Corporate Financial Risk Management

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Risk management at Fokker: a case study

"The Company has been the most conservative in its sector in accounting for new aircraft development programs, which means that there is significant future profit potential. As such the shares represent a unique investment opportunity."
(UBS Phillips and Drew, Global Equity Research, November 1991, about Fokker)

8.1 Introduction

In March 1996, the Dutch Aircraft company Fokker N.V. filed for bankruptcy. The joint development of two new airplanes (that turned out to be far more expensive than expected), without an existing line of airplanes to generate cash flows from, put too heavy a financial burden on the firm. Moreover, the firm was unable to reduce its production costs over time, which was problematic in a market characterized by fierce competition, declining demand and a depreciating US dollar (from fl.2.23/$ in 1987 to fl.1.56/$ in 1996). In addition, Fokker was subject to a significant dollar exposure. The aircraft industry is a typical dollar market; prices are quoted in dollars and only a small part of Fokker's costs was denominated in dollars. In the end, this currency exposure significantly contributed to Fokker's default. In this chapter we focus on Fokker's corporate risk management during this period.

In general, the use of financial derivatives should enable firms to deal with price risks such as foreign exchange risk. What went wrong in the case of Fokker? Did the firm's risk management fail (as suggested in the receivers' report and in the media) or were matters much more complicated? In this chapter we will address this issue and provide an in-depth analysis of Fokker's risk management. The purpose of this chapter is to apply the insights developed in this dissertation to analyze Fokker's risk management strategy. In doing so we shed light on the adequacy
of Fokker’s risk management and on the relative importance of the various rationales of risk management.

A thorough analysis of Fokker’s risk management strategy is interesting for several reasons. First, the case provides valuable information on the firm’s hedging activities, which is generally not available (or harder to obtain) for non-bankrupt firms. Firms consider such information highly strategic and therefore do not like to disclose this. Moreover, the receivers’ study on the causes of Fokker’s default and the potential liability of its management is public information and helpful for our analysis.¹

Second, we observed a shift in Fokker’s risk management policy in 1991. Until the end of 1991, Fokker engaged in a full hedging program of its transaction exposure.² However, at the end of 1991, Fokker decided to terminate its full hedging policy deliberately leaving important dollar positions unhedged, in the expectation that the dollar would recover. The case therefore captures periods of hedging and speculation. It is interesting to see whether this change of strategy makes sense from a theoretical perspective.

A third and related issue is that the receivers criticized Fokker’s risk management strategy in their final report suggesting that the firm lost at least fl.900 mln. due to speculation.³ This was emphasized by the media where the suggestion was made that such speculation had caused Fokker’s default.⁴ Were the receivers right and was it mere speculation or did they misjudge Fokker’s risk management? Only a careful analysis may reveal the answer.

We concentrate primarily on the period 1987 to 1996. In 1987, Fokker initiated the production of two new airplanes, the Fo 50 and the Fo 100. For these two programs we can clearly define Fokker’s main competitors in the product market. Furthermore, in this period, the US dollar fluctuated strongly and gradually declined. A final reason to focus on the 1987-1996 period is that this time frame receives the most emphasis in the receivers’ report providing us with detailed information about this period.

This case study is primarily based on information from the receivers’ report. Additional information has been obtained from an interview with the director of Fokker’s treasury during that time, Olde Loohuis⁵, as well as a study of Fokker’s annual reports on exchange rate exposure

¹The study to which we refer is: Deterink, Knuppe, Leuftink en Schimmelpennink (1997), “Onderzoek naar de oorzaken van het faillissement van Fokker”.
²This chapter also sheds some light on the management of economic currency exposure.
³See Deterink et al. (1997) p. 93.
⁵Olde Loohuis was director of Treasury from 1982 to 1996.
and corporate disclosure on risk management and an equity analyst report by UBS Philips and Drew Global Research Group (UBS, 1991).\(^6\)

The organization of this chapter is as follows. Section 8.2 gives a general introduction of Fokker and the problems that forced the firm into default in 1996. Sections 8.3 and 8.4 focus on Fokker’s risk management decisions. In Section 8.3, we discuss Fokker’s competitive environment, the development of its financial situation, its currency exposure and the development of the US dollar. In Section 8.4 we describe the way Fokker handled its currency risk. Section 8.5 analyzes the economic rationales behind Fokker’s initial full hedging strategy (1987 to 1991). Section 8.6 analyzes the switch to leave positions unhedged in 1991 and its decision to leave the exposure unhedged afterwards. Both sections discuss the firm’s risk management decisions applying the theoretical insights developed in this dissertation. In Section 8.7, we discuss alternative hedging strategies and analyze how Fokker’s competitors have dealt with price risks. Section 8.8 discusses the use of the US dollar in Fokker’s Financial Long Term Plan (FLTP) and Section 8.9 discusses the receivers’ criticisms about the firm’s currency risk management. Section 8.10 summarizes and concludes.

8.2 An analysis of Fokker’s default

8.2.1 Short history of the firm

Fokker\(^7\) was founded in 1919 and became one of the largest aircraft construction companies in the world by the end of the 1920’s. After the Second World War Fokker had to restart. At that time, the aircraft market was dominated by US and UK firms. It took Fokker until 1957 before it came to the market with a new passenger aircraft, the F 27. This aircraft was very successful in the 40-52 seater market making Fokker a market leader in this segment. During the period 1958-1986 Fokker sold 581 F 27’s (Deterinck et al. 1997, p. 2).\(^8\) The F 27 program was not only a commercial but also a financial success. All development costs were repaid and a net profit was realized by the end of the program.

In addition, Fokker developed the larger F 28 (65-85 seats).\(^9\) During the 1969-1986 period, Fokker sold 241 F 28’s. However, financially the F 28 was not an overwhelming success. By the end of the program fl.70 million of development credits still had to be repaid and the F 28

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\(^6\)The analyst report follows an announcement by Fokker to make an offering of its shares. If Fokker proceeded with the offering UBS would act as underwriter and book-running lead manager of the offer. Ultimately, the new shares were not issued.

\(^7\)Or more precisely Fokker N.V. Nederlandse Vliegtuigenfabriek.

\(^8\)In addition, approximately 205 F 27’s were produced under license outside Fokker.

\(^9\)The F 28 was quite different from the F 27. Most importantly, the F 28 was a jet, while the F 27 was a propeller aircraft.
8. Risk management at Fokker: a case study

failed to contribute to the net profit of the firm (Deterink et al., 1997, p. 2). The F 27 and F 28 programs clearly illustrate the rather long life cycle of these products which is typical in the aircraft industry.

Apart from the F 27 and F 28, Fokker had military orders and built smaller aircraft and from the beginning of the 1970’s was a subcontractor for parts of the Airbus consortium.

8.2.2 Development of the Fo 50 and Fo 100: 1979-1989

Despite earlier attempts to develop a new (larger) airplane in cooperation with others, there was no successor to the F 27 and the F 28 by the end of the 1970’s. The life cycles of these planes were nearly at their end. Therefore, in 1983 Fokker faced a critical strategic decision and decided to redesign both the F 27 and F 28 with minimal changes.

However, over time it became clear that this minimum change concept was impossible to maintain. The Fo 50 and the Fo 100 were not just minor modifications of the former F 27 and F 28, but almost completely new aircraft. As a result, the development costs of these two aircraft were much higher than originally estimated. In 1984, the development cost were estimated to be fl.700 mln. The Dutch government would finance 90% of this total amount and Fokker would have to finance the remaining 10% (fl.70 mln.) (Deterink et al., 1997, p. 8). Fokker, however, also bore the full risk of the development costs and in the end had to finance fl.700 mln. instead of fl.70 mln.

Apart from the fact that development costs were much larger than previously expected, technical problems in the start-up phase and strong competition in the market for the Fo 50 and Fo 100 enhanced Fokker’s problems at the end of the 1980’s. The first Fo 50 was delivered (after quite some delay) in August, 1987. The first Fo 100 was delivered in 1988.

