**Modern Risk Management : Collective Evolution of a Paradigm**

During the 1920s, the US financial markets, in particular the securities market, were mainly self-regulated. According to Dale (1996, p.60-61), the New York Stock Exchange imposed capital requirements on its member firms. Firms held a percentage of 10% of customer receivables and proprietary positions as capital. By 1929, the New York Stock Exchange had established well defined capital requirements. According to Holton(), this requirement was the beginning to what will evolve later to become capital requirements for financial firms. It also evolved into the Value at Risk model that financial institutions use these days.

Prior to 1933, US securities markets were largely self-regulated. As early as 1922, the New York Stock Exchange (NYSE) imposed its own capital requirements on member firms.1 Firms were required to hold capital equal to 10% of assets comprising proprietary positions and customer receivables.

During the 1920s in the United States, the stock and real estate markets were experiencing a boom in their activities. Millions of American citizens started depositing their saving in the commercial banks. These banks however were using this money as a collateral against the bets in stock and financial markets. Citizens had no legal protection against what commercial banks were doing and the separation between investment and commercial banks were absent. Kuhn Loeb, Lehman Brothers, Goldman Sachs, Brown Brothers Harriman and of course Jp Morgan & Company were some of the most recognized names of what had become an American elite. In the 1920, the financial power of these Wall Street bankers grew in an astonishing way, gaining economic and political power.

One of the biggest targets of criminal investigation was always the financial empire of JP Morgan whose bankers sat on the boards and directorships of many American industries and firms. Jp Morgan had a network of overseas business deals. It had many important investments in Britain. This European styled bankers aristocracy shaped the trends and opinions of the so-called American elite.

London monetary financial conference (which Roosvelt refused to attend) <https://en.wikipedia.org/wiki/London_Economic_Conference>

During October 1929, the stock market in the United States collapsed, losing close to 20% of its value . American banks were severely hit by that crash who experienced heavy loses on proprietary stock investments. Driven by the fear that banks will not be able to guarantee money in their accounts, depositors panic causing ‘run’ on banks. The result was that thousands of US banks failed.

1933 : Glass Steagall Act. Any investment house cannot engage in deposit activities and commercial banks cannot deal in securities underlying and dealing. Glass Steagall Act established deposit insurance. Chase National Bank and the National City Bank both dissolved their securities businesses. Lehman Brothers dissolved its depository business. The First Bank of Boston split off its securities business to form First Boston. JP Morgan elected to be a commercial bank, but a number of managers departed to form the investment bank Morgan Stanley. The 1933 act focused mainly on primary markets for securities where the goal was to ensure that information related to publicly offered securities is disclosed.

**1934**: Securities Exchange Act. This act targeted secondary markets to ensure that securities traders (brokers and dealers) act in the interest of investors. According to this act, the Securities and Exchange Commission was established as the main regulator of US securities markets. The SEC was given authority over securities firms which included investment banks. The SEA imposed a modest capital requirement on securities firms (Holton and check the literature). No indebtness in excess of 2,000% of firms’net capital. This requirement limited the amount of liquidity available to firms, but guaranteed that firms had less money to engage in stock market speculation.

**1938** : Maloney Act : this act gave Self-Regulation Organizations (SRO) the right to directly oversight securities firms under the supervision of the SEC. SROs came to include NASD and other exchanges. In 1938, the securities exchange act was modified to provide the SEC with the authority to impose its own capital requirements on securities firms. The SEC started to develop what is called Net Capital Rule.

1944: The SEC excluded from their Net Capital Rule all firms whose SRO imposed more comprehensive capital requirements. The NYSE requirements imposed on its member firms were deemed to meet this criteria. In the same year, the SEC modified its Net Capital Rule to subtract from net capital 10% of the market value of most proprietary securities positions held by a firm. This haircut afforded a margin of safety against market losses that might arise during the time it would take to liquidate such positions. In 1965, the haircut for equity securities was increased to 30%.

**July 1944** : Bretton Woods

During the 1970s, important steps were achieved towards the emergence of what would be later called “Financial Risk Management”. On the theoretical level, the black-scholes model was the main financial innovation.

**1952 Harry Markowitz : What is Risk ?**

In 1952, Harry Markowitz publish a paper in the Journal of Finance about what would will be the main building block of modern financial theory: portfolio theory. During his academic career at the department of economics at the University of Chicago, Markowitz favorite topics was the economics of uncertainty. Working for his PhD thesis, Markowitz got interested in answering the question of how investors in financial markets make (or ought to make) their decisions to buy or sell? To answer this question, Markowitz assumed that investors base their decisions on reward, risk and diversification. Reward for Markowitz was to be perceived as the most likely price at which an investor can sell her stock. Most likely would mean the average price that the stock would hit before an investor sells. Risk on the other hand was modeled as the variability of the stock price around its expected value (mean). Markowitz defined risk as the variance of stock price around the mean, thus founding his portfolio theory on the bell curve (normal distribution). In this way Markowitz reduced the problem of financial investment to choosing two numbers: mean and variance. The third ingredient of Markowitz’s theory is diversification. Since stocks tend to move together in similar or opposite direction, investors can calculate the covariance between them and combine stocks which result in an aggregated portfolio risk lower than the sum of individual risks. Thus the term diversification was born. A portfolio that maximizes the expected return for a given amount of risk is called an ‘efficient portfolio’ and if we plot the chart of all efficient portfolios, then the resulting pattern is called ‘efficient frontier’. For Markowitz, investors choose their efficient portfolio based on their risk aversion.

