducted. It tends to be used when market conditions are stable and a lot of liquidity is available.

6.3 Credit Ratings

6.3.1 Definitions

A credit rating is an opinion about the likelihood of default of either an issuer or an issue made by that issuer. An issue rating might be different from an issuer rating: clearly the former depends on the latter, but additional variables are considered in an issue rating such as the seniority of the issue, the presence of collateral, etc. Credit ratings have a huge impact on both the credit spread (i.e., the interest rate paid by the issuer) and gross spread (i.e., the fee paid by the issuer to the investment bank). The worse the rating is the higher both spreads are. A worse credit rating is associated with higher default risk: as a consequence investors will require a higher interest rate and for the investment bank will be relatively harder to price and place the bond (resulting in a higher fee). In several jurisdictions, financial regulations are tied to credit ratings: for example in many countries some institutions (e.g., insurance companies or pension funds) can only buy securities with rating above a given level. The capital regulation of banks is also partly related to credit ratings, since a possible way to compute the minimum capital requirement is based on the ratings of borrowers assigned by independent agencies.[1]

Rating scales are identical for issuer and issue ratings for medium and long-term securities (maturity longer than 1 year), whereas scales for issue rating of short-term securities are different. Table 6.1 reports the rating scales of the three most relevant rating agencies, i.e., Moody's, Standard and Poor's (S&P), and Fitch.

Agencies often modify ratings within the same rating class to provide a better definition of relative credit quality: for example Moody's modifies the Baa category into Baa1, Baa2, and Baa3. S&P and Fitch modify the BBB class into BBB+, BBB, and BBB-. Similar modifiers are applied to the other classes.

[1]It is the Standard Approach of Basel 2.

Table 6.1 Rating scales

Panel A – issuer and issue (long-term) rating			
	Moody's	S&P	Fitch
Investment grade	AAA	AAA	AAA
	Aa	AA	AA
	A	A	A
	Baa	BBB	BBB
Speculative grade	Ba	BB	BB
	B	B	B
	Caa	CCC	CCC
	Ca	CC	CC
	C	C	C
Default	D	D	D

Panel B – issue rating (short-term)			
	Moody's	S&P	Fitch
Investment grade	P-1	A-1	F-1
	P-2	A-2	F-2
	P-3	A-3	F-3
Speculative grade	NP	B	B
		C	C
Default	D	D	D

Ratings are traditionally classified into two categories (excluding default): (a) investment grade and (b) speculative grade. Investment grade securities are those with rating BBB- or better, i.e., the safest securities. Speculative grade securities are those below BBB-, also known as "high yield" or "junk".

6.3.2 Split Ratings

Some issuers or issues are rated by more than one agency. A split rating occurs when agencies assign different ratings to the same issue/issuer. In the finance literature split ratings are considered to be an indicator of opaqueness. Morgan (2002) provides a model to explain why split ratings are associated with opaque issuers/issues. The idea is simple. Through their analysis rating agencies estimate the probability of default of an issuer/issue. However this estimate is noisy, because the "true" probability of default is not observable. In the Morgan's model there are only two rating categories A and B. A-rated securities are good, i.e., raters think that A-rated securities will not default. In contrast, raters believe that B-rated securities will default. Since their estimate is noisy, they cannot be really sure of their opinion (ex ante). As such, they can only observe whether they were right ex post, observing the actual defaults. Rating agencies can thus make two types of mistake: (a) over-rating, i.e., assigning an A to a security that defaults; (b) underrating, i.e., assigning a B to a security that do not defaults. In both cases the agency bears a cost. The cost of overrating is related to the loss of confidence of investors that invest in

presumably safe securities (according to the agency opinion), that eventually default. The cost of underrating is related to issuer that receive a worse than deserved rating (thus paying a higher spread or forgoing the issue). The key assumption is that for a conservative rater the cost of overrating is higher than the cost of underrating. Raters have to convert their noisy estimate of default probability into a rating category: they have to choose a cut-off to distinguish A from B. The more conservative the rater the lower the cut-off is. In other words, fewer securities receives an A, because the rater wants to minimize the cost of overrating. If two rating agencies are equally conservative, no split rating will occur, because they both will choose the same cut-off. If one rater is more conservative than the other, a split rating will occur, because the former will choose a more selective cut-off relative to the latter. Moreover, the conservativeness of raters increase with the opaqueness of the securities being rated. Higher opaqueness will lead both raters to err on the safe side, but one (the more conservative) even more than the other. As result, the likelihood of split rating will increase with opaqueness.

Figure 6.2 illustrates the basic idea of the model.

Morgan (2002) investigates whether banks are more opaque than non-banks. As illustrated in Chap. 1, opaqueness theoretically explains bank existence itself. Borrowers are supposed to be better informed about their investments than lenders are. However, lenders may choose to delegate monitoring to banks, which therefore are supposedly opaque for the very same reason they exist: loans are informationally sensitive and, hence, hard to monitor by bank outsiders. Even more liquid financial assets, like trading assets, may be a source of opaqueness. Unlike loans, trading assets are transparent, but they are also easy to change and hence banks cannot commit to specific trading positions (Myers and Rajan (1998) call it the "paradox of liquidity"). Indeed, Morgan (2002) using data on new U.S. bonds issued between 1983 and 1993, finds that rating agencies disagree more often over bank issues than over non-bank issues. He also finds that bank assets and capital structure can explain this disagreement, as the likelihood of a split rating increases with the amount of cash, loans, and trading assets, and decreases with the amount of real estate, capital and with bank size. Iannotta (2006) also employs split ratings and, using a sample of bonds issued by European firms, concludes that banks are more opaque than non-banks. Other papers use split rating as a proxy for opaqueness (Livingston et al. 2007, 2008; Santos 2006).

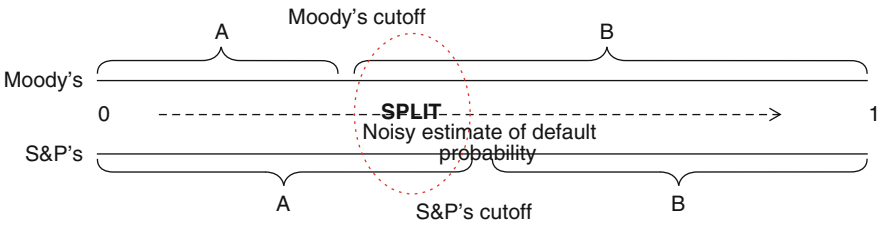

Fig. 6.2 A model for split ratings (Morgan 2002)

6.3.3 Solicited and Unsolicited Ratings

Agencies charge a fee for ratings requested by issuers. These ratings are called solicited. Issuers normally solicit a preliminary rating and then, depending on the outcome, they decide whether disclose it to the market or not. However, raters sometimes assign ratings without being requested by issuers: these are unsolicited ratings. It should notice the most of the ratings are solicited. Fight (2001) reports than unsolicited ratings represents between 6% (S&P) and 27% (Fitch) of total ratings assigned in developed economies in the year 2000. Despite their relatively low frequency, the practice of assigning unsolicited ratings has triggered a debate among issuers and agencies. In principle, unsolicited ratings should be considered less informative than solicited ratings, as the management of the issuer does not cooperate in the rating process. In other words, raters can obtain less information when assigning unsolicited ratings. Interestingly enough, some scholars find that all else being equal unsolicited ratings tend to be worse than solicited ratings (see for example Poon 2003 for a review), albeit the literature provides also contrasting results. Those who find that unsolicited ratings are worse than solicited ones, provide three different explanations. First, agencies might more conservative when assigning an unsolicited ratings, because they have less information. Pretty much like in the Morgan's model described above, it could well be that raters prefer to err on the safe side when they lack information, empirically resulting in less favorable unsolicited ratings. Second, raters could "blackmail" issuers, forcing them to pay for a solicited rating. The idea is as follows: agencies might issue better solicited ratings to keep current clients and worse unsolicited ratings to attract new clients. Third, it is possible that only better issuers solicit a rating (or disclose it when assigned), resulting in averagely worse unsolicited ratings. It is difficult to say which is the correct explanation, as empirical results are not univocal. To conclude it is still unclear, whether there is an actual systematic difference between solicited and solicited difference, and what is the source of this difference, if any.

6.3.4 Are Ratings Important to Bond Pricing?

Credit ratings are of crucial importance in determining both the fee charged by the syndicate and the interest rate paid by the issuer (see for example Morgan and Stiroh (2001), Livingston and Miller (2000), Gabbi and Sironi (2002), Iannotta (2009)). Ratings alone explain more than 50% of the credit spread cross-sectional variance. However, other characteristics also play a relevant role, e.g., the maturity, the face value, the coupon, etc. There are two variables affecting the credit spread of bonds that deserve particular attention. First, the book-runner reputation. Livingston and Miller (2000) find that prestigious banks are associated with lower fees, after controlling for their greater repeat business. Credit spreads are also lower for

prestigious banks, which suggests that investment banker reputation provides investors with a "certification" of the value of the bond issue. Second, the seniority of bond. Subordinated bonds pay higher credit spreads, even after controlling for the credit rating. This results is surprising as rating should impound the information about the bond seniority. Indeed agencies tend to rate subordinated issues with a "notching" approach, i.e., subtracting one notch from the corresponding issuer senior debt rating if this is investment grade. If the senior debt rating is speculative grade two notches are normally subtracted. As a result, the credit rating of subordinated bond should reflect the lower seniority of the issue. The fact the subordinated bonds pay a higher interest rate relative to that explained by their ratings indicates that investors require a higher risk premium on subordinated bonds than the one implicit in the notching procedure applied by rating agencies.

Even if ratings are not the only variable explaining the bond credit spreads, they are certainly the most important. Investors attribute such a relevant role to rating agencies, that the cost of funding of issuers is vastly determined by their opinion, i.e., the rating. However, investors' reliance on rating agencies proved to be dangerous, especially for some bonds that defaulted unexpectedly. The question is therefore whether investors still trust ratings. Generally speaking, they do, as the results above indicate. However, Iannotta (2009) finds that the accuracy of rating in explaining credit spreads is affected by some bond characteristics, in particular, the rating itself: while the rating predicts fairly accurately the credit spread of top-rated bonds, it appears much less informative for worse-rated issues. Investors deem a good rating more informative than a bad rating. In other words, a good rating is safe, a bad rating is on average riskier, but not necessarily so. Top-rated bonds pay on *average* a smaller of credit spread relative to worse rated bonds, with no much variation around this average. In contrast, worse rated bonds pay an *averagely* higher credit spread (indeed they are on *average* riskier than top-rated bonds): nonetheless the credit spread could be much higher as well as lower than the average, depending on the specific bond.

These findings therefore support the idea the investors' trust in rating agencies is limited to the top-rated bonds, while for worse issues investors' reliance on ratings decreases.

Also, investors' reliance on ratings seem to depends on the credit market cycle. Iannotta et al. (2009) use the AAA-BBB spread to proxy for the credit market cycle. When there is a lot of liquidity in the market this spread tends to narrow, whereas when access to credit is more expensive the spread tends to be wider. Investors' reliance on ratings tends to decrease when the AAA-BBB spread is wider. Why? One possible explanation is based on opaqueness. When credit market is less accessible, issuers find it more difficult to sell bonds. As a result, they might tend to disclose just the good information, hiding the bad one. In a word, issuers might result more opaque. This idea seems to be confirmed by the fact that the likelihood of a split rating increases with the AAA-BBB spread. If issuers are more opaque, investors might put an additional screening effort in selecting bonds, thus asking a different interest rate than that implicit in ratings.

To conclude, despite investors' reliance on ratings does not appear to be constant over time, nor across issues, credit ratings are still a crucial variable in determining bond credit spreads and the fee charged by investment banks.

6.4 Securitization

Securitization is the process by which loans or receivables are re-packaged and placed to bond investors. Investors purchase securities which are backed by the loans or receivables. These bonds are therefore called Asset Backed Securities (ABS). The risk of loans or receivables is thus transferred from the bank (or firm) that originally generated the exposure to the bond market.

The securitization process allows to transform typically illiquid assets (mortgage loans, consumer loans, corporate loans, trade receivables, etc.) into tradable securities. The transaction generates cash for the originator (i.e., the institution that originated the illiquid asset), which can be used to expand their business without an increase in equity capital. In the typical transaction, a Special Purpose Vehicle (SPV) is established by the originator. This is a bankruptcy remote firm which purchases from the originator the assets being securitized. This purchase is financed through the issuance of bonds, which are therefore termed ABSs. Consider the example of the banking industry. Banks have to respect a minimum equity capital requirement, measured as a percentage of risk-weighted assets. Consider a bank holding the minimum capital requirement for its assets. The only way to grant additional loans is either waiting the maturity of existing loans or increase the equity capital. An alternative solution is securitization. The bank could securitize a pool of homogenous loans (e.g., mortgage loans), generating cash to be invested in new loans. Also investors can benefit from securitization, accessing investments in assets otherwise unreachable. Moreover, normally ABSs offer a yield premium over comparably rated corporate bonds, due to their relatively more complex structures.

Of course the quality of ABSs is mostly determined by the quality of the securitized assets. Any asset, whose cash flow can be reasonably predicted can be securitized: from credit cards or trade receivables to virtually any type of bank loans, from toll road receipts to royalty payments, etc.

Most of the securitization transactions involve some credit enhancement. There are not many assets that can be securitized into top-rated securities. The purpose of credit enhancement is to raise the credit quality of the bonds issued. There are several credit enhancement techniques, which can be roughly classified into two categories: internal and external. Among internal techniques is worth mentioning: (a) tranching: bonds are issued in several tranches with different seniority (subordinated bonds absorb any losses, increasing the quality of senior bonds); (b) overcollateralization: the value of the assets transferred to the SPV is higher than that of bonds issued, to cover any shortfalls, (c) cash collateral: a cash account is set by the originator as a collateral to the bonds. Alternatively the originator might purchase

an external guarantee from a bank or a insurance company. Almost the same goal as traditional securitization can be achieved through credit derivatives. Indeed, these transactions are often called synthetic securitizations. The main difference between a synthetic and a traditional securitization is that the in the former there is no cash generation. Nonetheless, since credit risk is actually transferred, banks can obtain regulatory capital relief. For example, in a credit default swap (CDS), a common credit derivative, the protection buyer agrees to pay a regular premium and the protection seller agrees to pay upon the occurrence of a credit event (which is basically defining the default) losses on a reference credit. It is a sort of insurance policy, which therefore allows a real risk transfer, without any cash generation.

6.5 Hybrids

Hybrid securities are a blend of debt and equity. Hybrids can be structured in several different forms, the simplest one being convertible bonds. Convertible bondholders have the option to exchange their securities for a fixed number (the conversion ratio) of common shares. An alternative, but very similar structure is based on the combination of debt with warrants. It is important to note that convertible bonds and bonds cum warrants are just one type of hybrid securities. For example, mandatory convertibles are securities in which the bondholder is obliged to convert into common equity at maturity: as such, there is no option embedded.

There are several possible motivations for issuing convertibles. First, convertible bonds might resolve problems of asymmetric information (Brennan and Schwartz 1980). Some firms are more opaque than others, and hence not well understood by investors. As result, these firms might be forced to issue securities (debt or equity) at a larger risk premium, simply because investors cannot properly estimate risk. With convertibles, risk estimation is less relevant. An expected increase in risk will reduce the value of debt, while increasing that of the option embedded in the convertibles (and vice-versa). In other words, a risk shift produces opposite effects in the value of debt and option components. As a result, risk estimation is less relevant, allowing for cheaper capital raising. An equivalent view is to consider a convertible bond as a combination of equity plus a put option (insurance). If the firm is risky the equity in the convertible is worth less and the insurance is worth more. If the firm is less risky the equity in the convertible is worth more and the insurance is worth less. Therefore convertibles are less sensitive to estimates of the riskiness of the firm and management and investors can agree on a price for a convertible bond more readily even if they disagree on risk.

Second, convertibles allow managers to take advantage of their information about the future performance of their firms. Issuers who expect their stock price to rise over time may view convertible debt as “delayed equity”: in other words, it is like issuing equity in the future at a price higher than the current level. Alternatively, but analogously, convertible bonds can be seen as “cheap debt”. Suppose a manager believes that the market is over-estimating the risk of the firm, thus

requiring an excessive credit spread (in the manager's opinion). Rather than issuing straight debt, the firm could issue convertible bonds, whose option component will reflect the over-estimated risk: the firm would therefore be issuing equity (in the form of the option component) at a premium.

Third, depending on their specific characteristics, convertible securities are treated differently by rating agencies. For example, mandatory convertibles normally receive equity credit, i.e., the issuer can raise capital preserving its credit quality, while paying tax-deductible interests.

Fourth, some institutional investors specialize in convertible securities. Therefore, issuing convertibles allow firms to broaden the investors base further than the standard debt and equity investors.

6.6 Syndicated Loans

6.6.1 Definitions

Syndicated loans are loans granted by a pool of banks, organized in a syndicate. As mentioned in the introduction, although syndicated loans and bonds are quite similar in several respects, they differ in a remarkable feature: differently from bond offerings, in syndicate loans the pool of banks is the lender. As such, syndicated loans can be considered as hybrid instruments combining characteristics of commercial banking and investment banking. As in bond offerings one bank acts as lead, getting the mandate and negotiating the loan: this is the mandated arranger. The bank coordinating the syndication process (preparing the information memorandum, inviting banks to join the syndicate, etc.) is called book-runner. Most of the time the mandated arranger and the book-runner coincides, thus allowing to use the two terms interchangeably. For sake of simplicity I will use the term book-runner to indicate the lead bank of syndicated loan.

Banks have several motivations for being interested in loan syndications. It is an effective way to limit single-name exposure. Also, syndicated loans generate fees, which help diversify the traditional banking income, based on interest margin. Moreover, participating banks might get lending opportunities even if they lack origination capacity in a given industry or geographical area.

Since in many instances, the book-runner is a relationship bank of the prospective borrower, it might have inside information about the firm, unavailable to the other banks participating in the syndicate. As such, an adverse selection problem might arise. In other words, originating banks will tend to syndicate loans provided to "bad" borrower, presumably trying to limit their final take to the minimum level (if any). With the same reasoning, it is also clear why loan syndication might generate moral hazard problems: once the loan has been placed to syndicated banks, the book-runner has a limited incentive to monitor the borrower. Of course, the game of loan syndication is a repeated one, and reputation matters: reputation

building (and keeping) provides a strong incentive to the book-runner for not exploiting the syndicated banks. Also, the book-runner might signal the quality of the loan and its incentive to monitor the borrower, by increasing its final take.

There are two main types of syndicated loan facilities: (a) revolving loans and (b) term loans. In revolving loans the borrower can draw down, repay, and borrow again. A revolving loan is a very flexible type of facility. All else being equal, it tends to be more expensive than other facilities (usually a commitment fee is charged on unused amounts). Revolving loans have normally very short maturity, but often "evergreen" options are adopted, which allows the borrower to extend the facility with the syndicate's permission. Term loans are classical installment loans: the borrower can draw down the money in a limited time window and reimburses the facility at regular dates (amortizing) or with single repayment at maturity (bullet). Note that syndicate loans are normally divided into different tranches, each of one with different features (tenor, pricing, rating, etc.). Therefore, within a single syndicated loan there might be tranches of different facilities, with different seniority. Just as an example, consider a syndicated loan with five tranches: two secured (i.e., guaranteed by collateral) term loans (one amortizing and one bullet), one second-lien loan (claim on collateral is behind the two first-lien loan), one unsecured tranche (subordinated) and one revolver. Normally syndicated loans have some covenants: positive covenants (the borrower must take a given action, e.g., purchasing insurance coverage) or negative covenants (the borrower must refrain to take a given action, e.g., selling a particular asset, issuing new debt, etc.).

Syndicated loans have become a dominant source of money for general purposes as well for specific transactions (e.g., M&As, LBOs, etc.). Moreover, although banks are certainly the most important player in the syndicated loan market, there are also other types of lenders such as insurance companies or hedge funds.

As in a bond offering, the fee paid to the syndicate (as well as the credit spread of the loan) increases with the risk of the loan. Beside the fee, banks are often willing to lend money in syndicated loans to keep good relationship with the borrower, hoping to cross-sell other services (advisory, underwriting, etc.). Actually there are several different fees paid by the borrower to the syndicate. Since we are just interested in the syndication process we will focus on three main types of fees: (a) arrangement fee, (b) sub-underwriting fee, and (c) closing fee. Section 6.3. explains the fee structure and distribution through a numerical example.

6.6.2 Syndication Strategies

When structuring a syndicate (but even when bidding for the mandate) there are three relevant decisions to be taken:

1. *Fully underwritten versus best effort*: In a fully underwritten loan, the book-runner commits the loan amount: the borrower will receive the money anyway,

even if the loan is under-subscribed, that is, the book-runner cannot put together a syndicate to grant the whole loan. In a best effort loan (also known as an "arrangement") the book-runner just commits its final take, i.e., the portion of the loan amount that it would have finally provided. In a fully underwritten loan, the underwriting risk is taken by the book-runner, while in a best effort loan the risk is run by the borrower. Note that in fully underwritten deal usually a "market flex" clause is in place, which allows the syndicate to change the pricing (or other features) of the loan depending on the demand conditions. As a consequence, the loan syndication process results even closer to that of security offerings. A third, different type of syndicated loan is labeled "club deal". A club deal is a small loan not closed through a formal syndication process, but limited to a small numbers of relationship banks (i.e., banks with lending relationship with the borrower). Usually the lead bank is first among equal, and fee are distributed evenly among club members. Club deals are in between the classical bilateral loan and a real syndicated loan.

2. *Sole mandate versus joint mandate*: In an equity or bond offering the book-building procedure usually mitigates or eliminates the underwriting risk (the syndicate underwrites the issue after canvassing potential investors). This is why a bank generally prefers to be a sole book-runner: any other joint book-runner would just lower the profit without actually reducing the underwriting risk. In a fully underwritten syndicated loan there is a real underwriting risk, the level of which depends on several variables such as the rating of the borrower, the features of the loan (tenor, interest rates, collateral, covenants, etc.), the condition of the money market. Of course the market flex provision reduces the risk for banks, but if the underwriting risk is deemed to be relevant, a joint mandate might be a useful solution: of course along with the underwriting risk also the profit per bank will be lower.
3. *General syndication vs. sub-underwriting plus general syndication*: In a single-step "general syndication", the book-runner just invites several banks to join the syndicate. Each invited bank will receive the documentation to assess the credit risk of the deal and finally decide whether to join or not the syndicate. Depending on the complexity of the deal, the process can take as long as 1 year. During this period of time the book-runner runs the underwriting risk (in a fully underwritten deal). Alternatively, the book-runner can opt for a two-step strategy: sub-underwriting plus general syndication. In this case, in the first few weeks after getting the mandate, the book-runner invites some sub-underwriters to underwrite (i.e., to commit) a portion of the loan amount, thus lowering the underwriting risk. Notice that the sub-underwriters do not necessarily lend money to the borrower: in other words their final take might be zero (as it might be that of the book-runner). Similarly to a joint mandate, the two step strategy lowers both the underwriting risk and the profit of the book-runner. However, the two risk-mitigating approaches are different. Suppose a book-runner wants to lower the underwriting risk. In a joint mandate all joint book-runners are responsible for the loan amount (each one for a given portion): for example, if a joint

book-runner defaults, the borrower cannot ask to another book-runner to cover that portion of underwritten loan (unless it is specified in the term sheet). In contrast, in a sub-underwritten loan, the book-runner is responsible for the whole amount: if a sub-underwriter defaults, the mandated arranger will have to cover that portion of loan.

