Demographic Forecasting
Stock Market and Housing Trends in Japan and the United States
Over the Past 50 Years and a Forecast for the Next 20 Years

David G. MUNRO
Claudia ZEISBERGER
2010/90/DS
Demographic Forecasting

Stock Market and Housing Trends in Japan and the United States
Over the Past 50 Years
and a Forecast for the Next 20 Years

by

David G. Munro*

and

Claudia Zeisberger**

Volatility Research & Trading
September 2010

* CEO of Volatility Research & Trading, Email: david.munro@vvolatility.com

** Affiliate Professor of Decision Sciences and Academic Co-Director of Global Private Equity Initiative (GPEI) at INSEAD 1 Ayer Rajah Avenue, Singapore 138676 Email: claudia.zeisberger@insead.edu

A Working Paper is the author’s intellectual property. It is intended as a means to promote research to interested readers. Its content should not be copied or hosted on any server without written permission from publications.fb@insead.edu
Click here to access the INSEAD Working Paper collection
About the authors:

David G. Munro is the CEO of Volatility Research & Trading, and has run Treasury derivative, trading, structuring and sales for Top tier Global Banks. In 2003 David founded a Volatility-based hedge fund and was Director of Derivatives, Volatility and Investor Relations for a four-time winner of the “Best Asian-based Macro Fund” award. David advises Hedge Funds, Corporations and Family Offices on risk management, derivatives, volatility and demographics.  

David.Munro@vvolatility.com

Claudia Zeisberger is Affiliate Professor of Decision Sciences at INSEAD and is Academic Co-Director of INSEAD’s Global Private Equity Initiative (GPEI). Claudia has worked with clients throughout Asia and the Middle East in the areas of Integrated Risk Management, Structured Products, Private Wealth management and Portfolio Construction. Claudia is a Director of Volatility Research & Trading and conducts research on risk management, derivatives, volatility and demographics.

Claudia.Zeisberger@insead.edu
Introduction

Our ability to forecast degrades rapidly the further out we predict. Even if we do manage to accurately forecast an event, the magnitude and consequences of that event usually astonish us. On the rare occasion where we manage to accurately forecast the event, its magnitude and consequences, our timing is invariably off—sometimes by many years.

Yet we still seek the advice of economists, technicians and academics, knowing full well their documented inability to forecast with greater accuracy than chance would allow. There must be a better way to invest for the future.

Forecasts usually fail because we try to guess the future path of prices and the economy by building fundamental and technical models whose inputs are historic prices, correlations, covariances, causations and a steady stream of the latest economic numbers. Those are all symptoms of the past, not predictors of the future.

The forecasting picture clears up if we focus on the cause of events, specifically people and the waxing and waning populations of age-specific groups.

The economic fate of a nation derives largely from its population dynamics. The number of people in a specific group (or demographic), and the relationship of one demographic to another determines whether the stock market, house prices or long-term interest rates will rise or fall.

“Demography is destiny,” said Auguste Comte, a nineteenth century French sociologist. If he knew this centuries ago, why do so many forecasters ignore it today?

The Demographic Sweet Spot for Stock Markets

When the investing demographic (35-49 year olds) is rising, and rising faster than the spending demographic (20-34 year olds), the stock market rises. As soon as that dynamic changes to a declining number of investors and a falling ratio of investors to spenders, the stock market crashes.

This paper will show that stock and housing market booms and busts in Japan accurately followed these population dynamics. Japan was a near perfect template for the United States, which underwent almost identical booms and busts 12-14 years later.

But a growing investor base and a contracting spender base are not sufficient conditions for a bull market in equities. For demographic forecasting to be effective, certain minimum conditions must be met. The country must have a high literacy
rate, adequate infrastructure, a somewhat disciplined society and a broadly-based economy. As we will see with Russian and Iranian examples, banana (or oil) republics leave much of their fate to commodity prices.

