Case I

Babes-N-Toyland

Interest Rate Forecasting and Financial Strategy

Wally Ligenfelt, Vice President for Economic Planning at Babes-N-Toyland, absolutely *hated* January. After the Christmas selling season ended, sales at Babes-N-Toyland—an upscale retail chain of toy and infant supply stores—plummeted. In addition, January meant that it was time for him to begin preparing the annual forecast of macroeconomic conditions for use by the firm's strategic planners. As a five-year veteran of Babes-N-Toyland's management team, Wally realized he needed to get this report finished in a hurry, because the marketing department would soon be calling to request his assistance in forecasting sales and inventory levels for the coming year.

Before turning to the day's work, Wally glanced through his stack of Monday-morning mail in hopes of finding something to cheer him up. What he found, however, caused him to roll up his sleeves, forget about his routine plans for the day, and plunge into his work. It was the following memo from his boss, Abigail Fortenbury, the President of Babes-N-Toyland:

Exhibit 1 Babes-N-Toyland Internal Correspondence

Personal and Confidential
(Do not duplicate)

To: W. Ligenfelt, Economic Planning
From: A. Fortenbury, President
Date: January 7, 1993
Subject: Corporate Strategy Changes

As you know, Babes-N-Toyland just concluded a banner year. After our largest national rival, Child World Inc., closed its doors forever last year, and Lionel Corporation entered Chapter 11 bankruptcy protection, our market share advanced to 20 percent of the $15 billion toy market. While this is indeed good news for our entire organization, we face some new, potentially devastating challenges in the year ahead.

Reviewing the monthly profit-and-loss figures I just received from Bill Sheckland in Accounting, I see that our operating margin has fallen from its customary 14 percent to a little over 10 percent. The entry of discount merchants into our major market area—particularly Wal-Mart, Kmart, and Target stores—forced many of our retail outlets to reduce transaction prices during the holiday selling season. Because we compete head-to-head with these retail giants in practically all of our prime geographic locations, we must take drastic action in the coming year to defend our market share.

Over the holidays, I met with Brad Hinkle and several other members of the Board of Directors to discuss this threat. Based on our discussions, we plan to implement several strategic changes at Babes-N-Toyland in the coming year, including:

1. Broadening our product line.
2. Refurbishing our domestic retail outlets.
3. Expanding our base of retail stores in Europe and Asia.
4. Reducing our corporate headquarters staff.

In order to prepare for a special meeting of the Board on Monday, January 19, I need the following information from your office:

1. Yield curve data and analysis, showing the trends in interest rates over the last few years along with an explanation of these trends.
2. Information concerning the stability of current prices, and the rate of inflation that we will likely face over the next several years.
3. Your analysis regarding debt issuance by Babes-N-Toyland. Specifically, is the timing right for our organization to undertake significant capital projects financed with debt?

The Board realizes we need a quick response to the competitive threat I outlined above. They will probably suggest that we float a rather large bond issue to fund these changes. Based on my preliminary discussions with our underwriters, I think we can currently issue 3-year bonds priced to yield 6.4 percent per annum; 5-year bonds priced to yield 7.3 percent; and 10-year bonds priced to yield 8.4 percent. Before I begin serious negotiations with the underwriters, however, I want our in-house analysis team to give me a thorough overview of current credit conditions in the debt market.

Please call my secretary and set up a meeting with me on Thursday, January 14. Bring the information I requested above to our meeting, and be prepared to answer some of my questions as I prepare for the Board meeting on the 19th.

Table 1 **Treasury Security Yields**

Maturity	August 1991	August 1992	November 1992
3 months	5.33%	3.13%	3.20%
6 months	5.39	3.21	3.43
1 year	5.78	3.47	3.80
2 years	6.43	4.19	4.65
3 years	6.80	4.72	5.23
4 years	7.23	4.86	5.72
5 years	7.43	5.60	6.12
6 years	7.51	5.87	6.34
7 years	7.74	6.12	6.56
8 years	7.79	6.32	6.87
9 years	7.86	6.47	6.95
10 years	7.90	6.59	7.18
30 years	8.14	7.39	7.53

Source: *Federal Reserve Bulletin*, various issues.