In defining the syndication strategy, the book-runner should also specify the "invitation amount", i.e., the portion of the loan for which a bank should commit to join the syndicate. A larger invitation amount corresponds to a more senior title within the syndicate. Each single bank will then decide the invitation amount to subscribe. If the deal is oversubscribed, (i.e., banks are willing to lend more money than needed by the borrower) there are two alternative solutions: (a) increase the size of the deal or (b) scale back. Scaling back means reducing the final take of the syndicate banks: this could be done pro-rata or on discretional basis. Reducing too much the final take might be a problem for some banks, especially those who join to the pool with a small invitation amount. Indeed, participating in a deal means bearing the fixed cost of a credit analysis: if the final take is too small, the fee might be not enough to cover the expenses. Also, the borrower might have some preference for some relationship banks, thus driving the scaling back in favor of some syndicate members.

6.6.3 A Numerical Example

Designing the syndication structure and strategy means solving a risk/return trade-off. Consider the example of a fully underwritten loan of HKD 3,300. Total fee is 1.25%. The fee distribution depends on the syndicate structure. Table 6.2 reports a numerical example from Esty (2005).

The arrangement fee compensates for putting together the syndicate and for the underwriting risk. It is therefore computed against the underwritten amount (i.e., the "committed" amount). In case of sub-underwriting part of the arrangement fee is paid to compensate sub-underwriters for the underwriting risk (sub-underwriting fee). The closing fee compensates for credit screening and is computed against

Table 6.2 Fee distribution under different syndicate structures

	Invitation amount	No sub-underwriting		With sub-underwriting		
		Arrangement (%)	Closing (%)	Arrangement (%)	Sub-UW fee (%)	Closing (%)
Book-runner		0.55	0.70	0.30		0.70
Joint book-runners						
Sub-underwriters		–	–		0.25	0.70
Arrangers	250	–	0.70	–		0.70
Co-arrangers	150	–	0.60	–		0.60
Lead managers	100	–	0.50	–		0.50

the portion of loan actually granted. Notice that the closing fee available (0.70%) might be higher than the closing fee payable because junior syndicate members (co-arrangers and lead managers) get a lower fee (0.60% and 0.50%, respectively): the difference between closing fee available and closing fee payable is called *residual pool income* and it is distributed evenly among senior members (mandated arrangers and sub-underwriters).

The simplest strategy is "sole mandate – no sub-underwriting": Table 6.3 reports the fee distribution for this strategy, assuming that arrangers, co-arrangers and lead managers are 4, 8, and 8, respectively. The (sole) mandated arranger underwrites the whole loan (3,300), but its final take (i.e., the actual amount granted) is 300. As such, the mandated arranger gets 18.15 (3,300 $\times$ 0.55%) as arrangement fee. The closing fee is computed against the final take and it is equal to 2.1 (300 $\times$ 0.70%). Arrangers, co-arrangers, and lead managers get 7, 7.2, and 4, respectively, as closing fee. The total amount of closing fee available is 23.1 (3,300 $\times$ 0.70%). The closing fee actually payable is 20.3: the difference, 2.8, is the residual pool income and goes to the mandated arranger. In this strategy the sole mandated arranger gets more than half of the total fee, but it is exposed to the underwriting risk for 3,300 during the whole syndication process.

To mitigate the underwriting risk the mandated arranger might invite some sub-underwriters and/or include one or more joint mandated arrangers.

Of course, the total fee for the mandated arranger would be reduced. Notice that a mandated arranger might be tempted to include more junior banks than senior, in order to boost its profit. However, a too large syndicate creates a coordination problem (for example, in case of renegotiation of the loan): as a result borrowers usually prefer more concentrated syndicates and thus requires the mandated arranger to limit the number of syndicate members.

6.7 Conclusion

This chapter has illustrated debt offerings. In principle, there is no difference between an equity offering and a debt offering, with the exception of pricing complexities. The average bond is much easier to price relative to the average stock. As such, although the process is identical, bond issues tend to be simpler and hence less profitable for investment banks. Bonds are easier to price even because they are normally evaluated by independent organizations (rating agencies), which provide investors with their opinion (i.e., credit ratings). Despite the growing critiques drawn by agencies for being late or inaccurate in assigning their opinion, credit ratings are still the most important variable explaining credit spreads.

Apparently syndicated loans are quite similar to securities offerings. Nonetheless there is an important difference: the absence of investors. As a result, each single bank of the syndicate is lending money to the borrower, whereas in a bond offering the securities are ultimately bought by investors.

Table 6.3 Sole mandate – no sub-underwriting

	# Of banks	Loan amount	Sub-UW	Invitation amount	Final take	Arrangement fee	Sub-UW fee	Closing fee	Residual pool	Total
Book-runners	1	3,300			300	3,300 × 0.55% = 18.15		300 × 0.70% = 2.1	2.8	23.05
Joint book-runners	0									
Sub-underwriters	0									
Arrangers	4			250	250 × 4 = 1,000			1,000 × 0.70% = 7		7
Co-arrangers	8			150	150 × 8 = 1,200			1,200 × 0.60% = 7.2		7.2
Lead Managers	8			100	100 × 8 = 800			800 × 0.50% = 4		4
	21				3,300			20.3	2.8	41.25

Closing fee available = 23.1 (3,300 × 0.70%); closing fee payable = 20.3 (2.1 + 7 + 7.2 + 4); residual pool income = 2.8 (23.1–20.3)

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Chapter 7
Mergers and Acquisitions: Definitions, Process, and Analysis

7.1 Introduction

Economic theory provides many possible reasons for why mergers and acquisitions (M&As) occur. An often cited motivation is value creation through synergies. Sometimes M&As occur because firms want to increase their market power. In many cases managers undertake M&A transactions for self-serving objectives: for example, just to create a larger company. There are two consistent empirical features of M&A activity: it occurs in waves and within a wave, it cluster by industry. These features suggest that M&As occur as a reaction to unexpected shocks to industry structure. Examples of shocks are technological innovation (excess capacity and consequent need for consolidation) or deregulation. For example, deregulation is a key factor explaining the 1990s waves in the banking industry and in the telecommunication industry.

Another possible explanation for these empirical patterns is based on the idea of informational cascade: an action (in this case a M&A transaction) informs agents in similar circumstances about the profitability of similar actions. As a result once there is a first transaction in an industry, the likelihood of other similar deals occurring goes up, which would explain both waves and clustering. M&A activity can be analyzed from several different perspectives (strategic, financial, accounting, legal, etc.). This chapter focuses on the main financial aspects of M&As and on the role investment banks play in these transactions. The term M&As indicates a rather heterogeneous category of transactions: Sect. 7.2 describes the main types of deal. Although accounting for M&As is not exactly a financial topic, the current accounting standards implies a financial approach (especially when valuing goodwill): this is why Sect. 7.3 summarizes the main accounting issues. Section 7.4 describes the process of a typical M&A transaction, while Sect. 7.5 takes a look to the wealth effects of M&As on shareholders of the involved companies: the impact of investment banking services on shareholders wealth is also analyzed. Section 7.6 examines the most cited motivation for M&As: synergies. Section 7.7 discusses the

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different means of payment in M&As and their effects on the transaction outcome. Section 7.8 concludes.

7.2 Definitions

The term M&A refers to a number of different types of transaction. In (almost) any M&A transaction there is an acquirer firm (henceforth the Bidder) and an acquired firm (henceforth the Target).

In acquisitions the Bidder purchases all or part of Target's stock (stock acquisition). Alternatively the Bidder can purchase all or part of Target's assets (asset acquisition). In the typical merger the Bidder absorbs the Target. Bidder acquires all of the assets and liabilities of Target, which ceases to exist. This kind of transaction is also called forward merger. In a reverse merger it is the Target absorbing the Bidder. There is also another type of merger, called consolidation: an entirely new firm is created (Newco). Both the Target and the Bidder cease to exist. The so-called merger-of-equals is a particular type of consolidation where the distinction between the Bidder and the Target is blurred: there are just two companies that consolidate into a single new entity.

For the Bidder an alternative to direct acquisition of the Target's stock or assets consists in creating a subsidiary and have the Target merged into this subsidiary. This type of transaction is called forward triangular merger.[1] If the subsidiary merges into the Target, the transaction is called reverse triangular merger.

In all these transactions the Bidder can offer either cash or securities to the Target's shareholders (or to the Target firm in case of an asset acquisition). A hybrid payment is also possible (i.e., part cash and part stock) and other securities than stock might be offered (e.g., bonds). The mean of payment is called consideration.

The choice of the deal structure has a number of implications. Consider for example the tax effect: if only cash is used, selling shareholders have an immediate tax liability, whereas taxes are deferred in stock deals.[2] Consider also the different exposure to the Target's liabilities: for example a pending trial of the Target might produce future devastating effects in a merger, while in a stock acquisition these effects are limited to the value of the stock purchased. These are just examples. The deal design has a number of relevant implications in terms of taxation, risk exposure, control, etc.

M&A transactions can be friendly or hostile. In a friendly transaction, managers of the Target welcome the deal. In contrast, in a hostile transaction, the Target's management does not want to be acquired.

[1] This is the typical structure of leveraged-buy-outs. On this topic see Chap. 2.

[2] This is why stock deals are sometimes referred to as tax-free transactions.

Regardless of the deal structure, M&A transactions are also classified according to the industry of the participants in: (a) horizontal (the Target is in the same industry as the Bidder), (b) vertical (the Target is at a different stage of the same production process of the Bidder), and (c) conglomerate (the Target and the Bidder are in unrelated industries).

It is worth mentioning two terms frequently used in M&A transactions: (a) tender offer and (b) takeover. A tender offer is a public offer to buy shares made by the Bidder directly to Target's shareholders. If shareholders choose to accept the offer, they tender their shares. A tender offer is often contingent on the Bidder's obtaining some percentage of the total voting rights. If shares tendered are not enough, then the offer might be withdrawn or reformulated. Tender offers are often hostile. Target continues to exist as long as there are dissident shareholders. Successful tender offers ultimately become mergers. Chapter 9 describes the tender offer process. Takeover is a generic term which refers to the transfer of control of a firm from one group of shareholders to another. Takeovers usually occur through an M&A transaction, but not necessarily. For example a takeover can result from a proxy contest. In proxy contests a group of shareholders attempts to gain controlling seats on the board of directors by voting in new directors. A *proxy* authorizes the proxy holder to vote on all matters in a shareholders' meeting. In a proxy contests, proxies from the rest of the shareholders are solicited by an insurgent group of shareholders.

7.3 A Little Bit of Accounting

There are two basic methods of accounting for M&As: (a) pooling of interest and (b) acquisition (or purchase). The acquisition method in turn can be classified into two types: partial goodwill or full goodwill.

With the pooling of interests the book values (i.e., at existing carrying amounts) of the assets and liabilities of the merging firms are added to arrive at values for combined firm.

With the acquisition method the Bidder recognizes the Target's identifiable assets, liabilities, and contingent liabilities at their fair values at the acquisition date, and also recognizes goodwill. Goodwill is allocated to Cash Generating Units (CGUs). A CGU is the smallest identifiable group of assets that generates cash flows that are largely independent of the cash flows from other assets or groups of assets. Goodwill is subsequently tested for impairment annually (rather than amortized). According to IAS 36 an impairment loss exists when the asset's carrying amount exceeds its recoverable amount. An asset's recoverable amount is the higher of its value in use (DCF) and its fair value less costs to sell (the amount obtainable from the sale of an asset in an arm's length transaction).

With the partial approach, goodwill is measured as the difference between the cost of acquisition for the Bidder and the fair value of share of net assets acquired. With the full approach, goodwill is measured as the difference between the fair value of the Target and the fair value of (all) net assets acquired. In other words a

full goodwill emerges, regardless of the share acquired. The partial and full approaches differ in a "philosophical" sense: with the partial approach goodwill is considered an "unexplained" part of the Bidder's investment. In contrast, with the full approach, goodwill is in all respects a Target's asset, acquired by the Bidder. This difference has some practical implications. Suppose that the Bidder acquires 80% of the Target shares. The cost of acquisition is €5,100 including:

– 1,000 new Bidder's shares at the current market price of €4 (i.e., €4,000).
– €1,000 paid cash to Target's shareholders.
– €100 of investment banking, legal, and accounting fees.

The book value of Target's net assets is €2,000, while their fair value is €3,000. Target also owns an unrecognized intangible asset (e.g., a brand), the fair value of which is €1,000. The fair value of net assets is then €4,000.

With the partial approach goodwill would be equal to €1,900 (that is 5,100 – 80%·4,000). In the consolidate balance sheet there will be goodwill for €1,900, but all the other assets and liabilities will be recorded at their total fair values.

Alternatively, to compute the full goodwill the fair value of Target is needed: a good proxy could be the value implied in the price. However, in this case the price should not take into account fees, because they are part of the Bidder's investment, but not of the Target's value. The Target's fair value (implicit in paying €5,000 for 80% of shares) is €6,250. Goodwill is therefore €2,250 (that is 6,250 – 4,000). Goodwill of minority interest should also be recorded: this is not necessarily the 20% of the full goodwill. Indeed goodwill might incorporate synergies valuable only for the Bidder (e.g., because regarding some other controlled company).

In a 100% acquisition the two approaches only theoretically coincide. Indeed, the cost of acquisition includes the acquisition expenses (such as fees), whereas the fair value of Target should not.

The impairment test is conducted in a similar way; a major difference is related to the "grossing up" of goodwill. With the partial approach the carrying amount of the CGU (to be compared to its recoverable amount) includes all assets at total values and goodwill at its proportional value: the notional goodwill of minority interest should be added to this amount. An impairment loss of course reduces the value of assets (and consequently the value of equity) and is recorded as a loss. Roughly speaking, this loss is the difference between the carrying amount of the CGU and its DCF valuation. The high subjectivity of DCF valuation is well known: this is why analysts are quite prudent in handling goodwill related items when valuing firms.

The adoption of International Financial Reporting Standards (IFRS) in the EU in January 2005 was a major step toward accounting convergence. This leaves IFRS together with US GAAP as the key global accounting standards.

The two standard setters (IASB and FASB) are currently working to further eliminate differences. The current guideline for M&A accounting is IFRS 3 Business Combinations (replacing IAS 22). All business combinations should be accounted for by applying the acquisition method. IFRS 3 has been recently modified and its revised version will come into effect starting on January 2009: under the revised IFRS 3 full goodwill approach applies.

The IFRS 3 applies for "business combinations": in a business combination a Bidder is always identified. Hence there are two noticeable exemptions to the scope of IFRS 3: merger-of-equals (and joint ventures) and combinations of entities that are under common control prior to, and following, the transaction.

7.4 The Process

The M&A process depends on the kind of transaction. For example, the sale of a small firm to a private equity fund is radically different from a hostile takeover attempted through a tender offer, which in turn is different from a friendly merger between two listed firms. To sum up, it is difficult to describe the process of a M&A deal as it changes according to the specific transaction. However, if we exclude tender offers, whose process changes depending also on the jurisdiction, in most M&A transactions there are some recurrent steps.

7.4.1 Hiring the Investment Bank

When the transaction involves large firms (say the Target's EV is above €100) the first step for both firms is hiring a financial advisor, i.e. an investment bank taking care of the process. Both the Bidder and the Target hire an investment bank, often through a "beauty contest". This process involves meeting with and interviewing investment bankers from different firms. If the transaction is particularly large or complex even more than one bank is hired by each part. To win the mandate investment banks usually prepare a "pitch" book describing their prior experience in the industry of the transaction, price estimates, possible timetables, etc. In pitching sell-side (i.e., for the Target's mandate) the price estimates can play an important role, as the first interest for the Target is to get the maximum value. As a result, bankers might tend to be slightly upward biased. For this reason, experience and familiarity with the potential Bidder(s) are also important variables.

Fees are also discussed. In the typical fee arrangement there are two components: (a) the retainer fee and (b) the success fee.[3] Both these components depend on the deal size, usually measured by the Target's EV. The success fee is contingent upon the successful completion of the deal and it is a percentage of the Target's EV. For a €100 ml transaction a reasonable success fee is about 1%. For a €1 bl transaction the success fee can decrease to 0.5%.

When there are many potential Bidders for a Target, investment banks generally prefer to be sell-side, i.e., on the side of the Target. While the closing price is

[3]Beside advisory fees investment banks are also paid expenses including those for lawyers, accountants, or any other advisors retained.

uncertain throughout the sale process, it is quite sure that the Target will be sold. As a consequence, once an investment bank gets a mandate from the Target, it can be reasonably certain that it will gain the success fee. Sometimes sell-side advisors negotiate an ascending success fee, rather than a flat one. Suppose the Target's EV is expected to be valued between €100 ml and €120 ml. An ascending success fee could be 1% up to €100 ml, plus to 2% up to €120 ml, plus 3% up to €130 ml, plus 5% thereafter.

7.4.2 Looking for the Potential Counterparty

When a Bidder makes the first move, it is usually because a potential Target has been identified. In contrast, when management/shareholders of the Target decide to sell the company, a prospective Bidder has not necessarily been identified. As such, one of the first tasks of the financial advisor is to find potential Bidders. In their pitch book sell-side banks usually present potential Bidders, separated into two different lists: (a) *strategic* Bidders, i.e., firms in the same (or in a related) industry), (b) *financial* Bidders, i.e., private equity funds. The number of potential Bidders is of course related to size of the Target and the concentration of its industry: Bidders for a small firm in a very dispersed industry could be hundreds, whereas there just few names for a large company in an oligopoly.

7.4.3 Choosing the Type of Sale Process

When the Target is for sale, another important issue is the choice of the sale process. It means selecting a point along a continuum which runs from negotiated sale on exclusive basis with one prospective Bidder to a broad auction open to many potential Bidders, going through auctions limited to few Bidders. Several factors affect this choice, including again the size of the transaction and the industry concentration. Also the sensitivity of proprietary information matters. Indeed, the risk of business disruption caused by information leakage increases with the number of potential Bidders involved in the sale process.[4] Investment banks

[4]Subramanian 2005 reports an interesting quote of Howard Schiller, Co-Head of the Global Industrial and Natural Resources Group at Goldman Sachs about the relevance of the sale process: "It's very common to talk to multiple buyers to "shop the company" in order to get the highest price. You want to balance the number of buyers against the desire to keep things quiet. The more people you talk to, the greater the chance of leaks. But there is nothing like a competitor to push the price up. Walk-away alternatives are more prevalent on the sell side than on the buy side, because it's somehow more believable that I've talked to another person and they are ready to buy my company. It's less typical that there is the exact comparable thing to buy. But that is definitely a factor in some decision-making, particularly if there is a scarcity of acquirers.".

might try to "over-auction" some firms just to show more potential deals to private equity funds or other prospective clients: in this case a broad auction is best for the investment bank, but not necessarily for its client Target.

Notice that auctions in M&A transactions are usually multi-step with two of more rounds of bidding. Rules might also change throughout the process. Moreover, the price is not the only relevant variable. For example the reputation of the potential Bidder and its ability to effectively close the deal are also important aspects.[5]

7.4.4 Bidder Confidentiality Agreement (BCA) and Confidential Information Memorandum (CIM)

Suppose a limited auction is the selected sale process. The next step is the distribution of the "*teaser*". The teaser is a brief description of the Target. The document is blind, that is, the Target is not identified by name. Sometime the investment bank assesses the interest of potential Bidders before even sending the teaser. The purpose of the teaser is to identify a set of potential Bidders, interested enough to examine the CIM. The CIM is prepared by the investment bank and it contains a very detailed description of the Target, its products, market, history and financial projections. Since it reports very sensitive information, recipients of the CIM are requested to sign a BCA. The BCA is a document prepared by the legal advisor of the Target: it requires to not disclose any information contained in the CIM, to not contact any of the Target's directors, employees, suppliers, customers or shareholders without the Target's advisor approval, and other limitations. Not all the teaser recipients are ready to sign such a binding document. Hence, the BCA reduces the number of potential counterparties, especially with strategic Bidders. Indeed, while financial Bidders have analysts whose job is just examining prospective deals, strategic Bidders tend to dedicate time only to deals in which they are really interested.

7.4.5 First Round Bids

After having analyzed the CIM along with their advisors, potential Bidders might require additional information to decide whether to make a *non-binding bid*. This is

[5]Auctions are classified into common-value and private-value. Common-value auctions are those where the asset being sold has the same use for all Bidders: for example a commodity. In contrast, in private-value auctions the use of the asset (and consequently its value) is subjective. Price discovery tend to be easier in common-value auctions. M&A auctions are normally considered private-value auctions. Indeed, the value attributed to a firm might be different if the Bidder is a competitor, a private equity firm, or a firm in unrelated industry. However, when all Bidders belong to the same industry M&A auctions are probably more common-value than private-value.

a preliminary bid, usually expressed as a range of values and sometimes also specifying some details about the source of financing. The field of prospective Bidders narrows significantly, usually about 10 preliminary bids emerge from 60 CIM recipients.

Strategic and financial Bidder differ in their valuation approach: financial Bidders look for a given rate of return on the equity investment.[6] As such, an important part of their valuation consists in assessing the debt capacity of the Target. In contrast strategic Bidder will focus on the potential synergies being generated by the transaction.[7]

Sometimes the Target's advisor presents to potential Bidders tentative terms for the financing. This is called "stapled financing", as the Bidder will have just to staple a check for the equity. Staple financing is generally utilized only by financial Bidders. Strategic Bidders usually bring their own financing to a deal. Stapled financing represents a potential source of additional fees for the Target's advisor. As such, the investment bank is faced with a conflict of interest. Consider this simple example. Suppose there are two Bidders: Bidder A bids for €200 ml and it is not interested in staple financing (because it has its own relationship bank or simply because it does not need any financing). Bidder B bids for €180 ml and it interested in €100 ml of stapled financing. Now suppose that the success fee for the Target's advisor is 1% and the closing fee[8] for stapled financing is also 1%. If Bidder A succeeds the Target's advisor will get €2 ml as success fee. Though, if Bidder B succeeds the Target's investment bank will get €1.8 ml as success fee and €1 ml of closing fee, for a total of €2.8 ml. It is therefore possible that the investment bank favors Bidder B over Bidder A. This is why sometimes the Target precludes its bank from participating in the Bidder's financing. Staple financing has also other drawbacks. First, given the amount of staple financing, prospective Bidders can infer the value that the investment bank attributes to the Target. Moreover, if a bank often provides stapled financing on its deals, an enhanced screening effort will be put when stapled financing is not provided.

7.4.6 Data Room

The Target and its investment bank select a number of bids, based on the value, the credibility of the counterparties, and other criteria. One or more meetings are then organized with the Target's management and each of the Bidders. Most importantly, Bidders and their advisors can access the data room. The data room contains detailed information about the Target: contracts, customer lists, term of existing

[6]See for example the LBO valuation discussed in Chap. 2.

[7]Synergies and their valuation are discussed in chapter & of this chapter.

[8]The closing fee is paid up-front to the lender (or the mandated arranger in case of a syndicate loan). See Chap. 6 for details on syndicated loans.

financings, pension plan, legal actions, etc. Most frequently the data room is organized at the office of the Target's legal advisor. However, in an increasing number of deals, virtual data room have been used (i.e. on the web). Virtual data room might be beneficial to both Target and Bidders: it is less expensive, data are available 24 h a day, and more than one Bidders can access at the same time. Target can also monitor how much time Bidder is spending in the data room (to assess seriousness) and what they are viewing most intensely (to see areas of concern).

