

ORDERS OF MAGNITUDE

HYPERCHANGE AT HYPERSPEED - PROJECT YOURSELF INTO 2015

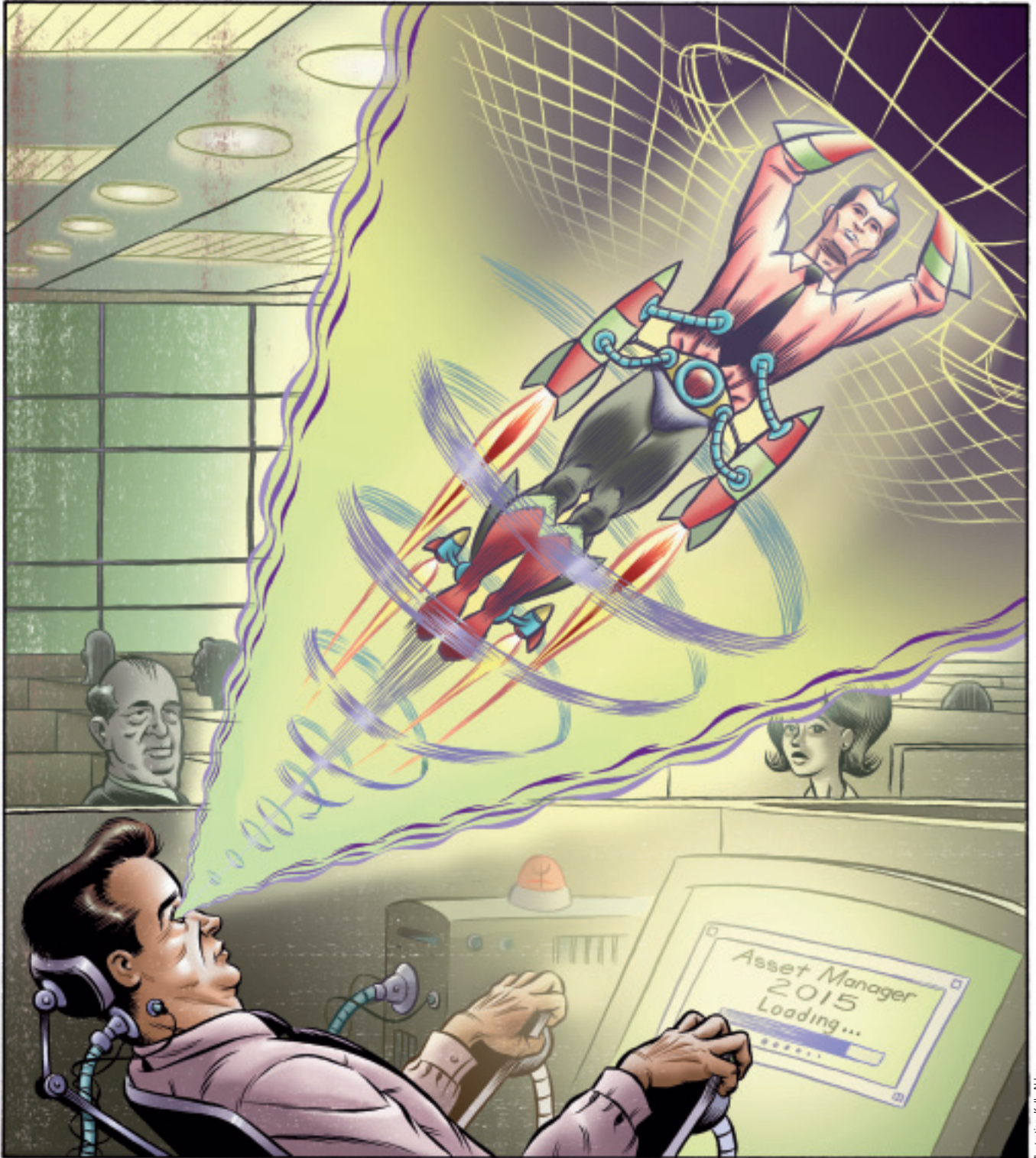


Illustration: Kelly Alber

BY JOHN RUBINO

Human knowledge isn't growing exponentially. Instead, it's actually expanding at a "double exponential" rate, in which "the rate of exponential growth is itself growing exponentially," as technologist Ray Kurzweil explains in his latest best-seller *The Singularity Is Near*.

