Topics: equity valuations and how market cycles end; navigating sector/regional bubbles; Germany, France and the ECB; private equity update; in search of EX-Men to prevent childhood disease; a petro-sectarian map of the Middle East

Pattern Recognition. The consensus among those who forecast growth, industrial production, inflation and profits is as high as it has been since 1990. In other words, almost everyone expects a continuation of modest US economic growth, low inflation, falling unemployment and gradually rising profits. This has proven to be a positive backdrop for equities, whose valuations have risen. How long will the good times last? Headlines like a $17 billion valuation for Uber in its latest round of financing prompt some to ask the question. Equity market cycles typically end when one of the following occurs:

- *Inflation*. Spare capacity is exhausted, resulting in rising wage and/or price inflation that Central Banks have to step in to control, leading to a recession and a correction in asset prices (standard post-war cycle: 1960, 1970, 1974, 1982, 1990)
- *Credit/banking crisis*. There's ample spare capacity and inflation is not a problem, but structural weaknesses in credit and banking result in a recession and a market correction (2008)
- *Equity market prices are too high*. Asset prices become so expensive, that even without significant inflationary pressures or credit/banking weaknesses, they collapse under their own weight due to unsustainable valuations and investor complacency (1987, 2001-2002)

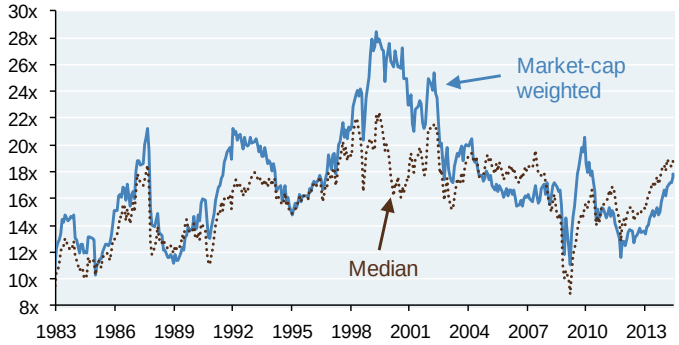
I am over-simplifying since there can be more than one in play, but this is my read on the primary factor causing the end of each cycle. The US economy arguably no longer needs zero interest rates (which are negative in real terms), but given excess labor[1] capacity and core inflation of ~2%, the Fed's adjustment should be gradual, well-telegraphed and set in motion towards the end of 2015. As a result, I do not see the first example above as the biggest risk for 2014 or 2015. After bank recapitalization and improvements in corporate and household balance sheets, I do not think the second is the primary risk either. There are excesses in the pricing of credit (tight credit spreads, relaxation of underwriting standards resulting from zero interest rate policies), but I do not get the sense that leverage and securitization have risen to levels where they pose systemic risks. Given the duration of the equity rally, the collapse in volatility and very bullish readings from investor sentiment surveys, **valuation (#3) is probably the risk to watch for most.**

Where are valuations? In an April *Eye on the Market*, we walked through several approaches: price to trailing earnings based on market cap, price to forward earnings, price to trailing earnings of the median stock, Shiller adjustments that incorporate a longer horizon, etc. Median P/E multiples are interesting since they show how the average company is priced, and reduce the impact of the largest companies that may be priced at a premium to the market (as they were in 2000) or at a

S&P 500 P/Es: Median, trailing earnings
Price-to-earnings ratio

Source: Deutsche Bank, J.P. Morgan Asset Management. June 2014.

S&P 500 P/Es: Market-cap weighted vs. median
Price-to-earnings ratio, trailing



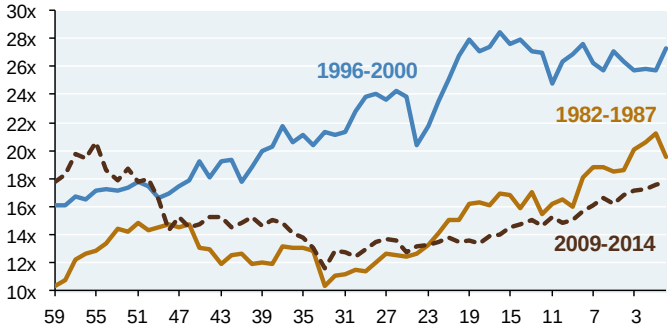
Source: Deutsche Bank, J.P. Morgan Asset Management. June 2014.

