Chapter 21

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I wasn't raised to be a quant. My childhood milieu recognized two professions as legitimate: doctors and lawyers. In spite of an early interest in science, and an aptitude for well-formulated expressions of antagonism, I wasn't attracted to either one.

Mathematics took a while to tighten its grip on me. I became interested in economics in high school to the increasing the puzzlement of my family. In spite of the reputation of economics as a somewhat quantitative discipline, I had little interest in mathematics. I did well in algebra and geometry, but to this day I have some problems understanding trigonometry, which has always seemed somewhat mysterious to me. My indifference to mathematics continued through college. I had the additional good fortune to attend a university that had abolished all quantitative requirements for an economics major.

How Not to Get a PhD

Graduate school broke in on my mathematical slumber like a death knell. In the first of three attacks, the last successful, upon the task of gaining a doctorate, I enrolled at Princeton. This institution was apparently as unaware as I was of my lack of preparation for graduate work in economics. My first inkling of the gravity of the situation came on my first day of class, in Microeconomic Theory. The professor drew the letter A on the blackboard and described it as a *matrix*. I had vaguely heard of matrices, which I thought had something to do with either biology or sociology, but never as a mathematical concept. The letter surprised me; I would have expected a picture of a box or a beehive.

Rudely awakened, I began a speed course in math. Alpha Chiang rescued me from what seemed a certain fate. I learned most of the math I know today in the next two months. In spite of the circumstances, I even found the experience enjoyable. Like Winston Smith via Room 101, I learned to love mathematics. I completed the academic year honorably, left the university, and spent the next decade wandering around the Middle East and Europe.

In the course of my wanderings, I sojourned at Ludwig-Maximilians-Universität in Munich, less well-known as a center of economic research than as the place where Sophie Scholl distributed anti-Nazi leaflets on a Thursday in 1943, leading to her execution the following Monday. At the time, West Germany provided a free education, residency, and work permission to qualified foreign students. I doubt I fit the profile of the intended beneficiaries.

My romance with the mathematical sciences continued. To finance my studies, I worked with a professor attempting to demonstrate the existence of business cycles of fixed periodicity, a theory that had the benefit for me of requiring an almost infinite supply of research assistant and computer time. Economic science may have benefited less.

Computers were becoming rather a big thing at this time. My first encounter with them, at Princeton, had been via punch cards, which I still remember fondly. They ordained a certain parsimony and elegance in programming, like having to write with a very thick pencil.

It was swell to be an American in Europe during the Reagan era. My fellow students saw the United States as a fascist state likely to turn

their continent into a sheet of radioactive glass. I respected their views, since they seemed to be more conversant with American popular culture than me.

How Not to Get a PhD, Continued

After harvesting a degree from Munich University, the time came to return to the States and see if I could earn a living. Although it had nothing to do with my personal choices, The Great Moderation had begun, and the prospects for finding work were far better than during the leaden 1970s. Back in New York, my first job was as an economist at the Federal Reserve Bank of New York, in a department quaintly named the Industrial Economies Division, in contrast to the Developing Economies Division. Today, I suppose, I would be working in the Service Economies Division and the emerging markets area would be Industrial Economies Division. The group's responsibility was to forecast GDP growth, inflation, and macroeconomic conditions generally in Western Europe.

At the same time, I enrolled, again, in a doctoral program in economics, this time at Columbia University. Even against my history of poor choices, the decision to simultaneously begin a PhD program and a professional career stands out. I didn't receive a degree for another decade. I took as my dissertation topic monetary issues in Europe, where several industrial economies still remained.

Years passed, and the fascination of watching the dollar and the price of oil fall began to fade. I switched to a different department at the New York Fed, this one tasked with studying financial innovation. It had its origin in a Bank for International Settlements group that also had a quaint name, the Eurodollar Standing Committee. The Committee dated back to concerns about one of the first great financial innovations of the postwar financial system, the Eurodollar market.

Today the Eurodollar market would hardly evoke a yawn from most observers, but at the time the central bankers meeting in Basel took an interest, it was considered a great mystery and even a threat. The Eurodollar market had arisen as a side effect of the U.S. current account deficits that had brought down the original Bretton Woods system, it

appeared to threaten a loss of the Federal Reserve's ability to limit the U.S. money supply, and to top things off, the Soviet Union and later the oil exporters were among the largest depositors.

In my new role, I searched for reasons to worry about financial innovations that, like the Eurodollar market in its time, were poorly understood, and that with some imagination could be seen as potentially harmful. In particular, I studied newfangled currency options such as average-rate, basket and barrier options. And, like the Eurodollar market, these now seem about as threatening to financial stability as a plate of pasta.