The double-exponential growth of knowledge is a tough concept for the human mind to grasp. But when you consider the events of the past decade, it has the ring of plausibility. Back in 1995, Netscape had just introduced the first mass-market Web browser and only a tiny fraction of the developed world (itself a tiny part of humanity) had traded a single share of stock online. Global investing meant loading up on European and Japanese blue chips. Traders still wrote trade tickets, and clerks still keyed them in. Quantitative models, such as they were, ran on the kinds of processors that now power children's toys. Telecom systems in the developing world were decrepit, China was mainly an exporter of toys and clothing, India was a nonfactor in knowledge work, and most good finance jobs were on Wall Street.

Yep, things have changed. But the 1995–2005 period was just a warm-up for the decade to come. Now that the masses are wired (or wireless) and capital and technology are welcome everywhere, the real double-exponential fun can begin. Let's take it piece by piece:

GLOBALIZATION: FOLLOW THE MONEY

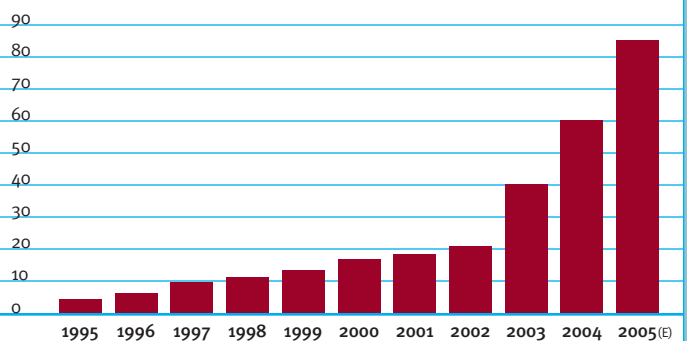
The safest prediction in finance is that by 2015, China and India will be bigger and more consequential. Of course they will. With 2.3 billion smart, hungry, and increasingly well-educated citizens, these two giants were destined for center stage the moment they went capitalist.

But their timing is what gives their emergence legs. Prior to the late 1990s, the developing world's telecom infrastructure was so unreliable that it offset most of the benefits of outsourcing. The technology bubble solved that problem by seducing impressionable entrepreneurs into girding the world with fiber optic cable. And before you could say "bankruptcy liquidation," Asia found itself with cheap, fat data pipes linking its cities to the global marketplace. In the words of *New York Times* columnist Thomas Friedman, the world has been flattened.

Today, China is "the world's factory floor" and India is outsourcing central for knowledge work. China runs an annual trade surplus that one study puts at US\$270 billion and has foreign currency reserves exceeding US\$700 billion. The market value of Indian stocks tripled between 2001 and 2004. And foreign capital just keeps pouring in. "The new trend is the 'mega' hedge funds expanding into Asia," says Guy Day, managing director of Ambition, a Hong Kong-based executive recruiting agency. Instead of money managers buying Asian blue chips from London offices, they're now on-site, analyzing Chinese and Indian mid- and small-caps up close and personal.