**1964 : William Sharpe : What is an Asset Worth?**

In 1960, William Sharpe approached Markowitz to ask him for suggestions for his this research topic. Agreeing to help, Markowitz proposed that Sharpe work on the idea of simplifying portfolio theory. Sharpe asked the following question: what happens if everyone in the market plays by Markowitz theory? The answer was interesting. There will be not many efficient portfolio but only one, which Sharpe called ‘market portfolio’.

Sharpe thought that if all that matter is market portfolio, then the value of individual stocks depends on who it behaves in relation to the rest of the market. If a stock plummets 4 percent when the market drops by 2 % is not attractive because it amplifies market’s movement, thus it is likely to have low value. On the other hand, if a stock loses 1% when the market drops by 2% is very attractive one, thus it should have higher value. The amount by which a stock react to market moves is called Beta. Therefore, to buy a stock Sharpe’s theory suggests that it should pay as much as a risk-free treasury bill plus (the stock’s beta times the equity risk premium which is return paid by stock markets in excess of risk free return. The concept says that the more you risk, the more you should expect in return and as investor the most important risk that you face is the general movement of the market. This theory was called by Sharpe Capital Asset Pricing Model (CAPM). The reason why CAPM became popular is that it reduced the number of calculations that Markowitz’s portfolio theory would require. For example, if we have a 30-stocks portfolio, then with Markowitz portfolio theory we would need 495 calculations (30 means, 30 variances and 435 covariances). However, with CAPM we would need only 31 calculations (one forcast for the market and 30 estimations of the betas of each stock). At the same time, Jan Mossin and John Lintner were independently pursuing similar ideas and later the CAPM came to be jointly accredited to all three. Soon after the publication of CAPM, several financial firms like Merrill Lynch, Pierce, Fenner and Smith; Wells Fargo Bank and Value Line turned the CAPM into an industry and started producing regular Beta Books for brokers and customers who were willing to do the math themselves.

**1960s and 1970s:** the term risk management is not completely new. It has been used for long time to address property and casualty contingencies. According to Dohetry (2000), organization were already making use of risk management as an alternative to insurance. This included risk reduction techniques like quality control and hazard education, self-insurance and captive insurance (Holton) . such measures, together with conventional insurance, were referred to as risk management.

**Late 1960s : Paperwork Crisis.** In the period between 1967 until 1970s, the New York Stock Exchange saw a notable increase in trading volume. Being highly unexpected, securities firm found themselves unprepared and without the necessary technology and staff to handle the increased workload. Processing trades and maintaining client records became confusing for back offices. Errors increased and this led to more loses. As a consequence of this “Paperwork Crisis”, NYSE was forced to reduce its working hours and even close one day a week to allow stuff to do paperwork[[1]](#footnote-1). Some firms started to invest heavily in technology but in 1969 the stock market fell and the combined effect of increasing loses and expenses led to the failure of some firms while some had to merge with others. Even the NYSE trust fund, which was founded in 1964 for the purpose of compensating clients in case a member firm fails, was exhausted.

**1970**. In the aftermath of the paperwork crisis, the Securities Investor Protection Corporation was created. The Securities Investor Protection Corporation (SIPC /ˈsɪpɪk/) is a federally mandated, non-profit, member-funded, United States corporation created under the Securities Investor Protection Act (SIPA) of 1970[1] and mandates membership of most US-registered broker-dealers. It is not a self-regulatory organization (SRO).[2] "The SIPC fund, which constitutes an insurance program, is designed to protect the customers of brokers or dealers subject to the SIPA from loss in case of financial failure of the member. The fund is supported by assessments upon its members. If the fund should become inadequate, the SIPA authorizes borrowing against the U.S. Treasury. An analogy could be made to the role of the Federal Deposit Insurance Corporation (FDIC) in the banking industry."[3]

As a consequence of these actions, it was deemed that the NYSE had failed to successfully enforce its own capital requirements. With the failure of NYSE trust fund , it was clear that NYSE did not want to lead member firms to liquidation. This passive position would mark the end of Self-Regulation Organizations’ authority to set capital requirement for securities firms.

**1973 : Black-Scholes : What is risk worth ?**

Beginning from 1973, the Chicago Board of Trade introduced a new class of options: stock options. An important question was then ‘how to determine the premium or price of a stock option’? The economist Fischer Black was among the first to think about this problem. A common idea was that in order to know the value of an option today, we have to know how much the underlying stock will worth at expiration. However, if we were to know how much the final price of a stock would be then there will be no need for option. Black tried to model the pricing of option premiums using differential equations, however not being able to solve these equations, he decided to stop working on it. During a workshop on finance, Black met with MIT professor Myron Scholes with whom he would resume working on his option pricing project again. Black and Scholes proceeded as follows: instead of trying to know what the final price is going to be, an option can be priced based on what traders know (i.e. strike price and time to expiration) and the volatility of the underlying asset. if a stock has very low volatility, then its out-of-the money option will not have much value, while if a stock has high volatility then it is very likely that the price can go up or down, therefore increasing the value of options on that stock. Moreover, as the option approaches maturity and stock price moves the option value changes accordingly. The Black-Scholes formula permitted the same and frequent calculations and recalculations as of value in line with the market. An important assumption in Black-Scholes formula is the normality of stock return. With few years after the publication of the Black-Scholes formula, traders and corporate financiers would start buying and selling hedge instruments on a routinely base.