Fokker’s strategy was also very ambitious. The development and production of two new aircraft put enormous pressure on the firm. A rise in personnel could not prevent important delays in the production of both the F 27/F 28 and the Fo 50/100 programs, which further

10 Note that the repayment on these development credits was conditional on the break even level of the F 28. Due to (among other things) developments in the dollar the F 28 never reached this break even point.
11 In 1969 Fokker merged with VFW (Vereinigte Flugzeug Werke), which was spun off in 1980 and taken over by MBB. Fokker also tried to cooperate with McDonnel Douglas to develop a larger airplane (150 seater). This cooperation failed at an early stage.
12 Later, the firm also developed the Fo 70, a smaller version of the Fo 100. This plane had its first flight in 1993. Only 71 Fo 70’s have been sold. We further have not included this in our discussion below.
13 It however should be stressed that the Fo 50 and Fo 100 belonged to the same family as the F 27 and F 28. In that sense they were still derivatives rather than totally new aircraft. This is important since it also implied a continuation with the partners of the F 27 and F 28 (DASA and Shorts).
increased the cost. Moreover, due to competition Fokker could only bring the aircraft to the market with costly customer adaptations or large discounts causing further technical problems and delays. Ultimately, in order to free production capacity Fokker decided in 1987 to stop producing the F 27 and F 28.\textsuperscript{14}

This was a rather dangerous strategy. The new programs only would cost money, while there were no programs left that could raise sufficient operating cash flow to make up for the high cost of the Fo 50/100.\textsuperscript{15} Altogether these decisions drove Fokker into major financial problems and brought the firm on the edge of bankruptcy in 1987, before any of the newly developed planes were brought into production. The Dutch government then provided fl.212 mln. in support under the condition that Fokker would search for a strong strategic partner and that it reduced its production cost by at least 10%. In exchange for the financial support, the government required an important control stake in the firm (Deterink et al., 1997 p. 127-128).\textsuperscript{16}

8.2.3 Things get worse, 1990-1996

Fokker faced many technical problems in the start-up phase of the production of both the Fo 50 and Fo 100, which resulted in large start-up costs. These costs were not disclosed in the firm’s profit and loss account, but were instead activated under inventory (“work in progress”). Due to delay in deliveries, clients forced Fokker to grant concessions in the form of discounts and/or penalty fees. As a consequence, the firm was actually producing at a much higher loss than expected and needed more external financing to offset these losses. The use of program accounting, however, prevented investors from finding out about the firm’s real problems.\textsuperscript{17} Despite its financial problems, Fokker was successful in tapping the financial markets in 1989 and 1990.\textsuperscript{18}

In the beginning of the 1990’s Fokker managed to increase its production capacity considerably. However, the firm was hit by three new problems. First, it faced a worldwide decline in aircraft sales. The liberalization of the airline industry, especially in the US, brought financial problems to some of Fokker’s potential US customers thereby reducing demand. Moreover, the

\begin{itemize}
\item \textsuperscript{14}This was also necessary since these aircraft were partly being produced on the same production line as the Fo 50/100.
\item \textsuperscript{15}Fokker did have other income sources such as overhaul and repair, space and other products, product support in addition to manufacturing Airbus and F 16 fighter components. However, the operating income from these activities was by far insufficient to finance the expenses of the Fo 50 and Fo 100.
\item \textsuperscript{16}Actually this was a reallocation of funds; the funds were originally intended to finance participation in the Airbus A330/340 program (Deterink et al., 1997, p. A2.2).
\item \textsuperscript{17}For a critical discussion of Fokker’s use of program accounting, see Langendijk (2000).
\item \textsuperscript{18}For example, in 1989, Fokker issued two convertibles (nominal value fl. 150 mln. and S. frs. 150 mln.) and a straight bond (DM 150 mln.).
\end{itemize}
Gulf War (August 1990 to January 1991) created a crisis in the world airline industry and further reduced demand for new airplanes. Fokker expected that this fall in demand would only be temporary and decided to increase production. However, the crisis lasted longer than expected and Fokker ended with a stock of “white tails” (unsold planes); the firm produced more than it sold. For example, in the second quarter of 1993 there were more than 15 unsold but finished Fo 50’s in addition to over 15 unsold Fo 100’s. The white tails created an enormous financing problem for Fokker; additional funds were needed to finance these stocks of aircraft.

The second problem Fokker encountered was that an increasing number of airline companies switched from buying to leasing aircraft. Aircraft producers started to offer vendor leases in order to support sales. As a result, aerospace companies faced new risks. Lease companies of aircraft producers had to finance the planes and, in addition, carried the economic risk of price changes. Suddenly planes had to be taken back, so that the firm also bore the risk of selling secondhand aeroplanes. Altogether, this made the business even more risky.

The third problem Fokker encountered was a strongly fluctuating, but historical low valued US dollar (see Figure 8.1).

Table 8.1 presents some key financial information on Fokker. The use of “program accounting”, where costs are amortized over the maturity of the project, makes these figures greatly exaggerated. The real financial problems were hidden and much larger. During the period 1990 to 1995 there were several occasions in which additional financing was required to meet direct...

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<td>- F27/F28</td>
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<td>- Fo 50/Fo 100</td>
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<td>Income other act.</td>
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<td>Profit before taxes</td>
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<td>Net profit</td>
<td>-159</td>
<td>-14</td>
<td>-15</td>
<td>21</td>
<td>61</td>
<td>31</td>
<td>-517</td>
<td>-520</td>
<td>-1319</td>
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8.2 An analysis of Fokker's default

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liquidity needs. In 1992 the firm was met with financial disaster. Sales declined and negotiations with a potential strategic partner DASA withheld the firm from taking the necessary steps to reduce its costs. However, the firm still reported a profit, primarily by activating interest charges and serial start-up costs.

Negotiations over cooperation with DASA started in January 1992 (Deterink et al. 1997, p. 137) and later included the Dutch government. In October 1992, these negotiations resulted in a Three Party Heads of Agreement. However, after due diligence DASA wanted to renegotiate. Fokker's financial health was worse than expected causing DASA to offer a lower share price in addition to requiring the Dutch Government to provide a state guaranteed loan. Finally on April 27, 1993, the Master Agreement between Fokker, DASA and the Dutch Government was signed with DASA taking a controlling interest (51%) in Fokker. In the meantime a consortium of banks catered to the firm's rapidly increasing financing needs. As result of the Master Agreement, DASA injected over fl.723 mln. in Fokker in May 1993. After the signing of the Master Agreement, banks decided in July 1993 to provide Fokker with a fl.1 bln. loan for an additional 364 days in which Fokker would sell its lease portfolio. In July 1994, this loan was extended for another three months until December 1994, at which time the loan was repaid, partly financed by a new consortium of banks.

A condition in the terms of Fokker's new loan was that repayment had to be made from the sale of its lease portfolio. It took until the end of 1995 before Fokker could finally sell its lease portfolio (at the cost of an enormous mark down). At that time the firm was already close to default. Moreover, all partners involved were fully aware of the situation. Negotiations at the end of 1995 about the financial restructuring of Fokker failed. DASA required a huge capital injection of fl.2.3 bln. (including fl.1.3 bln. from the Dutch government). The Dutch government only wanted to finance the firm temporarily with the aim to form a European consortium of aircraft companies. The partners did not find a way out and in January 1996 Fokker was forced to seek protection from its creditors.

8.3 Forces relevant to Fokker's risk management

After a brief sketch of the events that led to Fokker's default, we will now more systematically look at the forces relevant to Fokker's financial risk management. We first discuss some relevant

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21Earlier negotiations with DASA with respect to the forming of a strategic partnership with DASA, Aerospatiale and Alenia dated from 1990.
22The credit facilities of early 1993, were increased to fl. 1,140 mln. (Deterink et al. 1997, Chapter 10).
23In addition, the Dutch Government provided a loan guarantee for fl. 180 million. (Deterink et al. 1997, p. 138).
8.3 Forces relevant to Fokker's risk management

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<th>Turnover (bln. $)</th>
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<td>Boeing</td>
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<td>McDonnell Douglas</td>
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<td>Aerospatiale</td>
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<td>British Aerospace</td>
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<td>DASA</td>
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<td>Bombardier</td>
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<td>Fokker</td>
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TABLE 8.2. Turnover Aircraft producers in 1994. Source: Deterink et al. (1997, p. 104). characters of the product market. Then, we discuss Fokker's financial position over the years 1987 to 1996. Finally, we examine Fokker's currency exposure and the developments in the US dollar over the period.

8.3.1 An analysis of competition in the product market

Fokker was a relatively small firm in a concentrated industry (see Table 8.2). Apart from its size, Fokker differed from its competitors in its dependence on civil airplanes. Unlike Fokker, most firms received a large percentage of their turnover from military orders (e.g. 71% and 59% for British Aerospace and McDonnell Douglas respectively) or from other income sources (e.g. approximately 50% of Bombardier's turnover is from trains). For Fokker, and also for Boeing, the largest fraction of their revenues stemmed from civil airplanes (both 77%). In contrast to many of its competitors, Fokker therefore had little opportunity for cross-subsidization. This is especially important given the cyclical market demand in the civilian market since 1960 (Deterink et al., 1997, p. 96).