This was my first encounter with modern finance. The theoretical and institutional basis for it had been established over the previous two decades, and it was just beginning to emerge as a really large field. I found it attractive because it is pretty and has a lot to say, though admittedly about a very small field of human activity.

I also made my first acquaintance with a new discipline within finance, risk management, through which banks involved with new financial instruments were trying to cope with difficult-to-understand exposures. My boss at the time was excited by a paper he'd received from First Chicago, outlining an approach to measuring the volatility of a derivatives portfolio using the variance–covariance matrix of the positions' underlying returns. Value at risk seems to be one of those ideas simultaneously and independently born in a dozen brains. I personally know several people who discovered it.

I continued to meet my new objectives of acquainting myself with modern finance and my old one of procrastinating on my dissertation. A new opportunity for delay arose in the New York Fed's foreign exchange department, which had decided that economists might make good foreign exchange traders.

The New York Fed's FX desk is responsible for carrying out currency intervention operations on behalf of the U.S. Treasury and the Federal Reserve System; the Treasury owns the policy, the Fed the machinery. Most of the Fed's FX transactions are essentially commercial, executed on behalf of central banks that deposit reserves with it. By volume, however, the sporadic but large policy-driven FX market interventions predominate.

I had the good fortune of arriving on the desk in mid-1992, in time for a sustained bout of intervention in support of the dollar that lasted until early 1995—in fact, the last such sustained sequence to date. Intervention appeared to occur primarily to allay policy makers' fears that markets would get the impression that nobody's home, rather than to reach or defend a particular exchange rate level.

Participating in the FX market brought me back to the perennial economists' debate over market efficiency. My observation was that they are, but that there is a messy and hard-to-understand process for percolating information among participants. Sooner or later, market participants changing positions and investing a lot of resources get the market close to the right price, but no price is right for long. What is different about a day on which buying $100 million doesn't prevent the dollar from falling 2 percent and a day on which buying $50 million drives the dollar up 3 percent?

An episode I found instructive took place in the summer of 1993. The yen had been accelerating a steady rise against the dollar, and the Treasury did not want the exchange rate to go below 100. As it happened, the entire Fed trading room was either on vacation or otherwise engaged, apart from myself and another trader. We received a fairly large authorization to buy dollars. On the first round, the dollar rose much more sharply than we anticipated, and the markets were convinced that we had bought a large multiple of the actual intervention. We stopped buying, but the dollar kept going, and rose 4 percent (about six to eight standard deviations). Needless to say, on other days, an intervention many times larger had no impact on the market.

I grew increasingly interested in using market prices to draw inferences about what the market is thinking about future prices and the balance of risks. Our FX counterparties sent us reams of faxes each day reporting on the markets, including runs of currency option prices. One option combination, the *risk reversal,* by which counterparties trade an out-of-the-money call for an equally out-of-the-money put, was particularly intriguing, especially since no one in the trading room had a clue what it was. Once I understood what this beast was, I realized that it had a lot of information about the probability distribution of future exchange rates the market carried in its collective head. It even lined up well with

odd outcomes of currency market interventions. I spread the word to Fed and foreign central bank colleagues, one of whom charmingly and appropriately referred to this option combination as a *role reversal*.

In a moment of rapture, I also realized that I could write my dissertation on this. My topic, after all, was on forecasting realignments in the European Monetary System. I had flailed around for years with various regressions and Kalman filters. My advisor, who had previously shown no great enthusiasm for my infrequent visits, heard me out on the subject of risk reversals and told me I'd be done as soon as I wrote it up. And so it was. I got my degree a few months later.

RiskMetrics' Salad Days

By the time I took this step toward certified quanthood, I had been at the Fed for close to a dozen years. I started to make discreet inquiries regarding alternative employment possibilities by telephoning every finance and economics professional I had ever even fleetingly met. I was particularly interested in risk management.

I eventually landed at Credit Suisse First Boston for an interlude as a fixed income risk manager and for a bizarre experience of management at its worst. The head of risk management thought I was quite a find, but hadn't thought to ask my future immediate supervisor if he agreed. Nor did he think it necessary to have me meet in advance with my own direct reports. The range of his outside activities also impressed me, and I understand he later left the firm under a cloud.

I did, however, learn one vitally important lesson: It is far more difficult to create a system that delivers even simple risk information than it is to invent interesting statistics. In fact, most of my time was spent chasing down files from dozens of First Boston systems, some of them dating back to the colonial era, all of which had to enter the grand central processor before one could reliably say anything about the portfolio.