**1975 : The SEC’s Uniform Net Capital Rule**

In 1975, the SEC implemented a new capital requirement rule called Uniform Net Capital Rule (UNCR) which would apply to all securities firms. The new rule had the same purpose of ensuring that firms had enough liquidity to meet client obligations. Firms were required to produce a quarterly Financial and Operational Combined Uniform Single (FOCUS) report in which they detail their capital calculations. Haircuts were applied to proprietary securities to safeguard against potential market losses. Securities were divided into 12 categories such as government debt, corporate debt, etc. (Holton talks about more this in detail).

Haircut percentages ranged from 0% for short-term treasuries to, in some cases, 30% for equities. Even higher haircuts applied to illiquid securities. The percentages were apparently based upon the haircuts banks were applying to securities held as collateral (see Dale (1996), p. 78.).

**1970s and 1990s** : **Bankers Trust pioneered the development of modern risk management.**

A key figure in the history of risk management is Charles Sanford, who joined Bankers Trust in 1961 as a a commercial loans officer. In 1973, Sanford was promoted as head of Resources Management, the division responsible for trading in foreign exchange, bonds and other short term securities, and for managing the bank funding and investment account. According to Guill (2016), Sanford had a philosophical approach toward risky activities the was based on three principals:

1. Assuming a position (e.g. buying a stock), a trader makes use of the bank’s capital and adds a risk to the bank.
2. Risks are assumed in order to realize an expected return and the higher the risk the higher should be the expected return.
3. Risk taking should be justified based on a consistent view of what would be considered minimum return for similar risks that shareholders require.

Following this logic, Sanford set the stage for establishing a risk culture that related risky transactions with the bank’s capital and, as a consequence, to the shareholders capital. The idea of Sanford was to then allocate bank capital to the different activities based on the risks inherent in them. This way of allocating capital was called ‘risk capital’ or ‘economic capital’. By comparing the return generated by an investment to the required economic capital, Sanford’s method produced a measure of the risk-adjusted return on capital of that investment. Maximizing risk-adjusted return on capital became equivalent to maximizing shareholders’ return on investment. The resulting method became called RAROC, i.e. risk-adjusted return on capital. The move to RAROC made it clear that a measure of risk is needed to calculate the inherent risk in individual transactions.

By mid-1970s the RAROC was applied in the Resource Management Department at Bankers Trust. At the beginning, risk was defined as “the maximum potential loss that could occur during a ‘reasonable’ time required to exit trading positions of ‘normal’ size, given post-World War II market experience.” The bank would hold an amount of capital equal to the maximum estimated loss of a position the pre-tax RAROC was calculated as the income (gain or loss) realized from a position divided by the risk capital.

**(Standard-Deviation-Based Measure of Risk) By late 1970s**, Bankers Trust began to use a different and more general definition of risk, replacing the previous one which relied on the maximum loss incurred after the post-world war history. The new measure was based on probability theory, in particular the standard deviation. This measure was independent of historical experience and could be applied to any class of asset. According to the new measure, the value of an asset could be modeled as a random variable that follows a certain probability distribution. Accordingly, risk was defined as the maximum loss that can be incurred over a period of time with a specified confidence interval. Bankers Trust first adopted standard deviation of market value as a measure of risk in 1977-78. (This risk measure will successively develop to become what we know today as Value at Risk). Bankers Trust is thought to be the first to apply such VAR measures in the practical modeling of risk. BT identified four categories of risk (market, credit, operational and liquidity) and for each category calculated the maximum potential loss within one-year period at a 99% confidence level.

**By 1980**, Bankers Trust began envisioning further extensions of RAROC in order to develop “bank-wide system of capital allocation. Among the objectives of the this vision is (1) make sure that capital is allocated to business units based on how much risks they assume, (2) ensure that a minimal return is guaranteed for business units, after adjusting for risk, (3) measure bank performance by taking into account inherent risks, and (4) guarantee that the risk profile of the bank does not favor neither high-risk now low risk activities.

**1977** : lyndyn Larouch warns about the consequences of the architecture of financial system (which was trying to cancel Glass Steagall Act.

We can consider the 1980s as the period in which financial innovation related to financial risk management were growing fast.

When faced with risk, firms need to estimate and quantify how much is the risk they are facing.

**1978 : Group of Thirty is established**

The Group of Thirty, often abbreviated to G30, is an international body of leading financiers and academics which aims to deepen understanding of economic and financial issues and to examine consequences of decisions made in the public and private sectors related to these issues. Topical areas within the interest of the group include: the foreign exchange market, international capital markets, international financial institutions, central banks and their supervision of financial services and markets, and macroeconomic issues such as product and labor markets.

The Group of Thirty was founded in 1978 by Geoffrey Bell at the initiative of the Rockefeller Foundation,[2] which also provided initial funding for the body. Its first chairman was Johannes Witteveen, the former managing director of the International Monetary Fund. The G30's current Chairman is Tharman Shanmugaratnam.[3] Its current Chairman of the Board of Trustees is Jacob Frenkel, and Paul Volcker is Chairman Emeritus.