With little more than a week to prepare his report, Wally quickly got to work. He called the economic data shown in Table 1 up on his computer, and used this information to prepare a quick estimate of the market risk premia shown in Table 2. As he began working, he couldn't stop thinking about the fourth item in Fortenbury's list of pending changes: *administrative staff reductions*—why, that could mean *his* position, and *his* department! Wally knew it was high time to demonstrate his value at Babes-N-Toyland by responding to his boss' request with timely information and insightful analysis.

Table 2 **Babes-N-Toyland, Inc.: Risk Premia Information for Fixed-Income Securities, December 27, 1992**

Maturity	Maturity Risk Premia	Liquidity Risk Premia	DEFAULT RISK PREMIA		
			AAA-Rated Bonds	B-Rated Bonds	C-Rated Bonds
3 months	0.0%	0.0%	0.9%	1.8%	3.1%
6 months	0.0	0.0	0.9	1.8	3.1
1 year	0.0	0.0	0.9	1.8	3.1
2 years	0.2	0.0	0.9	1.8	3.1
3 years	0.3	0.1	0.9	1.8	3.1
4 years	0.5	0.1	0.9	1.8	3.1
5 years	0.6	0.2	0.9	1.8	3.1
6 years	0.7	0.2	0.9	1.8	3.1
7 years	0.7	0.3	0.9	1.8	3.1
8 years	0.7	0.3	0.9	1.8	3.1
9 years	0.8	0.3	0.9	1.8	3.1
10 years	0.8	0.4	0.9	1.8	3.1

QUESTIONS

1. Using the data provided in Table 1, construct the yield curves for August 1991, August 1992, and November 1992.

2. Evaluate the change in the shape of the yield curve between (a) August 1991 and August 1992, and (b) August 1992 and November 1992 using expectations theory and market segmentation theory.

3. Calculate the one-year forward rates of interest implied by the November 1992 yield curve over the period 1993–2002.

4. Using the one-year forward rates obtained in Question 3, calculate the expected annual inflation rate in each of the next ten years, and use this information to obtain the average rate of price appreciation expected over the 1993–2002 period. In your calculations, assume a strict expectations theory approach to nominal interest rate construction, where:

$$k_{nominal} = k_{real} + \text{Expected inflation premium}$$

5. Examine the information provided in Table 2. Do these data lead you to believe that the annual inflation rates you calculated in Question 4 might be incorrect? Why or why not?

6. Using the data provided in Tables 1 and 2, prepare a revised estimate of (a) the one-year forward interest rates implied by the November 1992 yield curve over the 1993–2002 period; and (b) the expected annual inflation rate in each of these years.

7. How would the yield curve for (a) an AAA-rated firm, (b) a B-rated firm, and (c) a C-rated firm, differ from the Treasury security yield curve you constructed in Question 1? Plot the individual yield curves for each of these risky securities to demonstrate your answer.

8. In Question 1 you constructed a series of yield curves using Treasury security yields, while in Question 7 you constructed yield curves using the term structure of interest rates for various classes of risky debt. In most cases, financial analysts prefer the former approach to yield curve construction. Why is it better to construct the yield curve using the term structure of returns drawn from Treasury securities rather than risky corporate bonds?

9. Can you use the information provided in the case to estimate Babes-N-Toyland's bond rating? If so, identify this rating, and explain how you obtained it.

10. If Babes-N-Toyland issues 10-year corporate bonds to fund its expansion plans and these bonds are priced to sell at par in the market, what is the semi-annual coupon payment that the firm must offer its bondholders?

11. Based on your answers to Questions 1 through 10, is now a good time for Babes-N-Toyland to issue a large quantity of long-term debt securities? Why or why not?

