Downside Risk and Internet Financial Applications

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1 Introduction

1.1 Summary

This paper reviews financial applications on the Internet. Services that analyze downside–risk are examined in detail.

1.2 Purpose

Our purpose is to determine the Business and Internet environment into which we might launch a new product: Prudence. Since Prudence hinges on something called downside–risk, we’ll try to define that also.

1.3 Availability

This paper is available in Adobe Acrobat Portable Document Format (PDF), which can be viewed and printed using one of the ‘Acrobat Reader’ packages that are freely available on the W3 from http://www.adobe.com/

Adobe Acrobat PDF

Postscript (GNU-zipped)
   http://www.kensho.com/pubs/stock/netstock.ps.gz

2 Downside–Risk

Does downside–risk ring a bell? I’d never heard of it before, so I ran a literature search, looking for Business and Financial papers that used it as a key concept. The thoughts shared here follow after reading 70 papers, abstracts, and articles, each bearing with some relationship to Internet Financial Applications and/or downside–risk.

2.1 Definition

To differentiate between run-of-the-mill financial analysis applications and downside–risk utilities, we should define downside–risk. Here’s the closest I could come to a clear definition, taken from an abstract of an article in the Financial Analysts Journal:

A downside–risk approach to investment decisions uses intuitive measures of risk that focus on return dispersions below a specified target or benchmark return... Asset allocation in a downside–risk framework therefore determines
an investment opportunity set for downside–
averse investors that is at least as efficient as that
derived using conventional techniques.[16]

Sounds like downside–risk is part of a strategy for deci-
ding how to invest your money based on the proven out-
come of similar investment scenarios played out through
time. If these statistics are available in machine-
readable form, we have a nice opportunity to load up
that data into a production database and run some data-
mining–style queries on it to answer investor’s questions
about the risk(s) they’re taking when they elect to work
with a particular stock.

2.2 Applications

Information derived from downside–risk analysis can be
applied to decision making in several areas of Finance.
Active Asset Allocation decisions can be informed us-
ing downside–risk analysis.[28] Portfolio Optimization,
which seeks to achieve the highest expected returns at
given risk levels, may also benefit from the results of
downside–risk analysis.[20] Harlow[16] studied an inter-
national set of Asset Allocation cases and found that peo-
ple taking the downside–risk approach were more likely
to allocate bonds than stocks.

My own limited understanding of the stock market tells
me that bonds are a stable, ‘sure thing,’ with less get–
rich–quick opportunity than stocks, and less risk of the
investor’s hard( or otherwise)– earned money. Downside-
risk appeals to what Harlow calls ‘risk-averse’ investors—
not only does downside–risk analysis tend towards bonds
allocation, it uses a simple, easy to understand method
(compared to other stock–market analysis resources) and
remains intuitively in–tune with people’s common–sense
perception of ‘risk.’

Perhaps the existence of another widely-used term to
describe downside–risk analysis explains the lack of in-
formation available on the subject. It is possible that
this is just the theoretical foundation of some more pop-
ular analysis tools: “A number of well–known risk mea-
sures, including the traditional variance measure, are spe-
cial cases of the downside–risk approach.”[16]

Now let’s leave aside the downside–risk branch of risk
analysis to come in from the macro–scope: Financial Ap-
lications on the Internet.

3 Internet Finance

The financial environment of the Internet will affect the
success of any Internet–based financial analysis utility.
Although you could use a stock analysis or financial anal-
ysis tool as a stand-alone device to inform future de-
cisions, it is far more likely to appeal to users if they
can act on the information at once — i.e. access to their
bank account is completely integrated with real-time In-
ternet banking services, one or more secure transaction
providers are available to enable transfer of funds and
confidential information, and brokers, electronic broker-
agents, or complete Broking houses are wired to facilitate
stock trade in real time.

This section will highlight a few growth–rings in the
story of cyber–finance, and then attempt to identify
competitors and potential competitors to Prudence, a
downside–risk risk analysis service on the Internet.