In the early **1980s**, the language of risk management was not a common practice. The use of the word risk was not frequent for those outside the insurance and part of the investment market.

In **1980** , the high volatility in interest rates caused the SEC to update its haircut policy to reflect the increased risks. This time, the SEC determined the haircut percentage based on statistical analysis of historical security return. The goal was to determine haircuts that with confidence level 95% would be sufficient to cover the losses that may be incurred during the time it would take to liquidate a securities firm in crisis. This period was assumed by the SEC to be 30 days[[2]](#footnote-2). According to Holton, the SEC new measure was in theory a ‘rudimentary VaR measure’. In fact the SEC was asking securities firms to calculate one-month 95% VAR and require them to hold extra capital equal based on the indicated value.

Securities firms became used to prepare and communicate FOCUS reports, and started employing them for their risk assessments. Moreover, firms began to use modified versions of the SEC’s Value at Risk measure for internal risk assessement. Little is known however about the measures that were developed within firms.

**During the 1980s**, the volatility of the economic environment increased and as well the potential for losses. This in part was caused by the emergence of exchange and interest rate volatility following the appeal of Bretton Woods system under Nixon. Another factor was the sustained inflation which in the 1970s. At the same time during the 1980s, additional volatility was faced by fluctuating energy prices. Another important factor was the wave of disintermediation and deregulation which started to take place in the 1980s. “This led to new pressure on funding costs and therefore to pressure on margins”. “Finally, the saving and loans crisis in the United States, in which an entire class of institutions was caught between long-term fixed rate loans and rising costs of funding, demonstrated the need to monitor and control interest income and expenses. Given the possibility of sudden, unanticipated losses, institutions had increased incentives to measure more closely the risks they faced.

During the 1980s, the increasing need for risk management led to the innovation of *Market Risk Management Function* which is designed to handle the risk taking function and work independently from the control function. The need stemmed from the expanding range of risk taking activities as well as the discovery of the risks inherent in the traditional activities of banks.

**1984** : increase for demand and competition provided compelling reasons to appeal Glass-Steagall. Glass-Steagall did not prevent commercial banks from engaging in securities trading outside the US. By the mid-1980s, US commercial banks like JP Morgan, Chase Manhatten and Citigroup had growing overseas securities.

**1986 : The United Kingdom’s “Big Bang”**

Historically, the United Kingdom had no mandatory separation between investment and commercial banking. The only distinction was in terms of supervision. Whereas the Bank of England supervised commercial banks, securities markets were mostly self-regulated. In 1986, a new act called Financial Services Act –also known as the “Big Bang” – changed the regulatory landscape. The act established the Securities and Investment Board (SIB) to regulate securities markets. The SIB delegated much of its authority to SROs, for example it assigned the responsibility for the wholesale securities markets to the Securities and Futures Authority (SFA). Firms who engaged in both commercial banking and securities activities had to supervised by the Bank of England and the SFA.

**1986 Regulators and Bankers Trust.**

During the 1980’s, Sanford and his colleagues shared their risk and research practices with US and foreign regulators. Regulators welcomed the idea of ‘Risk Capital’ and saw it as a promising regulatory standard. The challenges at the time was to conceive of capital adequacy rules that are comprehensive, simple to implement, and at the same time accurate. An employee of name Kenneth Garbade worked at Bankers Trust during that time and as part of his work he was working on developing sophisticated VAR measure for assessing internal capital requirements. Garbade wrote:

*In view of the importance of risk assessment and capital adequacy to regulatory agencies and market participants, it is not surprising that many analysts have tried to devise procedures for computing risk and/or capital adequacy which are (a) comprehensive and (b) simple to implement. Without exception, however, those who make the effort quickly discover that the twin goals of breadth and simplicity are seemingly impossible to attain simultaneously. As a result, risk and capital adequacy formulas are either complex or of limited applicability, and are sometimes both.*

Garbade was working on the US debt market and he calculated the value at risk of bonds by assuming normally-distributed markets and calculating the portfolio standard deviation. With this method, the VAR was calculated using the standard deviation and a 99% confidence level.

**1988 Basel I Capital Requirements.**

On June 26, 1974, That day, a number of banks had released payment of Deutschmarks (the German currency) to Herstatt in Frankfurt in exchange for USD that was to be delivered in New York. In the same day, Herstatt was forced by German regulators into liquidation. Given the time differences, Herstatt ceased operations between the times of the respective payments. The counterparty banks in New York did not receive their USD payments. As a response to this problem, the G-10 countries agreed to form a standing committee under the supervision of the Bank for International Settlements (BIS). The committee was called Basel Committee and comprised national regulatory authorities and central banks. Initially, the primary focus of the Basel Committee was on credit risk and risk-weighting of assets. Over time, the scope and goals of the committee have evolved to embrace issues like ensuring comprehensive supervision on banks by a national authority, promote the convergence to uniform capital requirements to guarantee international competition between banks. Although the Basel committee’s recommendations were not treated as mandatory rules to be enforced by law, national authorities implicitly agreed on implementing the Basel recommendations as laws. In 1988, the Basle Committee published the first a report on the minimal capital requirements for banks. The report was called “*International convergence of capital measurement and capital standards*”. The Basel I requirements applied only to banks and not securities firms. In some countries like the US and Japan, there was already a separation between commercial and investment banks, therefore making it feasible to apply Basel rules in addition to their existing rules for securities firms. The united States had the so called SEC’s UNCR rules for securities firms.

