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Deutsche Bank: Finding Relative-Value Trades

It was the third week of August 2003, and Jamil Baz, head of Deutsche Bank's Fixed Income Research Group, gathered his research group for a morning meeting. "So, what are the markets telling us today?" he asked the group. "Are there any trends or news for new trade ideas?"

The Fixed Income Research Group that Baz led was Deutsche Bank's internal research and development (R&D) department for fixed income instruments. Their mandate was to look for untapped value across bond markets and interest rate derivatives. Long-term-oriented research findings were presented to clients, whereas immediate opportunities were suggested as trades to internal traders as well as clients. The success of the group was in part measured by how many of their trade suggestions actually turned into successful trades. So far, they had achieved an impressive 75% success rate.

A natural place to start looking for new trades was the latest prices on various U.S. Treasury bonds (see **Exhibit 1** for data from August 15, 2003). The group's members consistently went through that data set, looking for possible trades to recommend. Typically relative-value trades took both long and short positions across different parts of the yield curve. Baz's standard weekly question just emphasized what they all knew: that it was time to scour through the numbers one more time to see if any such positions were available.

The Deutsche Bank Fixed Income Research Group

Headquartered in Deutsche Bank's London office, the company's Fixed Income Research Group consisted of about 50 analysts and strategists. (An additional 10 were located in the bank's New York offices.) Global head of Fixed Income Research and in charge of the group was Baz, a managing director with Deutsche Bank since 2001. Previously at Lehman Brothers in London, Baz also held an M.S. in management from MIT and a Ph.D. in business economics from Harvard University.

As a part of a large financial institution, the research group was under constant pressure to monetize the ideas that they generated. The group presented its findings both internally to the

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Professors George Chacko and Peter Hecht, Executive Director of the HBS Europe Research Center Vincent Dessain, and Research Associate Anders Sjöman prepared this case. This case deals with trade-specific advice activities of a research department and draws heavily from "Deutsche Bank: Discussing the Equity Risk Premium," HBS Case No. 205-040, by the same authors. Case No. 205-040 deals with macro-level advice from the same research department. Some names and data have been disguised for confidentiality. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management. This case is not intended as financial advice, and it should not be used as the basis for any investment decision, in whole or in part.

Deutsche Bank traders, as well as externally to Deutsche Bank clients at the CEO, CFO, and Treasury level. Baz explained how the ideas were pitched:

> The final goal is to create a franchise with fixed income clients. So, for clients on the asset side, such as mutual funds, hedge funds, insurance companies, and pension plans, we help them generate high returns on their assets. We give specific ideas to be executed by the clients—hopefully with us, although that is never certain. However, even if we don't get a trade out of our recommendation, it is important enough that we maintain Deutsche Bank's presence at the client. Sometimes we also do bespoke—or customized—work, where we analyze their balance sheet and asset-liability mismatches for them, almost like technical financial consulting. In general, research alone will not give us clients, but research combined with pricing are the keys to building long-lasting relationships with external clients.
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> Overall, we strive to push the frontiers of analytical finance when it comes to modeling interest rates, volatilities, and spreads. Owing to data availability and an intimate exposure to institutional market realities, we are often pushed to reach results ahead of academic finance journals.

On a group level, Deutsche Bank organized its fixed income activities in the global markets around three main pillars: investor coverage, issuer coverage, and research. The trading desks dealing in these areas were in turn divided into two groups: credit (with credit trading/credit derivatives, new issue syndicate, asset securitization, and emerging markets) and rates (with foreign exchange, money markets, fixed income, and interest rate derivatives).

The research efforts of the group were set up to match these organizational divisions. The Fixed Income Research Group was one of several research groups (as shown in **Exhibit 2**). All these groups were run under the banner of Global Markets Research. Research as a whole was headed by David Folkerts-Landau. Demand for direct meetings with Deutsche Bank's research groups had grown over the past few years, taken internally as a sign of increased respect for the bank's research output. In the last year, Baz's group alone had logged over 1,500 client meetings. All clients had access to the Deutsche Bank research in papers and newsletters that were available online. Internal traders also benefited from the research, which was a major influence behind much of the bank's proprietary—or "prop"—trading. Most members of the research group shared their time between external clients and traders, with more senior staff members working more with external clients and less with the trading floor.