The aircraft industry is further characterized by many strategic alliances (e.g. Aerospatiale, DASA and British Aerospace cooperated in Airbus while Aerospatiale and Alenia jointly produced ATR). Fokker, also repeatedly explored the possibility to form a strategic alliance, but attempts for cooperation failed because it did not want to give up the production and engineering in the 50-seater segment.

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24 Boeing obviously had a much larger product line and was therefore also more diversified (Deterink et al., 1997, p. 104-105).
25 In 1993, Fokker finally entered into a successful merger with DASA. DASA wanted to expand in the 50-130 seater area and thought that it could achieve this via a controlling interest in Fokker. DASA produced larger airplanes in Airbus and smaller via Dornier (see Deterink et al., 1997, p. 102-103).
Finally, government support and politics played a disturbing role in the industry\textsuperscript{26}, which were not favorable to Fokker; the Dutch government was relatively strict in its support and lacked political power to enforce contracts or stimulate demand.

We now analyze the main competitors Fokker had with respect to the two aircraft that it produced (the Fo 50 and the Fo 100). Initially, Fokker thought that with the development of the Fo 50 it could continue its reputation as a market leader (with the F 27) in the 42-50 seater market. However, the Fo 50 came (in 1987) too late to the market. ATR (with its ATR 42) had entered the market in 1981 and had already built up a considerable market share in the period when demand for this type of airplane was substantial (Deterink et al., 1997, p. 106). ATR was produced by a consortium formed by the French Aerospatiale and the Italian firm Alenia. The ATR 42 was less expensive (in purchase price) than the Fo 50 (although it might have had a lower operational cost). However, with the restructuring of the airline industry (especially in the US), a lower purchase price might have been important. Moreover, there were signs that ATR underbid every price offer Fokker made by approximately $1 mln.\textsuperscript{27} As a result, Fokker did not even sell one Fo 50 in the US. Figure 8.2 gives an overview of the market share of Fokker vis-a-vis its main competitors. ATR had by far the largest market share in the world market (Deterink et al., 1997, p. 106-107), directly followed by Fokker.

\textsuperscript{26}For some examples, see Deterink et al. (1997, p. 100), and The Economist: “Peace in our time”, July 24, 1997.

\textsuperscript{27}In addition, ATR had better contacts due to a joint venture with a US partner (Deterink et al. 1997, p. 106).
For the F700, the most important competitors were the Boeing 737-500 launched in 1987 (first plane delivered in 1989) and British Aerospace’s RJ 70/85/100 (with very silent engines). Since the RJ program had many “white tails”, British Aerospace sold its airplanes at a considerable discount (Deterink et al., 1997, p. 108-110). Boeing used its strong position in the large aircraft market to “force” its clients to take its 100 seater as well by threatening to not deliver 747’s or to delay delivery if clients purchased from competitors in other segments of the market. (Deterink et al., 1997, p. 109). Moreover, Boeing had better opportunities in cross-subsidizing lower prices. Boeing furthermore had a more flexible labor market that made it easier to lay off employees in periods of low demand. Figure 8.3 illustrates the development of the market share of the F700. Note that despite all its problems, Fokker managed to become a leader in 1993 and 1994 in the 70-125 market segment.

In conclusion, Fokker was a relatively small firm in a concentrated industry with a strong dependence on producing civil aircraft and therefore little opportunity for cross subsidization.

8.3.2 Fokker’s financial position: a clear case of debt overhang?

Table 8.3 gives some more foundation to Fokker’s financial problems. Despite equity infusions in 1988 and 1993, the firm’s debt ratio remained relatively high. Moreover, the interest coverage ratio was low (and in some years negative due to negative cash flows). Although the interest

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28 BA could subsidize this with its very profitable military division. A possibility Fokker apparently did not have. (Deterink et al., 1997, p. 109). Further it had lower costs due to a weaker pound sterling.

29 Of the seven aircraft construction companies, Fokker was the smallest and also had (after Bombardier) the lowest percent turnover from military sales (Deterink et al., 1997, p. 104).
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<td>Debt ratio (book)</td>
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<td>0.73</td>
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<td>0.76</td>
<td>0.88</td>
<td>0.89</td>
<td>0.81</td>
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<td>Debt ratio (market)</td>
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<td>0.70</td>
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<td>0.77</td>
<td>0.78</td>
<td>0.89</td>
<td>0.80</td>
<td>0.86</td>
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<td>Interest coverage ratio (ICR)</td>
<td>-0.04</td>
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<td>2.36</td>
<td>3.73</td>
<td>2.59</td>
<td>1.59</td>
<td>-0.86</td>
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<td>Adjusted ICR</td>
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<td>1.39</td>
<td>1.50</td>
<td>1.38</td>
<td>0.92</td>
<td>-0.64</td>
<td>-0.29</td>
</tr>
</tbody>
</table>

### TABLE 8.3. Development of the debt ratio and the interest coverage ratio of Fokker over the 1987-1994 period. Debt ratio (book) is the debt to total firm value based on book values. Debt ratio (market) is the debt to total firm value (book value of debt plus market value of equity). Interest coverage ratio (ICR) is cash flow/interest payments. Adjusted ICR refers to cash flow/(interest payments+activated interest).

Data sources: Fokker Annual Reports 1987-1994, and Table 5.2 in Deterink et al. (1997)

The coverage ratio seemed to have increased in 1989 and 1990, the table also shows that this was primarily due to activating interest charges. Taking this into account clearly shows that the adjusted interest coverage ratio was much lower.

Also from the receivers’ report we get a picture of a firm that was overloaded with debt and in a constant state of financial distress. In addition, Fokker operated in a very capital intensive industry and highly volatile market with excess capacity and therefore, huge business risks. Fokker had to be saved twice by the Dutch government in 1987 and in 1992 in a joint effort with DASA. Moreover, not a single Fo 50 and Fo 100 was sold at a price that covered the real cost (Deterink et al. 1997, ch. 3). Hence, Fokker was a classical example of a firm with a debt overhang.

Apparently, Fokker was successful in keeping most of the financial problems within the firm. Even when the firm realized that it could not survive without a strong partner (in 1990) the firm managed to tap the financial markets. “Program accounting” enabled the firm to “manipulate” accounting earnings by a considerable amount, which definitely helped the firm obtain financing.30 Within the firm, however, the need to restructure and the firm’s liquidity problems were widely acknowledged.31

### 8.3.3 The US dollar: further increasing financial problems

The aircraft market is a dollar driven market. Since only 20 to 30% of Fokker’s purchases were in dollars32 and aircraft prices were quoted in dollars, Fokker faced significant long (economic)

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30 Also, the fact that the Dutch government bailed out the firm before partly explains why investors were less reluctant to provide finance. This is particularly true for the banks, which had insights into the firm’s financial long term plans (interview Olde Loohuis).

31 Interview Olde Loohuis.

32 Deterink et al. 1997, p.88. The rest of its cost were in guilders, Deutsche Marks, Pound Sterling and Belgian and Swiss Francs (interview Olde Loohuis).
dollar exposure. Moreover, competition was strong and competitors either faced a lower dollar exposure (because they had a larger share of their costs in dollars) or operated in countries with a weaker currency than the Dutch guilder. Fokker was well aware of the potential negative consequences of a decline in the dollar. For example, in July 1991, an internal memo calculated that a decline of Fl.0.10 in the dollar implied a loss of Fl.0.8 mln. and Fl.1.55 mln. on each Fo 50 and Fo 100 respectively (Deterink et al. 1997, p. 57).\textsuperscript{33} The opinion within Fokker was that this economic exposure could only be reduced by a decrease in costs or by an increase in the fraction of cost denominated in dollars, but not through hedging.

In addition to the economic exposure, Fokker also faced transaction exposure. Prices in dollars were set at the moment that contracts were signed. Sometimes this was long in advance of the actual delivery (and more importantly the payment) date. Especially with the launching customers, the significant delays in development and production made this exposure relatively large. Later, production time started to decline and therefore also the time over which the firm faced its transaction exposure declined.