We will also identify how accurate predictions can be made about rising or falling demand for a product based on the number of people in a specific age group. We will show why too many high schools were built in the 1980s, why motorcycle sales plummeted in the 1990s, why iPods flew off the shelves in the 2000s, and why demand for hip replacements will outstrip supply for the next 20 years.

Demographic categories

We like to think of ourselves as individuals, original and free thinking, yet in reality we are members of a crowd and act in predictable ways as we progress through life. People can be broadly grouped into four demographic categories.3

**Moochers: Zero to 19**

From the time we are born until the time we leave the nest at 19 years of age we have a terrible income statement. We consume diapers, squished vegetables, Dr. Seuss books, Lego, sports equipment, clothing, tutors, iPods and astonishing amounts of food. Fortunately, the Moocher balance sheet is perpetually funded by parents.

**Spenders: 20 to 34**

We spend the years from graduation until 34 getting work experience (i.e. a low salary) buying cheap first cars, fixer-upper houses, appliances, baby clothes and paying off student loans. Very little cash is left over to invest in the stock market.
**Investors:** 34 to 49

From 35 to 49 years of age, our pay increases, our expenses increase at a slower rate, and with our rising discretionary income, we begin to invest in the stock market. Now is the time to make our money grow for the future.

**Bond Buyers:** 50+

From the age of 50 onwards, we already have most of the things we need. We are no longer as concerned with making our money grow as we are with preserving it for retirement and those nasty geriatric medical expenses. Bond markets become attractive.

---

**Preconditions for a Stock Market Boom**

Follow me on a trip through time as we see how the sequential introduction of sanitation, peace, birth control, education, literacy, women’s rights, infrastructure, a diversified economy and social discipline almost invariably leads to a stock market boom. Unfortunately, a stock market bust usually follows, as the positive dynamics that led to a surge of stock market investors dissipate.

**Sanitation**

High levels of infant mortality encourage women to have many babies. As recently as the mid 20th century, 15% of new born babies worldwide did not live to celebrate their first birthday. That number has dropped to less than 5% today. Of course, infant mortality rates vary tremendously by country (Singapore has the lowest rate globally at 0.23%). The key factor in reducing infant mortality is improved sanitation: clean hospitals, hand washing and sterilization.

It takes an adjustment period of a decade or two after the introduction of good sanitation before women realize more of their babies are making it past their first birthday. This is step one of a baby boom.

**Peace**

When men are in battle, away from their wives, baby production understandably drops.
Couples that remain together, holding the fort at home, are so fearful of what the future will bring that they also refrain from starting or growing families. Peacetime and optimism for the future means there is a lot of baby production catching up to do.

**Birth Control**

After one to two decades of maximum baby production, someone—usually the UN or a pharmaceutical company (or both) acting on Malthusian overpopulation fears—introduces birth control. Baby production slows dramatically.

**Education & Literacy**

Educated women want to spend more time applying what they have learned and less time raising babies. As literacy increases, fertility decreases, most of the time. Without literacy and an effective and widely available education system, those babies will never become stock market investors.

**Women’s Rights**

The more a woman is able to enter a man’s world, the more she will—within reason. An increasing number of women in developed countries become engineers, doctors, CEOs, pilots and take up other roles that have traditionally been the domain of men. This is the next step in reduced fertility. You can’t have many babies if you spend all your time delivering them.

**Infrastructure**

All of the above developments are useless without adequate infrastructure. As I type, athletes—fearful of their safety—are pulling out of the Delhi Commonwealth Games due to reports of “filthy and uninhabitable conditions” at the athletes’ village and the collapse of a footbridge that injured 27 people.

India will have its place in the demographic sun, but its force will be marginal instead of spectacular without adequate infrastructure.

**Diversified Economy**

A banana republic (a country who’s GDP derives largely from one dominant export) thrives or collapses due to commodity prices, not population dynamics.

**Social Discipline**

Fair laws, a just system of justice and respect for one’s fellow citizens are necessary preconditions for stocks to rise. Political oppression, rampant corruption, civil war and mass genocide are definite no-no’s for the incubation of a stock market boom.