7.4.7 The Definitive Merger Agreement (DMA) or Definitive Sale Agreement (DSA)

Bidders and Target review the DMA (or DSA in case of an acquisition). This document regulates the transaction, containing information on several aspects: the purchase price, when the merger will occur, how the price will be paid, covenants regarding how the business will be conducted prior to the closing, what happens if the merger is terminated.[9] Notice that negotiations on the DMA begin before final bids are submitted. This is because the DMA contains crucial aspects of the transactions, at least as relevant as the price. As a result, not necessarily the highest bid turns out to be the best for the Target. There are many possible provisions of the DMA that requires fierce negotiations. Among the others, it worth mentioning:

1. Material adverse change (MAC) out: it sets the conditions under which the Bidder can jump out of the deal. Of course the Target wants no MAC out or wants the MAC out to include only extreme events. In contrast the Bidder wants to shape the MAC out like an option.
2. Fiduciary Out: it sets the conditions under which the Target's board may exit the deal. It is named after the fiduciary duty of the directors, who have to act in the best interest of the shareholders. Typically, the Target tries to negotiate a clause that allows its board to accept a higher offer from another Bidder.
3. Break up fee: it is an amount paid by Target to Bidder if the deal is not consummated for pre-specified reasons, usually related to another Bidder.

The selection of the Bidder and the final negotiation of the DMA/DSA proceed at the same time. Once the Bidder is selected and price agreed, it is possible that some details of the DMA/DSA are not yet fixed. In this phase the risk is that the selected Bidder closes negotiations or tries to reduce the price. This also explains why the reputation of the Bidder is important.

[9]There is always the risk that for some reasons the negotiation quits and the deal is not closed.

7.4.8 *Fairness Opinion and Closing*

Prior to signing the DMA/DSA the Target's board of directors usually requires a fairness opinion. This is a "certification" about the value of the deal provided by a financial advisor (sometimes the Targets' investment bank). Kisgen et al. (2009) report that in the US over the period 1994–2003 80% of Targets and 37% of Bidders require a fairness opinion. Interestingly enough, these opinions produce no effects on the deal outcome when used by Targets, while they affect the outcomes when used by Bidders. In particular, the bid premium (i.e., the difference between the price paid by the Bidder and the Target equity value) is lower if the Bidder obtains a fairness opinion. Nonetheless, the market reactions to these deals is "cooler", suggesting that investors are somehow sceptical about these transactions.

After signing the DMA/DSA other steps might be necessary, such as gaining the approval from the Target's shareholders, getting the go-ahead by antitrust authorities, or arranging the financing for the deal.

7.5 Do M&As Pay?

7.5.1 *Abnormal Returns*

There is a huge amount of research on the effects of M&As on the wealth of Bidders' and Targets' shareholders. A detailed analysis of this literature is beyond the scope of this chapter.[10] However it is worth taking a look to some general results, with a deeper discussion about the role of investment banks.

The typical research approach is the "event study". Event studies examine the wealth effect to shareholders by measuring abnormal market-based returns at the time of the deal announcement. Although there are several ways to compute abnormal returns, a common methodology is the following. An expected return of the stock is estimated by a using a single index model, that is by regressing returns on the stock against the returns of the market index. The returns are usually selected over a period that begins one year and ends thirty days prior to the announcement.[11] The one-day abnormal return is equal to the stock actual return less its expected return.[12] The cumulative abnormal return over a period is the sum of the abnormal returns over each day during that period.[13]

[10]For a careful review of these studies see Bruner (2004).

[11]This estimation period ends some days before the announcement to avoid a possible bias related to information leakage about the deal prior to its announcement.

[12]A simpler approach consists in computing the abnormal return as the difference between the actual return and that of a market index.

[13]Time windows commonly used in the literature are [−2;+2], [−10;+10] or [−5;+30]. A cumulative abnormal return over the [−2;+2] window is the sum of the abnormal returns of the two days before (−2) and after (+2) the event (i.e., the deal announcement).

Event studies yield insights about wealth effects to Target's and Bidder's shareholders and to the combination of both.[14] Target's shareholders realize returns that are significantly and materially positive (from 10% up to 40%): abnormal return tends to be higher for cash deals. In contrast Bidder's shareholders tend to experience null or slightly negative abnormal returns. Again, the consideration appears to matter: the market reaction is more favorable for cash deals. There are typically two explanations for this result: (a) cash deals are usually associated with debt issues, which tend to discipline the management; (b) stock deals signal to the market that the Bidder believes its stock is overpriced. As we will see in Sect. 7.7 of this chapter, there is another explanation to these results, based on some technicalities of M&A analysis. To sum up, Target's shareholders make money and Bidder's shareholders lose money. Of course this is true on average, and hence there are many exceptions.

Research has also investigated the combined wealth effect. Typically the Bidder is bigger, thus one might think that a large percentage gain to the Target's shareholders is more than offset by a small percentage loss to the Bidder's shareholders. Notwithstanding the difference in size, the literature review reported in Bruner (2004) documents that both simple and weighted average returns are generally positive.

7.5.2 The Role of Investment Banks

Academic literature on the role of investment banks in M&As has mainly investigated two issues: (a) the factors affecting the choice of the advisors and their effect on the shareholders' wealth and (b) the determinants of merger advisory fees and their impact on the shareholders wealth. This section provides detailed references about these topics. In a nutshell, there are three main results. First, firms tend to hire a financial advisor only for more complex transactions, where an investment bank can provide a "certification" about the quality of the deal. Second, the strength of this "certification" effect seems to be related to the investment bank's reputation and to the intensity of previous relationship with the advised firm. As a result, top-tier investment banks with intense previous relationships are associated with a positive wealth effect for shareholders. Third, investment banks' reputation and previous relationship increase both the level of advisory fees and the proportion of success fees. Nonetheless, higher fees and higher portion of fees contingent on the successful closing of the transaction are associated with more likely and faster deal completion.

[14]Most of the studies focus on the short-run abnormal returns. However, the long-term effects of M&As are also relevant. Nonetheless, the market reaction in the few days after the announcement of the deal seems to be a good indicator of its long-term outcome (Hazelkorn et al. 2004).

7.5.2.1 The Choice of the Advisor and Shareholders' Wealth

Servaes and Zenner (1996) find that bidders are more likely to hire an advisor in more complex transactions, with a higher degree of information asymmetry: these are typically large, hostile acquisitions that use at least some securities as consideration. They also compare the abnormal returns of bidders assisted by an investment bank to those of bidders without financial advisors: they do not find any significant difference. Nonetheless, Bowers and Miller (1990) find that investment banks' reputation affects shareholders' wealth: more reputed investment banks can better identify good deals, which produce greater economic benefits. Put it another way, reputed investment banks generate a "certification" effect. When top-tier investment banks[15] are hired by either counterpart the total wealth gains are larger. Forte et al. (2009) focus on the Target's choice of financial advisor and to related effects on shareholders' wealth. They find that the choice to use an investment bank depends, among other variables, on the intensity of previous banking relationship of the target company. The relationship measure is computed looking at previous transactions (M&A transactions, equity or bond offerings, and syndicated loans) completed with a given investment bank. Previous relationship allows investment banks to gather private information, thus providing a more credible certification effect in a transaction. Indeed, they find that the wealth of Target's shareholders increases with the intensity of previous banking relationship. Interestingly, Forte et al. (2009) find that the likelihood for the Target to hire an investment bank also depends on the reputation of the *Bidder*'s financial advisor. Allen et al. (2004) investigated the role of commercial banks (as opposed to investment banks) as advisors to both Bidders and Targets. They argue that commercial banks have a comparative advantage in serving as M&A advisors for their customers with prior lending relationship, because they can provide a stronger certification effect. This is because commercial lending relationships are usually long standing and provided on a continuous basis, thus generating more information than M&A transactions or underwriting services (which are discrete and intermittent). However, the potential conflict of interest arising from a bank acting as both merger advisor and lender might countervail the certification effect. They measure the certification effect in terms of shareholders' abnormal return, finding supporting evidence of a net certification effect for Targets only. Nonetheless they find that the more intense the lending relationship with the Bidder, the greater the likelihood that a commercial bank will be chosen as merger advisor.

7.5.2.2 Merger Fees and Shareholders' Wealth

As far as the second branch of literature is concerned, Hunter and Walker (1990) find that most merger fee contracts include a payment contingent on the completion

[15]Bowers and Miller (1990) classified as top-tier First Boston, Goldman Sachs, Merrill Lynch, Morgan Stanley, and Salomon Brothers.

of the merger. This contractual structure provides an incentive to the advisors, which results in larger abnormal returns. McLaughlin (1992) uses several measures of tender offer outcome to evaluate the effects of different fee contracts, providing evidence that the fee structure does influence the offer final outcome. Rau (2000) investigates the factors affecting the market share of Bidders' investment banks, finding that more reputed investment banks charge higher proportions of their fees contingent on the successful completion of the deal. Saunders and Srinivasan (2001) find that Bidders pay higher advisory fees to investment banks with whom they have more intense relationship (measured in terms of prior debt, equity, and M&A transactions). They also document that Bidders are more likely to switch if their advisor is not a top-tier investment bank, but switching does not produce any significant difference in the shareholders' wealth. Finally, Hunter and Jagtiani (2003) empirically investigates the factors affecting the probability and the speed of a successful deal completion, the fees charged by investment banks to both Bidders and Targets, the effects on the wealth of Bidders' shareholders. They find that more reputed investment banks results in a more likely and faster deal completion. A higher portion of fees contingent on the deal completion also helps in speeding up the process, while prior Bidder's relationship with its advisor seems not to influence the time to deal closing. They also document that larger fees are associated with positive wealth effect for Bidders' shareholders.

7.6 Synergies

One of the most cited motivation for M&As is related to synergies. There is value creation (i.e. synergies) if the equity value of the resulting firm exceeds the sum of the (pre-acquisition) equity values of Bidder and Target:

$$E(C) > E(B) + E(T) \tag{7.1}$$

Where E(C) is the equity value of the combined firm (i.e., post-acquisition), E(B) and E(T) are the equity value of the Bidder and Target, respectively. If this condition is met, then synergies are defined as:

$$SYN = E(C) - [E(B) + E(T)] \tag{7.2}$$

The analysis of valuation methods is beyond the aim of this guide. However, it is worth giving a quick glance to synergy valuation. Synergies are often expressed in vague strategic terms, but they should be defined in a measurable way. In a DCF framework, value can be created through an improvement in the cash flow or through a reduction in the cost of capital. It is therefore possible to classify synergies into two categories: (a) operating synergies, which are related to cash flow enhancement and (b) financial synergies, which stem from a reduction in the cost of capital.

Operating synergies can be further broken down into the following types:

- Cost synergies: these are cost reductions stemming from economies of scales in production and administration, greater purchasing power in the raw material market, improvement in logistics, etc.
- Asset synergies: it is a "one-shot" cash flow due to disposal of redundant plants, premises, equipment, etc.
- Tax synergies : it is the tax savings due to the transfer of net operating losses from Target to Bidder (or vice versa).
- Revenue synergies: it is the revenue enhancement due to cross-selling, combination of distribution networks and know-how, greater pricing power due to higher market share, etc.

Usually, the market tends to be persuaded by the "cost-cutting" motivations for M&A, because it is more easily quantifiable.

Consider this example of synergy valuation reported in an analyst report.[16] In March 2000, oil major British Petroleum (BP) acquired lubricants firm Burmah Castrol in a USD 4.7 billion all-cash offer. BP expected cost synergy in distribution, supply, and administration for at least USD 260 million pre-tax per annum. The cost of implementation was expected to be about USD 390 million pre-tax. The WACC was assumed at 7% and the tax rate at 30%. Analysts considered the after-tax cost savings as perpetuity and discounted them at the WACC, resulting in a net value of synergies equal to USD 2.3 billion.

Notice that dis-synergies might also emerge in an M&A transaction. These are restructuring charges or loss of key employees or clients. For example, in December 2002, French cooperative bank Crédit Agricole made a friendly offer for Crédit Lyonnais. Crédit Agricole expected positive revenue synergies in asset management and specialized financial services; however these were expected to be offset by revenue losses in financing activity and investment banking (i.e, dis-synergies).

Financial synergies tend to be more problematic relative to operating synergies, both from a theoretical and practical standpoint. Often analysts classify as financial synergies the reduction in the cost of capital due to the acquisition of a Target with a bad credit rating by a Bidder with a good credit rating. This is because the lower cost of capital of the Bidder is applied to the valuation of the Target. However, it is not clear why the Bidder cost of capital should be unchanged post-merger. In other words, the post-merger cost of capital should reflect the worse credit rating of the Target. For example, in November 2002 HSBC announced the acquisition of US consumer finance firm Household. Household could benefit from HSBC superior credit rating (HSBC USA – AA). UBS analysts estimated financial synergy for about USD 1 billion per annum: this was calculated by looking at the difference between Household's historical cost of debt and the currently achievable cost of debt due to the acquisition by HSBC. This 120 b.p. difference was multiplied by Household's outstanding USD 84 billion of balance sheet debt. Though, shouldn't

[16]All examples in this section are reported in UBS (2004).

the HSBC rating worsen after the acquisition? Also, the classification of this cost saving as financial synergies is questionable. Indeed, in financial institutions the cost of debt is actually the cost of "raw materials"; therefore the value created by the merger is probably more a cost synergy.

Another often cited source of financial synergies is diversification: the combination of two cash flows streams that are not perfectly correlated reduces the risk, thus producing two effects: (a) lower cost of capital and (b) higher debt capacity. However, as far as the effect on the cost of capital, it is not clear why Bidder's shareholders cannot diversify on their own, by building an efficient portfolio.[17]

As we are going to see in the next section estimated synergies are the key variable in M&A analysis. In other words, synergies are what define good versus bad transactions. Nonetheless, promising synergy is the easy part: Christoffserson et al. (2004) document that 70% of acquisitions failed to achieve expected synergies. This partly explains why the market usually has a cold reaction to M&A announcement, at least as far as the Bidder shares are concerned.

7.7 Consideration

An important task performed by investment banks when designing the deal is the choice of the consideration (i.e., the mean of payment). The choice of consideration to use in the transaction is relevant in terms of:

- Control: a cash offer does not affect the voting rights, while a stock offer changes the ownership structure.
- Accounting results: stock or cash offers differ in their impact on earning-per-share (EPS).
- Wealth distribution: cash offers and stock offers differ in the distribution of wealth between Bidder's and Target's shareholders.

The next three sections analyze each of these aspects.

7.7.1 Control

In a stock deal an exchange ratio (ER) is defined. The ER is the number of Bidder shares offered per Target share. The *theoretical* ER is the ratio of the price of a Target share (p_T) over the price of a Bidder share (p_B). The price per share is simply the equity value divided by the number of outstanding shares (n_T and n_B for the Target and Bidder, respectively):

[17]Moreover, diversification sometime produces negative effect, i.e. the diversification discount. See Chap. 10 on this topic.

Table 7.1 Fictional deal

	Bidder	Target
Price-per-share	€20	€15
Shares outstanding	30 ml	10 ml
Equity value	€600 ml	€150 ml

$$ER = \frac{p_T}{p_B} = \frac{E(T)/n_T}{E(B)/n_B} \tag{7.3}$$

The *negotiated* ER will depend on the negotiated price for Target (P(T)) rather than on the actual equity value of Target (E(T)). Let m be the number of new shares that Bidder needs to issue in order to pay Target shareholders; m will be equal to ER times the number of Target shares outstanding.

The *negotiated* ER determines implicitly the ownership structure of Bidder post-merger.

Consider the fictional deal reported in Table 7.1.

The theoretical ER is 0.75 (or 15/20), that is 0.75 Bidder shares for each Target share. Since there are 10 ml Target shares outstanding, Bidder has to issue 7.5 ml new shares (or 0.75·10 ml). Hence, after the merger Bidder will have 37.5 ml shares: 30 ml (old shares) to the Bidder shareholders and 7.5 ml (new shares) to the former Target's shareholders. The ownership structure is therefore changed. Suppose that pre-merger there is only one shareholder holding 100% of Bidder shares: post-merger he will control just 80% of the combined firm (30/37.5). Although diluted, this single shareholder will still retain control. Think now of a shareholder holding 18 ml of Bidder shares pre-merger: this shareholder has the majority of voting rights, as he controls 60% of the equity (18/30). Post-merger he will hold 18 ml shares out of a total of 37.5 ml shares outstanding, i.e., just 48% of the combined firm: he will then lose the majority of voting rights. He can prevent the control dilution by purchasing additional shares or creating a voting trust.[18] The negotiated ER is usually higher than the theoretical one: this is because the Bidder pays a bid premium. In this case the control dilution of Bidder shareholders is even worse, as additional new shares will be issued to pay Target shareholders.

7.7.2 EPS Accretion/Dilution

The choice of consideration also affects the EPS of the combined firm. The term EPS accretion (dilution) indicates the positive (negative) effect of the deal on the EPS of the combined firm (i.e. the Bidder post-merger). Consider the fictional deal reported in Table 7.2.

[18]In a voting trust some shareholders transfer their shares to a trustee for a given period of time, thus creating a single block of votes, which together gives them more power relative to the simple sum of their fragmented interests.

Table 7.2 Analysis of EPS accretion/dilution under different consideration

	Bidder	Target	Combined	
			Stock	Cash
Price per share	€20	€15	?	?
Shares outstanding	30 ml	10 ml	37.5 ml	30 ml
Equity value	€600 ml	€150 ml		
Net income	€60 ml	€25 ml	€85 ml	85 – 150(10%)(1–30%) = €74.5 ml
EPS	€2.00	€2.50	2.26	2.48
PE ratio	10	6		
Accretion/Dilution			+€0.26 (+13.33%)	+€0.48 (+24.17%)

Suppose the negotiated price for Target (P(T)) is equal to the pre-merger Target value (E(T)). This is a simplistic assumption, but it does not affect the conclusion of the example. To estimate the effect of the consideration on the EPS of the combined firm, we need to compute the estimated net income and shares outstanding post-merger. Let's first consider a stock deal. Suppose that the estimated net income of the combined firm is just the sum of Target and Bidder net income, that is € 85 ml. The number of share depends on the negotiated ER, which is 0.75:7.5 ml new shares would be therefore issued by the Bidder, resulting in 37.5 ml shares outstanding post-merger. The EPS of the combined firm is then €2.26, which is greater than the Bidder EPS pre-merger (€2.00) with a 0.26 increase (or a +13.33% change): this deal is defined accretive, as the EPS is enhanced. Put it another way: if you are a Bidder shareholder you receive €2 per share before the merger. In a stock deal you would receive €2.26 per share after the merger. Apparently you are better off.

In case cash is used as consideration we have to subtract from the Bidder net income the cost of cash. This is the opportunity cost of using an existing cash reserve to finance the acquisition or the cost of the new debt contracted to get the necessary amount of cash. Suppose that the Bidder has a cash reserve of €150 ml invested at 10% annual rate of return and tax rate is 30%. By using this amount of cash to finance the acquisition the Bidder loses €10.5 ml, or 150(10%)(1–30%), of net income. The result is unchanged if we assume the Bidder does not have a cash reserve and it gets new debt for €150 ml at a 10% interest rate: in this case the 30% tax rate would represent the value of tax shield due to interest expenses. The number of shares outstanding post-merger does not change in a cash deal. Therefore the EPS of the combined firm is €2.48. Again, the deal is accretive.

There is a quicker way to assess whether a deal is accretive or dilutive: comparing PE ratios of Bidder and Target. In this example Bidder has a higher PE ratio relative to Target (10 versus 6). Whenever the Bidder's PE ratio is higher than the Target's PE ratio the stock deal will be accretive. The intuition is simple: Bidder pays only €6 for €1 of Target's earnings, while for Bidder €1 of earning is worth €10. In other words, Bidder is purchasing "cheap" earnings: the combined net income thus increases more than the number of shares does, resulting in a higher EPS.

The reasoning is similar in a cash deal: in this case the Target's PE must be compared to the "cash PE" of the Bidder. The cash PE is simply the ratio of the cash reserve to the earnings it generates. In the example the cash PE is 14.29, or 150/

10.5. Since the cash PE is greater than the Target's PE, the deal is accretive. Intuitively the Bidder is substituting €150 ml of cash reserve generating just €10.5 ml of earnings with €150 ml of Target's equity generating €25 ml. Again, the Bidder is purchasing "cheap" earnings.

The greater the positive (negative) difference between Bidder's PE (or cash PE) and Target's PE the greater the EPS accretion (dilution) is. EPS accretion/dilution is just an accounting aspect; nonetheless some practitioners tend to give great importance to the EPS effect, erroneously believing it changes shareholders' wealth. However, for this to be true, the market should ascribe the Bidder's pre-merger PE to its post-merger EPS. In other words, a EPS accretive deal will result in higher value per Bidder share only if the Bidder's PE pre-merger is unchanged post-merger. However, this assumption is very simplistic, since it implies that the combined entity will reflect only the Bidder's features. What really matters is the post-merger price per Bidder share compared to the pre-merger level (the question marks in Table 7.2). Only if the post-merger price is higher than pre-merger, the Bidder's shareholders are better off. The post-merger price still depends on consideration.

7.7.3 Wealth Distribution

The equity value of the combined firm should be (Arzac 2005):

$$E(C) = E(B) + E(T) + SYN - Cash \tag{7.4}$$

where Cash is the portion of consideration paid cash.

Usually the price paid for Target (P(T)) is higher than E(T). The difference between P(T) and E(T) is the bid (or acquisition) premium.[19] The consideration used in the deal affects the distribution of value between Target's shareholders and Bidder's shareholders. The intuition sounds like this: when the Bidder pays "stock" it shares the result of the transaction (either good or bad) with the Target's shareholders. This is because in a stock deal both Bidder's and Targets' shareholders hold shares of the combined firm. In contrast, in a cash deal Bidder' shareholders will get all of the gain or loss of the transaction, because the Target's shareholders are not involved in the combined firm.

The question is: "For the Bidder, when is a deal good or bad?" The answer depends on two variables: (a) the estimated value of synergies and (b) the bid premium the Bidder is willing to pay. If the value of the expected synergies is

[19]Clearly, it is possible to determine the magnitude of the bid premium only when Target is a listed company and the market value of equity is therefore publicly available. Notice, that the Bidder's abnormal return tends to be higher when the Target is a private company (Hazelkorn et al. 2004). One possible explanation for this result is that Bidder can pay a lower bid premium, as no public benchmark is available for private firms.

greater than the bid premium it is a good deal, while if synergies are lower than the bid premium it is a bad deal. Rappaport and Sirower (1999) call the difference between synergies and the bid premium the "shareholder value added" (SVA). Hence, if SVA is positive (negative) is a good (bad) deal for the Bidders' shareholders.

In a cash deal the Bidder's shareholders get the whole SVA: if this is positive their wealth is enhanced, while if it is a negative value their wealth will be reduced. In a stock deal the SVA is shared with Target's shareholders. All else being equal, when the SVA is negative (or highly uncertain) Bidders' shareholders will prefer a stock deal, because the losses would be shared with the shareholders of the Target. In contrast, if the SVA is positive, a cash deal is preferable to the Bidder's shareholders, because all gains will accrue to them.

7.7.3.1 The Bad Deal

Consider again the example reported in Table 7.2. To make it more realistic suppose that the Bidder is willing to pay a bid premium of 40% over the current market value of Target, corresponding to +€60 ml (or +€6 per share). Also assume that estimated synergies are equal to €50 ml. Data are reported in Table 7.3. This is a bad deal for the Bidder's shareholders because the SVA is negative (−€10 ml). One might wonder why the Bidder's management wants to undertake such a bad deal. The management might have more optimistic forecast about synergies or simply wants to close the deal despite it is a value-decreasing transaction. To assess the effects on the wealth of Bidders' shareholders we have to estimate the price per share of the combined firm.