The volatility and gradual decline in the value of the dollar (see Figure 8.1) from Fl.2.77/$ in 1985 till Fl.1.60/$ in October, 1992, implied lower prices measured in guilder for both the Fo 50 and Fo 100. The dollar therefore was an important reason why Fokker could not sell its aircraft at a price higher than its cost price (Deterink et al. 1997, p. 34).\textsuperscript{34} Moreover, most competitors were less exposed. Boeing, for example, had no currency exposure (its costs and income were in the same currency). Other firms were producing in countries with a weaker currency (ATR, British Aerospace). Only DASA faced a similar dollar problem as Fokker.

The developments in the US dollar were a serious concern to the management of Fokker. For example, in a board meeting on August 15, 1990, it became clear that the date on which the Fo 50 (Fo 100) was expected to contribute to the firm’s net income would not be in 1997 (1996).\textsuperscript{35} Instead, due to developments in the US dollar the Fo 50 (Fo 100) program would be profitable at the earliest in 2000 (1999) at the earliest, if at all (Deterink et al. 1997, p. 82/83). The lower dollar caused additional financing needs from Fl.90 mln. in 1990 to Fl.1.150 bln. in 1996. The only way out was a strong reduction in the firm’s costs. With the dollar remaining low, the firm would have important financing problems, and repayments of development credits in the future might become impossible.

\textsuperscript{33}More specifically, this note showed that costs in dollars for the Fo 50 were approximately 27% of the sales price and for the Fo 100 34% (Deterink et al., 1997, p. 57). UBS estimated that 58.5% of total costs were at risk from currency fluctuations. (UBS, 1991, p. 44).

\textsuperscript{34}Other reasons were the intense competition it faced and the decline in demand for aircraft.

\textsuperscript{35}The receivers refer to a specific meeting where a report was discussed with the impact of new dollar estimates on the Financial Long Term Planning. (Deterink et al., 1997, p. 83).
8. Risk management at Fokker: a case study

8.3.4 Summary of the main insights

To summarize, during the period 1987 to 1996, Fokker encountered the following problems:

1. substantial cost overruns;
2. tight competition in the product market;
3. overload of debt (debt overhang);
4. liquidity problems;
5. significant long economic exposure and a decreasing dollar.

In the early period (1987 to 1989) Fokker's problems were caused by technical problems and larger than expected development and serial start-up costs. In the beginning of the 1990's, these problems were augmented with a worldwide decrease in demand for aircraft.\(^{36}\) Fokker started to use lease contracts (as most other firms in the industry) in order to increase sales. However, this did not reduce the firm's existing problems but instead created new problems. In the years just prior to the firm's default, the financing of the (increasing) lease portfolio became an enormous problem. Throughout the period, Fokker was highly undercapitalized and faced high interest charges. Furthermore, Fokker was unable to reduce its cost price below the selling price. The decline in the US dollar was partly responsible for this. In addition, there were a small number of competitors that were generally in a better financial condition. Their product market strategies were primarily directed at increasing market share (even at a loss). All of these factors together brought the firm to default in 1996. In what follows, we will discuss Fokker's risk management strategy.

8.4 Currency risk management at Fokker

In order to measure its (transaction) exposure to foreign currencies, Fokker used foreign currency cash flow planning (Deterink et al. 1997, p. 88). All anticipated sales and purchases in foreign currency over a period of at least two years were registered in a database. The necessary

\(^{36}\)Over the whole period Fokker additionally carried the consequences of a loan escalation factor that was part of the pricing contract with DASA (for the bodies of the Fo 50 and Fo 100). Since wages rose more in Germany than in the Netherlands, Fokker paid a high price for DASA's bodies (Olde Loohuis estimates that this cost the firm in total approximately fl.1 billion).

Furthermore, Fokker had to repay the development credits to the Dutch government according to a preset schedule. These repayments depended on the number of planes that were being delivered. This also resulted in an important cash drain.
information was provided by the marketing and the purchasing departments. In addition, all (anticipated) financial transactions in foreign currency (e.g. loans, etc.) were registered here as well.37

Two phases in Fokker's currency risk management can be distinguished: a full hedging strategy during 1987 to 1991, and a non-hedging strategy during 1991 to 1996. Before 1992, Fokker used to hedge all net foreign currency positions that were expected for the next two years (derived from the foreign currency cash flow planning).38 However, at the end of 1991 management decided to change Fokker's risk management strategy and left large positions in dollars unhedged.


The treasury department calculated Fokker's net position in foreign currency on a daily basis and hedged this exposure using forward contracts. These forward contracts were, on average, of a shorter maturity than the underlying exposure and therefore forward positions had to be rolled over.39 The treasury department was given discretion on the choice of maturity for the hedge contracts, and as a result used its interest expectations to determine what the optimal maturity of the hedge contract should be.40 The treasury department had little discretion on the size of the hedge, generally hedging the complete volume of anticipated transactions.41 Once a week, 37 An important feature of this database was that all foreign currency transactions and payments were related to specific aircrafts. In this way, it became more difficult to have undetected speculative positions. Hence, when the aircraft was paid, the dollar position had to be closed. Fokker focused on the net positions coming out of this foreign currency cash flow planning as the basis for its currency risk management (interview Olde Loohuis).

38 In addition, the foreign exchange exposure on planes already sold after this planning period was hedged (Deterink et al. 1997, p. 88).

39 The advantage of such a strategy is lower costs. Because the short-term forward market is more liquid than the long-term forward market, the spread is generally lower in the short-term market. A disadvantage of the rollover is that the firm faces interest rate risk and that it may need (or generate) cash flows over the life of the hedge contract.

40 Interview Olde Loohuis.

41 It should be noted that the chosen rollover strategy may not result in a so called perfect (variance minimizing) hedge. If the hedging really occurred on a one-to-one basis (one dollar forward for one dollar to be received in the future), the firm was overhedged. A variance minimizing hedge ratio should actually be lower than one. The problems of a hedge ratio of one when using short-term instruments to hedge a long term exposure have been described in Mello and Parsons (1995b). Note that due to the gradual decline in the US dollar the rollover hedge strategy generated cash over time. The overhedge therefore was on average beneficial for Fokker. At a certain moment positive cumulative cash flows of around fl. 190 mln. were generated with this hedging strategy. The exact size of this could only be
the treasury and controller in addition to a member of the board of management responsible for
finance discussed the hedging strategy and hedge positions.

Despite Fokker's full hedging strategy, there was one particular transaction that remained
unhedged. In 1989, Fokker offered American Airlines (AA) 75 Fo 100's (with an option to
buy for another 75) at a discounted price of US $20.993 mln. each. The price included a cost
overrun correction factor based on cost developments in the US and a cap on the dollar. AA
could choose to either pay in dollars or in guilders or deutsche marks, if the dollar rate was
equal to fl.2.25/US $ or higher. Hence, when the dollar would go up, AA could pay in guilders
or marks. Otherwise, AA could pay in dollars. Therefore, Fokker ran the risk of a decline but
could only benefit to a very limited degree from an increase in the US dollar. This was a very
costly concession made by Fokker's marketing department.\footnote{Fokker tried to hedge the risk on
this contract, but decided that the option was too expensive (fl.52 mln.) and therefore left this
(very significant) position unhedged.}

\subsection*{8.4.2 Risk management: 1991 to 1996}

At the end of 1991 Fokker's management decided to stop hedging a major part of its dollar
exposure (Deterink et al., 1997, p. 89). The reason for this policy change was that the rate at
which forward contracts could be entered at that moment was below the rate that was used in
the FLTP's.\footnote{Therefore, entering a forward contract at this lower rate implied fixing a certain
loss. Management clearly hoped that the exchange rate would rise again such that the losses on
sales would be less than estimated (Deterink et al., 1997, p. 89).} Therefore, entering a forward contract at this lower rate implied fixing a certain
loss. Management clearly hoped that the exchange rate would rise again such that the losses on
sales would be less than estimated (Deterink et al., 1997, p. 89).