In the end, measuring the research group's value to the organization was still difficult. Said Baz:

> Putting a value on the work we do, and the effect we have on the bank, is very hard. In fact, if you were to really measure it by attributing sales and trades back to us, the trading floor would be more reluctant to work with us. Instead, we are mostly evaluated by top management on three other factors. Firstly, overall market direction, which is how much of rate and spread moves did we catch in our advice. Secondly, the relative-value trades we originated. Thirdly, any customized business we have brought in from our client meetings.

Compensation to the members of the group was tied to the evaluation of the group as a whole. Individual bonuses were then given at the discretion of Baz as the group's manager, based on his qualitative impression of each member's contribution.

Strategic Advice and Relative-Value Activities

The group's activities were normally broken down into strategic advice on macro trends and relative value. The strategic advice activities built on long-term discussions with clients, where the group presented Deutsche Bank's view on macroeconomic trends to external clients. In these discussions, George Cooper, the group's global fixed income strategist, typically did not expect a quick monetary return. Cooper, a Ph.D. graduate in engineering at Durham University with experience from both Goldman Sachs and JP Morgan, explained:

> This type of activity does not generate a lot of money from a trade perspective. It generates brand value, though, and is especially appealing to insurance companies or asset-liability people, who appreciate the long-term view. We believe it serves more of an educational purpose. It gets the fund managers thinking. They are not looking for prescriptive research, where we tell them to "do this trade," but they look for interesting ideas. Of course, they then weigh our ideas against whatever Goldman Sachs or Morgan Stanley are saying. Our role is to come up with hopefully insightful but also informative new ways to look at things.

By contrast, the relative-value activities looked for more immediate opportunities by comparing different instruments and then recommending various trading strategies to clients and internal traders. Head of Relative Value Research for Europe was Jean Dumas, an engineer from ESME SUDRIA in France with a specialization in finance, who had worked with Relative Value Research for Deutsche Bank in Paris, Frankfurt, and Sydney before moving to London. Dumas explained his work:

> We come up with different types of trades all the time. The trade opportunities may be there for a week or two, sometimes longer. I look at different spreadsheets, listen to what traders are saying, watch the news, study different models. . . . Then I try to put everything together—and suddenly there is a trade opportunity. Our job is really grabbing things that don't seem to be related at first and see if there is a trade to be done.

The trade opportunities that the research group identified were published weekly in the newsletter "Deutsche Bank Fixed Income Weekly," which was distributed to Deutsche Bank traders as well as to clients. A frequent contributor to the newsletter was Dr. Nikan B. Firoozye, head of Global Quantitative Strategies and a Ph.D. graduate in mathematics from Courant Institute at New York University with experience from Alliance Capital, Sanford C. Bernstein, and Lehman Brothers. Firoozye explained:

> I write a piece on Euroland strategy every week where we suggest trades. Some of these are big trades that we don't change very often, such as curve-steepening trades. We can have the same trade off and on for a full year. We also summarize economic data as it impacts the bond markets. For instance, how structured trades could be influenced by the move in dollar versus yen, and how you should position for that.

In his role as head of Euroland Strategy, Firoozye also oversaw all strategic investments in Euroland bond markets. He was also involved in all modeling issues and wrote stand-alone papers on quantitative strategy.

Looking for a Relative-Value Trade

For the research group, one way to find relative-value trades was to compare the prices of traded securities against the prices that the group thought the securities *should* trade at. This subjective view

was based on a proprietary model developed at Deutsche Bank. (Most banks used proprietary models as a base from which to evaluate the prices of traded securities.)