In a cash deal the negative result is entirely borne by the Bidder's shareholders. Indeed, the Bidder is paying €210 ml (150 + 60) to get the Target, which is worth €150 ml and synergies estimated at €50 ml, for a total of €200 ml. Bidder's shareholders are thus expropriated for €10 ml. Target's shareholders get a premium of €6 per share. Since there are 30 ml shares outstanding, Bidder's shareholders loose €0.33 per share (10/30). It is possible to get the same results computing the post-merger price per share. Using the (7.4), the estimated equity value of the combined firm is equal to:

$$E(C) = 600 + 150 + 50 - 210 = €590 \text{ ml}$$

Table 7.3 Analysis of wealth distribution under different consideration (Negative SVA)

	Bidder	Target	Combined	
			Stock	Cash
Price per share	€20	€15	€19.75	€19.67
Shares outstanding	30 ml	10 ml	40.5 ml	30 ml
Equity value	€600 ml	€150 ml	€800 ml	€590 ml
Bid premium	+40% (+€60 ml)			
Synergies	€50 ml			

There are 30 ml of shares outstanding. The price per share post-merger is therefore €19.67 which corresponds to the pre-merger price per share (€20) less the estimated loss of −€0.33.

In a stock deal the negotiated ER would be 1.05 (21/20). Indeed the negotiated price per Target share is €21 (15 + 6). Apparently Target shareholders still receive +€6 per share, but this value will turn out to be lower. Target shareholders will get 1.05 of *new* Bidder shares for each of their shares. However, since this is a bad deal, the price per Bidder share post-merger will be lower than pre-merger. As a result, the actual bid premium will be lower than expected. The estimated equity value of the combined firm is equal to:

$$E(C) = 600 + 150 + 50 = €800 \text{ ml}$$

The number of new Bidder shares to be issued is equal to 10.5 ml (1.05 times 10 ml of Target shares outstanding). The number of total shares outstanding post-merger will then be 40.5 ml. The post-merger price per Bidder share is therefore €19.75. Although the negotiated price is €210 ml, Target shareholders will actually receive 10.5 ml shares at €19.75 per share, that is €207.41 ml. This actual price is €2.59 ml lower than the negotiated price: this is the portion on the negative SVA borne by the former Target shareholders. We can get the same results by multiplying the fraction of the combine firm controlled by former Target shareholders (25.93% or 10.5/40.5) times the negative SVA (−€10 ml). Bidder shareholders are thus expropriated for €7.41 ml, which corresponds to −€0.25 per share for 30 ml shares outstanding pre-merger. Indeed, the price post-merger is €19.75 (relative to €20 pre-merger).

It is worth noticing that, since it is bad deal Bidder's shareholders are better off with a stock transaction, because their share the losses with the Target shareholders. The contrary is true in a good deal.

7.7.3.2 The Good Deal

Suppose that the bid premium the Bidder is willing to pay is just 20% over the current market value, that is +€30 ml. Table 7.4 reports the data. The deal is good in this case, because the SVA is positive (+€20 ml). In a cash deal, the whole positive SVA would accrue to the Bidder shareholders, who get +€0.67 per share for 30 ml share outstanding. In a stock deal the negotiated ER would be 0.9 (18/20), because the negotiated price per Target share is €18 (15 + 3). Target shareholder would then receive 9 ml new Bidder shares, thus controlling 23.08% of the combined firm. The remaining voting rights are in the hands of the Bidder shareholders, who then get 76.92% of the SVA or €15.38 ml, which corresponds to +€0.51 per shares for 30 ml shares outstanding pre-merger.

This is a good deal: Bidder's shareholders are thus better off with a cash deal, because they can get the whole positive SVA.

Table 7.4 Analysis of wealth distribution under different consideration (Positive SVA)

	Bidder	Target	Combined	
			Stock	Cash
Price per share	€20	€15	€20.51	€20.67
Shares outstanding	30 ml	10 ml	39 ml	30 ml
Equity value	€600 ml	€150 ml	€800 ml	€620 ml
Bid premium	+20% (+€30 ml)			
Synergies	€50 ml			

The examples of Tables 7.3 and 7.4 provide a simple (and admittedly partial) explanation of the market reaction usually observed at the M&A announcement. As described in Sect. 7.5 of this chapter, Bidder shares experience on average a null or negative abnormal return: the reaction tends to be worse for stock deal relative to cash deal. All else being equal, in a bad deal the Bidder will prefer to pay stock: as a result if a stock deal is announced the market might infer it is a bad deal because of the type of consideration.

Finally notice that when synergies are equal to the bid premium, the post-merger price per share is at the pre-merger level: therefore there is no difference in the wealth of Bidder's shareholders. Hence, the break even value of synergies is the bid premium. That is, the value of synergies must be at least equal to the bid premium to avoid expropriation to Bidder's shareholders.

7.7.3.3 Hybrid Consideration

Intuitively, in case of a hybrid deal the effects are those of a "depowered" stock deal. Consider again the example reported in Table 7.3 (the bad deal). Suppose now that the negotiated price of €210 ml is paid part cash (€11 per share, for a total of € 110 ml) and part stock (the remaining €100 ml, corresponding to €10 per share). The negotiated ER for the "stock part" of the deal is 0.5 (10/20). Hence the number of new Bidder shares will be 5 ml (0.5 times 10 ml Target shares outstanding). Using the (7.4), the estimated equity value of the combined firm is equal to:

$$E(C) = 600 + 150 + 50 - 110 = €690 \text{ ml}$$

The total number of shares outstanding post-merger will be 35 ml (30 + 5). The price post-merger is then €19.71 per share: between the €19.67 of a pure cash deal and €19.75 of a pure stock deal.

7.7.3.4 Shareholder-Value-at-Risk (SVAR) and Premium-at-Risk (PAR)

It is now clear the crucial importance of correctly estimating the value of synergies. A wrong estimate could lead to shareholders expropriation. Rappaport and Sirower

(1999) introduce a measure of value-at-risk for both Bidder's and Target's shareholders. As far as the shareholders of the Bidder, the relevant question is: "What percentage of the Bidder's market value are you betting on achieving the planned synergies?" The answer is the SVAR:

$$SVAR = \frac{Bid\,\mathrm{Pr}\,emium}{E(B)} \cdot Own(B) = \frac{Bid\,\mathrm{Pr}\,emium}{E(T)} \cdot \frac{E(T)}{E(B)} \cdot Own(B) \qquad (7.5)$$

where Own(B) is the percentage ownership of the Bidder's shareholders in the combined firm. This value shows how much of the Bidder's value is at risk if no post-merger synergies are realized. The (7.5) shows that the SVAR depends on three factors: (a) the percentage bid premium, (b) the relative size of merger participants, and (c) the percentage ownership of the Bidder's shareholders in the combined firm, which in turn depends on the consideration used. The higher the premium paid and the size of Target compared to Bidder, the greater the risk. In a cash deal Own(B) is equal to one, while in a stock (or hybrid) deal it is lower than one. This suggests that all else being equal a cash deal is riskier than a stock (or hybrid) deal.

For Target's shareholders the relevant question is: "What percentage of bid premium are you betting on achieving the planned synergies?" The answer is the PAR. The PAR is zero in a cash deal, because the bid premium is paid cash and Target's shareholders have no involvement in the combine firm. For stock deals the actual premium received is contingent on achieving the estimated synergies. As such the PAR is the percentage of ownership the Target's shareholders will have in the combined firm (Own(T)). Table 7.5 reports SVARs and PARs for the deals examined in Tables 7.3 and 7.4.

Since in a cash deal Own(B) is equal to one, the SVAR is always equal to the ratio of the bid premium to Bidder's equity value (5% in the good deal and 10% in the bad deal) and the PAR is always equal to zero (regardless of deal quality). In a stock deal the SVAR will be always lower relative to a cash deal: 3.85% in the bad

Table 7.5 SVAR and PAR for the good deal and the bad deal

	Bidder	Target	Combined – Synergies €50 ml			
			Good deal		Bad deal	
			Bid premium +€30 ml (+20%)		Bid premium +€60 ml (+40%)	
			Stock	Cash	Stock	Cash
Price per share	€20	€15	€20.51	€20.67	€19.75	€19.67
Shares outstanding	30 ml	10 ml	39 ml	30 ml	40.5 ml	30 ml
Equity value	€600 ml	€150 ml	€800 ml	€620 ml	€800 ml	€590 ml
Own(B)			76.92%	100%	74.07%	100%
Own(T)			23.08%	0%	25.93%	0%
SVAR			3.85%	5%	7.41%	10%
PAR			23.08%	0%	25.93%	0%
SVA			+€20 ml		−€10 ml	

deal (5% times 76.92%) and 7.41% in the bad deal (10% times 74.07%). The PAR is equal to Own(T) hence 23.08% in the good deal and 25.93% in the bad deal.

7.8 Conclusion

M&As is a rather generic term as it refers to a heterogeneous set of deals. For example, an acquisition is not a merger, albeit successful acquisitions can ultimately end up in mergers. Or, a takeover does not necessarily involve a M&A transaction, but some takeovers take the form of a tender offer (which in turn is a way to undertake an acquisition). While a deal differs from another in many relevant respects, there are some commonalities in terms of process, wealth effects to the shareholders, role of investment banks, and main analytical tools used by financial advisors. After describing the definitional aspects, this chapter focused on these commonalities. Few accounting aspects of M&As are also considered because with the most common accounting standards the border between finance and accounting is quite blurred. One of the key results of this chapter is that both the Bidder's and Target's shareholders might run some risk in undertaking a M&A transaction. For example, Bidder might overpay the Target, which can turn out to be bad (at least to some extent) also to the Target's shareholders in a stock deal. However, some uncertainty emerges even before the deal is closed. Indeed, there is always the risk that for some reasons the negotiation quits and the deal is never closed. Chapter 8 takes a look to these aspects of M&As, describing some risk-mitigating tools used by investment banks.

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Chapter 8
Risk Management in Mergers and Acquisitions

8.1 Introduction

When negotiating a M&A transaction the Bidder should be concerned about the risk of overpayment, i.e., paying a purchase price too high relative to the Target value. This risk is more relevant when the Target has no track record or belongs to a relatively unknown (to the Bidder) industry: in such a situation the Bidder and the Target opinion about a fair closing price might be radically divergent, thus making the deal impossible. Alternatively, the Bidder might propose to pay part of the purchasing price in the future, contingent on the achievement of a given result by Target: this is an earnout agreement. In a stock deal also the Target's shareholders might be worried about the performance of the combined firm, thus requiring some sort of price guarantee: usually this guarantee takes the form of contingent value rights. Even when the Bidder and the Target agree on the price, many things might happen between the signing and the actual closing of the deal. Think of a transaction where the form of payment is stock: suppose the two parties agree on a given exchange ratio and announce to the market the deal. Before closing they need the shareholders' approval, the antitrust go-ahead, etc. These steps could require few months: what if at closing the relative price per share of the Target and the Bidder is dramatically different? Should the two firms re-negotiate? Or should they jump out of the deal? To avoid or limit these consequences collar agreement might be used: basically a collar limits the economic effects of a change in conditions between the announcement and the closing. Moreover, given the uncertainty about the completion of a deal, there are some hedge funds that bet on the deal outcome, through a merger arbitrage strategy. The chapter is organized as follows. Sections 8.2, 8.3, and 8.4 examine earnouts, contingent value rights, and collar respectively. Section 8.5 analyzes the merger arbitrage strategy, while Sect. 8.6 concludes.

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8.2 Differences of Opinion: Earnout

8.2.1 Pros and Cons

Suppose the Bidder believes the value of Target is €3 ml, while the Target thinks its value is €5 ml. This large difference of opinion might arise from uncertainty about cash flows and/or discount rate. Whatever the reason of such a divergent valuation, there are three possible outcomes: (a) no deal, because the two counterparties are unwilling to negotiate; (b) closing at some point between €3 and €5 ml, but in this case both parties will be "unhappy", to some extents; (c) an earnout agreement, which is a contract whereby part of the price is to be paid in the future *contingent* on realization of the Target's performance (revenues, EBITDA, or other non-financial milestones). In this latter case the payment is uncertain as it depends on the uncertain future performance.

There are several advantages in using an earnout. First, it screens out Targets misrepresenting their potential performance. The Target might thinks its value is higher simply because of an over-optimistic business plan. Only a Target who really believes in its potential are willing to accept an earnout. Second, the Bidder and the Target might simply have different opinions, thus getting to different results: an earnout bridges the valuation gap between the two parties, making the deal possible. Third, an earnout provides an incentive to the Target's owner/manager to remain with the firm after the sale and to pursue an aggressive strategy, because part of the payment is pegged to Target's results. Finally, an earnout diminishes the Bidder's up-front financial commitment: in this respect an earnout works like a vendor loan (which is a loan provided to the Bidder by the Target itself).

Notwithstanding the potential benefits, earnout agreements are not always easy to implement. For example it is difficult to negotiate an earnout when the Target is fully integrated into the Bidder: this is because the Target's management cannot entirely control the operations and part of the Target's success might depend on the Bidder's performance. Moreover, earnouts are least effective when the performance goal is too ambitious or the portion of price is too small, thus demotivating the management. Also, earnout agreements might be problematic when the computation of the contingent payment is too complex or ambiguous. Finally, the Target's shareholders run the default risk of the Bidder, i.e., the risk of Bidder being unable to pay the contingent payment: to limit the effect of this risk some agreements give the Target's shareholders the right to takeover the firm if Bidder is unable to pay.

In general earnout agreements are used when there is a relevant information asymmetry between the Target and the Bidder: it is the case of a financial Bidder (i.e., a private equity fund) trying to buy a young company in a high-tech relatively unknown business, or a large strategic Bidder purchasing a small Target (or a division of a Target) in an unrelated industry. Bruner (2004) documents that the typical earnout agreement is pegged to EBITDA, with an earnout period from 2 to 5 years, and represents 30–50% of the total payment.

8.2.2 Earnout Valuation

8.2.2.1 DCF

Many practitioners value earnout agreements with a simple DCF approach. Consider the following example. The Bidder thinks that the Target value is €30 ml, while Target thinks the fair value is €40 ml. The valuation gap is due to a different opinion about projected growth rate: the Bidder believes that the EBITDA growth rate for next few years cannot be greater than 5% per annum. In contrast the Target thinks that a reasonable growth rate is 30%. They negotiate the following consideration: (a) €20 ml cash and (b) 1 times the EBITDA at year-end five. Target's current EBITDA is €10 ml. Assuming a discount rate equal to 10% (for both parties), the deal appears convenient to both Bidder and Target. Indeed, Bidder projects a EBITDA at year-end five equal to €12.76, which discounted to the present value results in €7.92 ml. The total price to the Bidder is hence €27.92 ml (€20 ml cash plus €7.92 ml earnout), which is less than Target's value estimated by the Bidder (€30 ml). Similarly, Target projects a EBITDA at year-end five equal to €37.13 ml, corresponding to a present value of €23.05 ml: overall, the expected payment is €43.05 ml, more than Target's estimation (€40 ml).

In general, a satisfactory transaction (to both parties) should simultaneously meet the following two conditions:

$$\begin{aligned}\text{Value according to the Bidder} &> \text{Consideration at closing} \\ &+ \text{Bidder's valuation of Earnout}\end{aligned}$$

$$\begin{aligned}\text{Value according to the Target} &< \text{Consideration at closing} \\ &+ \text{Target's valuation of Earnout}\end{aligned}$$

8.2.2.2 Earnouts as Options

The earnout in the previous case meet both conditions. However, it is quite a simplistic example, as earnout in the real life tend to be more complex. For example, earnouts often include one or more thresholds. Consider the following agreement:

$$2\text{X Max}[\text{EBITDA}_5 - €10\text{ ml}; 0]$$

At the end of the 5th year post-acquisition the Target's shareholders will be paid 2 times the 5th-year EBITDA minus €10 ml if the amount is positive and zero otherwise.[1] This agreement can easily be interpreted as an option and a straight DCF approach would be underestimating the value of the earnout. Indeed, this

[1]Often stale receivables (for instance older than one year) are deducted from the payment. This is done to discourage managers from inflating receivables to risky accounts. Sometimes a holdback from the earnout payment is retained and paid in few months after deducting uncollected receivables.

earnout can be seen as two call options on EBITDA with a strike price equal to €10 ml. The value of the earnout is the option premium, which can be estimated through the Black–Scholes formula or Monte Carlo simulations. The inputs of the Black–Scholes formula must be estimated. In this case, it is much better to model earnout valuation on Revenues rather than on EBITDA for at least two reasons: (a) EBITDA can be negative, while Revenues not (exactly like stock prices), (b) Revenues are linked to many other variables (i.e., EBITDA, EBIT, cash flows, etc.). Suppose EBITDA is a linear function of Revenues:

$$\text{EBITDA} = b \cdot R + a \tag{8.1}$$

where b is the EBITDA margin and a are fixed costs (negative value).

Hence, the payoff of an earnout with multiple on EBITDA equal to M and threshold H is:

$$M \cdot \max[b \cdot R + a - H; 0] = M \cdot b \cdot \max\left[R - \frac{(H-a)}{b}; 0\right] \tag{8.2}$$

Note that $\frac{(H-a)}{b}$ is the level of Revenues corresponding to the EBITDA threshold.

Suppose that threshold is set at EBITDA_0 (the current level of EBITDA). The payoff of the earnout is then:

$$M \cdot b \cdot \max[R_T - R_0; 0] \tag{8.3}$$

The value of this earnout is then the value of $M \cdot b$ calls on Revenues with strike R_0.

Consider the earnout in the example. M is equal to 2 and H is equal to €10 ml. Assume the following Revenues-EBITDA function:

$$\text{EBITDA} = 0.5 \cdot R - €5 \text{ ml}$$

Current Revenues are €30 ml, corresponding to EBITDA_0 equal to €10 ml. The value of this earnout is then the value of one call (2 times 0.5) on Revenues with strike €30 ml.[2]

Some earnouts are payable every year based upon performance matched against yearly thresholds: this kind of earnout is the sum of calls.

[2]The question is how to estimate revenue volatility. The volatility can be estimated from historical growth rates of Revenues (when available) or from analysts' forecast of the future growth rate of Revenues. In this latter case we should get an optimistic estimate and a pessimistic estimate of the growth rate (g^+ and g^-). If we assume a level of confidence we can infer the implicit standard deviation. For instance, assuming a 95% level of confidence, most of the probability lies within 2 standard deviations around mean. Suppose that the growth rate range is (−13%, 27%) with 95% confidence: the volatility of Revenues can be estimated at one-fourth of this range (10%).

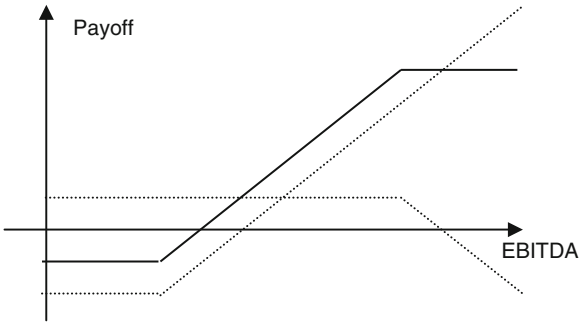

Fig. 8.1 Call (Bull) spread

It is common for the Bidder to cap the value of earnouts, i.e., the payment cannot exceed a given amount. For example, suppose the earnout of the previous example is capped at €30 ml. Again, an analytical method can be used to value this agreement. Indeed it can be viewed as a call (bull) spread, that is a long call with a given strike and short a call with a higher strike (Fig. 8.1). In particular the earnout in the example is composed of two long calls on EBITDA with €10 ml strike (corresponding to two long calls on Revenues with strike €30 ml) and two short calls on EBITDA with strike €40 ml (corresponding to two short calls on Revenues with strike €90 ml).

Suppose that the Target's owner negotiates the right to repurchase the company in case the Bidder is unable to pay the earnout at maturity. The repurchase option is a call option on the Target's equity. Of course the repurchase option would be exercisable only in the event of the Bidder's default. Suppose the Bidder's probability of the default is estimated at 5%, then the value of the repurchase option is 5% of the call value, while the value of the offer (including the earnout) is weighted at 95%.

The analytical approach (i.e., Black–Scholes or any other closed formula) to earnout valuation is very "elegant" in an academic perspective. However it is not flawless, for at least two reasons: first, the EBITDA-Revenues function is more a theoretical idea than a realistic relationship. Second, it is not a flexible approach: it can manages many different type of earnouts, but not all of them. Consider an earnout that pays 30% of the excess five-year average EBITDA over €10 ml (up to €20 ml) plus 50% of the same average over €20 ml with a cap at €15 ml. The only way to value this agreement is by using a numerical approach, such as Monte Carlo simulations. This approach consists in simulating thousands alternative scenarios about the value of the earnout at maturity. The value of the earnout is simply the average of these results discounted to the present value. The key step in generating a Monte Carlo simulation is the choice of the probability distribution of the key earnout variables (e.g., EBITDA). There are two main distributions that could work for most of the accounting variables:[3] (a) uniform, in which the probability is

[3]The normal distribution is not really a good choice with variables like revenues or profit margins.

Table 8.1 Valuing earnout with Monte Carlo simulations

	CAP at €1 ml	
Distribution	Yes	No
Normal (4, 2)	€0.511 ml	€0.593 ml
Uniform (1, 7)	€0.540 ml	€0.608 ml

equally distributed between a minimum and a maximum value and (b) triangular, in which the analyst needs three values as the minimum, maximum, and "most likely".

Of course the earnout valuation is crucially related to the chosen distribution and, most importantly, to the parameters defining the given distribution. However, in this respect Monte Carlo simulations are not more problematic than analytical valuation based on the Black–Scholes formula (for which inputs need to be estimated anyway). The real benefit of simulations is the flexibility: whatever payoff the parties may invent, an analyst can always determine the value of the earnout through Monte Carlo simulations, while an analytical approach (such as the one based on the Black–Scholes formula) can be used just for some kinds of payoff.

To understand how Monte Carlo simulation works, consider the following earnout:

$$\max[0;\ x \cdot \text{EBITDA}_5]\text{con}\begin{matrix} x = 10\% & \text{if EBITDA}_5 \leq €5\text{ ml} \\ x = 20\% & \text{if EBITDA}_5 > €5\text{ ml} \end{matrix}$$

In other words, Bidder will pay 10% the fifth-year EBITDA if this is smaller than €5 ml, while the percentage will be 20% if the EBITDA is greater than €5 ml. The parties are also considering to include a cap equal to €1 ml. The payoff of such earnout is not linear: it would therefore quite complex to evaluate it by using an analytical approach. In contrast, it is quite easy to evaluate the earnout with a Monte Carlo simulation. Table 8.1 reports the value of the earnout under different assumptions about the EBITDA distribution. The values are estimated by taking the average of 1,000 draws from a normal distribution with mean 4 and standard deviation 2 and a uniform distribution between 1 and 7. These values should then been discounted to get the present value of the earnout.

8.3 Contingent Value Rights

Earnouts guarantee the Bidder in case the performance of Target is below expectations. In stock deals, Target's shareholders might be worried about the future performance of the combined firm. After all, if it is a bad deal the Target is shareholders will share the loss. Of course, they can sell the shares on the market. Alternatively they can negotiate a price guarantee against a price drop of the combined shares. This guarantee takes the form of contingent value rights (CVRs). CVRs range from plain vanilla to exotic options, sometimes structured as binary (or digital) options (i.e., all-or-nothing payment). Moreover the guarantee can take the form of cash compensation or the issuance of new shares by the combined firm.

A simple stock deal with a price guarantee is worth the value of the stock consideration plus a long put with strike price at the price floor. An interesting feature in valuing CVRs is the dilution effect. Suppose the Target's shareholders receive 0.5 Bidder shares for each of their shares with a price floor of €10 (cash compensation). Also suppose the Target's shareholder will own 30% of the combined firm. In other words, Target shareholders receive for one of their share: 0.5 Bidder share plus 0.5 of a long put with strike €10. Since the cash compensation will be paid by the combined firm, Target shareholders will share the downside of the put. Hence, the value of the put is just 70% of the whole value.