3.1 Transactions

Internet transaction and payment systems allow higher–
level Internet commerce to take place without each online
business investing in the research and development of its
own proprietary protocol and software for secure and re-
liable transfer of financial information. This makes life
easier on the end-user, although present-day software for
online transactions and commerce is still complicated.

First Virtual Founded by local lawyer Lee Stein, and
three Internet Giants: Einar Stefferud, Nathaniel
Borenstein, and Marshall Rose. Their transac-
tion scheme is completely based on existing open-
systems technology, using tested–and–proven inter-
net protocols that were originally written by the
First Virtual founders and which they’ve cleverly ex-
tended and documented to support secure Internet
commerce. This strategy allowed First Virtual to be
the first Internet Payment System to launch, and their
philosophy is closely in–tune with first–generation
Internet dwellers. End users communicate seam-
lessly with vendors and via email to confirm their
purchases.

Cybercash secures credit/debit payment using encryp-
tion technology from RSA Data Security. The end-
user must download and figure out a ‘helper appli-

cation’ with a mental model akin to a wallet. This isn’t exactly seamless and user-friendly. CyberCash is supported by Wells Fargo and First National Bank of Omaha. “Because it only secures the payment transaction, CyberCash has been able to negotiate export licenses for its [encryption] software, which opens up international markets.”[9]

**DigiCash** Based in Amsterdam, they’re working on an entirely new form of money beyond the regulatory control of the Federal Reserve. As with physical cash, a DigiCash transaction can not be tracked by the vendor. It does allow the consumer to keep track of their purchases electronically.[9] Probably won’t apply to the highly regulated stock exchanges too soon, but who knows?

**CheckFree Corp.** Offers secure Internet payment via software called CheckFree Wallet.[5]

**VeriFone Inc.** Leading credit and debit card terminal maker, is reportedly sinking more than $32 million into the development of Internet commerce and payment systems.[13]

### 3.2 Banks

Full–service banking via the Internet is coming as fast as it can. Some banks are going online with the existing security and transaction technology, such as Security First Network Bank, who opened as an Internet–only full-service bank in October, 1995.[4] Other institutions are waiting it out or staging highly–publicized tests on the Internet, such as BankAmerica.

In 1995, BankAmerica partnered up with Lawrence Livermore National Laboratories to work on Financial Electronic Data Interchange (EDI)[1], a transaction protocol that may be adapted to the Internet and support secure transactions of financial and other information. Reviews of the project’s success were mixed. From what I’ve read, it works, but users must have a practical knowledge of cryptography and UNIX to participate.[17]

If stock–traders have a comfort level with their money and private information traveling across the unregulated Internet, they will be more likely to use online financial analysis services and then apply the information gained to immediate buy–sell actions with an online broker.

### 3.3 Trends

**DIY Stock Traders** One trend to be aware of is companies beginning to trade their own stock using their own Internet Resources. Just as a company creating its own “Employment Opportunities” page on a W³ server stands to steal some of the thunder of major Internet Resource sites, a pattern of companies taking the trade of their stock onto their own W³ site could easily decentralize the stock market resources online today.

An amusing example of this trend is Spring Street Brewing Co., a New York micro-brewery that raised $1.6 million for its IPO by posting its business plan on its W³ site. Their server also allows users to buy and trade Spring Street stock without paying a broker commission, presumably in hopes that users will celebrate their savings by ordering a case of beer while still logged–in. But apply the Spring Street model to a larger company, or collection of companies, and you start to see the potential impact.

With only $1.6 million in outstanding shares, Spring Street’s trading business won’t be a big loss to Wall Street. But some market observers said it is likely to be the first of many attempts to replace the traditional Wall Street middleman–brokers and exchanges–with Internet technology...

Thinking ahead, some entrepreneur or financial intermediary could bundle a number of these small stocks into a common Internet site, Klein said. Or, the Internet model might be better suited to some large companies. “Could you imagine if IBM decided people could trade its shares on its own Web site?” Klein mused.