Fokker's management also decided in 1991 that it would only restart hedging these positions
when the forward rate came close to the dollar exchange rate used in the FLTP. The positions
in dollars that were left unhedged over the period 1991 to 1994 were substantial. Table 8.4
provides an overview of the unhedged positions at certain moments in time.\footnote{In
hindsight, not hedging resulted in huge losses. The receivers estimated these losses in
1994 and 1995 at around fl.260 and fl.285 mln. respectively (Deterink et al., 1997, p. 90).} In
determined by the administration after much effort (Deterink et al., 1997, p. 89). The generated cash
flows were activated under inventory ("work in progress" as pre-payments).
\footnote{AA directly monetized this cap by selling it (Deterink et al., 1997, p. 39).}
\footnote{The cost overrun correction factor turned out to be favorable for Fokker since average wages in the
US increased faster than those in the Netherlands. (Deterink et al, 1997, p. 39).}
\footnote{The FLTP is Fokker's Financial Long Term Plan (see Section 8.8 for a discussion of the US dollar
rate used in the FLTP).}
\footnote{Receivers could not determine exactly how large the unhedged dollar positions were, rough estimations
varied between the 2 and 2.6 billion dollars (Deterink et al., 1997, p. 89).}
\footnote{This includes the depreciation of the lease portfolio due to the lower dollar rate.}
8.5 Objective in risk management

8.5.1 Fokker's rationale for full hedging, 1987 to 1991

Prior to 1991, Fokker hedged its complete (transaction) exposure for the coming two years. What economic benefits could be expected from such a risk management strategy? Why did they at that specific moment decide to stop hedging? To answer these questions, we will discuss Fokker's objective in risk management and put this into perspective with the insights developed earlier. This enables us to comment on the economic rationales behind Fokker's full hedging and its subsequent decision to lift the hedging strategy.

The purpose of Fokker's hedging strategy was to delay the effects of a change in the exchange rate levels on the firm's results. This delay should have given the firm time to reduce its costs (Deterink et al., 1997, p. 89). Corporate hedging could not protect the firm against the level of the exchange rate. However, with the full hedging strategy over a two year horizon Fokker at least bought some time to adjust its cost in order to remain competitive in the market.

8.5.2 Confronting theory with practice: rationalizing Fokker's full hedging strategy

What can we say about Fokker's motivation for risk management if confronted with theories that rationalize corporate hedging? Theories rationalizing corporate risk management suggest

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Table 8.4: Overview of unhedged dollar positions in millions of dollars, the US dollar rate at that moment and the dollar rate used in the firm's FLTP. Source: Deterink et al., 1997, p. 90.

<table>
<thead>
<tr>
<th>Date</th>
<th>AA order</th>
<th>Other Positions</th>
<th>Total</th>
<th>US $ rate</th>
<th>FLTP rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/16/91</td>
<td>1267</td>
<td>747</td>
<td>2014</td>
<td>fl.1.8732</td>
<td>fl.1.75</td>
</tr>
<tr>
<td>01/23/92</td>
<td>849</td>
<td>1795</td>
<td>2644</td>
<td>fl.1.7925</td>
<td>fl.2.00</td>
</tr>
<tr>
<td>12/17/92</td>
<td>474</td>
<td>2198</td>
<td>2672</td>
<td>fl.1.7413</td>
<td>fl.2.00</td>
</tr>
<tr>
<td>01/04/94</td>
<td>129</td>
<td>2024</td>
<td>2153</td>
<td>fl.1.9475</td>
<td>fl.2.00</td>
</tr>
<tr>
<td>01/12/95</td>
<td>-</td>
<td>2360</td>
<td>2360</td>
<td>fl.1.7235</td>
<td>fl.1.90</td>
</tr>
</tbody>
</table>

February 1994, the US dollar was equal to fl.1.97. By the end of 1995, the dollar had declined to fl.1.60. Each change in the dollar by one cent caused an additional loss of fl.21 mln.\(^{47}\)

In order to give a better motivated judgement of Fokker's risk management (both its hedging as its decision to stop hedging), we will discuss the economic benefits of such risk management for Fokker in the next section.

\(^{47}\)Deterink et al. (1997, p. 92), estimate the losses at about fl. 900 mln. after February 1994. Note that this does not correspond to the (lower) figures we just presented. We do not have a clear explanation of this difference in figures in the receivers' report.
that risk management contributes to firm value since: (i.) it reduces expected taxes, (ii.) it reduces the expected cost of financial distress, (iii.) it mitigates financial contracting cost and, as a result, investment distortions. Moreover, corporate risk management may be explained from (iv.) a managerial perspective. In addition, this dissertation has shown that risk sharing issues in relation to the firm’s security design decisions (Chapter 5) and that imperfect product market competition (Chapters 6 and 7) may affect and even serve as rationales for a firm’s risk management. Below we analyze whether these respective rationales were important for Fokker’s initial risk management strategy.

Reducing taxes

A firm can reduce its expected taxes through hedging if the firm’s tax scheme is convex. An appropriate hedging strategy to achieve this would be directed towards reducing fluctuations in the annual accounting income. Fokker, however, directed its hedging strategy on a two year horizon. Moreover, the firm hardly paid taxes (see Table 8.1). We therefore think that it is unlikely that Fokker used risk management to reduce its expected tax payments.

Reducing expected cost of financial distress

A more likely rationale for Fokker’s risk management is a potential reduction in the firm’s cost of financial distress. It should be clear that the costs of financial distress (both the direct and indirect costs) were considerable for Fokker. Direct costs of financial distress include the litigation and liquidation costs. The firm specificity of the assets will make liquidation relatively costly. Indirect cost of financial distress refer to the negative effects of financial distress on the cash flows generated by the firm. Since any aircraft needs maintenance and spare parts it is clear that the indirect cost of financial distress were considerable. Any doubt with respect to the financial health of an aircraft producer will have an immediate drawback on the product’s attractiveness for an airline (otherwise it will certainly affect the price). Another sign of the importance of the financial distress costs for Fokker directly follows from the firm’s undercapitalization and constant need for new funds.

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48See for an extensive discussion of these rationales Part 1 of this thesis.
49In the following discussion, we ignore potential benefits that Fokker might have received from an improved security design; we do not have sufficiently clear theoretical predictions to test.
50Fokker did have compensating tax loss carry forwards. These make the firm’s tax scheme likely to be convex.
51Another example where this may hurt has to do with the leasing business. After 1993, most planes were sold to lease companies (often partly owned by Fokker). These contracts often included a sell back option to the aircraft construction company (i.e. Fokker). It should be clear that the value of such an option decreases considerably with an increase in the probability of default.
Corporate risk management, together with the window dressing opportunities program accounting offered, might have played a role in order to reduce the expected cost of financial distress. Producing a stable and more or less predictable (small) profit was important to persuade future investors and clients. Corporate risk management that achieved such an objective contributed to this.

Reducing investment distortions due to financial contracting problems

We have concluded in Section 8.3 that Fokker faced a serious debt overhang. As a result of a debt overhang firms tend to underinvest in relatively safe projects with only a marginal contribution and overinvest in relatively risky projects. This complicates external financing and is a serious problem for a firm where future growth is important. We have indicated in Chapter 2 that, prior to financial contracting, it would make sense for a firm to hedge in order to reduce these agency costs of underinvestment. Hedging reduces a firm’s incentives to engage in either asset substitution (increasing risk) or underinvestment after the financing contract has been signed (when the firm commits to the hedging strategy over the contract life). Note that Fokker hedged in a period when it needed external financing. Hence, this seems in line with theoretical predictions. However, as far as we know, there was no clear commitment to hedging over the life of the financing contracts. The lack of such a commitment suggests that either this rationale was less important or that Fokker relied on a more implicit commitment, the reputation that it hedged. Fokker disclosed its full hedging strategy from 1989 to 1991 in its annual report, which might offer some support for this implicit commitment.

Apart from the debt overhang, the firm was also clearly liquidity constrained over the period considered. As Froot, Scharfstein and Stein (1993) noted, this suggests a role for corporate hedging to stabilize internal wealth in order to finance future investment opportunities. Since external finance became increasingly harder to obtain, Fokker had to rely more and more on internal funds. Because a large part of the firm’s receivables were exposed to the dollar, hedging this risk may have reduced investment distortions and the costs of external financing (if available).\textsuperscript{52} Therefore, Fokker’s risk management strategy should have been directed at achieving sufficient cash for future investment plans.

\textsuperscript{52}It should be noted, however, that there was a positive relation between the firm’s exposure and investment opportunities. The higher the US dollar, the more attractive investments were. This suggests that a full hedging strategy with linear instruments was probably not optimal if Fokker wanted to reduce these investment distortions or the expected financing costs.
Managerial reasons for corporate risk management

How important were managerial reasons for Fokker’s risk management strategy? Managerial risk aversion and the structure of management compensation contracts may give managers incentives to enter into corporate risk management.