8.4 Collar

Generally the period of time between deal announcement and closing could be as long as six months, during which authorities and shareholders' approvals need to be obtained. The proposed deal terms might be materially changed during such a long time. Consider a stock deal: the announced exchange ratio is negotiated according to the Bidder and Target stock prices. What if prices are dramatically changed at closing? Both the Bidder and the Target might have an incentive to renegotiate or even try to jump out of the deal: both alternatives are costly. To minimize this risk the two parties might decide to include a collar in the deal.

8.4.1 Fixed-Exchange Collar

In the typical stock deal the negotiated exchange ratio determines the number of Bidder shares offered as consideration for each Target share: in other words the number of Bidder shares to be offered is fixed. The ownership structure of the combined firm (i.e., the Bidder post-merger) is therefore defined, but the value that the Target's shareholder will receive at closing is uncertain, as it depends on the Bidder stock price on that date. A fixed-exchange collar specifies a constant exchange ratio over a range of Bidder stock prices, with adjustments outside that range. Consider the following example. Bidder and Target announce a merger: the exchange ratio is 2 and it is based on stock price equal to €5 and €10 for Bidder and Target, respectively. Target has 1,000 shares outstanding. Therefore, 2,000 (1,000 × 2) new Bidder shares need to be issued as consideration. Since the current Bidder stock price is €5, Target shareholders should receive €10,000 in Bidder shares. Now consider two alternative scenarios about Bidder stock price at closing (several months later): (a) the price per share is €10 and (b) the price per share is €1. Suppose, to keep it simple, that the Target stock price is unchanged (€10). Since the number of new Bidder shares to be paid is fixed (2,000), Target shareholders receive a much different value, in either scenario. In the first case, the value to Target shareholders is €20,000 (2,000 × €10), while in the second scenario the value is €2,000 (2,000 × €1). To avoid such a volatility in the value to the

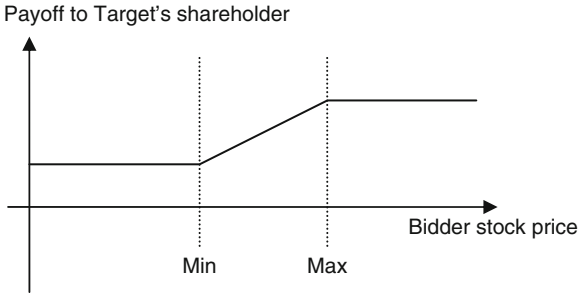

Fig. 8.2 Fixed-exchange collar

Target's shareholders the two parties may agree on fixed-exchange collar: the number of shares will be fixed if Bidder stock price is between €2 and €8. If Bidder stock price is below €2, the number of shares will be adjusted to keep the value to the Target's shareholders constant and equal to €4,000 (2,000 × €2). Suppose for example the Bidder price per share at closing is €1: Target shareholders will receive 4,000 shares (rather than 2,000). Similarly, is the Bidder stock price is above €8, the number of shares to be paid will be adjusted in order to fix the value to Target's shareholders to €16,000 (2,000 × €8). Assume the Bidder stock price at closing is €10: Target's shareholders will receive 1,000 Bidder shares as consideration.

Figure 8.2 depicts the payoff to Target shareholders at closing with a fixed-exchange collar.

How to value a collar? Consider again the previous example. Suppose at closing the Bidder stock price is below €2. The number of shares is adjusted to guarantee to Target shareholders a value equal to €2 per Bidder share. In other words they are hedged against a drop in the Bidder stock price: it is like a long put position on Bidder shares with strike equal to €2. If at closing the Bidder stock price is above €8, the number of Bidder shares to be paid as consideration is adjusted to a value of €8 per Bidder share: it is the effect of short call position on Bidder shares with strike equal to €8. To wrap it up, the value of fixed-exchange collar is equal to the premium of a put with strike at the minimum price of the range less the premium of a call with strike equal to maximum price of the range (Fig. 8.3). Some practitioners call this kind of trading position "Egyptian" because of the similarity of the payoff to hieroglyphic depictions of ancient Egyptian walking. Ideally, one wants to keep the terms of the offer relatively simple, and that is why it is best to design the collar such that the values of the put and the call offset each other.

8.4.2 Fixed-Payment Collar

Consider again the example discussed in the previous section. Now assume that the Bidder and the Target decide to fix the value to Target's shareholders. In other words the number of shares will be adjusted to keep the value to Target's

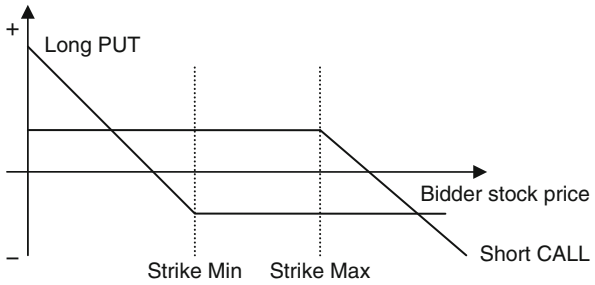

Fig. 8.3 The value of a fixed-exchange collar

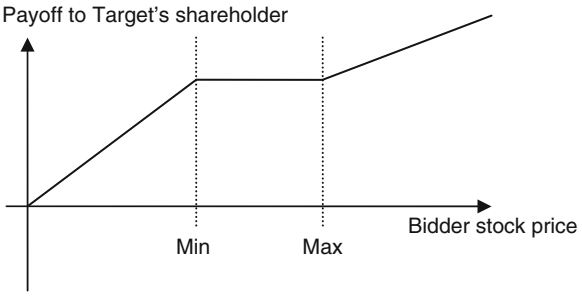

Fig. 8.4 Fixed-payment collar

shareholders equal to €10,000 (2,000 × €5). This is a quite unrealistic deal, but it helps to understand the second type of collar: the fixed-payment collar. If the two parties agree on fixed value, whatever the Bidder stock price at closing, the value to Target shareholders is certain: however the ownership structure is uncertain, as the number of shares is adjusted according to the Bidder stock price. To limit the uncertainty on the ownership structure the two parties might negotiate a fixed-payment collar, which guarantees the Target's shareholders a fixed value (€10,000 in the example) as long as the Bidder stock price stays within a given range (say, €2–€8): the number of shares is therefore adjusted within the price range to keep the value at a constant level. Outside the bounds the number of shares is fixed, and hence the value is uncertain, depending on the Bidder stock price. Figure 8.4 shows the payoff to Target shareholders of a fixed-payment collar.

If at closing the Bidder stock price is below the minimum price of the range, the number of shares is fixed and the value to Target's shareholders fluctuates. It is like receiving a fixed value, but losing money with a short put position. If the Bidder stock price is above the maximum price of the range, Target's shareholders gains as with a long call position. The value of a fixed-payment collar can be therefore estimated as the premium of a call with strike equal to the maximum price of the range less the value of a put with strike equal to minimum price of the range. Figure 8.5 shows this combined position, which is nick-named "Travolta" for

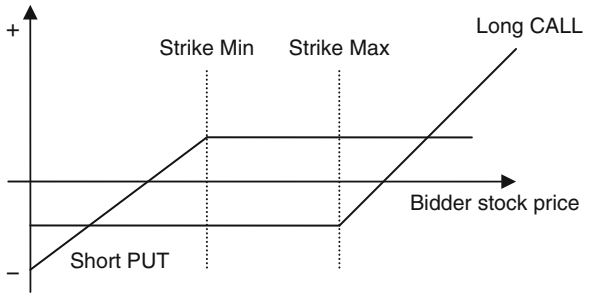

Fig. 8.5 The value of a fixed-payment collar

obvious reasons.[4] As mentioned before, the ideal collar is designed such that the put and the call premiums offset each other.

8.4.3 The Economic Rationale of Collars

The bid elasticity is computed as the percentage revaluation of the Target's compensation with respect to the percentage revaluation of the Bidder's compensation that is induced by a change in the value of the Bidder. In a cash deal the value to the Target's shareholders does not depends on the Bidder's value: the bid elasticity is therefore 0. In a pure stock deal with a fixed exchange ratio the bid elasticity is 1. Indeed, the value for both parties is the ownership share in the combined firm. Any change in the Bidder stock price produces an equivalent change in the combine firm and hence an equivalent change in value of both Target and Bidder. Hybrid offers, as well as collar offers have bid elasticity greater than 0 but lower than 1.

One reason for including collars, thus reducing bid elasticity is to minimize the costs of negotiation. Both the Bidder's and the Target's boards of directors have an ex post incentive (and a fiduciary duty) to demand renegotiation of the proposed merger terms if the value of the offer made by the Bidder changes materially. Both negotiating a collar ex ante and renegotiating the offer terms ex post are costly alternatives for the merger parties. The use of a collar increases the initial pre-bid costs of contracting, but it reduces the ex ante expected costs of renegotiation. If the merging firms face very different economic shocks, or have very different market-value sensitivities to the same shocks, (i.e., are not positively correlated) a pure stock deal (high elasticity) is likely to require ex post renegotiation. Indeed, empirical evidence shows that the most pervasive determinants of the bid elasticity are the Bidder and the Targets market-related stock return volatility and correlation (Officer 2004).

[4]If the reasons are not so obvious, watch the 1977 the movie "Saturday Night Fever" starring John Travolta.

8.5 Merger Arbitrage

8.5.1 The Arbitrage Spread

Hedge funds specialized in merger arbitrage make a living betting on M&As completion. Once a deal is announced, the "arbs" take position: they are long on Target shares and short on Bidder shares. This position is at the risk of the deal, but not exposed to the market risk. Consider a simple example. Suppose a stock deal is announced with exchange ratio equal to 1. The Bidder and Target stock prices (post-announcement) are €10 and €8 respectively. The difference between the current Target's price and the bid price offered by the Bidder is the "arbitrage spread": in this case the arbitrage spread is equal to €2. Because ultimately you can get one Bidder share (€10) with a Target share (€8) the arbitrage spread is a *potential* profit. This profit is just potential because the arbitrage spread may narrow and/or disappear as the likelihood of the merger increases or due to change in market prices. The arbs' problem is to maintain the spread until the merger is consummated. The arbs' short sells one Bidder share, getting €10, and purchases one (since the announced exchange ratio is 1) Target share, paying €8, thereby indirectly acquiring one Bidder's share (*if the merger succeeds*): they now gains €2. What can happen at closing? Consider two scenarios:

1. Bidder price drops to €7; since the exchange ratio is 1, the price of one Target share will be also €7; the arbs' sell the Target share for €7 with a loss equal to −€1 (€7 – €8) and cover the short at €7 gaining €3 (€10 – €7). The net profit per share is then equal to €2.
2. Bidder price rises to €13 and the price of a Target share will also be €13. The arbs sell the Target's share at €13 gaining €5 (€13 – €8) but covers the short at €13 realizing a loss equal to −€3 (€10 – €13). The net profit per share is then equal to €2.

At closing the profit from the long position is: (p_B – €8), while the profit from the short position is (€10 – p_B). The net profit is €2 for any p_B. Whatever happens to the market prices the arbs get their spread. The arbs just bet on the successful consummation of the deal. Suppose the merger of the previous example fails: this would produce a rise of the Bidder's price (say to €11) and a drop in the Target's price (say to €7): a pattern opposite to the one usually observed at announcement. What's the result for the arbs? They lose −€1 (€7 – €8) from the long position and lose also from the short position −€1 (10€ – €11), for a total loss of −€2. The main risk for the merger arbs is that the deal may not go through: this risk is particularly high in hostile tender offers (due to competing bids of just to the failure of the offer).

Notice that a merger arbitrage position can be created also in cash deals, simply purchasing the Target shares (and thus betting on the deal completion).

Consider another example, with an exchange ratio different from 1. Suppose a stock deal is announced with exchange ratio equal to 2. The Bidder and Target stock prices (post-announcement) are €5 and €9 respectively. Given these prices, the

arbitrage spread is equal to €1. Indeed, one would think about buying one Target share at €9 in order to eventually get 2 Bidder share valued at €10 and make a profit of €1. The arbitrage position is created by selling two Bidder shares and buying one Target share. In general the number of shares to short is the exchange ratio times the number of shares held long. The profit for the arbitrage position is then: $(2 \cdot p_B - €9) + (2 \cdot (€5 - p_B))$.

A change in the exchange ratio is another risk for the arb, because it would leave a previously hedged position partly at risk.

8.5.2 The Interpretation of the Arbitrage Spread

The arbitrage spread is an indicator of the likelihood of deal completion. Indeed, the current Target stock price can be seen as the probability-weighted average of two outcomes: (a) the deal is consummated and the Target's shareholders get the bid price and (b) the merger fails and the Target price is at its stand-alone level:

$$p_T^{Current} = \Pr ob \cdot p_T^{Bid} + (1 - \Pr ob) \cdot p_T^{Alone}$$

A proxy of the stand-alone price level could be the pre-announcement Target price (assuming the price does not impound any expected bid). Solving for Prob gives the market view about the likelihood of consummation:

$$\Pr ob = \frac{p_T^{Current} - p_T^{Alone}}{P_T^{Bid} - p_T^{Alone}}$$

When arbitrage spreads are negative, the current Target share price is above the Bidder offer. It means that arbs and other investors expect a higher offer to be announced soon. Consider again the first example. Table 8.2 below reports the key variables.

The implied probability of successful deal completion is therefore:

$$\Pr ob = \frac{€8 - €7}{€10 - €7} = 33.33\%$$

Table 8.2 Merger arbitrage

	Price per share	
	Bidder	Target
Pre-announcement	€11	€7
Post-announcement	€10	€8

8.6 Conclusion

This chapter has described some risk-mitigating instruments used in M&A transactions.

The Bidder's main concern should be the risk of overpaying the Target. To mitigate such a risk, the Bidder might propose to pay part of the price in the future, contingent on the achievement of a given result by the Target. This earnout agreement can be interpreted as a call option on an given performance measure and as an option should be evaluated. While the common analytical approaches to option pricing (such as the Black–Scholes formula) are quite easy to implement, they do not work for more complex earnouts. In this respect, approaches based on simulations (e.g., Monte Carlo) are definitely more flexible. In a stock deal, also the Target's shareholders could be concerned about the performance of the combined firm. For example, the stock price of the combined firm might drop unexpectedly after the merger: Target's shareholders can obtain CVRs to protect themselves from such a scenario. CVRs are basically options negotiated with the purpose of hedging the market risk over the combined firm. We have also analyzed collars, which aim at limiting the economic effects of a change in conditions between the announcement and the closing of a deal. Finally, we have described a trading strategy (merger arbitrage) to bet on successful completion of a deal, once it is announced to the market.

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Chapter 9
Hostile Takeovers and Takeover Regulation

9.1 Introduction

This chapter provides an economic explanation of defense devices in hostile takeovers and takeover regulation. A Bidder willing to purchase a Target, might make directly an offer to the Target's board of directors. It could be a bilateral negotiation or a sudden offer open just for a quick time. Investment bankers use some terms to indicate the different type of offers: for example a "bear hug" is an offer to the board not publicly announced or a "godfather offer" is an extremely high cash offer (so that the board is unable to refuse). In case the board refuses the offer, the Bidder can launch a tender offer to the shareholders. Since the offer is not supported by the Target's board, it is a hostile bid. A successful hostile tender offer is likely to produce the changeover of the Target's management. It is important to note that tender offers are not necessarily hostile: in other words, a tender offer might be the consequence of an agreement between the management of the Bidder and that of the Target. A tender offer is defined unsolicited until its nature is not defined (i.e., the attitude of the Bidder and Target are not known yet). The incentive, the process, and the outcome of any tender offer (hostile or friendly) is heavily influenced by the regulation in place.

This chapter is organized as follows. Section 9.2 describes different tactics that a Target can employ to oppose a hostile takeover. Section 9.3 discusses the economic effects of the defense mechanisms analyzed in the previous section. Sections 9.4 and 9.5 examine the economic effects of the takeover regulation. Section 9.6 concludes.

9.2 Hostile Takeovers

In case of hostile takeovers there are several defense tactics, which can be classified into two broad categories: (a) preemptive defenses and (b) reactive defenses.

Preemptive defenses are put in place before a hostile bid is launched, in order to discourage any unwanted takeover attempt. Reactive defenses are mounted after

G. Iannotta, *Investment Banking*,
DOI 10.1007/978-3-540-93765-4_9,

Table 9.1 Defense tactics

Preemptive	Reactive
Anti-takeover amendments (Shark repellents)	Restructuring
Golden parachutes	Greenmail
Labor agreements	White knight/squire
Poison pills	Pac Man
Poison puts	Litigation

a hostile bid is launched and aim at protecting from a specific attack. Table 9.1 summarizes the most common defense tactics.

9.2.1 Preemptive Defense

9.2.1.1 Anti-Takeover Amendments

Anti-takeover amendments, which are sometimes referred to as "shark repellents", are charter changes that aim at limiting a Bidder's ability to get the control of the Target. As any charter changes, anti-takeover amendments must be approved by shareholders. It should be noted that the types and effectiveness of these amendments depend very much on the jurisdiction. Although the number of anti-takeover amendments is virtually limitless, the four most common defensive instruments are: (a) staggered (or classified) boards, (b) fair price provision, (c) super-majority provision, and (d) dual class recapitalization.

In a staggered board, only a fraction of directors is elected each term. In other words, board members are elected fractionally each term, thus delaying the ability of a Bidder to gain control of the board. Consider for example a board composed of nine directors elected each year by the shareholders: if this board is unclassified, a hostile Bidder could replace the entire board in no more than 1 year. In contrast, suppose it is a staggered board where only one-third of directors is elected each year: in this case it could take up to 2 years to gain control of the board (i.e., the majority of directors) and up to 3 years or replace the entire board.

The fair-price provision requires that the Bidder pays a fair price to all shareholders: a fair price is usually defined as the maximum price paid by the Bidder in a given period of time. This provision protects against two-tier tender offers, where the controlling block is purchased at premium and minority shareholders are subsequently squeezed-out at discount. In some respects it resembles the mandatory bid rule that will be examined in Sects. 9.4 and 9.5: indeed under the mandatory bid rule a Bidder who reaches a give threshold must launch an unrestricted tender offer to all shareholders at the maximum price paid in a given period of time. With both the fair price provision and the mandatory bid rule a Bidder can purchase 100% of the shares in a single step, with no constraint on the price. However, in a two-tier process the Bidder is forced to extend the offer to minority shareholders.

The super-majority provision requires an augmented majority of shareholders for the approval of any transaction involving a change of control. While this

provision is very effective in defending the Target from hostile bids, it could seriously hamper the board's ability to negotiate in a friendly bid. Indeed, small shareholders are given a sort of veto power; this is why the super-majority provision is often associated with a "board out" clause that gives the board the right to waive the super-majority requirement.

Dual-class recapitalization allows the Target's board to issue shares with enhanced voting power. These super-shares are issued to friendly shareholders or to the board itself.

9.2.1.2 Golden Parachutes

Golden parachutes are provisions that generously compensate the top managers in case they are fired after a change in control. Further than defending from hostile bids, managers protected by golden parachutes are more likely to invest in firm-specific skills, as they are adequately compensated in case of job loss. Also, managers are more likely to favor a value-increasing takeover, rather than opposing it with the sole purpose of retaining their position. Golden parachutes are an effective defensive device, but they are not flawless. The market for corporate control can be interpreted as a disciplinary instrument (Manne 1965): in other words, a possible takeover motivation is to purchase an inefficient target and improving its performance by replacing the incumbent management. In this respect, golden parachutes represent a reward for inefficiency. Silver and tin parachutes also exist: they are similar to the golden ones, but with a lower level of compensation and a wider management coverage (including middle managers and/or all employees).

9.2.1.3 Labor Agreements

Union representatives might be part of the board of directors. Since hostile takeovers typically result in downsizing the Target, labor representatives are likely to oppose an attack. Also, part of the employee compensation could be in the form of the firm shares, thus creating a sort of inside ownership and hence hampering the Bidder's ability to gain control.

9.2.1.4 Poison Pills

Poison pills refer to the issuance of securities to make costly and difficult to gain control of the Target. It is considered to be the most effective defense. As noted by Bruner (2004), this type of defense is usually adopted with the intention of not implementing it, pretty much like a "nuclear weapon". There are two main types of pills: (a) flip in and (b) flip over.

Flip in pills consist in the issuance to Target's shareholders of rights to buy Target's shares at a large discount in case a Bidder reaches a given ownership threshold; the

right is valid only above that threshold, thus deterring the purchase of a relevant block of shares. Indeed, the Bidder's voting power would be largely diluted. Normally in case of an unrestricted cash tender offer (i.e., addressed to all shareholders) the flip in pills are waived. Flip over pills consist in the issuance to Target's shareholders of rights to buy Target's shares at premium over the current market price. However, in case of merger with a Bidder, the rights allow the holders to buy Bidder shares at a large discount. As a result the Bidder can actually gain control of the Target, but executing the merger would produce a relevant ownership dilution.

In both cases the aim is to produce an economic and voting dilution to the Bidder, thus making more expensive to gain control or executing a merger.

To understand the effect of poison pills consider the following flip in plan. Suppose the Target price per share is €10 and the flip in pill allows each shareholder to buy five new shares for each of their share at €1 (90% discount) if a Bidder purchases 50% of the shares. Suppose there are 100 ml shares outstanding. The market capitalization of Target is therefore €1,000 ml. If a Bidder buys 50% of the shares (by spending €500 ml) the pill is triggered. All other shareholders will exercise their rights: for each of their 50 ml shares five new shares will be issued, for a total of 250 ml new shares. This will produce two different effects: first, the voting power of the Bidder is diluted as he will hold 50 ml shares out of a total of 350 ml, or 14.29%; second the value of the Bidder's block is diluted as the new price per share will be €3.57[1] relative to the initial €10. To control 50% of the Target, the Bidder has to buy an additional 35.71% of shares, or 125 ml shares: the additional expense will be therefore 125 ml times €3.57, or €446.43 ml. Once the pill is triggered the cost to get 50% of the shares is almost doubled. The magnitude of the voting dilution depends on two variables: (a) the triggering threshold and (b) the exchange ratio (number of new shares per old share). Table 9.2 reports the voting power for different level of triggering threshold and exchange ratio, holding constant the other variables of the previous example. All else being equal, the diluting effect increases with the exchange ratio, as more new shares are issued per old share. Moreover, the higher the triggering threshold the lower the dilutive effect on the voting power. For example, a 90% triggering threshold implies that only 10% of shareholders can purchase new shares. Consider a 90% triggering threshold and an exchange ratio equal to 1: purchasing 90% of the shares, the Bidder will end up controlling 81.82%, with little effect on the voting power. Only with an exchange ratio equal to 9, the Bidder will end up with less than 50%. In contrast, a 10% triggering threshold would result in a 90% of shareholders exercising their rights, with an enhanced dilutive effect: a purchase of 10% shares, a pill with an exchange ratio equal to 1 results in just 5.26% voting power (almost half as the initial voting power).

[1]Intuitively, the price per share after the pill is triggered should be equal to the old market capitalization plus the amount of money raised divided by the additional number of shares: $\frac{1,000+250}{100+250} = 3.57$.