[1] According to the IMF, after incorporating discouraged workers and involuntary part-time employment, spare labor capacity in the US is more than 3% of the work force, even after the labor market recovery to-date. This 3% is larger than peak spare labor capacity following the 1990-1991recession.

discount (as some large tech companies are today). As shown, the price-to-earnings ratio of the median stock in the S&P 500 has risen sharply since the trough in 2008. The traditional market-cap weighted P/E appears on the right, and is compared to the median.

The next chart looks at the two over-valuation cycles (1987 and 2001-2002), and what P/E multiples looked like heading into the end of the cycle. We show the current cycle as well. The technology cycle's demise was linked to a collapse in pricing of the largest stocks: the market-cap weighted P/E was a massive 10 P/E points higher than the median by August 2000. In 1987, there was not much difference between market cap and median; five years of complacency led to multiple expansion and a market that was unprepared for a sharp shift in sentiment and the ongoing collapse in the USD.

Trailing market-cap P/E multiple heading into the end of the cycle, compared to current cycle



Source: Deutsche Bank, J.P. Morgan Asset Management. June 2014.

Time Capsule, 1987

"One of the largest bullish factors is burgeoning worldwide liquidity, thanks to expansive monetary policies by central banks. That has helped fuel a surge of foreign investing that could propel US stocks higher, regardless of what happens to the American economy, some analysts say…..Low interest rates also help stocks by making Treasury securities, certificates of deposit and other interest-paying investments less attractive. The sluggish economy, meanwhile, keeps the Federal Reserve from driving up interest rates and prevents inflation from overheating. Also, the sluggish economy--by keeping manufacturing rates low--discourages money from flowing out of financial assets into such investments as factories and machinery" [LA Times, March 8, 1987; a few months before the October 1987 stock market correction].

If I had to choose, this cycle is more reminiscent of the pattern in the mid-1980's than the tech boom, particularly given how low interest rates fuel demand for stocks. There's a related quote from the LA Times in 1987 (see box above) that could just as easily be pulled from Barron's today.

However, there are differences vs. 1987, and what appears to matter most is earnings. Current valuations are not a priori unsustainably high; in the past, they were sustainable when earnings growth supported them. Our expectation for 8%-10% profits growth may be the most important trend we're watching. In Q1, S&P 500 profits growth was 6%; a pick-up in nominal GDP could drive them higher (there's little room left to boost profits from declining wage or interest costs). In this regard, the US appears set to grow at a healthier pace in the next couple of quarters, in part a rebound from the deep winter freeze (the latest Q1 US GDP growth estimate is -1.5%). Business capital spending, commercial and industrial loans, truck and passenger car sales, job openings, employment and small business optimism are all improving. **As a result, we believe that our single-digit US equity market return forecast for 2014 is on track.**

Nevertheless, when determining portfolio allocations, liquidity tradeoffs and the price paid for growth, it pays to be aware of how far US (and European[2]) equity markets have already run. The February 2014 correction in internet and biotech stocks is a reminder that as the cycle ages, valuations on the most expensive stocks can decline simply due to their own lofty expectations[3].

As for the **Middle East**, we will look at sectarian violence and oil production in a future issue. For now, I have included a petro-sectarian map of the Middle East in the Appendix; what's notable is how major deposits of oil and gas often lie close to sectarian fault lines. In Iraq, oil deposits in the South near Basra are well-defended, and account for 75% of Iraqi production. Exports from the North (Kirkuk) are low after pipeline attacks earlier this year. The region was seized last week by Kurdish fighters (Peshmerga), but pipeline repairs are required in areas outside Kurdish control.

[2] European P/E multiples have risen as well, as shown on page 4 (France). The laggards are the emerging markets, whose P/E multiples are roughly unchanged since 2013, and 3-4 P/E points below the US and Europe.