**Flow of Cases in this Paper**

Before diving into the demographics of Japan, the United States, Russia and Iran, and examining how demographic trends in these countries have foretold the future of equity and housing markets, we take a look at the demographic life cycles of three products: motorcycles, high schools and iPods.

1) **High Schools:** A rapid increase in the student population in the 1970s—and the decision to build many more high schools—was followed by a 15% drop in the number of students and significant excess classroom capacity.
2) **Motorcycles**: A tremendous sales boom in the 1980s was followed by a spectacular bust in the 1990s.

3) **iPods**: From zero to 50 million unit sales per year in the 2000s, followed by the iPhone in the 2010s.

   We then move on to US equity markets, the real reason behind the movement of P/E ratios, the Japanese investor/spender ratio and how it was a template for the US, and finally conduct a post-mortem on the Japanese and US housing markets.

4) **US Equity markets**: Get ready to buy in 2019.

5) **Price/Earnings Ratio**: Throw out your multi-factor models.

6) **Japan**: More bubbles than a bottle of champagne

7) **Japan and US**: Comparison of the investor demographic

8) **Simplifying Complexity**: P/E ratios are about people, not algorithms.

9) **US and Japanese Housing**: Home buyers were a shrinking demographic and we knew it 40 years in advance.

   We will not look at Chinese, Indian, Brazilian, African, Indonesian, Singaporean, Italian or German demographics in this paper. They all tell extremely interesting tales (today) about the next couple of decades and we know the ending. If Italy and Germany maintain their current fertility rates (1.41 and 1.38 births per woman respectively as of 2008), Italy “will lose 61 percent of its native population by the end of the century, and Germany will lose 63 percent.”

   But population trends are not all bearish; far from it. The US actually has two demographics bulges coexisting: the 45-65 group (baby boom) and the less famous 5-25 group (echo boom). Unfortunately, the investors are missing.

   We will instead focus on two unique cases: Russia and Iran.

10) **Russia**: A boom and bust, and boom and bust and potential extinction in the near future.

11) **Iran**: At the cusp of a demographic boom, if they can get their social discipline, women’s rights and infrastructure figured out in time.

   We conclude with a graphic representation of the magnitude of the imminent geriatric goldmine.

12) **Hippies Return and Golfers Fade**: A look at expanding and contracting demographics.

**Summary**

**Notes and Sources**
High School Graduates – Highly Predictable

Barring war, plague, massive meteorite collisions or the rapid-onset of an ice age, it is relatively easy to predict how many 18 year olds will populate the planet 17 years from now. They already exist as one-year olds. Allowing for a degree of mortality and net migration, we know the approximate number of voters, drivers, drinkers and high school graduates to expect in the year 2027.

The number of high school graduates in the U.S. rose by 18% from 1972 to 1982. Noticing the increasing strains on high school classroom size, administrators sprang into action. They lobbied for increased funding and a high school building boom blossomed in the early 1980s. By 1990, after a 15% decline in the number of high school students, the administrators were left scratching their heads and wondering what to do with the underutilized teaching facilities.

They also questioned the cause of the disappearing students. Had they moved to another state, opted for the prestige of a private school, or had they been forced by new-age parents into home schooling? The studies conducted to understand the sudden drop in enrolment are comical in their omission of the obvious.

A report that tries to come to grips with the “cyclic nature” of the number of high school graduates by consulting firm Engineering Trends is instructive. The report opens with “We now seek to explore the possible origins of the cyclic nature of undergraduate enrolments ...over the last three decades of the 20th century,” and concludes with “the source of the cyclic nature of ...enrollments is not to be found in statistics of this type. We must explore other avenues to find the correlating factors.” The consulting firm’s tagline is “More than just data...we interpret data.”