Table 9.2 Voting power under different exchange ratios and triggering thresholds

		Exchange ratio								
		1	2	3	4	5	6	7	8	9
Triggering threshold	10%	5.26%	3.57%	2.70%	2.17%	1.82%	1.56%	1.37%	1.22%	1.10%
	20%	11.11%	7.69%	5.88%	4.76%	4.00%	3.45%	3.03%	2.70%	2.44%
	30%	17.65%	12.50%	9.68%	7.89%	6.67%	5.77%	5.08%	4.55%	4.11%
	40%	25.00%	18.18%	14.29%	11.76%	10.00%	8.70%	7.69%	6.90%	6.25%
	50%	33.33%	25.00%	20.00%	16.67%	*14.29%*	12.50%	11.11%	10.00%	9.09%
	60%	42.86%	33.33%	27.27%	23.08%	20.00%	17.65%	15.79%	14.29%	13.04%
	70%	53.85%	43.75%	36.84%	31.82%	28.00%	25.00%	22.58%	20.59%	18.92%
	80%	66.67%	57.14%	50.00%	44.44%	40.00%	36.36%	33.33%	30.77%	28.57%
	90%	81.82%	75.00%	69.23%	64.29%	60.00%	56.25%	52.94%	50.00%	47.37%

Table 9.3 Value to the Bidder for different discount level

Discount (%)	Subscription price	Value to the Bidder
10	€9.00	€464.29
20	€8.00	€428.57
30	€7.00	€392.86
40	€6.00	€357.14
50	€5.00	€321.43
60	€4.00	€285.71
70	€3.00	€250.00
80	€2.00	€214.29
90	*€1.00*	*€178.57*

The economic dilution, that is the effect on the Bidder's shareholding, further than depending on the triggering threshold and the exchange ratio, is also related to the discount. Indeed, the price drop due to dilution increases with the discount. Consider the initial example with a 50% threshold and the exchange ratio equal to 1. Acquiring 50% of the shares the Bidder would spend €500 ml: however this purchase would trigger the flip in pill, thus reducing the value of the Bidder's block (via a drop in the price per share). Table 9.3 reports the value of the Bidder's shareholding for different discount level.

The effect of a flip over plan is pretty similar, but the triggering event is a merger, rather than ownership threshold.

9.2.1.5 Poison Puts

Poison puts refer to covenants that grant bondholders the right to sell Target bonds at par (or, sometimes, even above par) in case of a change in control. In other words, in case of takeover bondholders can ask the Target the repayment of debt. Poison puts are quite effective in protecting lenders from debt-financed takeovers, which generally damage the incumbent bondholders. However, at the same time, poison puts are defensive instruments, as they result in a cash outflow from the Target, which makes the takeover more expensive, especially if it is financed with debt.

9.2.2 Reactive Defense

9.2.2.1 Restructuring

Different restructuring transactions will be discussed in Chap. 10. As it will be explained in that chapter the general purpose of these transactions is value creation. Nonetheless, all these transactions can also be effective defensive instruments. Divestures and break up transactions (e.g., equity carve out, spin off, etc.) can be use to dispose the segments of the Target in which the hostile Bidder is most interested: in other words the "crown jewels" are sold or somehow separated from the Target. Acquisition of undesirable assets can also deter hostile bids. Finally,

share repurchase or leveraged recapitalization could be used increase the leverage of the Target to intolerable levels for the Bidder.

9.2.2.2 Greenmail

Greenmail consists in the Target repurchasing its shares from the Bidder at premium, in exchange for the Bidder's agreement not to make an hostile bid over a given time span. In some respects it could also be considered a preventive defense: indeed a Bidder could purchase some shares of the Target and only afterward launching a hostile bid. The Target management might anticipate the Bidder, proposing a greenmail agreement. It is, in other words, a sort of bribe. It is a potentially powerful instrument in the hand of the Target managers, who might use it to protect their positions, rather than shareholders' interests. This is why sometimes managers are prevented to use greenmail (anti-greenmail provision).

9.2.2.3 White Knight/Squire

The Target might find a friendly Bidder (a white knight) to contrast the hostile bid. Similarly a white squire is a company purchasing a block, without gaining control: the white squire usually agrees to vote in alignment with Target management. The white squire defense could actually be considered also a preventive measure.

9.2.2.4 Pac Man

It is a quite aggressive reaction: is consists in the Target launching a counter bid on the Bidder. The potential effects could be severe. The two firms might use debt to purchase the counterparty's shares: the combined firm could thus be over-leveraged.

To conclude, it should be noted that the list of reactive instruments, pretty much like that of preemptive defenses, is potentially limitless.

9.3 Defense Tactics and Bargaining Power[2]

9.3.1 The "Pill Premium"

Some investment bankers and scholars maintain that powerful preemptive defenses are extremely useful in negotiated deal. In other words, the economic rationale of preemptive defenses would be extracting a higher bid premium in a friendly deal,

[2]The examples in this section are based on the model of Subramanian (2005).

further than deterring an hostile takeover: since one of the most effective preemptive device is a poison pill, some observers use the term "pill premium". The Target would then enjoy a superior bargaining power. The idea is quite simple: a well protected Target can get a larger bid premium, as for the Bidder the alternative to a friendly deal, is no deal at all. Consider a Target with fully dispersed ownership and an efficient board (i.e., acting in the best interest of the shareholders). Also assume that Bidder is interested in Target and only in Target (i.e., there is no an alternative firm to buy); similarly for Target there is no potential acquirer other than Bidder. It is therefore a bilateral monopoly. Under these (quite stringent) assumptions, preemptive defenses can actually increase the Target bargaining power. Suppose that the Target equity value is €100 ml, but the Bidder is willing to pay up to €150 (due to potential synergies). If the Target is unprotected by any defensive device, the Bidder can make a "take it or leave it" offer to the Target's board at €101 ml; the board should be forced to accept (under the assumption of loyalty to the shareholders). Indeed, the Bidder can credibly threat a hostile tender offer (at €101 ml) in case of board's refusal.[3] Now suppose that Target is completely protected by an effective anti-takeover device: in this case the Bidder cannot launch a tender offer. The only alternative is a friendly bid: in equilibrium the two counterparties would agree on a €125 ml price: this price is mid-way between the Target stand alone value (€100 ml) and the Target value under the Bidder's control (€150 ml)[4]

This example proves that defensive mechanisms can actually increase the bid premium. Nonetheless some authors are skeptical about the effectiveness of preemptive defense in strengthening the Target's bargaining power. Indeed, removing the assumption in the previous example leads to different results.

9.3.2 Competition

Suppose that an identical unprotected Target exists. Let's call it Target 2. The bilateral monopoly assumption is therefore removed. In this case the Bidder can always threaten to buy the Target 2 at €101 ml, thus forcing the board of Target 1 to accept the deal, notwithstanding the defensive devices. There are two relevant observations: first, in real life it is quite rare to find two perfectly identical firms; second, in real life a rational Bidder should buy both Target 1 at €125 and Target 2 at €101. Since both Targets are worth €150 under Bidder's management, the Bidder should buy both of them. The "bilateral monopoly" assumption can be also removed on the Bidder's side. Suppose that there is only one Target but two

[3]The assumption here is that shareholders are not aware of the Target's value under Bidder's control (€150 ml). Otherwise coordination problems among the Target's shareholders could result in a failure of the tender offer. The failure of the value-increasing takeover is examined later on in this chapter.

[4]This result implicitly assumes that the Target's board is aware of the value under Bidder's control.

identical Bidders. The competition between the two Bidders will drive up the bid premium, regardless of the anti-takeover devices.

To sum up, competition both on the Target's and Bidder's side make anti-takeover mechanisms less relevant. It should be noted that in real life alternative Bidders are normally more credible than alternative Targets: indeed, a Target can more easily state that another acquirer is willing to buy at a higher price, while it is hard to believe that a Bidder has an identical alternative Target to buy.

9.3.3 The Cost of Hostile Takeovers

It is well known that hostile takeovers are more expensive relative to a friendly negotiation, in terms of additional fees charged by both lawyers and investment banks. Also, a hostile takeover requires an enhanced commitment, resulting in a diversion of the management focus from the administration of the company. As a consequence, even in absence of takeover defenses the presence of hostile takeover costs can change the outcome. Suppose that the Target equity value is €100, but another potential acquirer is willing to pay €110: to the Bidder, this is then the minimum price. Also assume that Bidder can buy an identical firm for €140. Removing the "bilateral monopoly" assumption leads therefore to a bargaining range of €110–€140. Suppose there are no hostile takeover costs: in absence of defense mechanisms the equilibrium price would be €111. If the Target is protected by some anti-takeover defenses the equilibrium price is €125, with a relevant "pill premium". Now assume there are hostile takeover costs equal to €10. If there are defense mechanisms the equilibrium price is still €125, as there is no hostile alternative. In contrast, without defense devices, things are different: indeed, in case of hostile takeover the Bidder would bear a cost of €10. In case of hostile takeover the price would then be €120 (€110 plus €10). The bargaining range is further narrowed to €110–€120: the equilibrium price is hence €115, with a premium, but without any defense mechanism. If the hostile takeover costs are €30 (i.e., the initial bargaining range) the equilibrium price without defense is identical to the equilibrium price with defense: indeed, the narrowed bargaining range would be €110–€140, with a €125 equilibrium price. To conclude, the higher the costs of mounting a hostile takeover the lower the relevance of defense mechanisms. However, it should be noted that this conclusion is based on two assumptions: (a) defense mechanisms simply preclude any hostile takeover and (b) hostile takeover costs do not depend on defense mechanisms. If we remove these assumptions, the conclusion is different: indeed, if in presence of anti-takeover devices the Bidder can still launch a hostile bid, whose cost depends on the defense mechanisms, then a "pill premium" could be actually extracted. Suppose for example that with no defense, the cost of mounting a hostile bid is €10, while with defense devices in place the cost is €20. In the former case the equilibrium price is €115, while in the latter the equilibrium price is €120.

9.3.4 *Information Asymmetry*

A hostile takeover implies no access to a data room as it normally happens in friendly negotiations: in case of severe information asymmetry, a hostile Bidder is trying to purchase a Target, without really knowing it. In such a situation the threat of a hostile takeover is not really credible. Moreover, to get access to internal documents Bidders are usually required to sign a "standstill agreement" according to which the Bidder cannot increase its stake in Target or mount a tender offer. Therefore the Bidder is prevented from starting a friendly negotiate to gain inside information and then threat a hostile (and "informed") takeover. With such an agreement any defense device is quite irrelevant. To conclude, with severe problem of information asymmetry the hostile alternative is not really feasible, thus making any defense device useless.

9.3.5 *Agency Costs*

So far we have assumed the board of the Target is acting in the shareholders' best interest; however, this is not necessarily true. Removing this assumption might diminish the relevance of defense mechanisms. Suppose for example that the bargaining range is €100–€150. With anti-takeover protection and assuming no hostile takeover costs and no information asymmetry, the equilibrium price is €125. Now suppose that Target is fully protected from hostile bids and the Target's board is faced with two alternative friendly bids: bid A and bid B. Bid A is €125 for the Target. Bid B is €101 for the Target plus €10 for its board (a generous parachute, for example). A non-loyal board would opt for bid B, which is also more convenient to the Bidder, as the total takeover is €111 rather than €125. To sum up, in presence of non-loyal board, the role of defense mechanisms is reduced.

9.4 Takeover Regulation

This section aims at analyzing the economic rationale of takeover regulation.[5] There are three aspects of takeover regulation that deserves particular attention: (a) the mandatory bid rule, (b) the squeeze-out right, and (c) the sell-out right.

The mandatory bid rule states that any party who has gained control must make an offer to all remaining shareholders at an "equitable" price, which is defined as the highest price paid by the Bidder during a given preceding time span. Clearly, a relevant aspect related to this rule is the definition of control, i.e., the threshold

[5]For a more formal analysis of this topic see Burkart and Panunzi (2003) and Burkart and Panunzi (2006).

above which a party presumably acquires control. With the squeeze-out rule, a Bidder who owns a given fraction of the equity capital (e.g., 90%) can compel the remaining minority shareholders to sell their shares at the price offered in the preceding takeover bid. In other words it is a sort of call option granted to the Bidder. In contrast, the sell-out right is a put option granted to the minority shareholders: provided the Bidder owns a given fraction of the equity capital (e.g., 90%) of the equity capital, the remaining minority shareholders can compel him to buy their shares at the price offered in the preceding takeover bid.

What are the economic effects of these rules? The answer depends on some assumptions, mainly about the ownership structure of the Target.

A classic argument in favor of takeover regulation is the "collective action" problem: an individually rational behavior might produce a socially sub-optimal outcome. In a firm with fully dispersed ownership, each shareholder considers the impact of his behavior negligible: however, what is rational at the individual level can undermine the socially preferred outcome. Consider the following example. Suppose you are enjoying your favorite soccer team at the stadium: when a player is about to strike a goal each individual will "rationally" stand up to see better, but since everybody stand up nobody will really see better; if coordinated they could simply sit down and see the goal in a more comfortable way. Talking about takeovers, there are two possible socially sub-optimal outcomes: (a) the failure of the value-increasing takeover and (b) the success of the value-decreasing takeover.

9.4.1 The Failure of the Value-Increasing Takeover

Let Target be a public company with fully dispersed ownership and price per share equal to €10. The Bidder knows that he can manage much better the Target driving the per share price up to €15. He makes an unrestricted (i.e., to all the shareholders) tender offer contingent on achieving 50% of ownership. The cost of launching this offer is €0.5 per share. All small shareholders know that if they do not tender, and Bidder succeeds, they will own shares worth €15. Since the single shareholder believes that his decision (tendering versus not tendering) has a negligible impact on the final outcome, he will not tender unless the bid price (that is the price offered by the Bidder in the tender offer) is at least €15. For less than €15 nobody would tender and the tender offer will fail.

A game theorist would say that for the single shareholder "not tendering" is the dominant alternative. The problem is that the Bidder cannot set the bid price at €15 because he would not make any profit (and would incur the cost of making the tender offer). Hence, a potentially value-increasing takeover fails. This result is called the "free-rider problem" or the "paradox of Grossman & Hart". Table 9.4 reports the alternatives the shareholder is faced with: x is the bid price. For any x smaller than €15, the individual shareholder will prefer to not tender.

One can argue that if the Bidder sets the bid price at €13 the small shareholders might decide to tender because the bid price is certain, while the post-takeover price

Table 9.4 The failure of the value-increasing takeover

	Success (> 50%)	Failure (< 50%)
Tender	*x*	€10
No tender	€15	€10

Table 9.5 Value-increasing takeover with private benefits

	Success (> 50%)	Failure (< 50%)
Tender	x	€10
No tender	€13	€10

(€15) is uncertain. However, the assumption here is that the post-takeover price is certain too, this is why "not tendering" it's better than "tendering". However, this assumption is not too far from reality.

There are three possible solutions to this problem: (a) extraction of private benefits, (b) prior acquisition, and (c) the squeeze-out rule.

9.4.1.1 Private Benefits

Private benefits are extracted by a controlling shareholder through several mechanisms, the most common being "transactions with related parties". Consider the following example: Mr. X owns 51% of company A and 100% of company B. Suppose the market value of B is €100. If company A (where Mr. X is the major shareholder) decides to buy company B for €1,000, we can say it is a crazy acquisition, because it is ten times its fair value. However in such a transaction Mr. X gets 100% of the "crazy price", but pays only 51% of it. The remaining 49% of the "crazy price" is paid by the minority shareholders (who have no interest in making such a crazy acquisition). Of course the value of company A will decrease. Mr. X thus extract private benefits from company A (the benefits are private because he is the only one gaining from the crazy acquisition). Private benefits are the economic explanation of the control premium: if the value of a company is €100, then 10% of the company is worth €10, but 51% of the company is worth €70. Why? The controlling shareholder can expropriate the minority shareholders (i.e., extract private benefits), thus getting an extra-value. Indeed, the control premium tends to be higher in countries where the protections of minority shareholders are either not existent or not enforced.

If the Bidder can divert part of the Target's value as private benefits, the outcome changes. Suppose the Bidder can get €3 per share out of the €15 as private benefits (i.e., 20% of the post-takeover) value. The post-takeover price will then be just €12. For instance, the Bidder can set the price at €13. The small shareholder has to decide whether keeping his shares (not tendering), thus getting the post-takeover price in case of success (€12), or tendering getting the bid price (€13). Of course he will decide to tender and the takeover succeeds. Table 9.5 shows the possible outcomes of this game.

One might argue that with the mandatory bid rule the Bidder is obliged to make an unrestricted tender offer. So, all the shareholders are offered the opportunity to tender. But if all the shareholders tender (because it is rational to do so) the Bidder will become the only owner of the Target, with no minority shareholders to expropriate. It is true, but recall that the bid price is €13. If everybody tender the Bidder will pay €13 per share, while managing the company he can drive the price to €15 gaining the difference. As a result, the extraction of private benefits makes a value-increasing tender offer feasible.

9.4.1.2 Prior Acquisitions

If the Bidder acquired some shares before making the tender offer he can make a profit even setting the bid price at €15. Suppose that the Bidder acquired 20% of the shares at €10 before launching the tender offer. He can set the bid price at €15 for the remaining 80% of the shares, because he is making his profit (€15–€10) on the 20% shares already purchased. The mandatory bid rule affects somehow this result. Indeed, the threshold defining control is the percentage above which the Bidder is obliged to launch the tender offer. In other words he can profit from prior acquisitions up to the control threshold: the higher the threshold, the higher the profits.

9.4.1.3 Squeeze-Our Right

This rule grants the controlling shareholder (above a given threshold) the right to buy out remaining minority shareholders at the price offered in the preceding takeover bids. The rationale sounds like this: full ownership (100%) has a higher value to the Bidder than the ownership of a large minority (e.g., 90%). Suppose that the threshold is 90%. Assume no takeover cost, no extraction of private benefits, and no prior acquisition. If the shareholders retain its shares, they either get x or €15 depending on whether the Bidder exercises the squeeze-out right. The Bidder will exercises the squeeze-out right when the price $x <$ €15. As a result the maximum value for the shareholder is x, provided the Bidder reaches the threshold of 90%. See Table 9.6 for the outcomes of this game. Each shareholder is indifferent between tendering and not tendering and may as well accept the offer, even when the bid price is below the post- takeover share value ($x <$ €15).

The squeeze-out right makes the takeover feasible at a price below the post-takeover value (provided that the bid is conditioned on the squeeze out threshold).

Table 9.6 Value-increasing takeover with squeeze-out right

	Success (> 90%)	Failure (< 90%)
Tender	x	€10
No tender	x (if $x <$ €15) €15	€10

Despite the possible solutions to the free-rider problems, the Bidder's profit on a successful takeover is very limited (if any). As a result, too few takeovers are undertaken, and if a takeover occurs, most of the gain accrues to the Target's shareholders, as the evidence on abnormal returns confirms.

9.4.2 The Success of the Value-Decreasing Takeover

Assume that the current stock price of the Target is still €10, but now the Bidder is not better than anyone else in managing the Target. The Target price under Bidder's management could be indeed no more than €10. However, the Bidder can extract private benefits for €2, so that the post-takeover price is €8. This leads to a paradoxical result. The Bidder can make a restricted (say for 51% of the shares) tender offer at €9 and for the small shareholder it is rational to tender because €9 (tendering) is better than €8 not tendering (and being expropriated). This is called "pressure to tender". So, all the shareholders will tender their shares but only 51% will be accepted (it is a restricted tender offer!) and the Bidder will expropriate the remaining 49%. Table 9.7 reports the details for this game.

Of course someone can intervene is such a crazy offer (it is crazy because the bid price is below the current price): it is the incumbent management, who might try to convince the shareholders that it is crazy to sell to the Bidder at a below-market stock price. The competition of the incumbent management sets a constraint to the bid price. The bid price cannot be lower than the current stock price. The "pressure to tender" problem is not resolved, though. Indeed, the Bidder can set the price at €10.5. Everybody will tender, but remember that this is a restricted offer, and hence the Bidder will buy only 51% of shares. So the Bidder will (slightly) overpay 51% of shares (at €10.5), but he will expropriate €2 for each of the remaining 49% of the shares. The value-decreasing takeover can succeed, provided a restricted tender offer is allowed. There are two possible solutions to the pressure to tender: (a) the mandatory bid rule and (b) the sell-out right.

9.4.2.1 Mandatory Bid Rule

The mandatory bid rule basically bans restricted offers, compelling the Bidder to extend the offer to all shareholders. With such a rule the value-decreasing takeover will never take place, because all the shareholders will tender at €10.5 and no minority shareholders would be left to expropriate. So the Bidder will not make the offer in the first place. The mandatory bid rule does not protect minorities in a

Table 9.7 The success of the value-decreasing takeover

	Success (> 50%)	Failure (< 50%)
Tender	x	€10
No tender	€8	€10

value-increasing takeover. With or without this rule, the Bidder offers the post-takeover share value. Hence they get the same value either if they (are forced to) retain or (have the right to) sell. Moreover, the mandatory bid rule, reduces the incentive to launch a value-increasing takeover for at least two reasons: (a) if no minorities are left, there is none to expropriate and (b) an unrestricted offer might be more expensive; thus requiring a higher level of expropriation for the bid to be feasible. As we will see later in this section, the mandatory bid rule affects the takeover of firms with a controlling shareholder.

9.4.2.2 Sell-Out Right

Provided that the controlling shareholder owns a given share (say 90%), the remaining minority shareholders can "put" their shares at the price offered in the preceding takeover bid. The aim of this rule is mainly the protection of minority shareholders: minority rights are no longer available below a given percentage of ownership. Moreover, the market for these shares can be very illiquid in such situations, thus preventing an exit at a "fair price" (who wants to be a minority shareholder when the controlling party owns 90% or more?).

Theoretically, the sell-out right might also help in solving the "pressure to tender" problem. Suppose there is no mandatory bid rule and competition by the incumbent; the Bidder can offer less than the current value, e.g., €9, thus creating pressure to tender because the post-takeover value is €8. With a sell-out right there is no need to tender, because if the bid succeeds (and the Bidder reaches the sell-out threshold) minority shareholders can sell at the bid price (i.e., €9). This is true only if sell-out right is triggered: hence "pressure to tender" is removed only if the sell-out threshold is set according to the success threshold, that is 50%. In this case the shareholders can reject the offer without loosing the option of selling their shares if the takeover succeeds. However, is the sell-out threshold is set at a higher level (90% or more), the Bidder could make a restricted offer for 51% of the shares, thus creating pressure to tender.

Notice that the sell-out rule does not affect the outcome of the value-increasing bid. Since the price offered is equal to the post-takeover value, the remaining minority shareholders do not benefit from a sell-out option. Moreover, if the Bidder can expropriate more private benefits from minority shareholders when the minority becomes (very) small, he can simply makes an offer conditional on the sell-out threshold, thus setting the post-takeover value at the further reduced level.

9.5 Controlling Shareholders

The discussion in the previous section suggests that the mandatory bid rule has the role of preventing an inefficient takeover of a public company with no controlling shareholder. However, the same result holds when a controlling shareholder owns

the Target. Suppose the Incumbent owner of the Target controls 50% of the equity capital: under his management the equity value of the Target is €100 ml. The Incumbent is able to extract private benefits for €20 ml. As such, the value to the Incumbent is €70 ml, i.e., 50% of €100 ml plus €20 ml of private benefits. A takeover would be socially efficient if the value generated by the Bidder is greater than the value generated by the Incumbent. Let E_B be the equity value of the Target under the Bidder's management and P_B the private benefits that the Bidder is able to extract. The efficiency condition is therefore:

$$E_B + P_B > €120 \text{ ml}$$

9.5.1 No Mandatory Bid Rule

Suppose there is no mandatory bid rule: the Incumbent and the Bidder can trade without letting minority shareholders participate in the transaction. The Incumbent will accept to trade when the bid price is higher than the value of its stake: in other words a control transfer will take place if the Bidder is willing to pay more than €70 ml. The condition for a block trade is therefore:

$$50\% \; E_B + P_B > €70 \text{ ml}$$

By comparing this condition with the efficiency condition, two results emerge: (a) an efficient control transfer may fail and (b) an inefficient control transfer may occur.