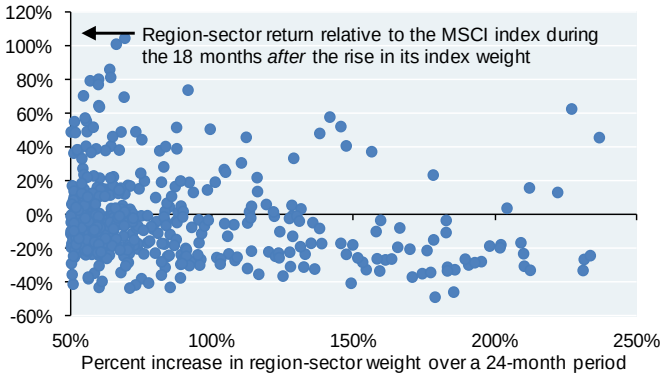
[3] In our April 8th EoTM, we showed valuations for 75 well-known internet and biotech stocks. Their valuations doubled from January 2013 to February 2014 (from 6x sales to almost 12x sales). Many of these stocks then declined sharply, with S&P internet and biotech stock categories down 15%-30%.

More pattern recognition: picking stocks when region or sector valuations balloon

The majority of equity benchmarks and investment products are based on the notion that liquidity is the most important thing. That's why so many are "market-cap" weighted, meaning that stocks in the index or portfolio are weighted by the market value of shares outstanding. The problem with this approach: it can suffer from concentrations of risk and instances of overvaluation. Notable examples from the S&P 500: the US tech sector weight rising from 6% in 1990 to 29% by 1999, and the US financials sector weight rising from 7.5% in 1990 to 22% by 2006.

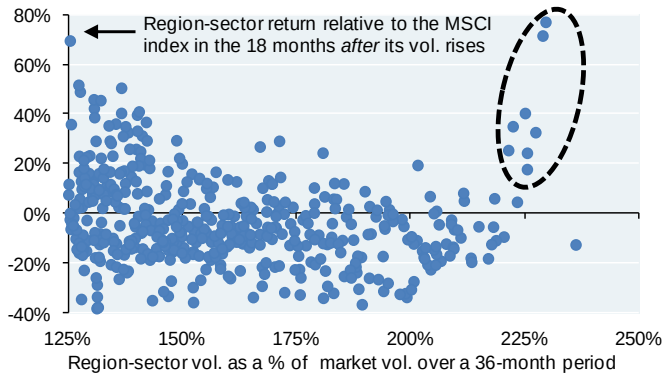
This point can also be illustrated by dividing global equities into 40 region-sector buckets (i.e., US financials, EU consumer staples, Japanese energy stocks). What happens when the index weight or volatility of one of these buckets rises sharply relative to the market? The first chart shows the % increase in region-sector index weights over a 24-month period (x-axis), since 1995. On the y-axis, we plot the *subsequent* return for that region-sector relative to the market over the next 18 months. The pattern is clear: **when region-sector index weights ballooned (x-axis), they usually underperformed the market in the following year or so (y-axis).**

Region-sector buckets tend to underperform the market after their **Index Weights** rise sharply



Source: JPMAM, MSCI World TR Index. Time period from 1995-2011.

Region-sector buckets also tend to underperform the market after their **Relative Volatility** rises sharply