Although Fokker’s annual report disclosed little information with respect to management compensation (only the total amount of salaries paid to the board of management is disclosed), options did not seem to play an important role. Only one member of the management board held options from 1987 to 1990, but these were far out of the money. Since 1990, no further options were granted to the management (at least there was no disclosure of additional outstanding management options).\(^{53}\)

Without options the most likely components of the management board’s compensation structure would have been a fixed wage with a performance related bonus (often on accounting based numbers or the achievement of certain targets).\(^{54}\) Such management compensation packages may have given managers an incentive to enter into hedging. Given the financial conditions, we think that these issues were not the dominant driving force behind the firm’s risk management.

Fokker’s poor financial conditions may have given its managers a reputational concern to keep the firm alive. This is likely to be the case given the aircraft industry where managers are highly concerned with the firm’s future, especially when they have invested (firm specific) human capital which is not easy transferable. Moreover, these managers may have been concerned about their reputation in the labor market. A risk management strategy directed at the prevention of financial distress may reflect these managerial concerns.

We do not think that risk management was used to affect the informativeness of the firm’s cash flows and financing decisions. Theories that rationalize corporate hedging from this perspective (see Section 2.6) assume that these risk management activities are private information and not shared with the firm’s shareholders. Fokker, however, reported exactly what it was doing in its annual report.\(^{55}\) These considerations therefore do not apply here.

Product market considerations

In Chapters 6 and 7 we argued that risk management decisions can be affected by product market considerations, especially with imperfect competition.

\(^{53}\)See the annual reports of Fokker from 1987 to 1990. One member of the management board held options. The options gave this member, together with other former members, the right to purchase 45,000 shares at a strike price of fl. 77.50. See for example Fokker, Annual Report (1987, p. 47).
\(^{54}\)See for example, Murphy (1998) for a survey of compensation practices.
\(^{55}\)For example, from 1989 to 1991 the firm reported that the firm hedged its currency risk for the next two years. From 1992 to 1994 Fokker reported that it did not hedge its dollar positions.
In Chapter 7 we argued that in a more dynamic product market framework hedging may create value, since it makes firms more long-term oriented. Hedging is particularly important for externally financed firms when switching costs, and thus also the benefit of building up market share are high. This product market rationale of corporate risk management may have some additional value in explaining Fokker’s risk management strategy. Switching costs in the aircraft industry are high, and therefore there might be an important benefit to building up market share. The optimal hedging strategy to achieve such a purpose should be directed at reducing the default probability on the firm’s debt service. Fokker’s hedging strategy was not inconsistent with this.

In addition, hedging may have further reduced the likelihood of competitors’ actions of driving the firm out of the market. Fokker faced aggressive competition from a few competitors both in the market for Fo 50 (from ATR) and Fo 100 (from Boeing). The greater the likelihood of financial distress, the more competitors will try to drive the distressed firm out of the market. Entry costs are rather high in the aircraft industry, which makes such a strategy quite attractive. A hedging strategy that reduces the likelihood of financial distress increases the competitor’s cost of predation and therefore the likelihood that competitors will pursue such a strategy. Another sign of its relevance is that Fokker’s initial hedging strategy (hedging all receivables on a two year horizon) was specifically directed at being able to restructure costs in order to remain in the market. This suggests that product market considerations were important in shaping the firm’s risk management strategy.

8.6 Why did Fokker stop hedging?

An interesting question is whether we can also apply the theories discussed in this dissertation to explain Fokker’s decision to leave the dollar positions unhedged from 1992 onwards. To this end, it is important to further characterize the firm’s situation at the moment of the change in risk management strategy and compare it to the period that the firm was hedging its currency risk.

First, it is important to stress that at the end of 1991 the firm was close to its second near-default. Compared to the situation in 1987, however, there were some important changes. For example, in 1987, Fokker had nearly produced and sold any of its new aircraft. Although the future at this time was still full of uncertainty, the initial problems at Fokker were primarily thought to be start-up problems. Moreover, market conditions at that time still seemed favorable. In 1992, Fokker had overcome most of its technical problems. It had become a rather efficient aircraft producer, yet the firm could not produce at a cost that was lower than the market price. Market conditions in 1992 had deteriorated dramatically compared to 1987. The demand (es-
specially for smaller aircraft) was much lower than expected. Moreover, due to the unfavorable market conditions and their own financial problems, airlines switched from buying to leasing. As a result large lease companies took over the market. Apart from an increased negotiating power, these firms also often asked aircraft producers to accept a guaranteed take back price. In general, because market conditions had deteriorated, despite the fact that Fokker’s operations were relatively efficient, Fokker’s future as an independent aircraft producer was very insecure.

A second important characteristic was that in October 1992 the US dollar’s value reached a historical low equal to fl.1.60/$. During 1991, the US dollar rate fluctuated strongly between approximately fl.1.70/$ and fl.2.00/$ (see Figure 8.1). Moreover, the dollar’s exchange rate was constantly lower than that which was used in Fokker’s planning system (FLTP). It was under these conditions that the decision to stop hedging was made.

The overload of debt and the fact that the firm was close to bankruptcy in 1992 clearly created a moral hazard problem. It is clear that ex post (after financial contracts have been signed) the optimal strategy for the firm’s shareholders is taking on as opposed to reducing risk, especially in the face of bankruptcy. In that case the gain from a stable cash flow is clearly less relevant. The motivation given in the receivers’ report, that management did not want to hedge a contract that fixed a loss, is therefore understandable when such a loss would drive the firm into default.

The change in hedging strategy might also be rationalized from the perspective that firms hedge to protect future investments. At a certain point in time, further investments were only relevant with a higher dollar rate. Future investments therefore became positively correlated with the dollar rate. In turn, theory predicts that not hedging was not such a bad idea after all (see Chapter 2.4 and Froot, Scharfstein and Stein, 1993).

Along the same line, our predation based explanation of corporate risk management (see Chapter 7) may be of help in understanding Fokker’s decision to stop hedging. Assume that while hedging Fokker would have locked in a loss such that it was pushed out of the market.

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57 Airlines also started preferring to have whole families of airplanes from one producer, rather than a fleet made up of aircraft from several producers. This creates more flexibility in manning flights, and economizes on training and maintenance costs. For an interesting discussion see Klemperer and Padilla (1997).

58 In the case of Fokker, it is important that the Dutch government was simultaneously a major shareholder and an important debtholder. Wealth extraction from debtholders via increasing risk was therefore not to the benefit of the Dutch government as a shareholder.
why did Fokker stop hedging? 261

Anyway. In that case (and only in that case), it would have been optimal for Fokker not to hedge.59

Managerial reputation and career considerations may also have played a role in the decision not to hedge. If a hedge strategy was insufficient to keep the firm alive then not hedging may, from this perspective, have been the optimal risk management decision. Not hedging might at least have given the firm the opportunity to survive.

All of the former rationales are strongly linked to the financial condition of the firm and do not hold after DASA took a majority stake in Fokker in May 1993. From that moment on there was no clear motivation to remain unhedged. A reason might have been that at the time of the merger Fokker's management was not so sure about DASA's future commitment. This last point is not so far-fetched; Fokker remained seriously undercapitalized and in other negotiations DASA was not very willing to support Fokker.60 But from DASA's perspective there seemed to be no clear motivation to remain unhedged.

An alternative reason why Fokker stopped hedging (and remained unhedged after the merger with DASA) was the historically low value of the US dollar. Despite all evidence that financial market prices are unpredictable, we believe that this might have played a role in Fokker's decision to stop hedging. This is also in line with the observation in Chapter 4, that managers often use their view on the market to adjust the size or timing of hedges. In the case of Fokker, the fact that the US dollar was at a low made the decision not to hedge easier at least, especially given the adverse financial conditions the firm faced.

Concluding this discussion, we have argued that Fokker's risk management (both the hedging and the decision to lift the hedge) can be explained using insights developed in this dissertation. In this context, it remains remarkable that Fokker remained unhedged after DASA became a majority shareholder.61

59 Note that this seems to contrast our discussion of product market rationales in Section 8.5. However, the key difference is the financial condition of the firm. If the firm's condition deteriorates such that hedging increases the probability of default (because it fixes an unbearable loss) then the product market argument is turned around and not hedging becomes the optimal strategy.

60 For example, even after the takeover DASA refused for quite some time to accept price cuts for the bodies of the Fo 50 and Fo 100. For some evidence of a potential lack of commitment on DASA's part see the discussion in chapter 10 of the receivers' report about the relation between Fokker and DASA (Deterink et al., 1997).