9.5.1.1 The Failure of the Efficient Control Transfer

Suppose E_B is equal to €120 ml and P_B is €5 ml. The Bidder is therefore a good manager, who can create more value overall ($E_B + P_B = €125$ ml), by enhancing the equity value of Target and with limited expropriation of minority shareholders. A control transfer would be efficient, but the Incumbent is not willing to trade, because:

$$50\% \cdot €120 \text{ ml} + €5 \text{ ml} = €65 \text{ ml} < €70 \text{ ml}$$

When the Incumbent's private benefits are large relative to the Bidder's private benefits, the former might not be willing to trade. This inefficiency arises because the two parties do not internalize the gain of the minority shareholders. This result does not necessarily mean that no efficient transfers can occur. Suppose for example that E_B is equal to €105 ml and P_B is €20 ml. This would be an efficient

control transfer as $E_B + P_B$ is still equal €125 ml, which in turn is larger than €120 ml (the efficiency condition). Nonetheless the control transfer can take place:

$$50\% \cdot €105 \text{ ml} + €20 \text{ ml} = €72.5 \text{ ml} > €70 \text{ ml}$$

9.5.1.2 The Success of the Inefficient Control Transfer

Suppose E_B is equal to €80 ml and P_B is €35 ml. The Bidder is a bad manager, who would destroy value overall ($E_B + P_B$ = €115 ml). A control transfer would be inefficient, but the Incumbent is willing to trade, because:

$$50\% \cdot €80 \text{ ml} + €35 \text{ ml} = €75 \text{ ml} > €70 \text{ ml}$$

When the Bidder's private benefits are large relative to the Incumbent's private benefits, the former might be willing to trade. Not all inefficient control transfer occurs: for instance if E_B is equal to €95 ml and P_B is €20 ml. This is still an inefficient takeover as €115 is smaller than €120, but the control transfer would be prevented as:

$$50\% \cdot €95 \text{ ml} + €20 \text{ ml} = €67.5 \text{ ml} < €70 \text{ ml}$$

9.5.2 Mandatory Bid Rule

With a mandatory bid rule the results are different. The Bidder cannot simply purchase the controlling stake from the Incumbent: he must offer the same conditions to all minority shareholders, i.e. €100 ml for all equity capital plus €20 ml to both the Incumbent and the minority shareholders (€40 ml, or 20/50%). The condition to trade is therefore:

$$E_B + P_B > €140 \text{ ml}$$

By comparing this condition with the efficiency condition, two results emerge: (a) an efficient control transfer may fail and (b) all inefficient transfers fail.

9.5.2.1 The Failure of the Efficient Control Transfer

Consider again the efficient control discussed in the previous section: E_B is equal to €120 ml and P_B is €5 ml. A control transfer would be efficient, but the Incumbent is not willing to trade, because:

$$€120 \text{ ml} + €5 \text{ ml} = €125 \text{ ml} < €140 \text{ ml}$$

When the Incumbent's private benefits are large, the mandatory bid rule might inflates the minimum price to trade above the value. Moreover, if all shareholders accept the offer, no minority shareholders to expropriate would be left: the value to the Bidder would therefore be even lower and equal to €5 ml.

9.5.2.2 All Inefficient Control Transfers are Prevented

A control transfer is efficient if E_B plus P_B is larger than €120 ml (€100 ml + €20 ml). The price imposed by the mandatory bid rule is by definition higher than €120 ml, as it must be higher than €140 ml (€100 ml + €20 ml/50%). Notice that a reduction in the fraction of the controlling shareholders (say from 50 to 30%) increases the minimum price to trade (from €140 to €166.7 ml).

Table 9.8 summarizes the results of the takeover with a controlling shareholder.

To wrap it up, the mandatory bid rule aims at preventing inefficient takeover. However the rule is effective only is the control threshold is "correct": in other words the mandatory bid rule prevents inefficient takeover if a Bidder can control the Target only reaching the threshold of the mandatory bid rule. Consider this simple numerical example: suppose a mandatory bid rule is in effect and the control threshold is 30%. The rule implicitly assumes that 30% is the threshold above which a Bidder can control the Target. What if a Bidder can takeover a Target just purchasing 27% of the equity capital? Purchasing 27% of the shares the Bidder is not obliged to make an unrestricted offer and then the value-decreasing takeover is not necessarily prevented.

Table 9.8 Takeovers with controlling shareholders

	Efficiency Condition* – $E_B + P_B > €120$ ml	
	Mandatory Bid Rule	
	No	Yes
	Deal condition – 50%·$E_B + P_B$ > €70 ml	*Deal condition – $E_B + P_B$ > €140 ml*
Efficient Deal	50%·€120 ml + €5 ml=€65 ml < €70 ml	€120 ml + €5 ml= €125 ml < €140 ml
E_B=€120 ml		
P_B=€5 ml	*No deal*	*No deal*
Inefficient Deal	50%·€80 ml + €35 ml=€75 ml > €70 ml	€100 ml + €20 ml/50% > €120 ml
E_B=€80 ml		
P_B=€35 ml	*Deal*	*No Deal (Never)*

*The Incumbent controls 50% of Target equity capital (€100 ml) and extracts private benefits (€20 ml)

9.6 Conclusion

This chapter analyzed two specific topics related to takeovers: (a) the defensive tactics in hostile takeovers and their effects on the bid premium; (b) the regulation on takeovers. As far as the first topic, a general conclusion can be drawn: despite many practitioners and scholars argue that defensive devices prove useful in negotiated deals, their effectiveness in increasing the bid premium actually depends on several assumptions. In particular, the relevance of defensive tactics is much lower when there are more than one Bidder and/or Target, the cost of a hostile takeover is not zero, there is an information gap between the Bidder and the Target, and when the board of directors does not act in the shareholders best interest. These situations are quite often verified in real-life cases: as a result, the importance of defensive mechanisms cannot be easily generalized. As far as the second topic, three particular aspects of the takeover regulation have been discussed: (a) the mandatory bid rule, (b) the squeeze-out right, and (c) the sell-out right. The economic analysis suggests that these rules might help in preventing two socially sub-optimal outcomes: (a) the failure of the value-increasing takeover and (b) the success of the value-decreasing takeover. In particular, the mandatory bid rule proves useful to prevent inefficient takeovers, but only if it is triggered at the "right" threshold. In other terms, the threshold of the mandatory bid rule should be set at a level so that no Bidder can effectively takeover a firm by acquiring less than that percentage of shares.

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Chapter 10
Corporate Restructuring

10.1 Introduction

A firm can be seen as a combination of contracts. Sometimes these contracts need to be restructured. Restructuring might be triggered by a condition of financial distress. However, sometimes firms re-contract preemptively, to avoid a crisis, or simply to enhance value creation. This chapter describes the main type of restructuring transactions, which can be roughly classified into two main categories: (a) asset restructuring and (b) debt restructuring. Asset-side transactions either consist in selling a subsidiary (or a given asset) to a third party (divesture) or in creating new stock classes. This latter type of transactions, also known as stock break-ups, includes equity carve-outs, spin-offs, targeted stocks, etc. Debt restructuring consists in changing the features of outstanding debt contracts (e.g., extending the maturity, reducing the amount, converting into equity, etc.). The design of restructuring transactions, as for all other investment banking deals, very much depends on the jurisdiction. In particular, when restructuring stems from a condition of financial distress, the type of bankruptcy law in a given country is crucial. A detailed description of the different bankruptcy laws is beyond the aim of this book. The US bankruptcy law is used as a reference point, just to illustrate the impact of the legal environment. The transactions described in this chapter are illustrated as possible solutions to a condition of financial distress. However, it is important to pinpoint that each of these transaction might be simply undertaken with the aim of improving efficiency and/or enhancing value creation. In other words, distress is not a necessary condition for restructuring. This chapter is organized as follows. Section 10.2 presents a "road map" to financial distress, illustrating the alternative solutions. Section 10.3 describes debt restructuring, while Sect. 10.4 looks at stock break-up transactions. Section 10.5 concludes.

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10.2 Financial Distress

10.2.1 A Road Map

A (minimal) condition for defining distress is that the firm is unable to meet its obligations. A situation of distress might be due to operating problems (economic distress) or to excessive leverage and/or inappropriate mix of debt (financial distress). In the real life it is quite difficult to distinguish between economic and financial distress and most of time it is a combination of the two. Regardless of the type, in a distress situation several forms of restructuring may take place. Figure 10.1 provides an overview of alternative solutions.

The two main alternatives are a private workout versus a formal bankruptcy procedure. A workout is an out-of-Court informal procedure, while bankruptcy is a formal legal procedure. Both in workout and bankruptcy the firm can be either liquidated or restructured. In the former case the assets are sold and the proceeds are used to payback creditors according to the absolute priority rule (APR), that is secured debt-holders first, then unsecured creditors, subordinated and finally equity holders. The assets might also be sold piecemeal or "as a going concern": in this latter case the firm is simply sold to a bidder, who will take care of its obligations.

Liquidation can be carried out as an informal solution or as a formal legal procedure: indeed liquidation is the simplest bankruptcy procedure, some version of which can be found in almost all countries. For example in the US this solution is regulated by Chap. 7 of the Bankruptcy Law. As we will see later, this kind of solution is easy, but it can destroy value, as the firm might be worth more if kept in business rather than liquidated. The alternative to liquidation is restructuring: the idea is that firm's claimants (creditors of every kind, management, shareholders) bargain about the future of the firm. Again, all the parties involved might find an out-of-Court agreement or through a formal bankruptcy procedure. According to many scholars and practitioners one of the most effective formal restructuring procedure is the US Chap. 11. It is important to note that the bankruptcy law in the US has historically favored restructuring, since the failures of the railroads in the late 1800s and early 1900s. US railroads were financed through several issues of mortgage

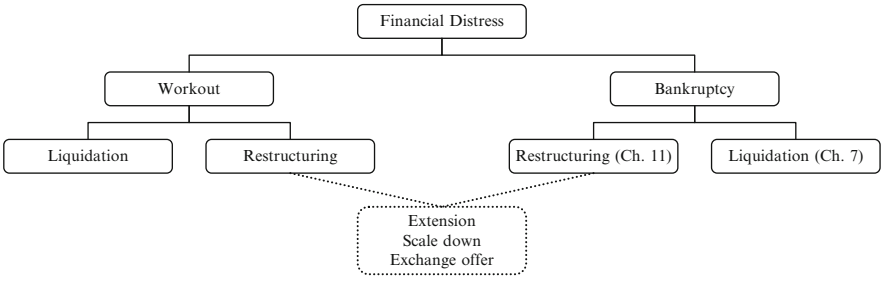


Fig. 10.1 A road map to financial distress

bonds. Each bond was issued to finance a portion of the railroad and it was secured by that portion of line. Investors soon realized that in case of failure, separate sales of railroad portions by each bondholder group would have destroyed the railroad value as a whole. The best strategy to maximize creditors' recovery rate was to keep railroads as a going concern. No real equivalent to the US Chap. 11 exists, though superficially similar laws have been adopted in some jurisdictions. While a detailed description is the bankruptcy laws is beyond the aim of this book, it is worth commenting the following key features of the Chap. 11 of the US bankruptcy law:

1. Management control: managers retain considerable control after a firm filed for bankruptcy, although many transactions are subject to Court approval; the management can propose a restructuring plan to be approved by creditors and shareholders; if the management fails to propose a plan or its plan is rejected, creditors can propose their own plan.
2. Simplified voting rules: the acceptance of the restructuring plan requires the approval of majority of the claimants whose claims are impaired: in other words, unanimity is not required, as it often occurs in an informal workout.
3. Automatic stay: the firm can stop all payments of principal and interest (including tax). Creditors are "frozen"; secured creditors cannot seize collateral. The creditors' "race" is prevented and the maturity of outstanding debt is *de facto* extended.
4. Debtor in possession (DIP): the firm can issue (subject to Court approval) new debt senior to outstanding debt. The firm can thus get fresh money.

Typically, shareholders receive a stake in the reorganized firm even if creditors are not paid in full. Indeed, the judge is required by law to ensure only that two conditions are met: (a) each claimholder must receive at least what he would have been paid in liquidation and (b) the firm must not appear to be in danger of going bankrupt in the near future. Why such systematic deviation from APR? APR is designed to ensure that creditors receive a reasonable return in bankruptcy, thus encouraging them to lend. Moreover, it "punishes" incumbent shareholder/management thus discipline them ex ante (which is considered one of the reason for taking on debt, i.e., to commit to pay out some of the future cash flow). However, an argument can be made against APR: if shareholders receive nothing in bankruptcy, then they will have an incentive to "go for broke", undertaking highly risky projects, rather than filing for Chap. 11 in a timely fashion. Deviation from APR can therefore be interpreted as a "bribe" to avoid that shareholders follow value-destroying tactics prior to or during the bankruptcy procedure.

10.2.2 Workout Versus Bankruptcy

The workout-bankruptcy choice has a parallel with the decision faced by plaintiffs and defendants over whether to settle out of Court or go to trial. If settling privately is appreciably less expensive, both parties will have an incentive to avoid the Court. Although the cost of the two approaches may differ depending on the jurisdiction, it is quite common that bankruptcy is more expensive than workout.

The cost of private workouts tends to be smaller relative to a formal bankruptcy mainly because of time. Bankruptcy is in general longer than private workouts, because no decision is subject to Court approval. Moreover, in a private workout the management needs to deal only with creditors whose claims are defaulted and not with all the creditors. As a consequence bankruptcy process results in higher direct and indirect costs. Direct costs are the fee to be paid to lawyers and bankers, which accrues on a time basis and therefore increases with the length of the procedure.[1] Probably even more relevant are indirect costs: dealing with creditors (and, in bankruptcy, with the judge) diverts management's attention from operating the business, thus resulting in lost investment opportunities. Although these costs cannot be directly measured it is reasonable to presume that any damage will depend on the length of time it takes to resolve distress: bankruptcy is therefore more expensive. Moreover, under a bankruptcy procedure many decisions must be approved by the judge, thus creating additional delays. Finally, despite their honorable intentions, judges lack financial incentive and management expertise: provided they respect the law, they have no incentive to find the most efficient solution. A measure of the investment opportunities (admittedly rough) is the difference between the firm value as an ongoing concern and its liquidation value. Empirical evidence shows that this difference is much higher for firms that successfully restructure out of Court as opposed to firms filing for Chap. 11, suggesting that when there is much value to lose private workouts succeed

To summarize, workouts are generally less expensive. Then the question is why it is not always a workout. If the parties are unable to agree on how to split the cost savings, then a trial may still be necessary, even though the combined wealth of both parties is ultimately lower. Moreover, a formal bankruptcy procedure as Chap. 11 might have some advantages, which I described in the previous section. In particular, simplified voting rules might be crucial to a successful resolution of the distress. An agreement on how to split the cost savings of a private workout will be more difficult in presence of many creditors and several class of claimants. Indeed, whether the cost savings from a private workout are realized will depend on whether creditors unanimously agree to the terms of the restructuring.

10.3 Debt Restructuring

10.3.1 The Holdout Problem

When claimants are unable to find an agreement, they might not approve the restructuring plan, even when this will produce a sub-optimal outcome, such as a

[1]Notice that in Chap. 11 fees have priority to other claims: therefore, there is no incentive to minimize the amount of time spent in formal bankruptcy; a possible solution would be paying lawyers and bankers a fee contingent on a quick successful resolution or using the same securities distributed to shareholders.

Table 10.1 100% tender rate

A		L	
Assets	€100	Equity	€100

Table 10.2 50% tender rate

A		L	
Assets	€100	Bonds	€60
		Equity	€40

liquidation (which will waste the value of the firm "as a going concern") or a formal bankruptcy procedure (which is more expensive and possibly leads to inferior result for creditors): this is the holdout problem. The likelihood of approval of the restructuring plan will depend on several factors, such as the number and sophistication of the claimants, the relative cost of the plan relative to other solutions, etc.

For example, in the presence of many small bondholders it might be very difficult to get the restructuring plan approved, as some of them might believe they will be better off not approving the proposed plan. In other terms, when there is public debt (i.e., bonds) outstanding the holdout problem can be particularly severe. Scale down, maturity extension, or debt-for-equity swap might be very difficult if *every* bondholder has to agree to the term changes. Consider for example an exchange offer where outstanding debt is exchanged with equity (debt-for-equity swap): in other words, creditors take over the distressed firm. In such a situation, the bondholders who do not tender might benefit at the expense of those who do. Suppose the firm's asset value is €100, with public debt outstanding for €120 (10 bondholders, each holding one bond with face value €12). The firm's asset liquidation value is only €80: there is therefore an incentive to keep the firm doing business. Suppose the exchange offer is contingent on achieving a 50% tendering rate. If all bondholders tender, the firm will have the balance sheet reported in Table 10.1.

The value to each bondholder will be €10, with a loss of €2: under liquidation each bondholders would receive just €8. Now suppose that only five bondholders tender: the exchange offer would succeed, but the five "holdout" bondholders will be better off. Indeed, the balance sheet of the firm would be that reported in Table 10.2.

The five holdout bondholders will still have one bond each, with face value €12: in contrast the five tendering bondholders would each receive equity worth €8, which corresponds to the liquidation value. Of course, rational bondholders will anticipate this outcome, and none of them will tender. The exchange offer will fail, unless the bondholders are able to coordinate. The success of the exchange offer also depends on the difference between the firm value "as a going concern" and under liquidation. As we will see in the next section, things can become even more complex when other classes of creditors are involved.

10.3.2 Private and Public Debt

A benefit of borrowing from banks is that private debt is much easier to restructure in financial distress than public debt. Indeed banks are sophisticated and (normally)

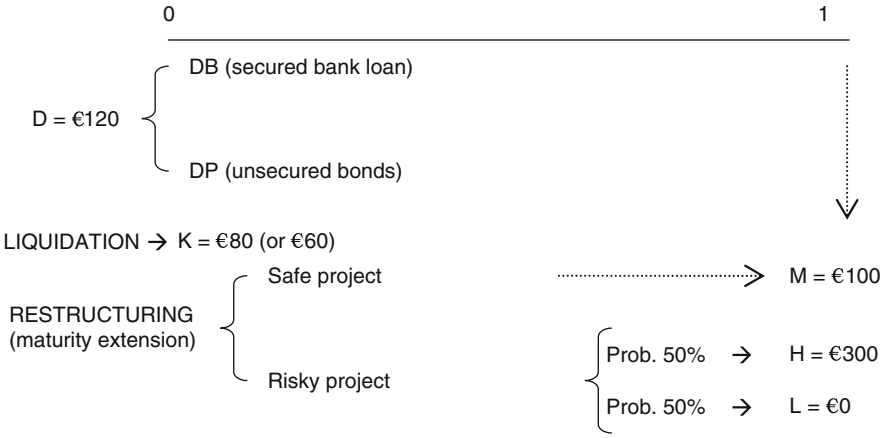


Fig. 10.2 A model of distress resolution

fewer than bondholders. However, since bank lenders are usually secured, they have little incentive to make concessions when a firm also has unsecured public debt outstanding. Banks are generally limited in their stockholdings in non-financial firms, with a remarkable exception in case of financial distress (in many jurisdictions). Whether a bank will decide to take an equity position in a financially distressed firm, will depend on several variables: again the cost of restructuring relative to liquidation, but also the amount of public debt and the bondholders willingness to restructure their claims. To understand how the financing mix might affect the outcome of the restructuring process consider a very simple model.[2]

At time 0 a firm is in financial distress as debt outstanding (D = €120) is larger than both the liquidation value (K = €80) and the value as going concern (M = €100). Liquidation is not necessarily the optimal solution as the value "as a going concern" is higher than liquidation: let's call this difference "growth potential". Now suppose that management/shareholders propose to restructure debt by extending the maturity to time 1. The firm can undertake two alternative projects: (a) a safe project that will produce a cash flow equal to €100 without uncertainty and (b) a risky project which might result in €300 or €0 with equal probability. Note that the risky project is not inefficient as the expected value is €150 (with risk), while the expected cash flow of the safe project is only €100 with no risk. Figure 10.2 provide the time structure of the model.

Without specifying the composition of debt it is clear that creditors will force liquidation, losing the growth potential. Indeed, if they accept the maturity extension, managers/shareholders will opt for the risky project, which in turn is sub-optimal to creditors. Table 10.3, reports the payoff to creditors and shareholders under the two projects.

[2]This is a simplified version of the model in James (1995).

If creditors accept to restructure the debt by extending the maturity, managers/shareholders can keep running the firm: if they choose the safe project, the payoff to creditors will be €100 (more than liquidation), while shareholders will receive nothing. In contrast, if the risky project is undertaken, the expected payoff to creditors is only €60 (less than liquidation) while shareholders' expected payoff is €90. It is therefore rational for shareholders to choose the risky project: creditors will anticipate the shareholders' incentive, thus rejecting the restructuring proposal and forcing liquidation. It is an under-investment problem, as the firm is liquidated even if keeping it on business would generate more value. The real-life intuition is simple: creditors do not accept changes in terms, as they believe that managers/shareholders will go "for broke" since they have "nothing to loose".

An alternative to liquidation is the use of some sort of "equity kicker" (e.g., convertible bonds or warrants) which align the incentive of shareholders with that of creditors. For example, suppose that creditors are offered 60% of the equity payoff (cash flow less debt) in addition to their credit. Under this agreement, creditors would get €114 with the risky project (versus €100 with the safe project): depending on their risk appetite they might prefer the risky project as the shareholders do. Table 10.4 reports the payoffs with an equity kicker.

Suppose that creditors are not willing to accept any equity kicker because the risky project is inefficient.

For example, the risky project would be clearly inefficient if the resulting cash flow could be either €140 or €0 with equal probability. Table 10.5 shows the payoff to shareholders and creditors under this assumption.

Table 10.3 Payoff under different projects

	Creditors		Shareholders	
Safe project	***€100***		*€0*	
Risky project	50%·€120 50%·€0	*€60*	50%·€180 50%·€0	***€90***

Table 10.4 Payoff under different projects (Equity Kicker)

	Creditors		Shareholders	
Safe project	*€100*		*€0*	
Risky project (Equity Kicker)	50%·[€120 + 50%·(€300 – €120)] 50%·€0	*€114*	50%·[50%·(€300 – €120)] 50%·€0	***€45***

Table 10.5 Payoff under different projects (Inefficient risky project)

	Creditors		Shareholders	
Safe project (efficient)	*€100*		*€0*	
Risky project (inefficient)	50%·€120 50%·€0	*€60*	50%·€20 50%·€0	***€10***

Even with a 100% equity kicker (i.e., creditors get 100% of the equity payoff) creditors would still prefer the safe project. Since shareholders would opt for the risky one, creditors would force liquidation.

Alternatively, creditors might consider to take over the firm (i.e., accepting a debt-for-equity swap), in which case they could undertake the safe project realizing the growth potential. That would be the outcome if the debt structure is composed by a single non-naïve lender (i.e., a bank or a group of banks). Also, if the whole debt outstanding is public (i.e. bonds) the debt-for-equity swap would be a feasible outcome, provided the holdout problem is resolved (an investment bank might help, as we will see in the next section). However, things are more complex when the debt composition is mixed.

If $D_B < K$, then the bank will accept equity only if $M - DP > DB$, i.e., $M > D$. But in this case external finance would be feasible, thus violating the definition of distress. Only if public debt holders scale down their claims too, the bank will accept the offer. If it is impossible to restructure the public debt (due to the holdout problem), the bank will never accept equity in exchange for its unimpaired secured claim. Consider a numerical example: suppose $D_B = €30$, $D_P = €90$, and $K = €80$. The bank debt is unimpaired ($€30 < €80$). The bank could get paid its money by forcing liquidation and would accept equity only if it can get more than €30. If the bank accepts equity and undertakes the efficient project, it will get $€100 - €90 = €10 < €30$. There would be a wealth transfer from the bank to the bondholders. The bank will accept equity only if also public debt holders scale down their claims: suppose the bondholders accept to scale down their claims to €60. The bank would hence get $€100 - €60 = €40 > €30$. If it is impossible to convince the bondholders, the firm is liquidated.