Case 2

Bay Street Bankcorp

Hedging Interest Rate Risk with Financial Futures

Michael Wang, president of Bay Street Bankcorp, peered anxiously at the thick envelope sitting on his desk from the Federal National Mortgage Association. Michael realized the envelope contained Fannie Mae's response to his request that the agency invest $5 million in the fledgling bank over the next year to expand BSB's highly successful and innovative minority lending program. Taking a deep breath, Michael quickly tore open the envelope and scanned the cover letter. He read no further than the second paragraph to learn that the FNMA had approved his funding request. BSB would become only the seventh bank in the United States to receive equity capital from Fannie Mae; the bank now stood on the verge of an ambitious and innovative expansion plan.

The plan was full of risks. But Michael, and now Fannie Mae, felt it was the right thing to do. Bay Street Bankcorp was chartered in 1991 and opened for business in a large, southwestern city with a substantial population of Asian, Hispanic, and African American residents. In a hotly competitive banking market, BSB grew quickly and confidently by offering a unique product mix tailored to the needs of first-generation Asian immigrants. The majority of the bank's common stock was owned by Taiwanese immigrants, and BSB's management team understood its basic business strategy well.

As the bank gained experience in minority lending to small Vietnamese, Chinese, and Taiwanese entrepreneurs, it started to reach out in the community to other minority groups. BSB opened a second office in 1993 in the barrio to serve the needs of the Hispanic community, and now planned a third office in the inner city to gain entry into the African American community.

Over the course of its brief history, BSB succeeded by doing the little things that the mega-banks in town neglected. The bank's main office manager was an American-born descendent of first-generation Chinese immigrants who was fluent in both Chinese and Vietnamese. The bank's counter literature was always available in four different

More important, however, BSB understood the financial needs of its minority customers better than any bank in town. The tiny bank aggressively extended business and mortgage credit to newly arrived immigrants who had virtually no credit references. BSB understood that immigrants lacked credit histories because they had limited access to financial institutions in their home countries—not because they were poor credit risks. In fact, many first-generation immigrants arrived in the United States with large amounts of cash provided by extended family members and saved over many years abroad. The family nest egg represented a down payment on the American dream for the immigrant family, and the opportunity to gain economic freedom in America.

Unfortunately, the larger, well-established banks in town rejected many business loan applications from immigrant families because there was no established credit history available from these potential borrowers. Adept at understanding immigrant culture, BSB took the time to assess the character of its customers in other ways, and approved many loans its competitors rejected. The bank quickly acquired a reputation among Asian and later Hispanic immigrants, and BSB grew rapidly in the shadows of the big, chrome-and-glass office towers in the central business district.

By 1996, the bank's asset base had reached $150 million, and its penetration of the Asian and Hispanic markets was almost complete. Recognizing that the bank's unique approach in marketing financial services across various minority groups could be extended to the African American community, the bank proposed the establishment of a third branch office in the inner city. At the same time, BSB developed an aggressive, $30 million lending plan offering long-term, fixed-rate mortgage financing to black-owned business ventures. The plan would be financed by an innovative savings deposit program, attracting immigrants' savings by offering one-year certificates of deposit at 50 basis points above prevailing market rates to qualifying families. BSB sought to raise $25 million from this program over the course of the year, and in combination with the bank's $5 million infusion of equity capital, BSB could fund its $30 million minority loan program over the course of the next year.

The plan looked excellent on paper. BSB was an SBA Preferred Lender, which meant the bank could originate SBA-guaranteed loans without the prior approval of SBA loan officers. The bank was also rated in the "outstanding" category under the Community Reinvestment Act, providing testimony to its exemplary record in minority lending within the local community. Finally, the bank was profitable, posting a respectable profit of $1.25 million against an asset base approaching $150 million.

On the downside, however, BSB was still a young, and very small, financial institution operating in a large and competitive marketplace. The institution was adequately capitalized with sufficient reserves for future credit losses, but Michael Wang understood that a few unexpected charge-offs might destroy the bank—and the businesses of its customers. Standing on the verge of a 20 percent expansion plan targeted to occur in only a year's time, Michael was clearly nervous. The bank had little room for error if the intended expansion was to succeed. At the same time, the community depended on the bank to provide innovative and flexible loans where other banks simply refused to tread. There must be a way, Michael thought to himself, to contain the plan's risks and give it the best possible chance for success.