61 As we will discuss in Section 8.8, DASA also used a system in which it only hedged conditional on achieving a prespecified target $-rate.
8.7 Alternative risk management strategies

The former discussion focused primarily on Fokker’s transaction exposure. What about the firm’s economic exposure? Fokker sold its aircraft in a dollar market while it had most of its costs in other currencies. Market conditions and especially imperfect competition forced Fokker to take on the currency risk rather than pass it through to its clients. Fokker therefore could not simply quote its prices in guilders. Was there an alternative way the firm could have protected itself against unfavorable changes in the exchange rate? In order to address this issue it is important to consider Fokker’s exposure more carefully. The cost of an aircraft roughly consists of three components:

1. 10% development costs (primarily wages in guilders);
2. 30% production costs (also primarily wages in guilders);
3. 60% purchases (partly in dollars but mostly in other currencies: pounds, deutsche marks, etc.).

The development costs could theoretically be hedged using a dollar loan. In 1982 and 1983 Fokker tried to finance part of its activities in dollars. However, since most (90%) of the development credit was from the Dutch government and because they refused to provide a loan in dollars, this was only a theoretical possibility for Fokker.

With respect to the production costs, the time period between the first moment costs are incurred for the production of an aircraft and the final (planned) moment that the receivables are collected is approximately two years. Hedging these costs in advance enables the firm to lock in the margin on the plane. The only effect of hedging here is that the effects of the change in the exchange rate on the firm’s cost is shifted to the future. This gives the firm time to restructure its costs. Note that Fokker pursued such a hedging strategy during the period 1987 to 1991. Note also that Fokker faced a volatile and gradually declining dollar with forwards rates that, during most of this period, traded at a discount. Moreover, hedging generally implied fixing a loss rather than fixing a profit margin. An alternative way to achieve this would have been to switch production location (e.g. producing in a dollar related country). However, given the firm’s ownership structure (with the Dutch government as a major shareholder) this was not likely either.

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62 The following is based primarily on an interview with Olde Loohuis.
63 One may question why Fokker did not swap its guilder loan into dollars. The main reason is that the repayments on the debt contract were linked to the number of aircraft that were being sold. Such conditional repayments cannot easily be swapped into a dollar loan.
The exposure of the third component (purchases) could have been reduced by quoting all purchase contracts in dollars. If initially such a strategy had been followed, these purchases would have formed a natural hedge. However, due to Fokker’s small size, this was impossible. Developing two new aircraft in the 1980’s required the cooperation of partners. For example, Shorts (UK) produced the wings for Fokker while DASA (Germany) produced the bodies. The huge investments required to participate in such a partnership forced Fokker to single source making it very hard (almost impossible) to shift to other parties for purchases. The financial health of these partners over time therefore became of considerable interest to Fokker. Putting risk on these partners was not without dangers. It could have come back to Fokker if it had caused financial problems at these firms. Since the switching costs were high and alternative partners not very easy to find, the opportunity to dollarise purchases and reduce purchase prices was rather limited. Over time Fokker tried several times to reduce the cost of purchases. However, this was not very successful. Even when DASA had taken over Fokker it was not before 1995 that DASA accepted price cuts for the bodies that DASA delivered for the F 50/100.

How then did Fokker’s competitors deal with their economic exposure (to the US $)? Were they in a better position to deal with such risks and if so why? To discuss these matters we have to distinguish between the very large competitors (Boeing and AIRBUS) and the smaller ones (e.g. ATR). Boeing actually started way back in the 1970’s and 1980’s to force its subcontractors to accept an important part of the business risk. It offered contracts where it put an important part of its risk on the distributors who could only participate if they accepted the conditions. Due to the market power of Boeing and the production scale (no single sourcing but multiple sourcing), the firm was less sensitive to the default of one of its subcontractors. AIRBUS also forced its partners to accept an important part of the business but also of the financial risks before they could participate. In most cases these partners were either state-owned or supported by the local government. Also in the ATR project both partners, Alenia and Aerospatiale, were state-owned and remained in the market despite important losses over time. Hence, actually the governments of some of these partners in addition to some of the smaller aircraft companies

Moreover, since the F 50 and the F 100 were derived from the F 27 and F 28, Fokker was more or less bound to these partners.

For example, the partners in AIRBUS carried all the dollar risk. For partners that were state owned (e.g., Aerospatiale) this implied that the local government carried the dollar risk. DASA, which was not state owned, until 1991 used development credits that were conditional on the break even level (and therefore on the dollar) to transfer the firm’s dollar risk to the government. After 1991, such support was not allowed. British Aerospace could not transfer its risk to the government, but benefited from a low value of the pound sterling.
carried these risks. Although the Dutch government did support Fokker several times\textsuperscript{66}, it did not want to engage in this type of support\textsuperscript{67}.

In conclusion, we have shown that the opportunities for Fokker to reduce economic exposure were very limited. With respect to the use of financial instruments (forwards) to hedge the firm’s risk, we can conclude that buying time was all that could be achieved with hedging. At a certain point, this was not sufficient for the firm’s survival and a more opportunistic risk management strategy was followed. Competitors, except for the US firms, also faced an important dollar exposure. However, these firms were either large enough to pass at least for a significant portion of the dollar risk on to their subcontractors (e.g. AIRBUS) or this risk was carried by the local government (like in the case of ATR).\textsuperscript{68} Moreover, Fokker operated in a country with one of the strongest exchange rates. Hence, for firms in these other (weaker currency) countries the developments of the US dollar were less intense.

8.8 The US dollar and Fokker’s financial planning

The development and construction of airplanes requires long-term planning. From the start of the Fo 50 and Fo 100 programs, Fokker set up a financial planning (FLTP) with a ten-year horizon that was continuously updated.\textsuperscript{69} These FLTP’s played a crucial role:

1. as the basis of program accounting;
2. as an internal control mechanism so that deviations of the budget could be detected;
3. as a means to attract finance from the NIVR and banks.

The dollar rates used in the FLTP’s were estimates from various financial institutions (Deterink et al., 1997, p. 56). However, an ex post comparison of these with the realized dollar rates, shows that the FLTP rates appeared to be too high (see Deterink et al. 1997, Table 4-2). A more appropriate benchmark to compare the dollar rate that was being used in the FLTP are the corresponding forward rates at that time. Figure 8.4 shows the dollar rates that were being used in the 1990 FLTP, versus the corresponding forward rates in 1990. It appears that the FLTP rates were consistently higher than the corresponding forward rates.\textsuperscript{70}

\textsuperscript{66}For example, with the financing of the development credits of the F 28 repayments on the loan were also conditional on the achievement of a specified break even level.

\textsuperscript{67}For an extensive discussion of the relation between Fokker and the Dutch government, see Deterink et al. (1997, Chapter 9).

\textsuperscript{68}See for an indication of the losses in the ATR program the annual reports of Alenia and Aerospatiale.

\textsuperscript{69}Initially these were eight year planning periods.

\textsuperscript{70}In all except one year (1994), forward rates were lower than the FLTP rates that were used.
An interesting question is why Fokker did not use the forward rate as the planning rate for its financial plans. A possible explanation is that forward rates reflect interest rate differentials. When taken over a long time interval (five to ten years) this implies that the premium or discount on the spot rate becomes quite considerable. It is not unlikely that for this reason Fokker did not want to use these forward rates. Alternatively, we should conclude that any other prediction on the dollar rate over such a long time horizon, even from respectable financial institutions, is more or less useless.\footnote{Note that also fundamental methods of predicting exchange rates based on interest rate parity and purchasing power parity (PPP) have a rather poor track record. See, for example, Hallwood and MacDonald (1994). Deviations from PPP can exist for rather long periods. And even the forward rate is not an unbiased predictor of the future spot rate. Moreover, it is likely that the financial institutions have used these fundamental methods to achieve their long term predictions.}

The dollar rate in the FLTP played an important role, not only as a planning device but also as a basis for program accounting and in the end as a guideline for the firm's hedging decisions. Fokker stopped hedging because the dollar was below the rate that was being used in the FLTP. Moreover, the management had decided to restart hedging only when the forward rate was five cents below the FLTP rate. This is remarkable considering the US dollar was an \textit{exogenous} variable that could not be affected by Fokker's management. It therefore seems rather awkward that a change in the dollar did not lead to a change in their plans but rather that management perceived the FLTP rate as some kind of objective that could be managed by means of its hedging strategy (even if this led to no hedging). Therefore, seen from the perspective of financial planning there is no use in tying the hedging decision to the FLTP rate.
However, given the importance of the FLTP in program accounting and in reporting to the NIVR (for funding purposes), this might have given Fokker an incentive to use overly optimistic exchange rates for the FLTP and to link the hedging decisions to the rate that was being used in the FLTP. Using a lower exchange rate in the FLTP would have further increased the losses. Moreover, hedging at a rate lower than the FLTP rate implied that the firm should report losses larger than already expected. Such larger losses might reduce investors’ (but also clients’ and employees’) confidence in the firm’s future, thereby creating more problems (further slow down in demand, harder access to financial markets, and fleeing employees). It is not unlikely that, given Fokker’s position in 1991/1992, the decision to make future hedging conditions conditional on the FLTP dollar rate was based on such considerations.