Trading experts said such a move would create quite a stir on Wall Street. “It’s an intriguing possibility,” said an official at one US stock exchange. “What would the New York Stock Exchange or Nasdaq say if one of its listed companies said, ‘we’ll pay you our listing fees but we also want to trade on our home page’?”[23]

Spring Street should be available at this URL: http://www.interport.net/witbeer/

The European financial press is noticing this trend also, lamenting a possible loss of margins and jobs and bye–
...the use of e-space by those wishing to undermine the old broking community which is the fascinating development. If decisions can be made based on easily accessible information and can then be acted upon via execution only services, the value of the broker who "knows" the market by having access to market pricing and justifies its margins by having to cost for the research that they do is undermined.[12]

As many as 42% of all W³ sites—in–progress were initiated by the investor-relations department of their organization, with the intention of posting some sort of financial disclosure.[26]

Digital Equipment Corporation does just that at URL: http://www.digital.com/info/finance/

The Securities and Exchange Commission appears to be all–in–favor of W³–based financial information, citing less paper and faster access. Companies are allowed to deliver proxies, annual reports, and other required disclosures on the Internet.[26] More and more human financial advisers are also making their presence known online.[12]

**Influential Online Discussions** Another trend is the growing influence of online discussion groups such as the Usenet and the user-sponsored bulletin boards available through commercial online services. While newspapers and television are somewhat obligated to verify their sources and consider liability before publishing, individual participants in these worldwide discussion groups are free to speak their minds, free to wrap fact, folklore, legend and lies into a series of messages that are written as though they contained only truthful and verified information. Speakers can also (mis)represent their authority in a given field. Dangerous.

So how does this relate to the Financial environment on the Internet? Suppose you were interested in purchasing Silicon Graphics, Inc. stock. You open your Usenet newsreader and select the comp.systems.sgi.advocacy group from the menu of over 18,000 international discussions. In the 1,234 messages that day are several threads discussing SGI stock and gossip of circumstances that may influence the value of the stock in days to come. People participating in the discussion may claim to be associated with SGI—as employees, contractors, relatives, whatever. They might also profess to be Stock Brokers, Financial Analysts, however they choose to call themselves. How will reading and participating in such discussions influence your stock market trading? If someone claiming to be involved in the development of SGI's next 'killer-app' product mentions that it is way ahead of schedule and even better than promised, will this motivate you to pick up the phone—excuse me, log—in to a broker’s W³ site and buy stock in SGI? What will be the reaction of every other Internet user who can freely access this same (mis)information?

How about the opposite situation—you’re the proud owner of 2,000 shares of stock in IOMEGA, and somebody in the comp.periphs.scsi newsgroup mentions that IOMEGA is way behind schedule and that their latest product is disaster-prone. Will you sell your stock? A single America Online (AOL) discussion group named Motley Fool may have had exactly this influence on IOMEGA stock when a user known by the alias of Diomega posted some influential (mis)information.

As the market opened that morning, Iomega stock climbed more than $2, to $52.50, great news for anyone with call options. Then, at 9:43 A.M., Diomega posted a message that electrified the board. He claimed to have learned of unpublished earnings estimates put together by Montgomery Securities, one of Iomega's investment bankers, that were less than half what Brous was estimating: 23 cents a share. “I hate to say it, but these numbers are lower than some of the quarterlies I’ve seen around here,” he jabbed. “Then again maybe Management actually answered some questions for the Investment Bankers.” For 12 long minutes the board was completely silent, seemingly stunned by this news. Diomega again, 9:55 A.M.: “Must be no one believes. Ten minutes without a post?” Then the Dow Jones news wire picked up the story that Montgomery's estimate was substantially lower than published estimates. The stock began to tumble, dropping $7 a share before the market closed. The board went ballistic.
Over the next 24 hours, hundreds of people logged on to express their disgust and anger at what Dio[mega] had done. Just about every one of them believed, as one put it, that Diomega "was not worth spit." But many went further, accusing him of attempting to manipulate the stock. "If someone's mother... loses money, I think they can sue Diomega," wrote a poster named KenlMarcus. Another poster, DrJoeDoom, wrote, "I remained convinced that these estimates provided by Diomega are inaccurate [and] part of a conspiracy."