The simple answer was that fertility rates dropped dramatically 18 years earlier. Fewer babies were born.
Motorcycles – Sales Cycles

Kenneth Gronbach relates a life-changing observation in his simple yet profound book The Age Curve. In 1979, Gronbach’s marketing company won a regional American Motorcycle advertising account. Honda was selling 400,000 motorcycles per year and had a 40% share of the market.

“The number of individual Honda motorcycle dealerships we served grew from 30 to 130 in just a few years. Bikes were flying out the door and cash registers were ringing. We were geniuses. Life was good. But in 1986 sales came to a screeching halt; 1987 was not any better, 1988 was worse; 1989 showed no improvement.”

To solve the mystery of declining sales they corrected suspected design flaws, increased marketing budgets, reduced the price, introduced special edition bikes and tried advertising on billboards, print, radio and TV. But unit sales kept on falling. By the mid 1990s, sales had dropped by 80% and 130 dealerships closed.

No one could figure it out.

Gronbach’s “ah ha” moment came when he realized that 16-24 year old males purchased motorcycles. At 26 years of age, men tend to get married, and as Gronbach says, “It is amazing how close in price a late-model high-end Japanese motorcycle is to a one-carat diamond ring.”

Had motorcycle manufacturers been looking at potential demand (the number of 16-24 year old males) instead of the factors that affect demand (disposable income, employment levels, cost of alternative transportation), they would have been better able to manage their production and expectations. And the motorcycle dealers—had they looked at the red line in the chart below—might have opted for new careers as stock brokers.

Demographic groups rarely change their stripes, but motorcycles are a clear example of a moving market. In the 1980s, U.S. motorcycle demand from 16-24 year olds dominated. In the 2000s, the 45-55 year olds buy most of the bikes. Apparently, the movie Easy Rider left an indelible impression.
iPods – Steve Jobs Understands Demographics

Steve Jobs closed a keynote speech in 2007 with a quotation (below) from the leading hockey goal scorer of all time. Gretzky had this fascinating ability to read the intentions of his teammates and those of his opponents, estimate where they would pass the puck, and be the first one there to receive it:

“I skate to where the puck is going to be, not where it has been.”

Wayne Gretzky

Jobs has the same ability to know where demand (the puck) will be in the future, but unlike Gretzky, he doesn’t have to guess.

iPod demand is dominated by the 13-24 year old demographic. Something happens when you turn 13. The desire to consume a steady stream of ear drum-shattering music while simultaneously drowning out the sage guidance of your parents becomes overwhelming. Something also happens when you turn 24. The desire to get a job, pay off debt and listen to your boss sends the iPod into the drawer.

I would guess that Jobs and the Apple engineers looked at youth demographics in the late 1990s and saw something similar to the blue line below—a 20% increase in the teenage/young adult population in just 13 years. The iPod was launched in 2001 and reached sales of over 50 million per year within eight years.

Jobs knew exactly where the puck was going to be. He also may have noticed that after 2009, the iPod demographic was destined to flatten out—no net growth—for 8 years. iPod sales have indeed dropped by 8% in 2010, but sales of iPhones, up over 50% from last year, have more than compensated.

The iPhone buyer demographic follows directly behind the iPod demographic. The iPhone was launched in 2007, just in time to catch a 12-year wave of strong demand.
Stock Market Demographic Sweet Spot

1) A rising number of 35 to 49 year olds (forming the Investor Base).

2) A falling number of 20 to 34 years olds (comprising the Spender demographic)

3) An investor/spender ratio rising above 100% so that there are more people in the investor demographic than in the spender demographic.

4) A diversified economy

5) Sufficient infrastructure

6) A disciplined society with a fair judiciary.

**Investors**: Age 35 to 49,  **Spenders**: Age 20 to 34,  **Bond Buyers**: Age 50+

“Remember, an economic boom is usually followed by an economic kaboom.”
US Equities—20 Dismal Years

In the 1950s, the ratio of investors to spenders (blue line in the chart below) soared through 100% on its way to 116% by the early 1960s. Every passing year brought proportionally more people in the 35-49 age group (investors) relative to those in the 20-34 age group (spenders). When more money flows into investing than consumption, the stock market rises. It is difficult for it to do otherwise.