ASIAN HEDGE FUND ASSETS

(in US\$ Billions)

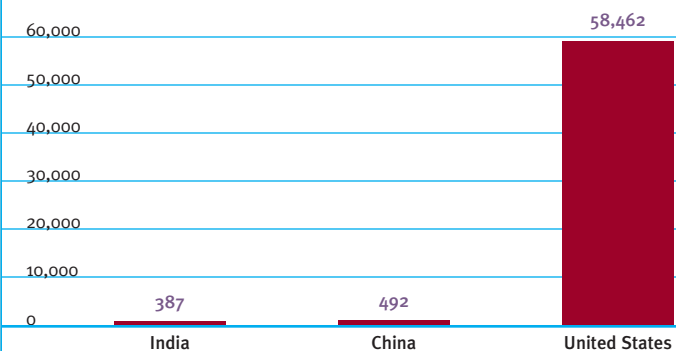


Source: Eurekahedge

For many countries, a few years of such frenetic growth would raise local wages enough to eliminate the country's comparative advantage (think Japan in the 1980s). For Chinese and Indian stocks to reach US levels of per capita market value, however, they will have to outperform for decades. Chinese factory wages are still less than a fifth of those in the United States, and Indian programmers make maybe a fourth of their Silicon Valley counterparts. And both countries' capital markets have barely entered adolescence.

2004 EQUITY MARKET VALUE PER CAPITA

(in US\$ Billions)



Source: Standard & Poors

So the future challenge for these countries is the building of regulatory structures and institutions that mesh seamlessly with those of the developed world. This will entail codifying property rights, removing restrictions on global capital, minimizing corruption, and generally creating structures that allow modern finance to do its thing. But in rising to this challenge, the two countries differ. Although it started liberalizing a decade later than China did, “India always had functioning capitalist institutions,” says Frances Dydasco, the Singapore-based manager of T. Rowe Price’s New Asia Fund. “It has a functioning bond market, a reasonably independent central bank, and a large pool of skilled managers.” So it merely has to clear out the bureaucratic cobwebs.

China, in contrast, must build a capitalist country from scratch. “It doesn’t have an independent central bank or bond market, and the underlying rule of law is still very nascent,” says Dydasco. Moreover, most of the major Chinese companies are still partially owned by the state, which creates uncertainty about when and how they’ll be privatized.

“But I think they both get it,” says Dydasco. China is gradually privatizing its largest state-owned banks. And India is liberalizing the rules governing, among other things, foreign investment in retail and real estate.

Other developing countries get it too. In November, Brazil’s treasury launched an online service that allows foreign investors to obtain in a single day the licenses needed to buy securities. Previously, the process could take 10 times longer. And Thailand has just launched its own derivatives exchange.

Up the food chain. “Right now, India and China make the wheel cheaper rather than reinvent the wheel,” says Dydasco. But in the coming decade, they are expected to create and own more and more intellectual property and, in the process, spawn both world-class multinational corporations and hot growth companies. Chinese computer maker Lenovo’s purchase of IBM’s PC business, for example, gave China a company with global marketing clout in a high-profile field. Expect dozens of similar deals to create hundreds of notable companies by 2015.

Energy: The other capital migration. Right now, India has maybe seven cars per 1,000 citizens, compared with more than 400 in France or Germany. The average Chinese person consumes less than a tenth as much oil as the average American consumes. But as the wealth gap closes, so will the energy gap. Between now and 2015, the number of vehicles worldwide will probably rise from 750 million to nearly a billion; the number of air conditioners and washing machines will soar.

The likely result: persistently high energy prices and a massive flow of funds from oil consumers to oil producers. In 1995, Saudi Arabia earned US\$47 billion from oil sales; in 2005, it earned US\$163 billion. It runs a US\$50 billion annual budget surplus, and its foreign currency reserves will exceed US\$200 billion by the end of 2006. Russia’s budget surplus in the first nine months of 2005 totaled US\$27 billion, and Brazil’s surplus equals 5 percent of GDP.

How the recipients use this windfall will shape the world of 2015. On the hopeful side, both Saudi Arabia and Russia are angling to join the World Trade Organization, which requires transparency and liberalization. And Abu Dhabi recently lifted a ban on property sales by citizens and land ownership by noncitizens. On the scary side, Iran is likely to use its windfall from oil to build a nuclear arsenal. As British Prime Minister Tony Blair said after an incendiary speech by Iran’s new president, “Can you imagine a state like that with an attitude like that having a nuclear weapon?”