Now suppose that the bank debt is unimpaired, that is $D_B > K$. The bank will accept equity only if $M - D_P > K$, i.e. $M > K + D_P$. This is true when:

1. D_P is scaled down: suppose $D_B = €90$, $D_P = €30$, and $K = €80$. The bank debt is impaired ($€90 > €80$). The bank will accept equity if it gets more than liquidation value (€80). Taking equity the bank gets $€100 - €30 = €70 < €80$. The bank will take equity only if also public debt holders do or if they scale down their claims.
2. K is small (large growth potential): suppose $DB = €90$, $DP = €30$, and $K = €60$. The bank debt is impaired ($€90 > €60$). The bank will accept equity if it gets more than liquidation value (€60). Taking equity the bank gets $€100 - €30 = €70 > €60$. The bank will take unilaterally (i.e., no need for public debt restructuring) equity in this case.
3. D_P is small (larger fraction of bank debt): suppose $DB = €110$, $DP = €10$, and $K = €80$. The bank debt is impaired ($€110 > €80$). The bank will accept equity if it gets more than liquidation value (€80). Taking equity the bank gets $€100 - €10 = €90 > €80$. The bank will take unilaterally equity in this case too.

This model tries to explain what happens in the real life. James (1995) empirically investigates which factors affect the likelihood that a bank takes equity in exchange for some concession of principal: he finds that this likelihood

increases with the market-to-book-value ratio (which is a proxy of growth potential), with the debt-to-asset ratio, and when public debt holders also accept equity. In contrast the probability that banks accept equity decreases with the weight of public debt to total debt.

10.3.3 The Role of Investment Banks

As we have seen earlier, when restructuring public debt the holdout problem might be a severe impediment to the successful completion of an exchange offer, leading to a sub-optimal outcome, i.e., liquidation. Investment banks may play an important role certifying the value of the exchange offer and thus indirectly "coordinating" bondholders. The US regulation represents the ideal framework to test this hypothesis: indeed in the US exchange offers may be conducted in two ways which differ in the role of investment banks: (a) Section 3(a)(9) offers and (b) investment-bank-managed exchange offers (IBMEO). Section 3(a)(9) of Securities Act allows the distressed firm to avoid the registration of the new securities offered in exchange for outstanding public debt. However, the Securities Act prohibits paying a third party to promote such an exchange. An investment bank might be hired to structure the exchange, but the firm cannot pay an investment bank to solicit tenders, and any investment bank receiving fees from the firm may not make a recommendation to bondholders. Alternatively the distressed firm can undertake an IBMEO: the advantage of registering the new securities (a lengthy and costly job) in an exchange is that investment banks may market and promote the securities offered and solicit tenders.

Not surprisingly the investment bank's fee for advising a firm on a Section 3(a)(9) are much lower than in IBMEOs (about 1% of the market value of the securities sought *versus* about 2%). Rather than taking advantage of Section 3(a)(9) and avoid the registration process, many firms choose IBMEOs. Why? To understand what is the role of investment banks in resolving distress, Mooradian and Ryan (2005) empirically investigate this topic. They try to answer the following three questions. First, which factors affect the choice of a IBMEO versus a Section 3(a)(9) offer? Second, is the composition of IMBEOs different from Section 3(a)(9) offers? Finally, how successful are IMBEOs compared to Section 3(a)(9) offers?

10.3.3.1 Which Factors Affect the Choice of a IBMEO Versus a Section 3(a)(9) Offer?

According to Mooradian and Ryan (2005), firms tend to opt for a IBMEO in complex situations when it is more difficult to successfully complete the exchange offer. In other words, investment banks are hired when it is more difficult to resolve the distress without any "help". For example, the likelihood of a IBMEO increases when the firm is in worse financial conditions (higher leverage). Also, investment

banks tend to be hired by larger distressed firms with a greater number of long-term contracts.

Interestingly enough, the likelihood of hiring an investment bank is negatively correlated with the fraction of private debt: this result stems from the fact that, as explained above, public debt is much more difficult to restructure relative to private debt. As consequence, firms chooses to be supported by an investment bank as the fraction of public debt increases. The model illustrated above, also suggests that the likelihood of a bank concession is higher if public debt is also restructured. Empirical results indicate that when banks accept to restructure their credit, the likelihood of investment bank involvement increases. Banks' acceptance is usually contingent on the successful completion of the exchange offer: this is why distressed firms tend to hire investment banks when banks make a concession. These results suggests that investment and commercial banks play both substitute and complementary roles in restructuring public debt: a higher fraction of private debt reduces the importance of a successful exchange offer (commercial and investment banks are substitute); however, commercial banks often accept to restructure their credit only if also the public debt is restructure (commercial and investment banks are complementary

Also, a higher percentage of proposed debt reduction, a proxy of the difficulty of the exchange offer, increases the likelihood of hiring an investment bank. Finally, if at least one firm in the industry has recently (3 years) conducted a Section 3(a)(9) exchange offer, the likelihood of investment banks' involvement is reduced. This is most probably due to the fact that the manager of a distressed firm in a given industry might reasonably believe to succeed in the exchange offer without an investment bank if other did in the same industry.

10.3.3.2 Is the Composition of IBMEOs Different From Section 3(a)(9) Offers?

A possibility to mitigate the holdout problem is offering senior claims for outstanding public debt. Bondholders accepting the exchange offer would therefore hold securities senior relative the holdout bondholders. As such, all bondholders will have the incentive to accept the offer. However, offering senior claims does not really reduces the firm's outstanding debt and might actually worsens the firm's condition: in the end, the outstanding debt would be replaced with more senior securities. Is there any other mechanism to increase the likelihood of a successful exchange? Put it another way, is there an alternative solution to the holdout problem? Investment banks might actually mitigate the holdout problem by certifying the value of securities offered. Indeed, Mooradian and Ryan (2005) find that 77% of the offers without investment banks include senior claims compared to 44% of the offers with investment banks. The median amount of senior-debt offered per dollar of junior debt-sought is zero when an investment bank is involved compared to 0.71 for transactions without investment banks.

10.3.3.3 How Successful are IMBEOs Compared to Section 3(a)(9) Offers?

There are two possible approaches to compare the success of an IMBEO relative to a Section 3(a)(9) offer. The first one simply consists in looking at the offer outcome in terms of completion and debt reduction. The second one looks at the performance of the distressed firm in the years following the offer. As far as the first approach, empirical results indicate that IMBEOs are completed (acceptance at least some securities) less often than Section 3(a)(9) (50% vs. 74%). The actual debt reduction is computed as the product of proposed debt reduction and the acceptance rate, where the acceptance rate is the percentage of securities outstanding that are tendered for completed exchange offers (it is zero for exchange offers that are withdrawn or expires with no acceptance). Since Section 3(a)(9) offers are completed more often, the acceptance rate is higher relative to IMBEOs. Nonetheless, the actual debt reduction is much higher for IBMEOs: 38% compared to zero for Section 3(a)(9) transactions. In other words, since Section 3(a)(9) offers have less difficult objectives, their completion rate and their acceptance rate are higher relative to IMBEOs. However, for the objective of reducing debt, IBMEOs are definitely more successful than Section 3(a)(9) exchange offers.

As far as the second approach is concerned, the percentages of firms that survive 2 years and 5 years without filing for Chap. 11 are not statistically different. Also, excluding firms in bankruptcy (and acquired by other firms), the proportion of Section 3(a)(9) firms and IBMEO firms with positive EBITDA is approximately the same. However, in the following years the percentage of IBMEO firms with positive EBITDA is much higher (also controlling for positive performance prior to restructuring).

To sum up, firms choose an investment bank when they have a critical need to mitigate impediment to debt reduction and resolve financial distress. In other words, investment bank are hired when the "mission" appears to be "impossible". Looking at the firm performance after the restructuring, it emerges that investment banks are better able to resolve financial distress.

10.3.4 Over-Investment and Private Benefits

So far we have been discussing of liquidation as an outcome to avoid. However, sometimes, even though liquidation or sale might be preferable, the debt is restructured, leading to an inefficient outcome. Consider the following example: a firm with one large creditor, holding a claim equal to 60, and many small creditors collectively holding a claim equal to 40, is in distress. There are three potential investors interested in this firm. One is the large creditor: by managing the firm he will generate 50 in security value and will enjoy 40 in private benefits of control. The two other potential bidders (A and B) have no private benefits of control, but are able to generate 100 in security value (Table 10.6).

Table 10.6 Value under different bidders

	D-for-E Swap	Liq./Sale	
	Large creditor	A	B
Value	50	100	100
Private benefits	40	0	0

Table 10.7 Payoff under different strategies

	D-for-E swap	Liq./Sale
Large Creditor	(60%·50) + 40 = 70	60
Small Creditors	40%·50 = 20	40

Table 10.7 reports the payoff to creditors under a debt-for-equity swap and under liquidation/sale. It is efficient that ownership goes to one of the two higher valuation bidders (A or B), and an auction will deliver this outcome: all creditors are fully paid (60 and 40). In the case of a debt-for-equity swap, the large creditor obtains 60% of the shares plus the entire value of control, for a total of 70. Since 70 is more than 60 the large creditor will prefer this alternative (preventing the auction from taking place). Moreover, since the value of the controlling block for the large creditor/shareholder is bigger than its value for the external bidders, even afterwards ownership will not change hands, but will inefficiently remain in the hands of the large creditors.

Why should small creditors accept the restructuring plan? In some jurisdictions a majority of claimants is required for a plan to be approved (for instance under Chap. 11). Penati and Zingales (1997) provide a different explanation for the case of Ferruzzi Group: the alternative to a private workout (managed by the large creditors) was the application of the "Prodi's Act", which was automatically invoked for large insolvent companies. The "Prodi's Act" aimed at protecting the integrity of a firm and employment levels, thus weakening creditors' claim. In other words each single creditors was faced with the alternative of accepting the plan or rejecting the plan and facing the prospect of the "Prodi's Act", with a vastly inferior outcome. It was therefore rational to accept the plan.

To conclude, in the presence of large private benefits of control, a debt-for-equity swap may lead to an inferior result: by taking control of the firm through a debt-for-equity swap, large creditors can appropriate the value of the private benefits, without having to share it with the other creditors. By contrast, if the firm is auctioned to the highest value bidder, the proceeds are divided among all creditors pro rata. Moreover, the fact the creditors' payoff in default substantially deviates from the intrinsic value of the claims affect the efficiency of the credit market: if small creditors perceive they might be consistently penalized in case of a financial restructuring, they will have an incentive to become large by concentrating lending, and consequently risk.

10.4 Stock Break-Ups

10.4.1 Definitions

A firm can restructure its assets by selling (i.e., divesting) them (e.g., a division or the equity stake in a subsidiary). However, there are types of asset restructuring transactions, such as stock break-ups.

Stock break-ups can be seen as ownership restructuring. As mentioned in the introduction stock break-ups basically consist in the creation of a new class of stock, with the purpose of creating value for shareholders. There are three main types of stock break ups: equity carve outs (ECOs), spin-offs, and tracking stocks. To illustrate these three transactions consider a public parent company controlling two subsidiaries (or divisions), A and B (Fig. 10.3).

An ECO is an IPO of a subsidiary's stock. Shares of subsidiary B are sold in the market (Fig. 10.4). The parent therefore raises cash. An ECO is not a divesture because the parent company maintains a majority interest in the subsidiary. In other words the subsidiary B is still controlled by the parent.

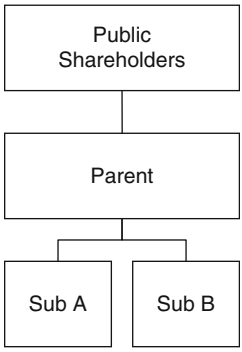


Fig. 10.3 The initial structure

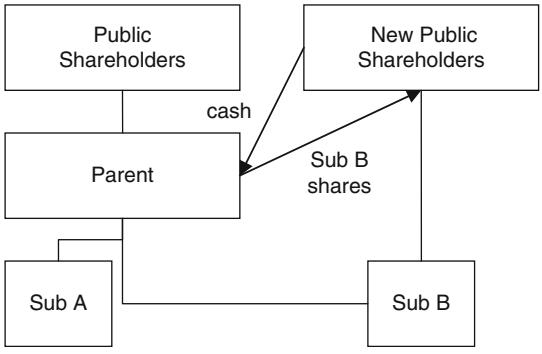
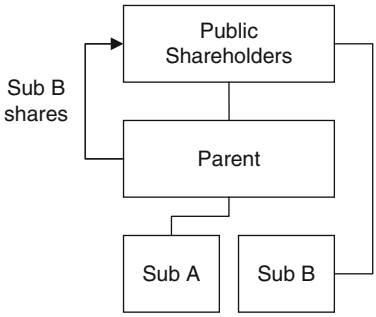


Fig. 10.4 Equity carve out

Fig. 10.5 Spin off

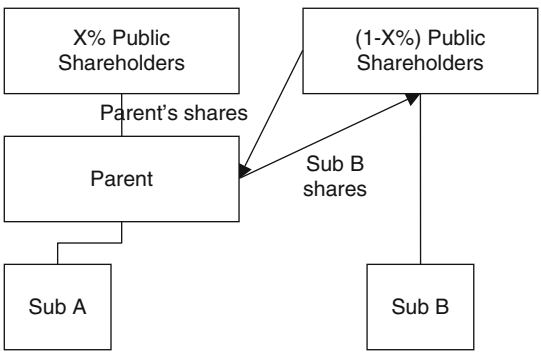


A spin-off is a pro rata distribution of the subsidiary's shares to the firm's existing shareholders (Fig. 10.5). As such it does not involve any cash. After restructuring, the spun-off firm becomes an independent company with a separate board of directors and management team. There are not connections between the parent and subsidiary after the restructuring, at the firm level or at the shareholder level (as shareholder may sell the shares).

Cash is not involved and the value of the parent company will decrease of the value of subsidiary B.[3]

Tracking stocks are shares whose cash flows are tied to the performance of a subsidiary (Fig. 10.6). The issuance of tracking stocks has features similar to both ECOs (as cash is involved) and spin-offs (as most of the firms that have issued tracking stocks have done it through a pro rata distribution of the subsidiary's shares to the parent's shareholders). However, tracking stocks resemble ECOs more than spin-offs, as the subsidiary is still controlled by the parent.

[3]A fourth type of restructuring is the split-off: in a split-off, shares of the parent are swapped by parent's shareholders for shares in the subsidiary. This results in a freestanding firm owned initially by a sub-group of the former parent's shareholders. Differently from spin-off, the shares are swapped with a sub-group of parent's shareholders, rather than given on a pro rata basis to all the parent's shareholders. The structure of a split off is reported here below.



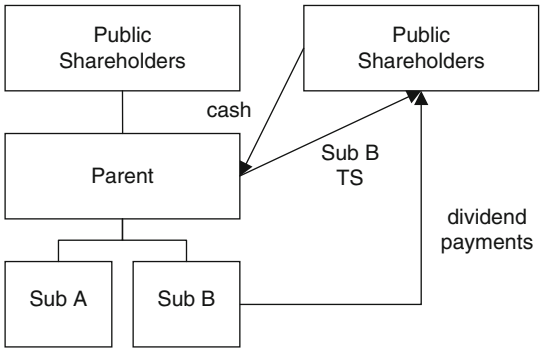


Fig. 10.6 Tracking stocks

10.4.2 Economic Rationale

Stock break-ups should help firm to "unlock hidden value", by separating the subsidiary from the parent. The idea is very simple: suppose that market value of the parent company (which is made of the sum of A and B) is €200 ml. A stock break up can generate value to the parent's shareholders if separating A from B can generate an aggregate value higher than €200 ml. Why should a break up unlock hidden value? There are two main lines of motivations: (a) information related and (b) governance related.

The information-related motivation stems from the idea the some of the information relevant to valuing the firm is not already reflected into the stock price. As such, a stock break up might disclose additional relevant information both at the time of the restructuring, but also by mean of an increase in the quantity and quality of analysts following the firm. Indeed, new analysts with relevant industry expertise (i.e., specialists) will begin covering the subsidiary and additional analysts specializing in the more focused parent's industry will begin following the parent. Also, the analysts' accuracy increases because of the increased ability of specialists to use their industry expertise. Gilson et al. (2001) conduct a study to determine the information effects of stock break ups, with several interesting results. They define an industry specialist as an analyst covering at least five other firms within the same industry. Industry specialists result to make more regular and earlier earnings forecasts than other (non-specialists) analysts. Gilson and co-authors look at number of specialists following the parent firm before the break up (i.e., the conglomerate firm) and the parent and the subsidiary after the break up. They also look at the forecast accuracy. Table 10.8 shows some selected results from their research. Pre-restructuring total coverage is defined as the number of analysts following the conglomerate firm. Post-restructuring total coverage is the number of different analysts who issued at least one earnings forecast for *either* the parent or subsidiary. Note that the sum of parent analysts and subsidiary analysts is higher than the number of total analysts post-restructuring, as one analyst might follow both the parent and the subsidiary. Post–restructuring the coverage is significantly higher

Table 10.8 Average analyst number pre- and post-restructuring from Gilson et al. (2001)

Year	Total analysts	Parent analysts	Subsidiary analysts	Parent-industry specialists	Subsidiary-industry specialists
−2	16.5	–	–	9.1	1.7
−1	15.4	–	–	8.8	1.7
+1	20.9*	14.4	8.0	8.8	4.1*
+2	21.6*	14.1	8.5	8.6	4.9*
+3	22.3*	13.7	9.5	8.4	5.9*

*Indicates that the value is statistically different from that of year −1 at the 1% level

Table 10.9 Average AEFE pre- and post-restructuring from Gilson et al. (2001)

Year	Conglomerate	Parent	Subsidiary
−2	2.66%	–	–
−1	2.82%	–	–
+1	–	2.28%*	1.55%*
+2	–	1.84%*	1.84%*
+3	–	1.52%*	1.78%*

*Indicates that the value is statistically different from that of year −1 at the 1% level

than pre-restructuring. This is mostly due to new analysts covering the subsidiary. In particular, while the number of specialists following the parent does not change after the break up, the number of subsidiary increases significantly. This result clearly reflects the fact that the specialists following the conglomerate pre-restructuring tend to be specialized in the parent industry, rather than in the subsidiary industry: as a result, once the subsidiary is separated, new specialists (focused on the subsidiary industry) will initiate coverage.

Gilson et al. (2001) also compute the absolute earnings forecast error (AEFE), defined as follows:

$$\frac{|AF - AE|}{P}$$

AF is the analyst earnings forecast for a given year. AE equals the actual earnings for the year to which the prediction applies and P equals the end-of-year stock price. Table 10.9 shows that the forecast accuracy is clearly improved post-restructuring.

The improvement in the forecast accuracy is due to two factors. First, more information about the firm is available after the restructuring. Second, specialists are better able to use their industry expertise.

The second motivation behind break-ups is related to corporate governance. Break ups can provide better managerial incentives by allowing to employ stock option plans and by eliminating inefficiencies.[4] Typical inefficiencies are related to

[4]See for example Schipper and Smith (1983), Jensen (1986), Jensen and Murphy (1990), Bhagat et al. (1990), Morck et al. (1990), Berger and Ofek (1995), Comment and Jarrell (1995), John and Ofek (1995), and Gilson et al. (2001).

resource allocations: within-group transactions, delays in getting approvals due to bureaucracy, cross-subsidization, etc. Moreover, improved corporate focus due the reduced diversity in the firm assets increases productivity. Overall, empirical results show an improvement in financial performance following break-ups in term of sales, net income, ROE and ROA, for the parent and, particularly, for the subsidiary.

10.4.3 Diversification Discount

Note that both the information- and the governance-related motivations for corporate break-ups are based, at least to some extent, on reducing diversification. Reduced diversification enhances the quality and quantity of analyst following and boosts corporate performance by means of managerial incentives and specialization. Theoretically diversification can produce some benefits (e.g., internal capital markets, reduced cash flow variability, and hence lower cost of capital, etc.). Nonetheless, it is well known that some conglomerates trade at discount to their fair value: it is the "diversification discount" (i.e., the difference between actual market value of the firm and the "sum of the parts" value) which justified many hostile takeovers followed by split up strategies. Recently some studies have challenged the size and even the existence of the diversification discount (Villalonga 2004). Nonetheless, investment bankers often use the "diversification discount" motivation to convince firms to undertake a break-up. Consider the following example: assume Pharma (health-care industry) is a fully owned subsidiary of Giant Group (food & beverage industry). Giant is publicly listed. Table 10.10 reports the last available data about the two companies:

Also assume that the average EV/EBITDA multiple in the food & beverage industry is 10x, while the average EV/EBITDA multiple in the health-care industry is 20x.

Investment bankers normally use a "bottom-up" approach: in other terms they estimate the value of the conglomerate as sum of parts, trying to prove that this value is higher than market value. Since Pharma has an EBITDA equal to €100, its estimated EV is €2,000 (or 20 times €100). The EBITDA of Giant excluding Pharma (i.e., the pure "food & beverage" EBITDA) is equal to €900 (or €1,000 less €100), resulting in an estimated EV of Giant, excluding Pharma, equal to €9,000. The sum of parts is therefore €11,000 (or €9,000 plus €2,000): it seems therefore reasonable to unlock the hidden value (€1,000) by means of a break up.

While this approach is widely used by investment bankers in their pitches, it is worth underlying that it is based on the crucial assumption that there actually is an hidden value (i.e., not reflected into the stock prices) to be unlocked. What if the market perfectly reflects the value of Giant and Pharma and there is no hidden value

Table 10.10 Carving out pharma

	Giant	Pharma
EBITDA	€1,000*	€100
Market Cap + Net Financial Position (EV)	€10,000	n.a.

*From consolidated financial statements

to unlock? Consider a "top-down" approach: by subtracting the estimated Pharma EV (€2,000) from the conglomerate market EV (€10,000), we get the implicit market EV of the pure "food & beverage" activity of Giant: €8,000. Since the pure "food & beverage" EBITDA is equal to €900, the implicit market multiple is 8.89x, well below the industry average, which is 10x. However, the lower-than-average multiple of the Giant's "food & beverage" activity might simply be justified by a lower prospective growth or some other sort of competitive dis-advantage, that has nothing to do with the hypothetical hidden value. In this case, separating Pharma from Giant would not generate any incremental value: post-restructuring Giant stock price would simply reflect an EV/EBITDA multiple lower than pre-restructuring.

The main point here is not to argue than one approach is better than the other (bottom-up versus top-down) but simply to pinpoint that whatever estimate is conducted pre-restructuring, the actual outcome of the restructuring can be assessed only post-restructuring.

10.5 Conclusion

This chapter has described the main restructuring transactions. Restructuring is usually associated to a condition of financial distress, but is not necessarily so. Indeed, a firm might undertake a restructuring transaction simply to enhance value creation or to prevent a situation of distress. In a distress condition there are mainly two alternatives: either restructuring or liquidation, both of which can be realized either with a formal bankruptcy procedure or with an out-of-Court workout. Work-outs are normally less expensive and therefore should be preferred to formal procedures. Nonetheless, it often happens that different claimants of the distressed company cannot find an agreed solution. As a result the only solution is going to Court. The solution of a distressed situation normally involves restructuring the firm's debt contracts. Investment bank can play an important role in debt restructuring, by coordinating the different claimants and certifying the quality of the proposed restructuring plan. Also the asset side of a firm can be restructured. Beside divestures (i.e., sale of a subsidiary or division), the typical asset restructuring is a stock break-up. Stock break ups consist in separating a subsidiary or a division from the parent company with the purpose of creating value to the parent's shareholders by means of enhanced information or better managerial incentives. The extant empirical evidence suggests that stock break ups do create value.

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