

DRAGON SLAYER WENT TO THE STREET

-----My experience in joining the financial industry

“Perfected in the art of dragon slaying,
he started teaching how to slay dragons.....”

-----A cartoon at the NYU Physics Department

When a business school faculty member quits academia to join a Wall Street firm, they say “He went to the street”. It implies that he leaves the safe haven for the jungle of the merciless world. Not without envy, everyone expects him to make a large fortune, though, at the cost of a scholar's soul.

Traditionally a person who had gone through the long and arduous way to attain the Ph. D. in theoretical physics had only one destiny: becoming nothing but a professor of physics. All branches of natural sciences culminated in the first half of this century as the first atomic bomb vaporised Hiroshima, television sets crept into the living rooms of the ordinary men, and Neal Armstrong stepped down to the surface of the moon. By the 1990s, it seems that most important and doable things have been done in theoretical physics. The remaining problems are either too difficult, or simply tedious and uninteresting. Like the dragon slayer in the cartoon on the corkboard of the physics department coffee room, I did not find any significant dragons to slay.

I went to the street in 1993 after being a postdoctoral research scientist for a year at the Courant Institute of Mathematical Sciences of New York University. The inspiration came from a few friends and fellow physics graduates who went on to business schools for another Ph.D. in finance. At that time a few former physicists already landed on jobs with famous Wall Street firms. The rumour said some of them were making over a hundred thousand dollars for the first year. It sent shockwaves among the fellow scientists and graduate students. In parties and coffee rooms, I started to hear about talks of options, stock trades, and Wall Street anecdotes. With scepticism I bought the famous book by Professor John C. Hull, “Futures, Options, and Other Derivative Securities”. My friend at the Stern School of NYU recommended it to me and said that the book was regarded “the Bible of Wall Street”. To my amazement, the content was quite interesting. It was all about models and formulas that made a lot of sense. I even wondered that I could have discovered the Black and Scholes formula myself if I had had been in finance. For a glimpse at the culture and throat-cutting warfare of the street, I started to read those once best-selling books such as “Liar’s Poker”, “Money Culture”, “Thieves at the Den”, and “Barbarians at the Gate”. They absorbed me in a similar way as did the “God Father”.

Then I was ready to try out my lucks. A friend at Prudential Securities gave me a list of eight headhunters and I started sending out resumes. Five of them promptly called and asked me to pay a visit to their offices. In about a month's time, a nice lady headhunter arranged an interview for me with JP Morgan's derivatives research group. In the morning she gave me a final check-up phone call before the interview. "Be confident", she said, "From now on you will never worry about money again".

The JP Morgan building on 60 Wall Street looked serious and intimidating. The guy who received me was very nice. His business card showed his title as "Vice President". I was truly shocked. "Am I really this important?", I thought. Then I was brain stormed by six interviewers each talked about 20 minutes with me. Three of them asked me game-like questions such as "What is the minimum number of times you have to use a balance to find out a fake coin among eight other identical looking real ones?", "What is the optimal stopping strategy for getting the highest expected score if you are allowed to toss a dice four times?". One person asked me if we could price American options by using Monte Carlo simulations. Another wanted me to formally write down the formula for a look back max option. I also found out that they were mathematicians, physicists and engineers themselves, and they were interviewing a pool of a dozen applicants just like me. In the end I was told that they would call me if it was necessary. Two days later I went there for a second time to meet two traders who asked me similar game-like questions. Then the head-hunter told me to wait and be patient. Seven months passed by without any news.

In September 1993 I got a phone call from another head-hunter who told me that Merrill Lynch needed some people with my background to model mortgage backed securities. He managed to arrange an interview for me in two weeks. I sensed that I was just like any other applicants in the JP Morgan interviews. In order to succeed I had to distinguish myself this time. Without any hesitation I set out to inquire what mortgage backed securities were. I bought a book on MBS and worked on it day and night. In ten days I wrote a paper on the computation of the option adjusted spread for 5 tranches of different MBS based on my model and computer simulations. I got the clues from the book and defined my own mortgage backed securities, complete with IO, PO, and different maturity classes. I also implemented the implicit finite difference method for valuing the American put option in John Hull's book and put all the results in a nice scientific style report.

The effort paid off this time. My future manager at Merrill Lynch, Raj, told me that he needed a person like myself, who could formulate practical problems in simple mathematical terms, and then solve them by applying the methods learned at school. Again I was brain stormed by eight other people in the three times I went there.