**1989 : JP Morgan Internal Value-at-Risk**

During the 1980s, JP Morgan was developing a firm-wide Value-at-Risk system. Their model included several hundred risk factors and the corresponding covariance matrix. The covariance matrix was updated quarterly using historical data. Positions’ deltas with respect to each risk factor would be reported by each trading at the end of each day. These information were aggregated to express the portfolio’s value as a linear polynomial of all risk factors. One of the various VAR measures used was he 95% one-day USD VAR, which was calculated by assuming portfolio value to follow a normal distribution.

**1990s : emergence of derivatives as the new risk management products**

(check riskmetrics introduction and Weatherstone quotes). During the 1990s, the use of financial derivatives was rapidly increasing. Dealers were promoting derivatives at risk management products. However, a new form of risk management were emerging that viewed derivatives as a risk as much as a risk management tool. The new form of risk management focuses on the importance of reporting, oversight and segregation of duties within firms/ (Holton).

**January 1992 : Gerald Corrigan warns about derivatives risk**

On January 30, 1992, Gerald Corrigan, who was the chairman of the Basel Committee, gave a famous speech at Federal Reserve Bank of New York, of which he was a president. In his speech, Corrigan would set the

… the interest rate swap market now totals several trillion dollars. Given the sheer size of the market, I have to ask myself how it is possible that so many holders of fixed or variable rate obligations want to shift those obligations from one form to the other. Since I have a great deal of difficulty in answering that question, I then have to ask myself whether some of the specific purposes for which swaps are now being used may be quite at odds with an appropriately conservative view of the purpose of a swap, thereby introducing new elements of risk or distortion into the marketplace—including possible distortions to the balance sheets and income statements of financial and nonfinancial institutions alike.

I hope this sounds like a warning, because it is. Off-balance sheet activities have a role, but they must be managed and controlled carefully, and they must be understood by top management as well as by traders and rocket scientists.

**1992** : **UK’s Securities and Futures Authority Rules**

In 1992, the Securities and Futures Authority of the UK adopted a new set of financial rules for securities firms. The rules included capital requirements for market and credit risk. These included a crude Value-at-Risk measure to be used for calculating capital requirement for securities like equity, fixed income, commodities and foreign exchange. The VAR measure of the SFA used concepts from portfolio theory like the distinction made by the CAPM between systematic and idiosyncratic risk. By the 1990’s, institutional investors where already using concepts form portfolio theory. The SFA’s VaR measure came to be called the “portfolio approach” to calculating capital requirement.

**1992 The Basle-IOSCO Initiative**

Given the increasing market risks which banks were assuming, in the early 1990s, the Basel Committee decided to modify its rules to include capital requirements for market risk. Non-banks securities firms would be impacted by this. Historically, capital requirements for banks existed to address systemic risks, while capital requirements for securities firms existed to protect clients who left money on a deposit with a securities firm. The need for harmonization of capital requirement for all securities firms proposed in Europe’s CAD and the increasing risks of trading in illiquid OTC derivatives which posed credit risk for counter parties were two factors that increased the need to consider capital requirements for securities firms. To this end, the Basel Committee and the International Organization of Securities Commissioners (IOSCO) formed a joint committee in 1992. The committee was in front of a hard choice between the CAD’s Building-Block VaR, the UNCR Var –which came to be called the “comprehensive” approach- and the SFA’s portfolio approach. The portfolio approach was rejected for being too complicated. While Europeans gravitated toward the building-block approach, US regulators resisted. The SEC argument was that the building-block approach might reduce capital requirements for US securities firms. Finally, The Basle-IOSCO initiative had failed. In the United States, banking and securities capital requirements were to remain distinct.

Jan 1992 :

**1993 : Europe’s Capital Adequacy Directive**

European countries like Germany, France and Scandinavian countries had a universal banking tradition, which did not distinguish commercial banking from securities firms. Under German law, firms dealing with securities were treated as banks, and therefore supervised by the same regulatory authority. The European Union had a goal of implementing a common market by 1993. To achieve that goal, the EU had to choose between the German model of universal banking and the British model of generally separate commercial banks and securities firms. With the 1993 Capital Adequacy Directive (CAD), the EU market opened towards the German model of universal banking. The directive allowed British securities firms to operate under a separate regulatory framework. The CAD proposed also to harmonize the capital requirements of the British securities firms and universal banks by setting capital requirements applicable to both. Universal banks were thus subject to the CAD capital requirements for their trading activities and 1988 Basel rules for their commercial banking activities. Market risk for a trading book was measured using a crude VaR modeled to reflect a 10-day 95% VaR metric (see Dale p.42). This entailed separate general and specific risk that needed to be calculated with the results summed. This approach came to be called the “building-block” approach.

**1993 : Weakening of Glass-Steagall Act.**

The Glass-Steagall act, which historically was known for its separation between commercial and investment banks, continued experiencing incremental weakening due to regulatory actions on one hand and unanticipated market developments on the other.