As the day progressed, there seemed to be two basic (and conflicting) charges against Diomega. The first was that he had made up the numbers to drive down the stock price. The second was that he hadn't made up the numbers but had somehow managed to get them out of Montgomery—which, in allowing them to leak, had somehow violated its duty to its client, Iomega.[27]

You’ll have to read the whole ten-page article to get the full effect. It also offers a good summary of the positive and negative influences of Internet access and discussion groups on stock-trading as a whole.

If information is power, they say, then power is finally being grabbed by the small investor. Online, small investors have access to earnings estimates, to SEC filings, to company press releases and obscure articles from far-away places. And most important, they have each other. Technical people online can evaluate products; those with a financial background can crunch numbers. They can find things out themselves, by (for instance) surveying stores in their neighborhoods and asking clerks how the company’s products are selling. They can even-why not?-ferret out information from the company itself, or its competitors, just as the Wise do.

On the other hand, there is a great deal of hype on the stock boards, some of which undoubtedly comes from brokers trying to pump up a stock, and a great deal of trash talking, some of which just as surely comes from short-sellers trying to talk stocks down. And because AOL employs a system of screen names, giving its subscribers the option of anonymity, viewers have no idea of the private agendas of any of the participants in the online discussion. They don’t even know whether the information being posted is true.[27]

Accepting Technology This probably goes without saying for our internal readers, but we may want to point out to our clients and friends that there is increasing acceptance of technology among the general population, both in the USA and in Europe. Acceptance of technology can only lead to acceptance of online finance. “In general terms, those people with access to a computer had a generally more sympathetic attitude to the use of technology in financial services than did others.”[3]

3.4 Competition

So what about downside-risk? Who else is doing something that is competitive or might become competitive to such an online risk-analysis service?

Banker’s Trust In addition to a host of conventional Internet services, Banker’s Trust is porting its million-dollar risk management system onto the Internet.

Even more ambitious, the bank is doing preliminary work to adapt its signature business line—financial risk management—to the Web. BT programmers are starting work on translating Raroc, the bank’s proprietary risk management system, into the nascent Internet programming language, Java. BT executives have dubbed the project: JavRoc.[25]

You can download a sample of their risk-management software and check progress of their planned Internet-based transaction services at: http://www.bankerstrust.com/

Richard Olsen Olsen & Associates have put his currency forecasting service on the Internet. The system is of
interest to us because it supposedly offers historical analysis dating back 10 years, as well as up-to-the-minute analysis on 53 exchange rates.[19] We might be able to use a system like this as a model in developing our own downside-risk tools.

Established Physical Stock Exchanges While not posing a direct threat to online risk-analysis tools, some established exchanges are obviously intimidated by the possibility of losing business to cyber-exchanges. Electronic Share Information Ltd. (ESI) had a brief but well-publicized scuffle with the 250-year-old London Stock Exchange during its attempt to get a real-time feed to start online trading.[7],[14]

ESI can be found at URL:
http://www.esi.co.uk/

TIAA-CREF The Teachers Insurance and Annuity Association–College Retirement Equities Fund (TIAA-CREF), with assets of $155 billion, estimates that “up to 25% of people requesting information from the organization are going through the Internet site.” A survey of some of their 1.7 million members revealed that 80–90% would like ‘Internet Transactions,’ although it’s not exactly clear what that covers. The organization is working on providing those services and the additional information resources needed to support them, which may include risk-management software.[24]

Their $ site can be visited at:
http://www.tiaa-cref.org/

Internet Securities Augments freely available ‘detailed-analysis’ and information on the ‘emerging’ markets of Eastern and Central Europe by integrating, organizing, and adding value to free services such as OMRI, CET, and the Prague Financial Monitor.[10]

PAWWS Financial Network Allows investors to track client portfolios and trade securities in real-time. “The heart of PAWWS’ service, as with its parent company, Chicago-based Security APL Inc., is its real-time portfolio analysis software.” Three broking houses take trades from this $ site, and more brokers are supposedly on the way.[11] I’m not sure how much real-time analysis differs from downside-risk analysis, or if this service will also offer downside-risk analysis as part of their package.