The DJIA adjusted for CPI (red line in the chart below) rose through the 1950s until 1965 and then collapsed. The collapse coincided with a dramatic drop in the ratio of investors to spenders—from a high of 116% to a low of 67% in 1980. With an abundance of spenders (many of them hippies, so we won’t question what they were buying) and a dearth of investors, the stock market had nowhere to go but down.

Imagine understanding this relationship in 1980 and looking at the investor/saver ratio 20 years into the future. This would not be a forecast, as every one of the people comprising that ratio had already been born. The index pointed steadily upward, without interruption, until 1999 where it “predicted” 1.2 investors for every saver. Money was about to be invested at the expense of consumption.

The DJIA really took off in 1993 when the investor/spender ratio crossed 100%. This phenomenon appears to be universal.

We are now half-way through a 20-year period of a falling investor/spender ratio. By the time we reach 2019 and only 87 investors for every 100 spenders, equity will be a dirty word.

I tried explaining this concept to my 13-year old son (a potential stock market investor in 22 years) and he immediately called me on it: “If an increasing number of people are buying things that companies produce, then surely the companies will make more money and their stock prices must rise.” Almost logical.
Increased Sales do not equal a Higher Share Price

Imagine a world with no 35-49 year olds. The only demographic categories are the 20-34 spenders, the 0-19 moochers and the over 50 bond buyers.

Companies sell large quantities of their goods and the profits roll in. Unfortunately there is no one around to buy their shares (the 35-49s don’t exist). The result is high earnings and a low share price, colloquially referred to as a low price to earnings ratio (P/E).

Now, let the 35-49 year olds return to earth, and banish the 20-34 year olds. Companies can no longer sell their product and the losses mount, yet their share price miraculously rises thanks to an abundance of 35-49 year old investors.

The chart below shows the ratio of Investors to spenders (blue line) against Robert Shiller’s S&P 500 P/E ratio (red line).

From 1965 to 1980, when a large number of baby boomers became spenders and outnumbered their investing parents, P/E ratios fell.

From 1981 to 1999, when those same boomers became investors, and outnumbered the sparsely populated Y generation (born 1965 to 1984), P/E ratios soared.

For the next nine years, until 2019, the ratio of investors to spenders will steadily drop. P/E ratios are already low, and have the potential to head lower. Plan to invest heavily in S&P 500 company shares in 2019-2020. Until then, receive dividends from companies that sell lots of products to the spenders. Sounds like a plug for technology preference shares.

**High P/E = many investors but few spenders**

**Low P/E = few investors, many spenders**
Japanese Equity Baburu

The Japanese have kept fastidious records of the number of births per year since 1872. As the chart below shows, from just 600,000 births in 1872, the number of new Japanese babies per year rose steadily to reach 2.25 million in 1936.

Births tumbled to less than 1.6 million in 1946, undoubtedly due to the August 1945 bombings of Hiroshima and Nagasaki. Government incentives and the security of peace ignited a massive but short three-year baby boom. Yearly deliveries climaxed at an astonishing 2.7 million for three consecutive years from 1947 to 1949.

All demographic studies must begin with Japan since the data is uncontaminated by net migration, disease, or mortality. Ok, perhaps they haven’t figured out the secret of immortality, but they certainly do seem to live for an awfully long time. But as this recent headline suggests, dodgy accounting may be responsible for much of their longevity.

“Fri Sep 10, 2010: Japanese officials say more than 230,000 people listed as being over the age of 100 cannot be found.”

The Japanese baby boom spanned the period from 1947 to 1949. Western babies boomed from 1946 to 1964. Taking an average of the mid and end points of the baby booms (1948.5 and 1960.5), Japanese demographics lead U.S. demographics by approximately 12 years. There really couldn’t be a better map to follow.

The ratio of Japanese investors to spenders (the same ratio we looked at for the U.S. on the previous page) plateaued in the late 1980s and began a precipitous decent in 1990.