Currencies were not treated as commodities under the Glass-Steagall Act, therefore when exchange rates were allowed to float in the early 1970s, they entailed similar market risk. Similarly, in 1933, future markets were very limited and transacted mainly in agricultural products, therefore they were excluded from the Glass-Steagall Act. Generally, the Glass Steagall Act did not anticipate the emergence of active OTC derivatives markets, so the majority of derivatives classes were not included in the Act. As a result, by 1993, US commercial banks were trading actively in the foreign exchange, futures and OTC markets. (maybe the whole section talking about this should be move to 1993). You can call it Weak

**1993 : Wilson’s VaR Measure**

by 1993, several financial firms had already developed and employed their proprietary VAR for market risk measurement and capital allocation. The most common approach was based on Markowitz’s portfolio theory, where a portfolio’s value is assumed to be a liners polynomial of some risk factors. Given the risk factors, a covariance matrix is constructed for them, and afterward the standard deviation of the portfolio can be calculated. If the value of portfolio is assumed to follow a normal distribution, then the quantile of loss could be calculated. At that time, Thomas Wilson, who was working as a project manager for Mckinsey & Co., published an advanced VAR measure. In his paper, Wilson made the first published attempt to reflect heteroskedasticity and leptokurtosis in VAR measures. The author’s implicit assumption that readers are familiar with the concept and use of VAR is indicative of how diffused the use of VAR measures had already become.

Without acknowledging his doing so, Wilson also touched on a philosophical issue of some practical importance. He suggested that the covariance matrix for risk factors actually exists, but that a user may have limited knowledge as to its values. This objective interpretation of the underlying probabilities runs counter to Markowitz’s (1952, 1959) subjective approach, which suggests that the covariance matrix does not actually exist, but is constructed by the user to reflect his own perceptions.

**July 1993 : The G-30 report**

In 1992, Paul Volker, who was then the chairman of the group of 30, approached the chairman of JP Morgan Dennis Weatherstone and asked him to conduct an industry-wide study on the use of derivatives. Weatherstone established an international committee formed of senior managers from derivatives firms, end users, accountants and academics. The output was a 68-page report, published in July 1993 and entitled “*Derivatives : Practices and Principles*”. The report came to be known later as the G-30 report. The report described the current practices in the use of derivatives by dealers and end-users as well as recommendations to help both end-users and dealers manage their derivatives activities. Among the topics that the report mentioned were the role of management and boards, independent risk functions and the risks inherent in derivatives transactions. As for market risk, the report recommended that market risk is assessed using Value-at-Risk and stress testing and that portfolios be marked-to-market daily. The report came to define the new risk management of the 1990s.

**1993 : Till Guldimann Annual Research Conference**

In 1990, Till Guldimann became the head of Global Research at JP Morgan, which is the unit responsible for research activities to promote marketing to institutional clients. In 1993, Guldimann organized a research conference where risk management was the main theme. At that conference, Guldimannpresented JP Morgan’s Value-at-Risk technique. His presentation generated a lot of interest and clients asked if they could buy the system. However, since JP Morgan was not a software vendor, clients’ requests were declined. Guldimann proposed an alternative that consisted in JP Morgan publishing their methodology to their clients who would then implement their own system. JP Morgan would make publically available the VAR methodology, distribute covariance matrices and encourage software providers to develop compatible commercial software.

**1994 : JP Morgan issues RiskMetrics**

The research unit led by Till Guldimann at JP Morgan prepared a detailed document with technical details and a daily-updated covariance matrix for several hundred risk factors. Both were made public over the internet. JP Morgan contracted a public relations firm to place ads and promote RiskMetrics and representatives of JP Morgan went around the world to demonstrate the service. Software vendor would begin developing compatible solutions. RiskMetrics contained original ideas, but the practices it described were already widely used. According to Holton() the idea of linear VAR measure in RiskMetrics was less sophisticated than those proposed by Garbade (1986) or Wilson (1993). However, the important contribution of RiskMetrics remains that it popularized VAR to a wider audience.