Another likely effect of the shift in wealth from the developed to the developing world is a decline in the relative importance of the US dollar as a reserve currency. “People are diversifying out of the dollar and into the euro, and when China and India have more stable financial systems, you might see a similar shift into the renminbi and the rupee,” says Dydasco.

AUTOMATION: RISE OF THE MACHINES

After running the double-exponential math on microchip processing power, Kurzweil concludes, “You’ll be able to buy the hardware that can emulate the human brain for US\$1,000 by 2020.” Maybe, but long before then, financial engineers will have access to computing power that is orders of magnitude greater than today’s state of the art. The systems of 2015 will chomp terabytes of data at petaflop speeds, imbuing trading algorithms and quantitative models with eerie levels of creativity.

Meanwhile, the flow of data — the raw material from which trading systems build value — is actually outpacing the gains in computing power. “The amount of data that’s being distributed by electronic exchanges used to double every couple of years, then every year, and now every half year,” says Larry Tabb, a technology consultant in Westborough, Mass. This growth in both processing power and data availability will transform every corner of the financial world. But two areas stand out — algorithmic trading and quantitative investing.

Algorithmic trading. Computer programs that break big institutional orders into smaller pieces and sell them over electronic exchanges are huge money-savers for the buy side. But a recent survey by tech consultancy IDC found that fewer than half of all trades are executed through algorithms and, when algorithmic trading is used, “the oldest, most primitive trading algorithm is also the most popular.” Fewer than 40 percent of buy-side firms use customized, relatively sophisticated algorithms.

By 2015, the buy side will use algorithms extensively. “Basket” algorithms will manage lists of securities rather than individual stocks, allowing a fund to automatically rebalance a portfolio when a benchmark index is updated. “Instead of 100,000 shares of Microsoft, you’ll be able to do 203 shares of 600 different stocks” while staying within your fund’s risk and balance covenants, says Tabb.

Algorithms will monitor other algorithms, allocating trades between different models — and tweaking the models themselves — according to changes in the markets. Tabb explains, “Say you want to reduce your market impact and you’re being very passive. If a big buyer comes into the market, instead of just doing a couple hundred shares, [the meta-algorithm will] switch to another model that trades more aggressively.”

And where the vast majority of today’s algorithmic trading involves large-cap, highly liquid equities, by 2015, the programs will trade virtually anything. Goldman Sachs, for instance, recently added futures, foreign exchange, and options to its REDIPlus direct-access trading platform. Next will come mid-caps and other thinly capitalized stocks. These algorithms “won’t trade till they see the footprint of someone else providing liquidity,” says Tabb, “and then they’ll go out and grab up the liquidity.”

Quantitative investing. Stock-picking models have been around forever (Value Line has used an earnings momentum formula, for instance, since the 1960s). But in the past few years, the practice has gone mainstream, with hedge funds and investment banks developing ever more sophisticated ways of finding alpha, or excess return over the risk-free rate. The advantage of the coming order-of-magnitude leap in processing power is obvious in this case: models that can make sense out of more data and find heretofore hidden alpha.

As with the Asian markets, the migration path is from large-cap equities into other markets. So expect quantitative models to thrive in derivatives, commodities, foreign exchange, fixed income, and emerging country equities. Then they’ll go cross-instrument, searching for alpha in the relationships among different markets and their related indexes and derivatives.

But whereas the explosion in data availability is mostly a good thing for algorithmic trading, it is more challenging for quantitative investing. Faster processors shorten the model-building cycle, which means that once you find some hidden alpha, it won’t be long before others start harvesting it too. “The value of any signal will get shorter and shorter going for-

ward,” says Alan Post, managing director of financial data at Prediction Company, a financial modeling firm. “You’ll have to run just to stand still.”