By the time this ratio bottomed 13 years later, the Nikkei had lost 80% of its value.

Oddly enough, 13 years of a falling stock market coincided with 13 years of a falling ratio
of investors relative to spenders.

But surely the rest of the story can’t be true? Could the Nikkei rally until 2020?

The so-called "echo" baby boom from 1985 to 2004 has set the stage for a surging investor base starting in 2019. The rising ratio of investors to spenders from 2019 onwards is supported by a rising population.
Long-Term Trends

A look at the number of equity investors shows that the 70s belonged to Japan, the 80s to both, the 90s to the U.S., from 2003 to 2015 to Japan, and beyond 2015 (and as far as the data can reasonably predict) the U.S. will be the leader.
Simplify Complexity—More on P/E Ratios

In a 2001 paper for the Journal of International Financial Management and Accounting titled 
Price-Earnings ratios in Japan: Recent Evidence and Further Results,17 Shashi Kumar and 
Kumi Hyodo analyze the disparity between Japanese and U.S. price/earnings ratios between 
1975 and 1995 “with a view to find if the accounting differences between the two countries 
can explain the disparity.” Their findings suggest “accounting differences explain a 
significant part, but not all of the difference.” They investigated further and found that 
changing expectations about growth opportunities, changes in real returns and differing 
inflation [essentially any economic factor] did not fully explain the behavior of the 
price/earnings ratio.”

An article by Ben Levisohn in the Wall Street Journal of 30 August, 2010, titled The Decline 
of the P/E Ratio18 questions the usefulness of the ratio. “The stock market’s average 
price/earnings ratio, meanwhile, is in free fall, having plunged about 36% during the past 
year, with the largest 12-month decline since 2003. What explains the contraction? In short, 
economic uncertainty. A steady procession of bad news, from the European financial crisis to 
fears of deflation in the U.S….”

In Levisohn’s WSJ piece of 4 September, 2010 he asks Is It Time To Scrap the Fusty Old P/E 
Ratio?19 He claims the ratio is “losing its mojo as a market gauge”. Levisohn’s inability to 
rationalize the increasingly mysterious relationship between price and earnings is seen as a 
reason to discard the measure.

An extensive search for explanations of the driving forces behind the P/E ratio uncovered 
a plethora of algorithms, multi-factor models, inflation, interest rates, psychological, 
astrophysical, and technical studies. None of the studies addressed the size of the equity-
buying demographic (who determine “P”) or the size of the consumer group that buys most 
products (leading to “E”). An alien arriving from another planet would have surmised that 
the actions of people had absolutely nothing to do with P/E ratios.

Individuals decide to either buy or sell a traded equity and thus assign it a value, known as 
price. More individuals, usually from a younger age group, buy the products and help 
generate earnings. If there are few investors, the price won’t be very high regardless of the 
number of widgets the company sells.

A P/E ratio is determined largely by the investor/spender demographic, not by algorithms.
US Housing—Boomer Mansions

Thirty years ago, in 1980, the large house-buying demographic in the US comprised 24 million people, which was 10% of the population (red line in the chart below). By 2005, this demographic had increased to 42 million people, or 14% of the population (large house buyers were predominantly baby boomers in 2005). By 2015, this group will have shrunk to just 33 million people, which is back to 10% of the population. The number of 42 to 50 year olds will fall by 21% from 2005 to 2015, and they will not begin to increase in numbers again until 2021.

Why then does the US government spend so much time and money supporting the housing market when the natural source of large house demand won’t return until 2021?

Asia clearly has a different problem: fast rising prices. What accounts for the extreme differences in real estate market dynamics? Peak house-buying demographics in Asia, and eroding demographics in the US.

China Measures Keep Lid on House Prices
5:30 AM Wednesday Aug 11, 2010

Prices in 70 major cities climbed 10.3 per cent from a year earlier, the statistic bureau’s newspaper, China Information News, reported yesterday. That was less than an 11.4 per cent increase in June.