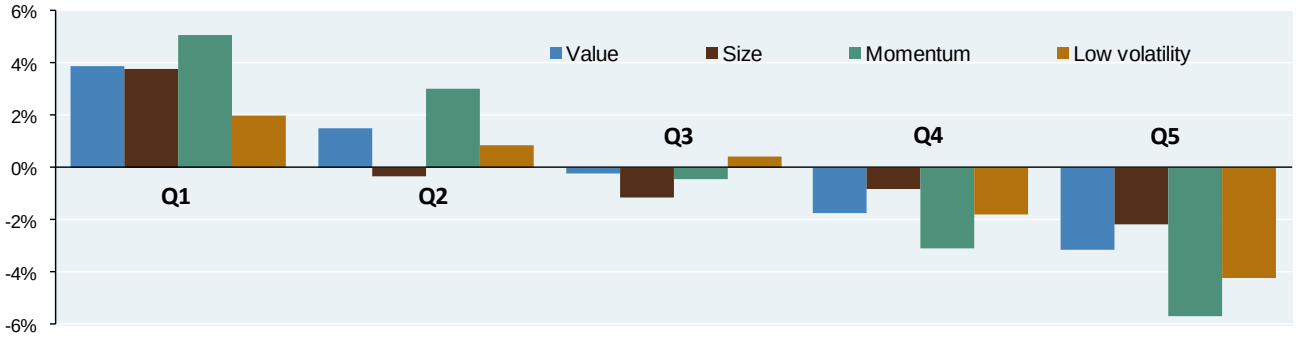


Source: JPMAM, MSCI World TR Index. Time period from 1995-2011.

The same goes for region-sectors that exhibited more *volatility* than the market: in the next leg of the cycle, they also tended to underperform (2nd chart above). The outliers (circled) confirm the thesis rather than reject it: a few months after the end of our assumed time horizon, the outliers underperformed as well [dots correspond to Asia ex-Japan tech stocks in the late 1990's).

What to do? An investment process can be designed to limit exposure to regions and sectors when their index weights and volatilities become elevated. Empirical modeling of such an approach over the last 15 years shows substantial benefits compared to a market-cap weighted approach. This method of limiting exposure to overvalued or volatile regions and sectors can be combined with long-standing principles of individual stock-picking. As shown below, over the long run, low valuations, smaller market caps, higher momentum and lower volatility have generated excess

Excess returns generated by quintile and factor
Excess return vs. MSCI World Index



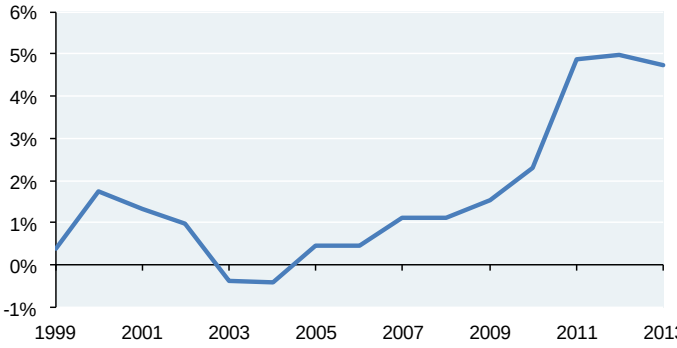
Source: Factset, JPMAM. Monthly data from December 1995 to December 2012.

returns on global equities. **The goal: an investment process that strikes a balance between liquidity, concentration risk and valuation.** As the positive thrust to markets from zero interest rate policy fades, stock-picking is likely to play a greater role in portfolio returns.

Europe: the pattern of cheap ECB liquidity continues, and Germany is in full agreement

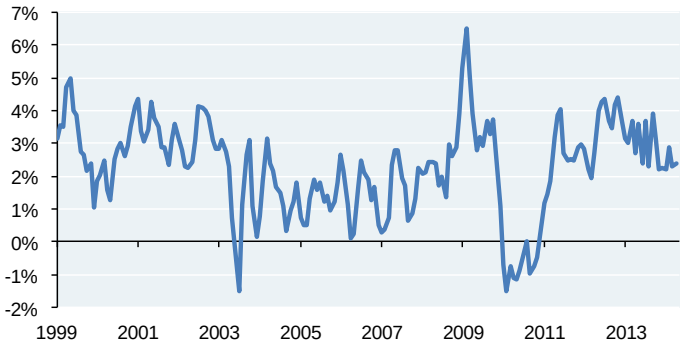
The ECB threw everything but the kitchen sink at the European economy: lower borrowing rates for banks, disincentives for banks to deposit money at the ECB, term borrowing facilities for banks with incentives to lend to the private sector and plans for the ECB to purchase private sector securities directly. These steps were well-received by markets, and I can understand why: the pattern to-date has been ECB loans leading to lower credit spreads for both European banks and governments. **The interesting question is why Germany changed its tone and acquiesced so readily to easy money ECB policies.** Part of the answer may lie in low German inflation. German home prices have risen sharply, but wage and price inflation are not showing signs of increasing (yet). The Bundesbank expects wage inflation to pick up next year, in part a reflection of a minimum wage increase that starts in 2015, but also appears to believe that immigration will prevent inflation from rising too far. As shown below, consumer price inflation is below the ECB target not just in the periphery, but in core Europe and Germany as well.