Fortunately, a group at J.P. Morgan dusted off my resume, which had continued to molder on various desks around Manhattan. The group was responsible for consulting on risk management to Morgan's external clients. It was also the custodian of an Excel-based value-at-risk

calculator called Four-Fifteen, named after the time of day by which risk reports ought rightly to be delivered, and of a production process for variance-covariance estimates for several hundred market risk factors, updated daily. In September 1998, it spun off as an independent, privately owned company, with me among the initial 25 members.

The spinoff took place close to the height of the first Internet boom, a time at which companies that had a single ridiculous idea could trade publicly at equally ridiculous valuations. RiskMetrics Group had many ideas, and only a few of them were ridiculous. Initially, we were harbored in Morgan's Wall Street headquarters, and our startup tech company atmosphere stood in marked contrast to staid Mother Morgan.

We were not the first company to specialize in risk measurement and reporting software, but the existing systems were heavy and costly to install and maintain, and were therefore commercially vulnerable now that delivery of information via the Internet was becoming feasible. RiskMetrics grew steadily, to over 200 people and many millions in revenue at the time I left, but it never quite lost the campus feel of a tech company.

Changes in the regulatory environment were also helpful to RiskMetrics' business. The Golden Age of Bank Supervision was arriving, when it seemed as though a stable relationship would be established between regulators and financial institutions. The regulators would finally get their arms around what those traders were up to, but the markets would be free to innovate. The regulators would use subtle, indirect tools such as capital requirements, rather than the blunt tool of prohibition.

The new approach started in the 1980s, as a reaction to a series of bank crises, focused in different phases on a range of bank assets, from real estate loans to emerging-market debt. By the time these crises had passed, banks had turned themselves from lenders into packagers of loans, investors, and providers of services. Regulators shifted the focus of regulation from static rules and solvency tests to capital adequacy, and eventually, to capital tests based on risk measurement. If we're going to protect banks with deposit insurance and an implicit too-big-to-fail guarantee, they said, let the banks run themselves so as to minimize the likelihood that their equity disappears and the taxpayer steps in. From RiskMetrics' point of view, it was easier to sell risk analytics to satisfy a regulatory requirement than purely on the strength of the information.

No More Mr. Nice Guy

My most recent shift has been to the hedge fund industry, as the risk manager for the Clinton Group. After the sedate and thoughtful atmosphere of an analytics and research company, a hedge fund offers a refreshing cold plunge.

Hedge funds are the most recent financial innovation to be digested by the broader public. They are nonetheless a fairly old institution—in fact, almost as old as the Investment Company Act, which didn't anticipate them. I suppose that makes them the world's second-oldest form of pooled investment. But they have become an important financial services sector only in the past two decades or so. Among the main drivers of their growth have been the development of derivatives and structured products and the finance theory that supports them, since these products provide the perfect playing field for hedge funds, and mutual funds aren't well situated or permitted to get involved. The other main driver of growth has been the fact that the world is becoming both richer and less volatile, driving down risk premiums and returns on conventional assets and making it harder for individuals and pension plans to profit: it used to be much easier to be a rentier.

Hedge funds have always practiced risk management, in the sense that they examine their portfolios carefully to make sure that the risk/reward relationship is the one they want, and that they don't blow up. But as long as the money belonged to the manager and a few other people, and the fund was not that large, this could be done by inspection. As hedge funds have grown, and as they have begun to enter institutional portfolios, the need for a specialized risk management function has grown.

The role of risk manager in a hedge find has a number of benefits. For one thing, all of the traders hate you. Another is the fact that, in the nature of random things, the worst loss is always in the future. Best of all, I can experience first-hand the limited usefulness of quantitative information.

On this sobering topic, I've drawn two main conclusions. First, without quantitative information of some sort about the portfolio, a risk manager can't know or do anything. Yet almost all the information one generates is deeply flawed, and is more likely to be flawed, the more

sophisticated it is. Second, not only is it inevitable that the information is deeply flawed, but it is also not such a bad thing.

I've been fortunate to be in at least some of the right places at the right time: at the Fed during the Golden Age of Supervision, at RiskMetrics during and after the technology bubble, and at a hedge fund during what may prove the heyday of hedge funds. Perhaps it's the distorted perspective that comes from studying modern finance too much, but it seems to me that my career has been driven a lot more by my response to random events and larger forces than by my personal attempts to shape a path. Almost like life.