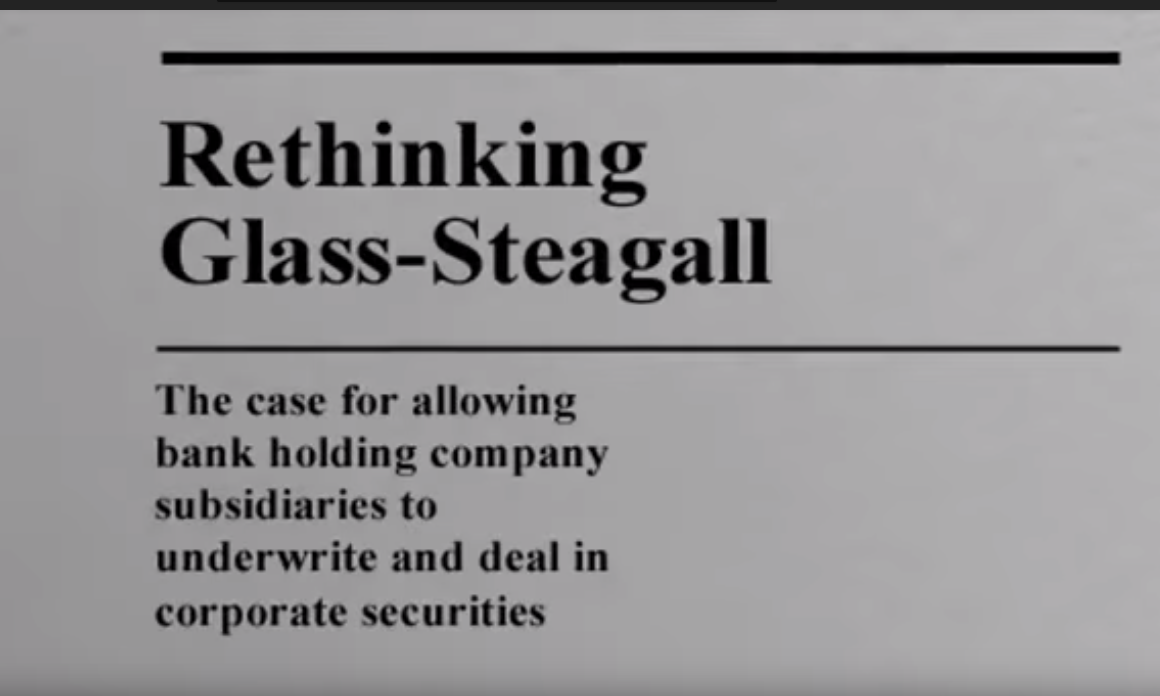
**Early 1990s** : 10 – 15 banks were working on developing risk management technologies.[[3]](#footnote-3)

Alan Greenspan became the hero with Jp Morgan launching a was led by Greenspan. He wrote the below paper in which he evaluated GS and found that it contributed nothing to the stability of the financial system.

The British were dedicated at breaking Brett.Woods as much as they were determined at abolishing Glass Steagall. First they started with Nixon being convinced by bankers to pull the US dollar from the Bretton Woods system 1971 (?). With that the era of speculation started. Currencies will be treated as commodities to be traded on the future market. With the fixed exchanges system abolished, currencies were under assault by the monetary manipulation of the power of the financial system. They created the circumstances by which they could determine the value of a currency. The british empire created an assault team known as the Inter-Alpha Group of Banks (<https://en.wikipedia.org/wiki/Inter-Alpha_Group_of_Banks>).

Jimmy Carter started the wave of de-regulation of rail and trucking act. He passed the Depository Institution Deregulation and Monetary Control Act of 1980. It started from there. The next was Garn Sain Germain Act of 1982 which dealt with the differentiation of saving and loans and commercial banks. With SG, the savings and loans started to engage in speculative activities.

Greenspan was working for Jp Morgan as accountant. he was an adherent of Ayn Rand. She called him the undertaker. After serving for Nixon, Greenspan served Jp Morgan and company where he crafted the document below. Within two years after the publication of his document, Greenspan is the chairman of the Fed. He started the restructuring of the banking sector to take into account the risk sharing advantage of repealing GS Act.



After the crash of 1989 (?) Greenspan created a monetary window for wall street banks to buy the stocks as the market were collapsing. This move set the stage for what would become later the casino stock market and later financial derivatives. Greenspan contributed to the shift from industrial to financial economy.

Greenspan found a loophole found in the Bank Holding Company Act 1956 which vested discretionary authority in the federal reserve board to allow commercial banks to engage in securities trading. The 1956 act was originally intended to strengthen regulation of banking holding company and restrict inter-state banking. Greenspan studied the act very carefully and he discovered that he had the power to permit commercial banks to engage in investment bank (from 5% to 10% to 25%). But with GS , commericla banks had no complete freedom to engage in investment bank

**1998** : Travelers Insurance Company under the chairmanship of a guy name Sanford Vile merged with Citibank. Travelers In. Co owned a brokerage company called Smith Barney (insurance + commercial bank + investment bank). This started a wave of money poured to lobby against Glass Steagall including Citi and JP Morgan (LaRouche was conducting a campaing against this trend)

Clinton : new financial architecture.

Note that during all this period, Britain was a major player in all of this.

**1999** : Gramm Leach Bliley Act (which was pushed out of a conference ) was passed.

Read this : <https://en.wikipedia.org/wiki/Gramm%E2%80%93Leach%E2%80%93Bliley_Act>

Risk

It should be noticed that financial risk management has emerged thanks to a mix of market, institutional and evolutionary dynamics. On the market side, the factors mentioned above. On the institutional side, regulation and academia were the most important driving force behind the development of financial risk measurement. Evolutionary dynamics concern the feedback mechanisms and collective knowledge sharing and observation that characterized the financial sector during the 70s, 80s and 90s.

On the academic side, portfolio theory could be considered the main line of research that contributed to the development of financial risk management. The origins of portfolio theory can be traced to non-mathematical discussions of portfolio construction. Authors such as Hardy (1923) and Hicks (1935) discussed intuitively the merits of diversification. Leavens (1945) offered a quantitative example, which may be the first VaR measure ever published.

Leavens considered a portfolio of ten bonds over some horizon. Each bond would either mature at the end of the horizon for USD 1,000 or default and be worthless. Events of default were assumed independent. Measured in USD 1,000’s, the portfolio’s value at the end of the horizon had a binomial distribution.