Germany: house prices
YoY % change



Source: Statistisches Bundesamt. 2013.

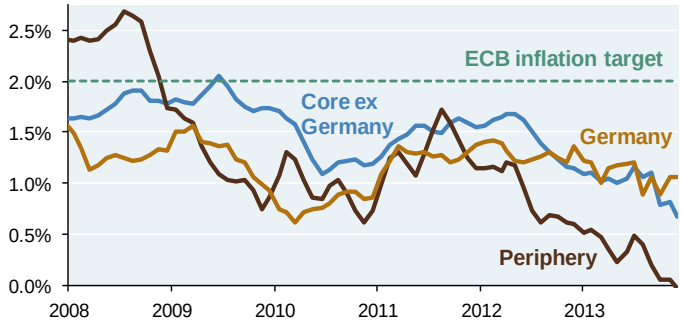
Germany: wage inflation
YoY % change, 3-month moving average, industry incl. construction



Source: Deutsche Bundesbank. April 2014.

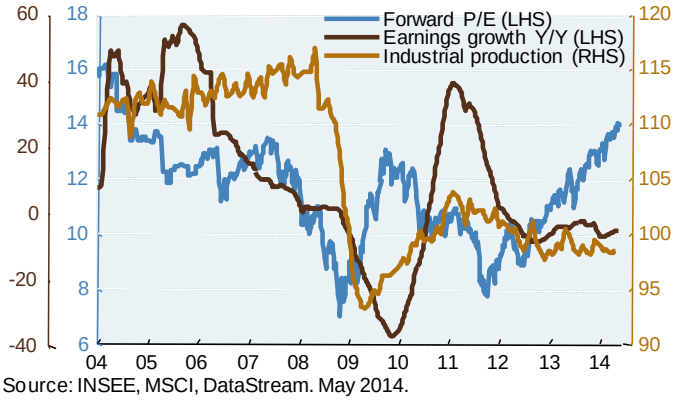
Another possible reason for German acquiescence: France needs the help. While P/E multiples have risen in France, profits and industrial production are still weak (second chart below); France is not experiencing the rebound seen in Germany (or Spain, for that matter). I have seen research comparing Hollande's volte-face agenda (pension reform and corporate tax cuts) with the one announced by Mitterand under similar circumstances in 1982: poor growth, tumbling support for Socialists and a fall in competitiveness vs. Germany. After Mitterand's policy shift (*and* a decline in the Franc vs. the USD and the Deutsche Mark), French equities performed well. Will the pattern repeat itself? Equity optimists have been rewarded in France this year; now we will see if ECB policies can change the facts on the ground. As in the US, it looks like European P/E expansion has run its course and that earnings growth will have to carry markets higher.

Euro area core inflation
Percent, GDP weighted average of services and non-energy goods



Source: Eurostat. June 2014. Core: Austria, Belgium, Finland, France, Netherlands. Periphery: Greece, Italy, Portugal, Spain. GDP weighted.

France: Vive la Difference
P/Es rise while production and profits stagnate



Source: INSEE, MSCI, DataStream. May 2014.

A brief update on our 2013 Private Equity paper

The last decade has seen a ~9% shift by US corporate and public pension plans, endowments & foundations and high net worth individuals out of public equities and into alternative investments. Much of this transition reflects a shift into private equity, a category which includes buyout, venture capital and mezzanine debt. While research on non-public companies is harder to do than on public companies, there is a growing body of literature that is doing just that: **analyzing the historical pattern of returns on private equity.** The research often draws from the Burgiss dataset, sourced from 200 state and corporate pension fund, endowment and foundation limited partner investors in 1,400 private equity funds. The data set is constructed at the cash flow level, which allows for time-weighted comparisons vs. public markets, and is net of fees.