The models were built on the fact that the returns offered by fixed income instruments could be characterized by the yields that they offered. The yield was roughly seen as compensation for the risk borne by the holder of that security. There were many sources of risk in fixed income securities, such as interest rate risk, credit risk, and prepayment risk. Also, the yield of an instrument could be broken down into components. The components could be thought of as compensation for the different sources of risk. So, for example, the yield on a corporate bond could be thought of as being composed of a risk-free yield plus a credit spread. The risk-free yield represented compensation for interest rate risk in the bond, while the credit spread represented compensation for default risk in the bond.[1]

To understand the compensation for the interest rate risk alone, banks typically constructed "yield-curve models." These were models for the yields on zero-coupon Treasury securities, since Treasury instruments typically contained only interest rate risk. Models for the yield curve could be then used to compare the current and expected prices of U.S. Treasury instruments.[2]

The research group at Deutsche Bank had developed their own proprietary yield-curve model, a so-called three-factor affine model (see **Exhibit 3** for a conceptual description of the model). Firoozye explained the fundaments of the model:

> We have three factors driving the yield curve that we see as analogous to the economy. In an economy, there is inflation, output gaps, and short rates. So first among our factors is a long rate, which is analogous to inflation. It is the slowest mean reverting of our three factors. In the fifties inflation was low, in the seventies it was extremely high, and now it is back down again. It takes 20 years to go through its cycle. It is very slow, very persistent, whereas the business cycle is much, much faster. You go through a business cycle in about seven years. So slope, our second factor, is then the measure of output gap. Slope mean reverts much more quickly than inflation. The third factor is the short rate, which mean reverts the fastest.

After estimating the variables of the three-factor model, the team calibrated the model to price the one-month, two-year, and 10-year zero-coupon bond.

After Baz's request at the weekly meeting, the analysts now used the latest numbers on various U.S. Treasury bonds to update and calibrate the model (see **Exhibit 4** for the resulting output from Deutsche Bank's model). The idea was to then compare the actual zero-coupon yield curve against the predicted ones coming out of the model and see if any trade ideas presented themselves.

In fact, several trades seemed to come out of that comparison. Baz and the team now had to pick the trades with the highest profit potential.

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[1] It should be noted that the notion of compensation here is approximate. The yield on a zero-coupon corporate bond is *not* the expected return of that bond. It is simply the *promised* return of that bond, or the return an investor would get if the bond did not default. Starting with this promised return and then factoring in the probability of default and a default risk premium leads to the expected return for that bond.

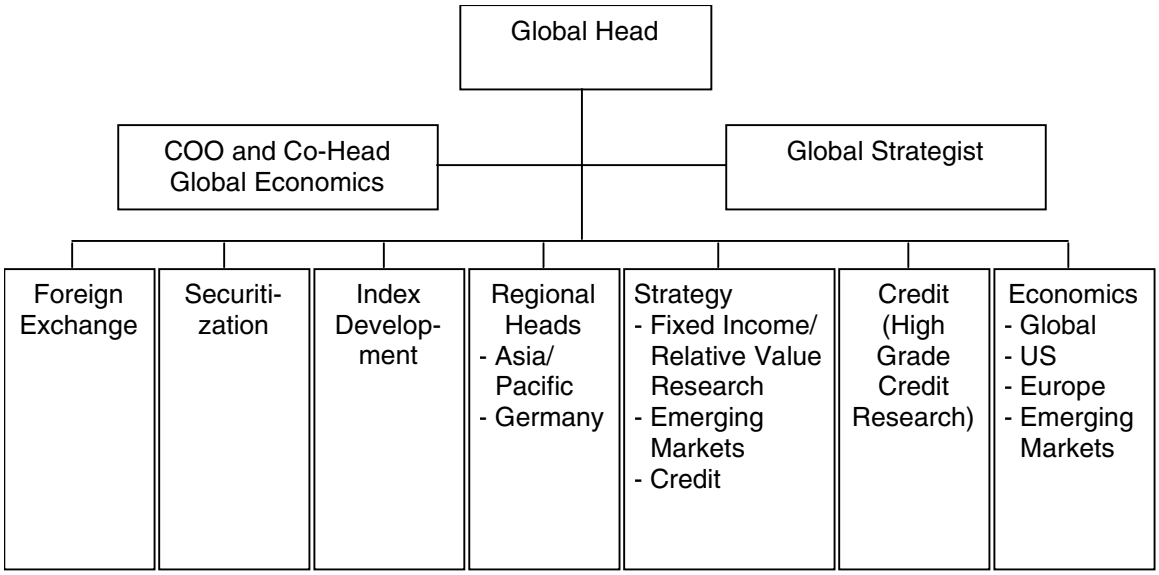
[2] More generally, yield-curve models could be used to price any interest rate-sensitive security. For example, the pricing of interest rate options starts with a yield-curve model.