The “never-ending upgrade cycle” is par for the course in technology, of course. The real departure will come when models no longer need their makers. Using techniques such as genetic computing, in which programs evolve in response to their experience, the quantitative models of 2015 will be able to search for alpha independently — without human guidance.

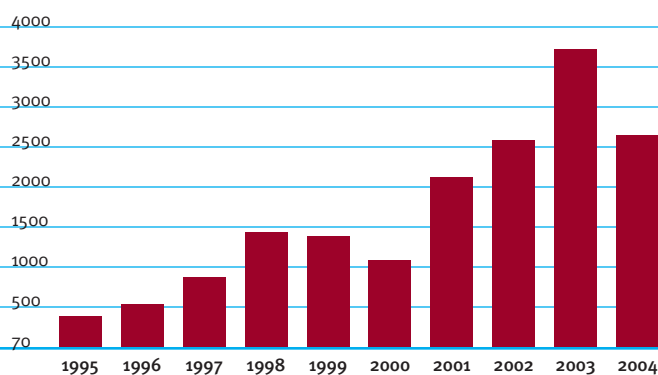
It’s easy to picture hedge fund managers turning such a program loose and then just hitting the links, checking in occasionally to see how much money they’ve made. “But that’s tricky from a risk management perspective,” says Post. “You need to be able to tell clients where the money is and where it’s going.” So, he says, expect genetic algorithms and their post-human progeny to “start at the margins [with smaller hedge funds] and migrate in.”

SECURITIZATION: TURNING EVERYTHING INTO BONDS

Back in the 1980s, some (mostly US) financial engineers discovered that they could take a bunch of relatively small, heterogeneous loans and bundle them into investment-grade bonds. In the 20 years that followed, the US securitization machine became a juggernaut, turning everything from mortgages to corporate receivables to credit card balances into asset-backed securities (ABS). What was a modest stream in 1995 has become a river of new bond issues, although issuance declined in 2004.

U.S. ASSET-BACKED SECURITY ISSUANCE

(in US\$ Billions)



Source: BondMarket.com

Now extrapolate this development to the rest of the world for a sense of the credit markets of 2015. The expansion of securitization will have two dimensions: geographical, as other countries embrace securitization (China and India are both creating regulatory structures that permit it), and by type of debt, as things not previously thought of as collateral are reclassified. If the past is any guide, a decade hence (barring a major war or some other serious discontinuity), bonds backed by Chinese mortgages and Brazilian receivables and other

unlikely-sounding securities will be common. Here's a sampling of what's to come:

Diversified payment rights (DPR). Banks that process regular payments for developing countries' export industries or remittances from workers living abroad have begun securitizing these future cash streams. Turkish and Brazilian banks have created about US\$15 billion DPR securities, but this figure barely scratches the surface. The World Bank estimates that by the year 2020, worker remittances from countries in the Organization for Economic Cooperation and Development will grow to nearly US\$200 billion.

Life insurance. Insurance companies used to wait patiently while their customers made their monthly or annual premium payments. Now they don't have to. In early 2005, European insurer Swiss Re securitized the future profits from a portfolio of US life insurance policies.

Pharma bonds. Yale University recently securitized the royalties from its blockbuster HIV drug Zerit. And UK-based SecurePharma is proposing to securitize the revenues of drugs in the development stage in various pharmaceutical company pipelines.

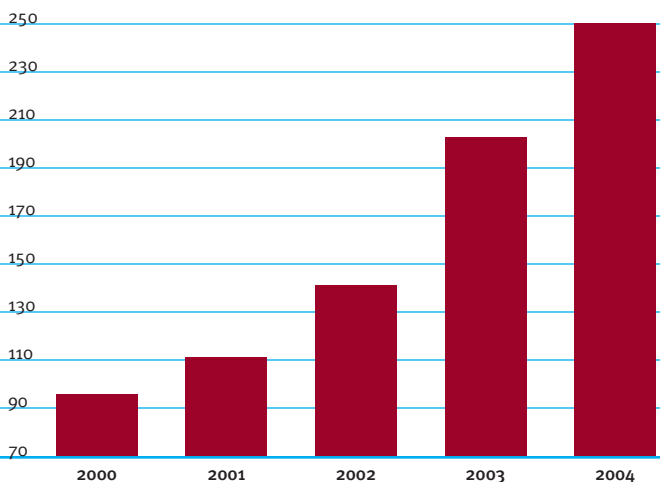
Intellectual property (IP) bonds. David Bowie got this ball rolling in 1997 when he turned his 300-song library into what came to be known as "Bowie bonds." More recently, Steven Spielberg's DreamWorks studio raised US\$1 billion by securitizing its future film revenues.