Michael realized that an unexpected change in market interest rates, coupled with the proposed commercial mortgage loan program, could destroy the projected profitability of the program. The bank's forecast called for stable interest rates over the next 12 months, and because of the small average size and unique features associated with individual credits to minority borrowers, securitizing the new commercial loans was out of the question. Each

loan must be priced correctly for the bank to earn a profit. At the same time, each loan must carry a reasonable cost to give fledgling entrepreneurs the greatest opportunity to succeed.

It was a delicate balancing act, and Michael needed a novel way to tip the scales in BSB's favor. Remembering an article he recently read in the financial press, he began to wonder if the bank might limit its risk exposure by using financial futures contracts. At first, the very thought of buying and selling derivative financial instruments was appalling; after all, derivatives had received so much negative publicity that Michael rejected them out-of-hand for BSB. Now, however, he was forced to rethink his position. The bank des-

Table 1 Selected Interest Rate and Price Data

	Annualized Yields		Futures Contract Prices		
Date	Bank CDs[1]	FNMA Yield[2]	Treasury Bonds[3]	Treasury Bills[4]	Eurodollar Deposits[5]
July 7	5.28%	7.69%	115-01	94.01	94.60
July 14	5.19	7.54	114-15	94.96	94.53
July 21	5.22	8.00	110-23	94.73	94.28
July 28	5.24	7.96	110-30	94.78	94.32
August 4	5.24	7.98	109-31	94.71	94.24
August 11	5.24	7.97	109-21	94.75	94.26
August 18	5.25	8.07	109-19	94.57	94.07
August 25	5.23	8.03	110-24	94.72	94.22
September 1	5.24	7.82	112-24	94.81	94.28
September 8	5.20	7.67	113-10	94.82	94.27
September 15	5.19	7.60	114-24	94.94	94.40
September 22	5.14	7.74	113-10	94.86	94.29
September 29	5.21	7.82	112-31	94.72	94.17
October 6	5.23	7.64	115-00	94.89	94.24
October 13	5.29	7.65	115-23	94.89	94.23
October 20	5.24	7.58	116-31	94.93	94.35
October 27	5.28	7.62	115-30	94.99	94.37
November 3	5.23	7.48	117-25	95.08	94.47
November 10	5.20	7.53	117-09	95.06	94.44
November 17	5.20	7.52	117-00	95.05	94.57
November 24	5.16	7.58	117-04	95.01	94.61
December 1	5.18	7.37	119-05	95.10	94.68
December 8	5.05	7.37	120-00	95.07	94.65
December 15	5.11	7.29	119-29	95.00	94.58
December 22	5.04	7.30	118-30	95.04	94.62
December 29	5.04	7.21	121-04	95.13	94.66

Note:

[1]Annualized yields on commercial certificates of deposit represent primary new issues of 1-year negotiable CDs at major New York banks on deposits of $100,000 or more.

[2]FNMA yields represent posted yields on 30-year mortgage commitments (priced at par) for delivery in 30 days to the Federal National Mortgage Association.

[3]Treasury bond futures prices are quoted in 1/32 increments of par. Thus, 115-01 represents a price of 115 and 1/32 percent of par value. Contract yields are standardized using a 15-year, $100,000 par value, 8 percent coupon bond. Each futures contract represents $100,000 in face value securities.

[4]Treasury bill futures prices are quoted at a discount from face value in increments of 1/100th of 1 percent. Thus, 94.01 represents a price of 94 and 1/100 percent of face value. Contract yields are standardized using a 1-year, $1 million face

perately needed a tool to contain its interest rate risk. Flipping to the third section in *The Wall Street Journal,* Michael scanned prices of three popular, and widely traded, futures instruments that would be easy for BSB to acquire and understand: the Treasury bond futures contract traded on the Chicago Board of Trade, the Treasury bill future traded on the Chicago Mercantile Exchange, and the Eurodollar future traded on the Chicago Mercantile Exchange.