Using this data, academics compute traditional internal rates of return and multiples of invested capital, but prefer a third performance measure: the public market equivalent. The PME compares how much a private equity investor earned, net of fees, to what the investor would have earned on an investment in public equity at the same time. Over the life of a fund, a PME ratio of 1.3 works out to 3%-5% private equity outperformance per year. As shown below, buyout funds outperformed the S&P 500 in each of the last three decades, without much difference between them. Venture capital funds, on the other hand, had a great run in the 1990s after which industry performance has been below public equity markets.

Performance of private equity relative to public equity markets
Public market equivalent ratios, Data from 1984 to 2011

Vintage Year	Buyout Fund PMEs				Venture Capital Fund PMEs			
	Funds	Average	Median	Weighted Average	Funds	Average	Median	Weighted Average
Average	**598**	**1.22**	**1.16**	**1.27**	**775**	**1.36**	**1.02**	**1.45**
Average 2000s	411	1.27	1.25	1.29	423	0.91	0.84	0.95
Average 1990s	157	1.27	1.17	1.34	251	1.99	1.26	2.12
Average 1980s	30	1.04	1.03	1.11	101	0.98	0.90	1.08

Source: "*Private Equity Performance: What Do We Know?*". April 2013. PMEs calculated vs. S&P 500.

We reviewed all of this in a July 2013 EoTM, along with other private equity topics[4]. Of the questions we received on it, the following 2 were the most frequent. Here are our answers.

[1] How do buyout funds perform relative to public equity when using benchmarks other than the S&P 500 (to reflect the small/mid-cap nature of many companies acquired by private equity firms)?

The authors of the private equity paper cited above also computed buyout fund outperformance using the Russell 2000, the Russell 2000 Value Index and the NASDAQ. The PME ratio using an S&P 500 benchmark was 1.22; using the Russell 2000, Russell 2000 Value Index and NASDAQ, the ratios were 1.22, 1.16 and 1.20. In other words, very similar.

[2] How does buyout fund outperformance look when applying leverage to the S&P 500 benchmark (to reflect the leverage typically used by buyout funds)?

The same studies reran their analyses using an S&P benchmark with 1.5x leverage. The buyout fund outperformance measure falls to 1.08; still positive, but less than the original results. Interestingly, the PME is 1.28 for the 2000's decade, 1.09 for the 1990's and 0.76 for the 1980's. The reason the more recent PMEs look better: **applying leverage to the S&P 500 during a decade with two 40%+ declines in the stock market creates a lot of distress in the S&P benchmark**. Compared to the first question, this one is more theoretical; while investors can buy small and mid cap equities instead of private equity, most will not leverage their entire equity portfolios as an alternative.

[4] "*Private Investigations*", Eye on the Market, July 9, 2013. Other topics reviewed: do managers with higher fees and lower GP ownership underperform; operating improvements of public companies taken private through LBOs; adjusting for stale pricing of private equity in mean-variance portfolio frameworks; performance characteristics of secondary buyouts; do bondholders benefit from private equity backing.

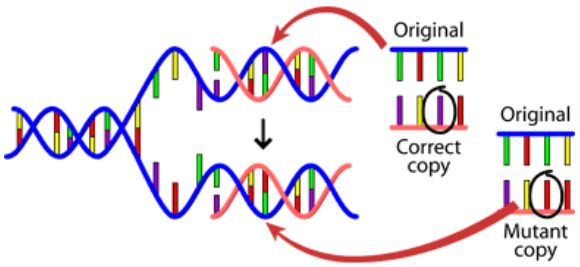
In search of the EX-Men: mining DNA patterns to cure childhood disease

This last section is not about investments, but is a topic that many of our clients care about, at times through direct experience. It's also the ultimate in pattern recognition, which is what this week's note is about. I spent some time with Stephen Friend from the non-profit Sage Bionetworks (Stephen spent much of his career at Merck leading their cancer research efforts). Stephen explained how the world spends a lot of money on palliative care for people with diseases, but much less on prevention. Is it possible that genetically predisposed diseases could be prevented in some way? Stephen and his colleagues seek to answer this question by answering another: **why do some people genetically predisposed to get a disease never get sick?**