DERIVATIVES: REALLY SLICING AND DICING RISK

Derivatives have been around for decades, mostly in such familiar forms as futures and options. But they took off in the late 1990s, when currency, interest rate, and credit default swaps became immensely popular.

GLOBAL DERIVATIVES EXPOSURE

(notional value in US\$ millions)



Source: Bank for International Settlements

"IF YOU'RE MEDIOCRE, YOU SHOULD BE WORRIED, BUT IF YOU HAVE TALENT, YOU'LL BE FINE."

VIK MEHROTRA
Founder
Venus Capital Management

Whether the current derivatives boom is reducing overall risk or facilitating the creation of excessive debt is an argument the markets will settle well before 2015. But the concept of slicing up and distributing risk is a valid one, and like securitization, the creation of derivatives will probably expand to new instruments in coming years. For example:

Weather. With the introduction of Heating Degree Day (HDD) and Cooling Degree Day (CDD) derivatives, farmers and ski resorts can now hedge against the vagaries of nature. "Because they serve a legitimate need, I think weather derivatives have a lot of room to grow," says Don Chance, CFA, finance professor at Louisiana State University and author of *Analysis of Derivatives for the CFA Program*.

Economic derivatives. To allow money managers to hedge their portfolios against economic surprises, Goldman Sachs has developed options linked to US employment reports. In Europe, according to the Royal Bank of Scotland, the market for inflation swaps, which insure pension fund bond portfolios against rising consumer prices, could reach US\$95 billion this year.

By 2015, options and futures on US and European inflation, telecom bandwidth, disaster insurance, pollution credits, real estate futures, and developing world securities, among other things, will probably be common. The real question, says former options analyst and University of San Diego law professor Frank Partnoy, is whether the world's governments will be able to keep up. In Partnoy's book *Infectious Greed*, a securities regulator complains, "For US\$112,000 a year, we can't hire someone who can check the models of kids making ten times that."

CHANGING INVESTMENT PRACTICES

Soon, you won't be able to tell a hedge fund from a mutual fund, the competitive arena of a Swiss pharmaceutical company from that of a US pharmaceutical, or the time of day by where the markets are open.

We're all hedge funds now. From a paltry US\$200 billion of assets under management in 1995, hedge funds now control more than US\$1.3 trillion. But according to William Berg, president of Portland, Ore.-based Sigma Investment Management, their popularity depends on a "a quirk of uneven regulation." Because they were originally limited to high-net-worth investors, they were unregulated, giving them the flexibility to pursue a wide variety of strategies and markets,

which was a huge advantage over tightly regulated mutual funds. But this edge is ephemeral. US and European regulators are imposing registration and reporting requirements on hedge funds. And traditional mutual funds are adopting hedge fund tools, such as short selling and derivatives. By 2015, “You’ll have a relative uniformity of regulation. The question will be who’s managing the money, not whether you call the bucket a mutual fund or hedge fund,” says Berg.

Forget time and place. In a recent essay titled “The Future of Investment Management,” Gary Brinson, CFA, president of Chicago-based GP Brinson Investments, writes that as the global financial markets flatten, a company’s home address will lose meaning: “Focusing on countries of origin makes no more sense for multinational companies than does emphasizing where in the United States a company is headquartered. ... Equity asset allocation driven by country [and currency] exposure will be replaced by allocation driven by global sectors and industries.”