That leaves the decision to remain unhedged after the merger with DASA. Why did Fokker continue making the decision to restart hedging conditional on the FLTP if the firm’s future improved considerably after the merger? This remains unclear and is not in line with our expectations. From discussions with Olde Loohuiss it appeared that DASA also used a system where hedging decisions were conditional on certain preset target rates. Hence, the system used by Fokker at the time of the merger had strong similarities with DASA’s own system. This is clear from the fact that from that moment the dollar did not reach the FLTP rate, Fokker’s decision to remain unhedged was in full accordance with DASA’s system. Therefore, after the merger, there was no need to change the hedging strategy to keep it in line with the recommendations given by DASA.

The literature to date, however, has no explanation as to the benefits of such a system. The only economic benefit of such a hedging system that we can think of is related to improvements in internal planning. A benefit of the hedging strategy used by DASA and Fokker is that plans less often need to be revised after a change in the dollar. If this implies that firms can concentrate more on long-term goals in planning and reorganization, there might be an advantage. However, if the dollar has significant impact and overly optimistic rates are being used in the planning system, then we think that the costs of such a strategy outweigh the benefits. The cost of the system then is that it may be late in giving firms an incentive to reorganize in response to changes in the exchange rate.

The FLTP’s however were accompanied with deltas in which the consequences of a different dollar rates on specific parameters were estimated.

Brown (2000) also finds that improvements in internal planning were given as a motivation for a US multinational to follow a certain hedging strategy. Boot and Ligterink (1995a) motivate hedging as a way to improve transparency and accountability in the firm. Both studies however do not imply a hedging strategy such as that used by Fokker and DASA.
8.9 Some comments on the receivers' criticisms of Fokker's risk management

The receivers criticize Fokker's risk management strategy during the period 1992 to 1996 on two grounds. First, the receivers argue that Fokker's risk management was inconsistent. Despite the fact that management had decided to stop hedging the dollar, Fokker did enter into some very specific (but also relatively small) hedging decisions. According to the receivers, this inconsistency was caused by a coordination failure between the treasury and the management board (Deterink et al., 1997, p. 90). We do not share this criticism. The examples appeared to be very specific transactions where the hedging decisions were well-founded and not inconsistent. However, as the receivers concluded, the amounts concerned were not very material.

More importantly, however, is the second criticism concerning the moment when Fokker should have restarted its hedging policy again. The receivers argued that there was at least one instance where the management board had decided to leave a position open while they actually should not have done so (Deterink et al., 1997, p. 91). In February 1994, the dollar reached a level of fl.1.9720/$ while the forward rate was around fl.1.92/$ and the FLTP rate was fl.2.00/$. The management had decided to restart hedging only when the forward rate was five cents below the FLTP rate. The management therefore decided to leave the position unhedged. The receivers argue that they cannot understand this decision very well. They claim that at this time the dollar was exceptionally high and that it was very unlikely that the spot rate would come close to this level again in the near future. Therefore, probably the spot rate should have been

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74 The first transaction was that the Treasury purchased a small amount of long-term dollars while there was a large amount of future dollar receivables (Deterink et al., 1997, p.90). Olde Loohuis explained that the purchase of forward dollars was a hedging transaction that it entered for the Dutch government. The Ministry of Defense had put in an order with Fokker and wanted a price in dollars. However, when the Ministry realized that this would leave them exposed to the dollar, it searched for a way to get rid of this risk. Since, the Dutch government had problems hedging this transaction, the treasury of Fokker offered to do it for them.

The second case described in the receivers' report concerned prepaid dollars. These were put on a deposit (or swapped into future guilders) until the moment that the planes were expected to be delivered (Deterink et al., 1997, p.90). The receivers questioned this since the firm wanted to keep positions unhedged. Olde Loohuis argued instead that there was a real risk of non- or delayed delivery in which case compensation (or repayment in dollars) would have to be made. By keeping the prepaid dollars on deposit, Fokker reduced its exchange rate risk on these repayments.

75 Moreover, Olde Loohuis argues that the only way dollar positions could be left unhedged was to address specific payments in the database. Note that all transactions in the database were linked to specific airplanes. Hence, the separation between the positions left open and those that were not was purely technical and not due to differences in responsibility.
taken instead of the forward rate causing them to restart hedging when the spot rate was five cents below the FLTP rate. If this rule had been followed Fokker should have restarted hedging in February 1994. In addition, the receivers question the rigidity of the management in the use of the self selected FLTP dollar rate (which was always too optimistic). More prudence with respect to this rate would have been more appropriate. The receivers then conclude that Fokker should have hedged (an important part) of its open positions: "This is no hindsight wisdom, but based on professional judgement. It has cost Fokker a large amount of money." (Deterink et al., 1997, p. 92)

We disagree with at least part of the receivers’ criticisms. Although with hindsight we may conclude that the decision not to hedge was extremely costly, this was far from obvious at the outset. The receivers’ criticism have been built on two pillars. First, they argue that the spot rate instead of the forward rate should have been taken as reference for the FLTP rate. If the spot rate was five cents below the FLTP rate then the firm should have restarted hedging. But why is this the case? The receivers provide no rationale for this decision rule. One may criticize the firm’s decision to stop hedging, but given the firm’s prospects at the end of 1991, there are reasons why this may have been a rational strategy. If the decision to hedge was indeed based on whether this would fix a loss, the firm should have used the forward rate and not the spot rate. The spot rate is not important in that context; it is the forward rate that determines the losses that will result after hedging. Hence, we do not share the receivers’ criticism on this matter.

The second pillar of the receivers’ criticism is that they argue that the dollar exchange rate was exceptionally high in 1994, and that it was very unlikely that in the future the spot rate would come close to this level again. The receivers imply with this statement that the exchange rate is to some extent predictable (they refer to market predictions by renowned financial institutions). However, most research in financial economics shows that prices in financial markets and especially exchange rates are highly unpredictable. It is well-known that forecast services have very poor track records. We do however share the receivers’ criticism on the use of an (optimistic) FLTP dollar rate as a reference for the firm’s hedging decisions and do not see the benefits of such a system.

8.10 Concluding remarks

In this chapter we have analyzed Fokker’s risk management. Our main findings can be summarized as follows:

1. We find that Fokker’s risk management strategy can be explained to a large extent using the theoretical insights developed in this dissertation. We argue that based on these theories both the decision to hedge as well as the decision to stop hedging can be rationalized. Preventing the consequences of financial distress (in its broadest sense) appeared to be
8.10 Concluding remarks

a main determinant of Fokker’s risk management strategy. However, at a certain point in time financial conditions deteriorated to such an extent that hedging lost its effectiveness in achieving such a goal.

2. The decision to maintain the non-hedging strategy after the merger with DASA is harder to understand and can be criticized;

3. Fokker was more financially constrained than its major competitors, and thus was vulnerable to its competitors’ predatory strategies. Moreover, it was too small to deal with risks compared to many of its competitors.

4. Fokker's use of the dollar in the financial long-term planning can be criticized. This is especially true after the takeover by DASA when there was no clear reason for Fokker to link the decision to restart hedging with the dollar rate in the FLTP.

5. We do not agree with the receivers' claim that the management of Fokker should have restarted hedging in February 1994 for the reasons stated in their report. Fokker could not foresee at that moment that the dollar was relatively high. However, we also do not see what the economic benefits of the non-hedging strategy were after the merger with DASA.

This chapter gives us some tentative information about the relative importance of one theory over the other. In the case setting, the initial hedging strategy offers some support for the importance of arguments related to financial distress but also for product market considerations in corporate risk management. With its hedging strategy, the firm tried to buy time to restructure in order to be able to compete in the product market. Unfortunately, due to both internal and external causes, Fokker appeared to be unable to reduce its costs in the time period that it “bought” with its hedging strategy. Eventually, Fokker’s hedging strategy lost its effectiveness and therefore the firm switched to a non-hedging strategy. Why it remained unhedged after the takeover by DASA is an open question.
8. Risk management at Fokker: a case study