On the first Friday of October, Raj called me and asked me to meet him on Monday. I went to his office at 8 o'clock in the morning. He told me that he would like to make me an offer: 65 thousand base salary plus a bonus in Feb 1994. I was overwhelmed with joy. He said the stack of paper on his desk contained 40 or so resumes. They had chosen me, and many others were just as good.

I was not completely without feeling guilty when I told my postdoc advisors, two eminent lady professors who had high expectations of me, that I would like to quit. The feeling was mixed: sad, excited, scared, eager and hesitant. Had I betrayed all my past? It had taken me such a long way to get there. Like everyone else, I had worked single-mindedly for 14 years at several universities and research institutes in my own chosen field of study-----theoretical physics. Though still nothing, a postdoc was only an embryo of a full scientist, the status could not be achieved without extraordinary efforts and the constant encouragement by dreams of becoming Newton or Einstein. Believe it or not, when I chose physics and went to the University of Science and Technology of China at the age of fifteen, I wanted to become Einstein, and would not settle for Dick Feynmann. Then there was the hard work and personal sacrifice: days and nights, books after books, tests after tests, challenge after challenge, deteriorating eye sights, missed dance parties, and countless sleepless nights. If I chose to join Merrill Lynch, would I forfeit all those efforts?

The pursuit of my scientist's dreams had given me lots of joys and times of triumph. The path to the doctorate was not entirely uneventful or without excitement. I felt my destiny was within the final grasp when I came to the US on the CUSPEA program to study for the Ph.D. in physics at New York University. Ten years ago we saw things differently. Unlike most foreign students who came to the US in the 90s and soon switched to a computer science or a MBA program for quick job opportunities, we didn't realise that we had plunged into a material world. Instead we believed that America could offer the best environment for conducting fundamental research. Than ever before were we more determined to become top scientists who would leave foot prints on the path of human wisdom and understanding. We believed that science was above everything else, and there were trivial and non-trivial professions. In times of frustration, I often comforted myself by making the following analyses. Look at a lawyer, or the judge who ruled that I still had to pay for the two parking tickets out of my \$900 dollar per month scholarship. He was as successful as anyone else. What did he do? For an entire evening, in front of 50 or so frustrated people waiting in line, he sat there with a stern face to decide who should still pay the speeding summon or a parking ticket with or without a reduction. What triviality! Or look at a dentist who made a couple hundred thousand dollars. What did she do? Everyday, including on week ends, she looked into people's mouth with iodine cotton balls. What a tragedy! Scientist was king. In a cozy evening, we thought about the fundamental structure of matter in space and time, enjoying a cup of hot tea or a lit cigarette. We pondered upon the existence of intelligent life on a distant planet. Trivial or non-trivial, that was the difference.

Then I asked myself. Is the job in the financial world more like the job of a lawyer who was continuously bothered by endless pettifoggeries? Or was it like that of the dentist's, dirty and scary? One of the things I was afraid was getting up early and always wearing a suit and a tie. Under that kind of shallow formality and the rigid work schedule one would surely lose freedom which was held so dear to the scientist.

Things turned out better than I had expected. After spending a week on the beach and at the Disney World in Florida, I joined Merrill Lynch and soon became used to the 8am to

7pm work schedule. Every morning, walking through the corridor from the World Trade Centre subway to the World Financial Centre was a titillating experience. I felt the action, the power, and the sense of modernisation. The first paycheque made the entire family smile. My initial assignment was to build French yield curves and produce relative value analyses. Together with a former Princeton physicist we created the Merrill Lynch Exponential Spline Model, which by this day has been widely applied. I found enjoyment and satisfaction. In the financial world, we could work on important and useful projects that could be accomplished easily in elegant ways. The research papers we wrote were read by most of the analysts, traders, sales persons, as well as select clients. The kind of recognition of our works was not possible if we had stayed at universities.

In the beginning I took it as a job opportunity. Gradually I realised that I had a career in this industry. The field of applied finance needs well-trained and disciplined professionals like us. Finance is becoming a science as the market is getting more and more efficient. A scientist can bring the scientific method to financial modelling and applications. Instead of quitting on science, we are transforming applied finance into a new branch of science, meanwhile renewing ourselves as pioneering scientists in a field of practical importance. Moreover the intellectual challenge is not at all second class. Interest rate theories are just as difficult as theoretical physics.