At the same time, the global markets will be operating continuously, much like today’s currency markets. “Portfolio pricing will be set to an agreed Greenwich Mean Time to facilitate uniform reporting for clients, but the markets themselves will become continuous and globally available,” says Brinson.

CREATIVITY RULES

Tomorrow’s markets, in short, will be a more complex, interesting place than they are today, with wealth spread more evenly and with the United States just one of many financial powers. Indian and Chinese (and Brazilian and Polish) multinationals will vie with General Electric, Nokia, and Hitachi in key industries. Emerging stock markets will resemble today’s NASDAQ. And developing countries’ financial centers will be home to armies of analysts, money managers, and investment bankers.

Outsourcing and/or automation will have gobbled up the low end of every investment niche. But great jobs will abound for those who can design complex trading models, analyze ABS, manage derivatives portfolios, use multiple tools to generate alpha, structure cross-border mergers, or speak Mandarin. “If you’re mediocre, you should be worried,” says Vik Mehrotra, founder of Venus Capital Management, a hedge fund with offices in the United States and India. “But if you have talent, you’ll be fine.”

John Rubino, a former financial analyst, is the author of How to Profit From the Coming Real Estate Bust and Main Street, Not Wall Street.

THROUGH THE VALLEY

Forecasting a decade ahead is like looking from one mountain peak to another. But actually traveling that distance means crossing the valley in between. And the valley separating 2005 from 2015 is full of boulders, rivers, and grizzly bears. Here are three to worry about:

A collapse in US consumer spending. The US trade deficit is as large as the 10 biggest national trade surpluses, which is another way of saying that global growth depends on US consumers continuing to live beyond their means.

With household debt at record levels and the savings rate below zero, most new consumer spending comes from Americans tapping their home equity. And now the housing bubble is losing air. The inventory of unsold homes is surging in many formerly hot markets, notes San Diego, Calif., real estate analyst Richard Toscano. And rates on the millions of adjustable-rate mortgages taken out in the past few years are starting to ratchet up. “People will see their housing costs rising at double-digit rates,” predicts Denver-based real estate developer Marcel Arsenault. Now add in sharply higher energy prices and rising — sometimes doubling — required minimum credit card payments, and you have the potential for a dramatic slowdown in US consumer spending.

What happens to the Asian and European export economies if US consumers stop spending? Their surpluses will evaporate, very possibly causing a global recession, according to Deloitte & Touche economist Roger Bootle.

Hedge fund die-off. It’s getting crowded out there. As money

pours into hedge funds, they are piling into a limited number of strategies and driving down returns. The result: “A more challenging period than the industry has seen for the past 10 years,” says Andrew Lo, director of financial engineering at MIT’s Sloan School of Management. “The probability of liquidation is increasing across the entire hedge fund sector.”

This development matters for the same reason that hedge funds are so popular: hedge funds are not regulated. No one knows how much leverage they’re carrying or which markets they’ve cornered. A crack-up at a highly leveraged fund (or several of them) could disrupt any market — from European stocks to developing country debt or the swap market.

Currency crisis. The United States is flooding the world with dollars, via its US\$600 billion annual trade deficit. As long as the recipients — say, Asian central banks — turn around and buy US Treasury securities, the dollar stays strong and US interest rates stay low. But now that the amount of dollars flowing to the oil producers nearly equals the combined current account surpluses of Asia’s trading nations, the dollar may not be treated as kindly. The Asians have been willing to accept lower yields on their reserve assets if the resulting imbalances benefit their export industries, but “the Middle East tends to be more return oriented,” says T. Rowe Price’s Frances Dydasco.

Should the Saudis and Iranians start demanding a higher return on dollar-denominated assets, the dollar’s value will plunge. That’s another way of saying that the yen, euro, and renminbi will soar — a potential crisis for exporters that depend on sales to the United States.