Writing for a non-technical audience, Leavens did not explicitly identify a VaR metric, but he mentioned repeatedly the “spread between probable losses and gains.” He seems to have had the standard deviation of portfolio market value in mind. Based upon this metric, his portfolio had a VaR of USD 948.69.

The Markowitz and Roy VaR Measures Markowitz (1952) and, three months later, Roy (1952) independently published VaR measures that were surprisingly similar. Each was working to develop a means of selecting portfolios that would, in some sense, optimize reward for a given level of risk. For this purpose, each proposed VaR measures that incorporated covariances between risk factors in order to reflect hedging and diversification effects. While the two measures were mathematically similar, they support different VaR metrics. Markowitz used a variance of simple return metric. Roy used a metric of shortfall risk that represents an upper bound on the probability of the portfolio’s gross return being less than some specified “catastrophic return.” Both Markowitz and Roy skirted the issue of how probabilistic assumptions might be specified. Roy’s VaR measure required a mean vector and covariance matrix for risk factors. He observed that these must be “estimated from information about the past”. Markowitz’s VaR measure required only a covariance matrix for risk factors. He proposed that this be constructed using procedures that would be called “Bayesian” today: These procedures, I believe, should combine statistical techniques and the judgment of practical men. In a (1959) book, Markowitz elaborated, dedicating an entire chapter to the construction of subjective or “personal” probabilities, as developed by Savage (1954).

The work of Markowitz and Roy were intended for practical purposes, however given the limited computational power and the state of technology at the time, portfolio measures remained theoretical. The was the case with all the papers published on the subject like This encompassed the work of Tobin (1958), Treynor (1961), Sharpe (1964), Lintner (1965) and Mossin (1966), which were published as a contribution to the emerging portfolio theory. In these papers, the application of portfolio theory were mostly intended for equities. Other categories of assets were not considered initially because of practical issues that would have raised at the time.It was until the 1970s that technology allowed for the necessary computations needed to calculate the Value-at-Risk models for portfolios.

In 1973, Black and Scholes published their groundbreaking option-pricing model. That same year, the first registered options exchange, the Chicago Board Options Exchange (CBOE), opened for business.

During the 70s and 80s, a wide range of financial innovations in the instruments market took place, mostly in the form of derivatives like options, swaps, futures and forwards. An important consequence of this wave of innovations was the increasing use of leverage by financial institutions. Organizations implemented leveraging in a decentralized where trader, portfolio managers and product managers were all equipped with a leveraging tool. As a consequence of this proliferated use of leverage, organizations realized that there is an increasing need to introduce a measure of risk.

The traditional risk metrics of financial accounting were ineffective, especially when applied to derivatives. Exposure metrics such as duration, convexity, delta, gamma, and vega were widely adopted, but were primarily of tactical value. Trading organizations started to resemble a Tower of Babble, with each trading desk adopting risk metrics suitable for its own transactions (diversity existed at the beginning). Even when two desks adopted similar metrics, there was no means of measuring their aggregate risks—you can’t aggregate a crude oil delta with a JPY delta. In his paper ‘why we never used the black-scholes-merton formula’, Taleb stated that traders are used to use their own heuristics for quantifying risk.

However, organizations always felt the need for a standardized risk measure. Quantifying risk became the main problem for organizations because expressing risk in quantitative or numerical rather than qualitative terms provides a “*common language*” for risk managers and traders throughout the organization as well as between organizations. In developing risk measurement techniques, market risk management units inside organizations relied to a large extent on the theories and methodologies developed in academia.

One thing to distinguish is the following: innovation can exist anywhere and anytime. In economic settings, innovation is assumed to take place if there it contributes to the maximization of expected return or profits or if there is a problem that for the good functioning of the firm requires some innovation (Talbi from Research Policy).

Financial innovation is the same. Although academic research can be considered an invention which will materialize into an innovation once it is implemented for commercial purposes[[4]](#footnote-4).

By the time financial risk management was developing, and in particular during the 1980s, an important innovation emerged which was represented by ‘independent’ market risk management. During this period, organizations were expanding their range or risk activities, while at the same time discovering existing risks inherent in their activities. By the early 1990s, the major financial institutions had established independent units for managing market risk. In the famous G30 report, it was recommended that firms establish their independent risk functions. The G30 report indicated that at the time of the report 60% of firms already had independent risk functions. The proportion grew to 90% a year later.

Regulators added another impetus by requiring the establishment of independent risk functions in order for banks to be allowed to use their internal models for managing market risk under the Basel accord.

The value-at-risk (VaR) concept has emerged as the most prominent measure of

downside market risk.

Dale, Richard (1996) Risk and regulation in global securities markets, Chichester, UK, John Wiley, 352pp.

1. https://medium.com/@nickgraynews/the-new-york-stock-exchange-used-to-be-closed-every-wednesday-4d693133e06 [↑](#footnote-ref-1)
2. See Securities and Exchange Commission (1980) and Dale (1996), pp. 78, 80. [↑](#footnote-ref-2)
3. http://www.wallstreetandtech.com/careers/the-top-10-financial-technology-innovators-of-the-decade/d/d-id/1253235? [↑](#footnote-ref-3)
4. This can be related to the difference made by Schumpeter between Invention and Innovation. [↑](#footnote-ref-4)