The premise: **find people above the age of 40 who were healthy as children, and who did not get certain crippling childhood diseases despite carrying the genes associated with them.** Since these individuals may have been exempted from the disease through some kind of DNA mutation, I refer euphemistically to such men and women as **EX-Men.** If scientists can isolate the genetic and environmental factors that blocked the disease from occurring, they could try to develop *preventive* therapies. This is a powerful idea, since many childhood diseases involve losses of motor function that are practically impossible to restore. That is the idea behind **"The Resilience Project"**, which involves a global search for EX-Men everywhere.

Examples of the 127 single-gene diseases that they intend to canvas for: cystic fibrosis, Tay-Sachs, ataxia and other metabolic, neurological and developmental childhood diseases which tend to fully manifest themselves by age 18. Can it be done? There are precedents in gene therapy and cancer treatments in which scientists successfully identified, from hundreds of potential candidates, gene sequences which function as a buffer against disease. The other good news: in preliminary sampling, Sage already found nine potential EX-Men who should have gotten sick, but never did (see table).

DNA Mutations: some can be beneficial



The Resilience Project: snapshot of potential EX-Men so far

Number of potential EX-Men	DNA Sequence		Disease normally associated with this DNA mutation, but which EX-Men did not get
	Normal	Mutated	
2	c.1558G	c.1558T	Cystic Fibrosis
2	c.964-1G	c.964-1C	Smith-Lemli-Optiz Syndrome
1	c.2204+6T	c.2204+6C	Familial Dysautonomia
1	c.220C	c.220T	Sanfilippo Syndrome
1	c.373C	c.373T	Epidermolysis Bullosa
1	c.755C	c.755G	Pfeiffer Syndrome
1	c.769C	c.769T	APECED

Source: Resilience Project, Sage Bionetworks

What Sage is looking to accomplish:

- Sage seeks to analyze one million+ DNA samples, each collected with a swab. Once an EX-Man candidate is found, genome sequencing and biochemical testing will occur to validate that the person's DNA mutation has the potential to block the onset of the associated disease.
- Recent advances in medical science and genetic data analysis allow these samples to be analyzed for less than $100 each, a number which could fall further with scale. To reach their goal, **Sage is hoping that The Resilience Project will be incorporated into wellness programs at large corporations and institutions**.
- Sage plans to use an open-source approach that allows distributed project teams to share data, and hopefully accelerate the discovery process. Furthermore, Sage intends to keep the information in the public domain as long as possible, in order to speed treatments to patients.
- For more information on how to participate or get your company involved, visit http://resilienceproject.me.

Michael Cembalest
J.P. Morgan Asset Management

Appendix: a petro-sectarian map of the Middle East

We will review this map in more detail in the weeks ahead. Oil and gas deposits often lie close to sectarian fault lines in the Middle East (Kurdistan and Basra in Iraq; Shi'ite areas in Eastern Saudi Arabia; Kuwait), which is why oil markets are sensitive to sectarian violence. In Iraq, oil deposits in the South near Basra are well-defended, and account for 75% of Iraqi production volumes. Exports from the North near Kirkuk are low after pipeline attacks earlier this year. The region was seized last week by Kurdish fighters (Peshmerga), but pipeline repairs are required in areas outside Kurdish control. More to come.