Exhibit 1 Prices and Coupon Rates of Various U.S. Treasury Bonds on August 15, 2003

Coupon Rate (%)	Maturity Date	Current Price
3	2/15/2004	101.0544
2.125	8/15/2004	100.9254
1.5	2/15/2005	99.8942
6.5	8/15/2005	109.0934
5.625	2/15/2006	108.438
2.375	8/15/2006	99.7848
6.25	2/15/2007	111.7184
3.25	8/15/2007	101.0841
3	2/15/2008	99.1692
3.25	8/15/2008	99.271
5.5	2/15/2009	109.7707
6	8/15/2009	112.145
6.5	2/15/2010	114.9084
5.75	8/15/2010	110.3894
5	2/15/2011	105.2934
5	8/15/2011	104.7607
4.875	2/15/2012	103.4391
4.375	8/15/2012	99.2806
3.875	2/15/2013	95.0288
4.25	8/15/2013	97.7693
13.25	2/15/2014	174.3251
12.5	8/15/2014	168.9389
11.25	2/15/2015	157.0552
10.625	8/15/2015	152.4222
9.25	2/15/2016	140.0135
7.5	8/15/2016	123.3044
8.75	2/15/2017	136.0598
8.875	8/15/2017	137.504
9.125	2/15/2018	140.792
9	8/15/2018	139.9079
8.875	2/15/2019	138.7431
8.125	8/15/2019	130.7162
8.5	2/15/2020	135.2938
8.75	8/15/2020	138.3466
7.875	2/15/2021	128.4995
8.125	8/15/2021	131.7341
8	2/15/2022	130.4736
7.25	8/15/2022	121.58
7.125	2/15/2023	120.1744
6.25	8/15/2023	109.4538
7.5	2/15/2024	125.46
7.5	8/15/2024	125.4466
7.625	2/15/2025	127.1477
6.875	8/15/2025	117.5509
6	2/15/2026	106.3626
6.75	8/15/2026	116.1986
6.625	2/15/2027	114.7086
6.375	8/15/2027	111.4036
6.125	2/15/2028	108.0391
5.5	8/15/2028	99.633
5.25	2/15/2029	96.2876
6.125	8/15/2029	108.4062

Source: Adapted by casewriter from Datastream.

Exhibit 2 Deutsche Bank Global Markets Research Organization



Source: Deutsche Bank.

Exhibit 3 Deutsche Bank's Zero-Coupon Yield Model

- **Key variables**: Short rate, slope, and long rate (or short rate, output gap, and inflation)
- **Model specified by a system of equations (in Q measure)**
  - Long rate mean reverts slowly (possibly to nonzero mean)
    $dX_t = (\mu_X - k_X X_t)dt + \sigma_X dW_t^X$
  - Slope mean reverts faster (to zero)
    $dY_t = -k_Y Y_t dt + \sigma_Y dW_t^Y$
  - In equilibrium short rate, r_t, follows the target X_t+Y_t (an analogue of the Taylor rule)
    $X_t + Y_t - r_t = 0$
  - Short rate mean reverts fast in order to restore the equilibrium
    $dr_t = k_r(X_t + Y_t - r_t)dt + \sigma_r dW_t^r$

Source: Adapted by casewriter from "Quantitative Models for Fixed Income," Deutsche Bank presentation, October 2003.

Exhibit 4 Output from Deutsche Bank's Zero-Coupon Yield Model

Maturity (years)	Model Prediction (BEY)
1y	1.2443%
2y	1.8727%
3y	2.4110%
4y	2.9665%
5y	3.4454%
6y	3.8557%
7y	4.1996%
8y	4.4677%
9y	4.6528%
10y	4.7107%
15y	5.7160%
20y	5.9517%
25y	5.9315%

Source: Adapted by casewriters from Deutsche Bank information.

Note: The yields in this table are bond equivalent yields (BEY), that is, the semiannual yield multiplied by two.