In January 1995 I was promoted to Vice President. By then I understood what it meant. Rumours were that, in the late 80s, as profits were low or even negative, Wall Street firms did not have money to pay bonuses. Instead they awarded employees AVPs (assistant vice presidents), VPs, or even FVPs (first vice presidents). Some people joked that those titles actually meant “almost a virtual person”, “virtual person”, and “full virtual person”. Scientists should not be impressed by names without substance. I was amused by the following experience in connection with those false titles. I went back to China after Merrill Lynch Chairman and President Dan Tully visited Beijing. One of my friends asked me, “I saw your boss on TV last week. Why didn't you come with him?”.

Raj was laid off three months after hiring me because of politics that I never completely understood. There was a dynamic side and a dark side to the enterprise. He was certainly as competent as anyone else. He was from India, obtained the BS at the age of fifteen, Ph.D. in materials science from Berkeley at age 20, and by then was already in the finance industry for 8 years. He started the group about 3 years earlier. It was glorious in the beginning. Even David Komanski (now the president) stopped by to shake hands with everyone in the team. Later on one of his competitors became his boss, and then his boss's boss. Rivals were hired to take on part of the projects. His position became less and less significant, until it was eliminated. In the four years 11 out of some 15 immediate co-workers of mine had moved. Some fired, some laid off, some moved to other groups, and others hopped to other firms. At one time our group was down to my boss and me. Then we revived and flourished. In the end, I was the only person among my ex-physicist friends who had not switched jobs.

There were indeed lots of work and pressure for anyone in the industry. First of all everybody understood that a part, or most part, of the compensation came from the year end bonus that was actually paid in February the following year. In this way managers had good control of their underlings. As regards to work schedule I was certainly among the luckiest. My boss was a reasonable man. Genuinely enjoyed my work and produced fast, I could not recall a single instance of being pushed to do something. Once in a while I worked long hours and went to the office on weekends mainly because I wanted to do so. In contrast one of our neighbour groups was managed by a true martinet. People in the group were mostly single young kids a few years after college. It was rare if they ever left work before 7pm. Some routinely stayed until midnight and never missed a weekend. The dozen or so employees in the group worked on a huge project that intended to build an all-purpose financial application which had become too clumsy and outrageously complicated. Still worse, all the original developers had left. Newcomers did not want to touch the accumulated mess, but instead they added layers after layers of new gizmos around it. It was most like a bursting bubble, doomed to explode. They would not quit because there was already too much put into it. As a general rule, when you saw people needed to work that hard, there must be something wrong with it. We understood that the industry was definitely not a "9 to 5" world. Everyone had to figure out a way to protect himself from being whipped at. From cool-eyed observations and sharing thoughts with the more experienced veterans, we compiled a few rules for our own protection: (1) come extremely early or stay extremely late occasionally, (2) on most days work at the industry's norm of 10 to 11 hours, and (3) take it easy on half of the day, for always working hard creates the impression that you are not up to the task, therefore cannot be squeezed further if needed. Under the financial world's harsh conditions, for survival, one needs to be scientific and philosophical.

The bright side was that the pay did not stay low. Among two dozen research papers I wrote, two or three were called million dollar papers, because they had helped the firm's business in many ways. I certainly deserved a fraction of that result. With a scientist's modest expectations, the bonus checks always came larger than expected. Over the years I was unmoved by all the winds and waves because I totally focused on the work. Much of what I did was rather like scientific research. I tried to quantify financial concepts whenever it was possible, formulate ideas in simple and practical mathematical terms, and always offer the results to the front-line practitioners for criticism and application. The apex of my career at Merrill Lynch was reached when I travelled to Paris, Frankfurt, and London in May 1997 for a marketing mission to promote the application of our yield curve model, two-factor hedging method, and international bond market trading strategies. In London more than 30 traders and salespersons attended my presentation. In this land of opportunity, if you have a great idea, you will always find people who will take it seriously. As the models became widely applied, the firm as well as the industry began to recognise my contributions. In time the Strategic Research Institute of New York, the International Institute of Research (IIR), the International Communications in Management (ICM), and the RISK magazine all invited me to give talks at conferences and workshops. At those meetings I became friends with those eminent researchers such

as Lane Hughston of Merrill Lynch London, Peter Carr of Morgan Stanley, Professor Mark Broadie at Columbia University, and Professor Alexander Lipton-Lifshitz at Banker's Trust. The atmosphere was exactly like that in physics. I no longer felt isolated and guilty as I had left the academia. Gradually I have become part of the elite circle of distinguished researchers in the finance industry.