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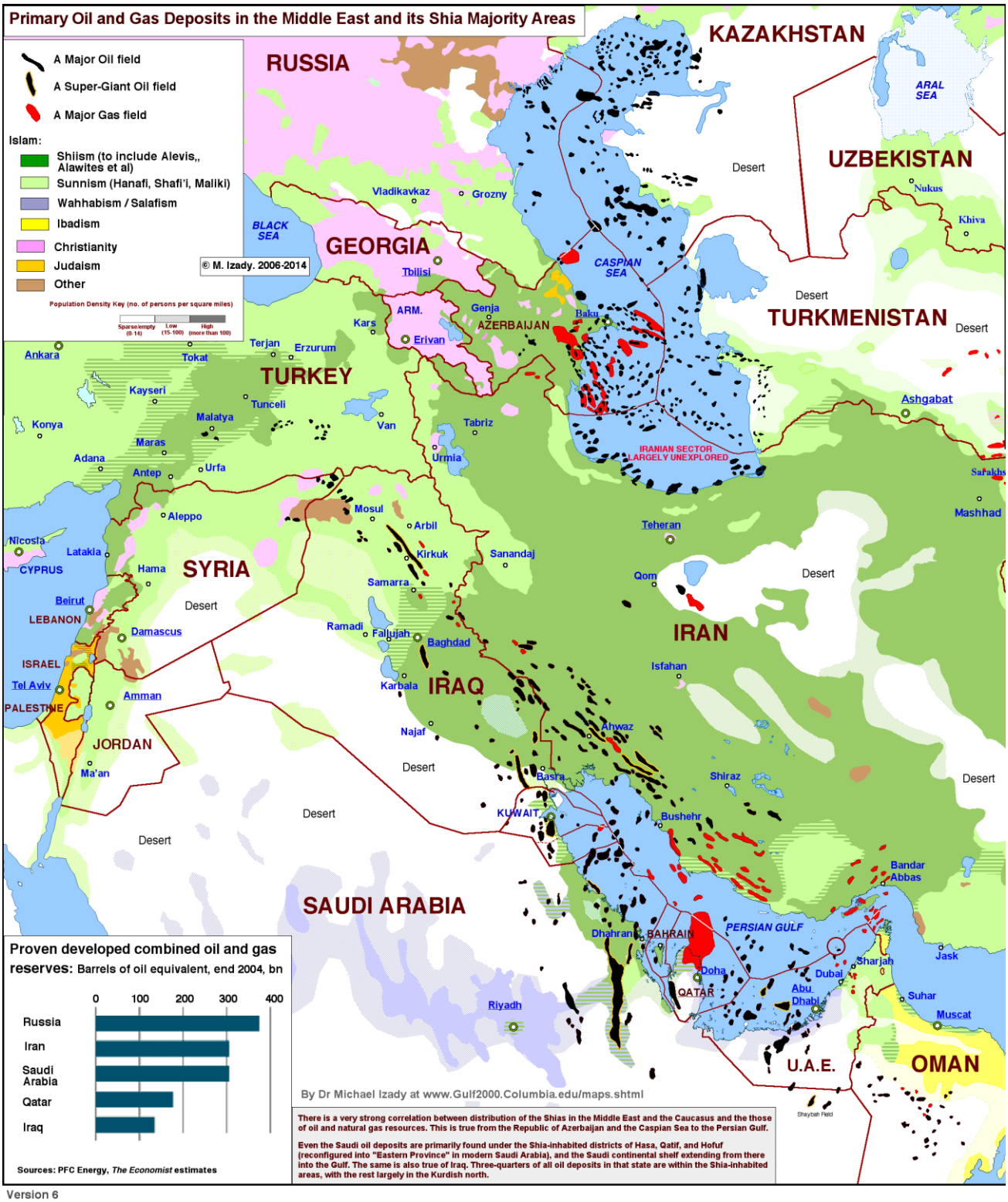

Acronyms

DNA: Deoxyribonucleic acid; ECB: European Central Bank; EU: European Union; GP: General partner; IMF: International Monetary Fund; LBO: Leveraged buyout; P/E: Price-to-earnings multiple; PME: Public market equivalent ratio

Russell 2000 Index: an index comprised of the smallest 2000 companies in the Russell 3000 Index aiming to measure the small-cap segment of the US equity universe

Russell 2000 Value Index: an index that measures the performance of the Russell 2000 companies with lower price-to book ratios and lower forecasted growth values

NASDAQ: a broad-based capitalization-weighted index of stocks in all three NASDAQ tiers: Global Select, Global Market and Capital Market

Sources

"Private Equity Performance: What Do We Know?", Harris (UVA Darden), Jenkinson (Oxford), Kaplan (Chicago Booth), July 2013, Journal of Finance.