Michael decided the time was right for a little research project. Scanning a few weeks of futures prices on the three instruments noted above, he compiled the information shown in Table 1. These futures contract price quotes represented contracts with an expiration date one year from the date of each published price. Given the bank's limited experience with hedging risk in the financial futures market, Michael decided to limit his hedging activity to this time frame.

The minority lending project would involve three separate components over the course of the coming year. First, BSB would receive $5 million in cash from Fannie Mae to cover the agency's equity investment in the bank. While these funds would eventually be invested in the minority loan program, the bank planned to invest the money temporarily in Treasury bills. Second, the bank would issue $25 million in new certificates of deposit within the next six months. Finally, the bank would originate $30 million in new commercial mortgage loans before the end of the 1996 fiscal year to complete the program.

At the time of his analysis, the spot rate on one-year Treasury securities was 5.10 percent, the spot rate on one-year bank certificates of deposit was 5.04 percent, and the bank's price for fixed-rate commercial mortgage loans was 7.21 percent. Michael used these rates in forecasting the profitability of the minority loan program over the course of the 1996 fiscal year, but he realized that BSB faced some sort of risk if market interest rates shifted from their current position. Scanning the numbers shown in Table 1, Michael set out to determine just how these financial futures contracts might limit the bank's exposure to this risk, increasing the minority loan program's chances for success.

QUESTIONS

1. Identify the cash market risk exposure facing BSB in each particular phase of the minority lending project.

2. If BSB decides to hedge its market risk exposure in each phase of the minority lending project, what is the appropriate direction of the hedge (i.e., long or short position in the futures market) for each component of the project? How will the hedge position immunize the bank from loss if market interest rates rise or fall?

3. Given the three separate phases of the minority lending project and the information shown in Table 1, what is the best futures contract (i.e., the Treasury bond future, the Treasury bill future, or the Eurodollar future) that BSB should use to hedge interest rate risk related to each phase of the project?

4. Given the magnitude of BSB's exposure to interest rate risk in the cash market at each phase of the minority lending project, what is the appropriate number of futures contracts the bank should buy or sell in order to immunize its exposure to interest rate risk?

5. Suppose interest rates increase over the course of the next year, so that one year from today the one-year rate on bank certificates of deposit stands at 5.5 percent, the yield on FNMA securities is 8 percent, and the yield on one-year Treasury bills is 5.6 percent. Given this increase in interest rates, the prices of the financial futures contracts described in Table 1 are:

Treasury bond futures contract	119-24
Treasury bill futures contract	94.63
Eurodollar futures contract	93.05

Given this interest rate scenario one year from today, what is BSB's net gain or loss on each of the three components of its minority lending program?

6. Refer once again to your answer to Question 5. Did the bank's immunization strategy depend upon market interest rates rising over the course of the coming year, or is the bank's profit position protected from both increases and decreases in the level of market interest rates? Explain your answer by demonstrating the bank's net gain or loss on each of the three components of its minority lending program, assuming that market interest rates fall over the course of the coming year. In this case, assume that the following interest rates and futures contract prices are observed one year from today, and recalculate BSB's net gain or loss on each component of the minority lending program:

One-year Treasury security spot rate	4.3%
One-year bank certificate of deposit rate	4.0%
FNMA yield	5.5%
Treasury bond futures contract price	124-03
Treasury bill futures contract price	95.93
Eurodollar futures contract price	97.91

7. The case mentions that BSB seeks to eliminate its exposure to risk by buying and/or selling financial futures contracts. In using these derivative financial securities, does the bank eliminate all of its exposure to risk, or just a portion of the total risk the firm faces? Does the introduction of financial futures within the bank create any additional risks for management to consider? If so, identify and explain these risks.

8. Examine the hedging strategy you developed for BSB in Questions 2 through 4. Does this particular strategy represent a static or dynamic hedge? Given your answer to this question, comment on the risk that BSB faces in executing this strategy, and describe how the bank's hedging technique might be improved to immunize the bank more effectively against changes in the level of market interest rates.