My smooth track at Merrill Lynch started to diverge when Lane Hughston introduced to me the new proprietary trader, Achilles, in March 1997. Connie had come from London to New York as the head of everything. He was a super trader who now became the king. Merrill had always been against proprietary trading. Now it was again the time to restart the effort. He hired Achilles to start a prop trading group in New York, and Achilles was no ordinary man. He got a computer master degree from Stanford, Ph.D. in applied mathematics from MIT, taught at Stanford, worked as a researcher at Bank of America, and as a trader at a Spanish bank, he made 10 million for the firm in 1996. He was ready for big-time action at Merrill Lynch. We soon became good friends and together wrote a two-page paper titled "The Holy Grail". For the first time we found the way of systematically arbitraging the global fixed-income markets. We applauded when it was finished. The theory was so simple, practical and elegant. A computer search of the market every day according to the paper revealed all the possible two-factor risk free trading opportunities. It also revealed that the US Treasury market was very efficient. Instead of being able to make mountains of money, we would be able to make tons of money. I always believed that in the financial world one would have to make some trades at least for the sake of the first-hand experience. Without doing a trade in the finance industry is like being a soldier without ever firing a gun. Achilles offered me the opportunity to realise this dream. He let me put on two German and one US trades I identified as profitable. On the hoot box, we asked the Treasury market-making traders: "Can you give me three prices? I want long 42 million six and five eighth of July 01, 88 million six and seven eighth of Auggy 25, and short 100 million of 9 and seven eighth of Nov 15." The voice promptly responded. We quickly checked the prices, and a moment later, he said "Done". It was that simple. The trade made about 110 thousand in 4 days.

Achilles had become more like a trader than a scientist. Somehow his looks and talks reminded me of Mike Corleone in the God Father movie. He said years before he became tired of talking about trades and wanted to be a risk taker. Some of his strategies I felt not a 100% in agreement with. They were not at all the safest ways of doing things in the world. He usually monitors the historical relationships among significantly different financial products, then puts on a few million dollar worth of risk if he spots something extreme. He likes to double up if things go against him. Once I went down to the trading desk for a chat with him, he asked me to eat from the bag of peanuts on his desk. We were cracking the peanuts and talking about the German trades we put on when he turned his head to look at the screen and said, "Now we are down 18 thousand". After cracking another peanut. He looked again and said, "We are up 10. It's not worth my time and your time to look at it".

The plan was for me to quit research and join him as a prop trader. But a manoeuvre as such was not the easiest thing in the world. Simply put, the research would not let me go. Archilles said I would have to quit the firm in order to make this possible. It just happened that a lady managing director of a top executive search firm called me and over lunch at the Millennium she persuaded me to interview with Swiss Bank's Treasury sales and trading department. I did not expect that SBC considered about forty candidates and finally offered me the job.

Merrill Lynch tried everything they could. They gave me three choices: stay with research as director of quantitative trading strategies, be a co-head of the swap desk, or join Archilles as a prop trader. Finally I got it! The dream job, the best job possible on the street, except a top manager's. A lot of people, including the MBAs from Wharton, Chicago, and Harvard were striving for such a position. Above all, it was at Merrill Lynch, one of the two or three best firms in the industry, and the swap desk was the heart of the business that made over 300 million dollars last year. After all, I was never unhappy at Merrill. They had treated me well. Three days after I broke the news, in that fateful afternoon, Flavio, the head of all trading and Connie's right hand man, sent the message through Archilles, that he would leave for the airport in two hours' time, and that after he was gone my destiny would not be changed. Looking at the book of papers and reports I wrote, I burst into tears. It was incredible that I had achieved all that at Merrill Lynch. It was emotional. Without the firm, I would have still been nothing. Two hours later, Flavio left for London. That evening I felt extremely sad.

I joined Swiss Bank in July 1997, to start a quantitative analysis group for global Government markets sales and trading, with the ambitious plan to help build a strategic proprietary trading core group like that of the Salomon Brother's. Swiss Bank's investment banking division is a growth company lead by people with a great vision. Just completed with the newest technologies, the Stamford North America corporate centre will recreate the Swiss culture in the US. I don't need to wear a suit and a tie. One of a kind, the football-field-size trading floor with 5 story high ceilings is the largest in the world. It is futuristic. Finally I have become a leader and a frontliner. It is routine now for me to recommend trades. The goal is to direct an army for making the shooting, and from time to time, fire a few shots myself if it is preferred.