Prudential Securities “The new client site will also include Prudential analyst comments and recommendations on stocks held in customer portfolios, in addition to bond ratings. It will offer a variety of analysis tools.”[21] How will this ‘variety of analysis tools’ compare with a dedicated downside-risk analysis $ site? Prudential claims to offer users password-protected access to their portfolios online, along with a slew of wired-in services.

Prudential is on the $ at:
http://www.prusec.com/

Depending on the quality of their online risk-analysis tools, the Prudential Internet services could actually help us launch a new downside-risk analysis utility, because part of the Prudential package includes providing Internet access to their ‘newbie’ users, whose average age is 58.[21]

Leland O’Brien Rubinstein Associates Known for developing ‘portfolio insurance’ in the ‘80’s, Leland O’Brien Rubinstein Associates are developing an ‘Internet Finance Center’ that will attract its target audience of investment managers and Wall Street ‘quants’ (huh?) by offering “…free interactive features like an on-line options pricer and a financial simulator.”[22] The freebies will hopefully lure users into paying for their more sophisticated analysis models.

Microsoft & Intuit Microsoft and Intuit are working on adding value to their home and business financial management software (Microsoft Money and Intuit Quicken). These services include online banking, transactions, and possibly other services. By adding a feature to their software that competes with a proprietary downside-risk analysis utility, Microsoft or Intuit could effectively wipe out their competition.[9]

Barra Inc. Released Riskcaster Real-Time 3.0, a program that can perform equity portfolio risk analysis using real-time information.[18]
4 Prudence

*Prudence* is a proposed product from Future Focus that will deliver *downside–risk* analysis of ‘stocks, mutual funds, or other financial instruments.’

4.1 Description

*Prudence* will be a W³–based service. Details are available from Future Focus, (619) 452-4365. If we’re going to improve or adapt this document in any way, perhaps Tim can fill in the blanks. Future Focus is on the W³ at: http://www.future-focus.com/.

The one-page handout on *Prudence*[6] is about 1/4 whitespace, 1/4 Internet introduction, 1/4 Future Focus, and 1/4 offers a brief definition of the *Prudence downside–risk* evaluation service through examples of questions it could answer for customers, such as:

1. What is the chance that my stock will drop by 10% over the next month?
2. What is the chance that my mutual fund will be down by 5% sometime over the next year?
3. How likely is my bond to drop in value compared to all other bonds?
4. Given my current stock picks and level of downside risk I am willing to tolerate, how can I optimize my mix to yield the best returns?

4.2 Questions

To better understand *Prudence* and how it compares with similar services, we should take time to learn the answers to some of the questions below. Answers may already be obvious to experienced traders and folks with lots of money, but it could still use some clarification for me.

1. How do *downside–risk* analysis and *Prudence* fit in the overall array of tools and devices available to help people manage their finances?
2. Would this be the one–and–only tool somebody uses to evaluate their financial options, or just one of several ‘online oracles’ they might consult when making financial decisions?
3. Are consumers interested in using *downside–risk* as their preferred method of stock analysis?
4. How will *Prudence* create demand for *downside–risk* analysis services?

References


REFERENCES


[23] Hal Lux. Company plans to trade its own stock on web. *Investment Dealers Digest*, 62(10):8, Mar 1996. Similar to what we’re seeing in the HR industry, with each organization beginning to post its own net-want ads, companies may begin to see their own stock through their online presence sites.


Scandal– Online Discussion of Stock can have a big influence.