Singapore Tries to Cool Its Property Market
AUGUST 30, 2010, 12:29 P.M. ET

SINGAPORE—Singapore’s government Monday introduced new curbs against housing market speculation in the city state after prices surged to record highs, stoking fears of a bubble.
Japanese Housing—a Template for the U.S.

The Japanese tend to buy houses when they reach their forties, a demographic that closely correlates to the U.S. “boomer mansion” cohort.

It is not news to anyone in the West that Japan, an aging nation, experienced a spectacular real estate “baburu” in the 1980s, and an equally spectacular crash in the 1990s.

Explanations for the bubble generally cite easy credit, excessive leverage and an insatiable appetite for financial assets (sound familiar?). Very few mention the disappearing home-buying demographic (41-49 year olds) as the culprit.

The chart below shows the Japanese home-buying demographic increasing in size by almost 20 per cent from the mid 1970s until the 1990 peak, and residential land prices jumping by 200 per cent. Over the next 12 years (1990 to 2002) the house-buying demographic fell by one third and land prices halved.

If you were a Japanese homeowner, it would have been useful to know that the number of people of home-buying age was on the verge of collapse. This information had been available to everyone for decades but, for some bizarre reason, no connection was made between the number of potential home buyers and land prices. Perhaps even more bizarre was the “surprise” real-estate boom and crash in the US 14 years later.

Symptoms of the changing demographic (rising prices due to easy credit, excessive leverage and demand for financial assets, followed by falling prices because of tight credit, restricted leverage and disdain for financial assets) are cited as the cause of the collapse, not the changing demographic itself (18 million people rising to 22.2 million people and then falling to 14.7 million people).
Russian Equities in the 1990’s

The same investor/spender ratio we examined in Japan and the United States pointed to a 1999 stock market peak in Russia. The investor/spender ratio rose from 80% in 1980 to 120% in 1999, while the size of the investor demographic increased by 30%, from 28 million to over 36 million.

The acceleration point in our investor/spender ratio was 1994 when it rose above 100%. From 1995 until late 1997, the Russian stock market jumped by almost 500%.

One is tempted to question if LTCM ever considered the potential impact of a highly leveraged Russian position in light of the ominous demographic trend change that lay in the near future.

Russian equities fell by over 90% in one year, the ruble dropped by 85%, and many bonds went to zero. This was about as complete a financial wipe-out as one could imagine.

Demographic forecasting is not precise—especially when using yearly data, but it probably would have been helpful to know that Russia's demographic sweet spot would start around 1994 and lose momentum and head south four to five years later.
Russia in the 2000s: (Population) Size Matters

Ratios mean little to a country’s success if there are no people. In 1990, the US population was 102 million larger than Russia’s (250 million vs. 148 million). By 2036, the US population advantage is expected to increase to 274 million (393 in the US vs. 119 in Russia). Additionally, the Russians have a higher median age and a lower life expectancy. American men can expect to live 20 years longer, on average, than their Russian counterparts.

Russian men are dying in their 50s (vodka the main culprit) and are fathering fewer babies. The US may have won the cold war, but Russian women seem to have won the cold shoulder war.

How then did Russia manage to become a card-carrying member of the BRIC group of fast-growing developing economies (Brazil, Russia, India and China)? Oil revenue plus a cheap currency have been able to save them from oblivion thus far.

![Graph showing population and median age trends in Russia and the United States](image1)

**Banana Republic**

Oil and Gas companies (predominantly Gazprom, Lukoil and Rosneft) comprise over half the weight of the Russian Traded Index. The size of the domestic population has little bearing on stock market performance if you prosper or die according to the price of a commodity. Without an abundance of natural resources, Russia would be a basket case by now.

The perfect hedge against falling oil prices would be a short Russian exposure.

The purpose of this Russian analysis is to show how the investor/saver ratio mattered when oil was not a dominant factor in the 1990’s, and how oil and gas are now the only things that matter.

![Graph showing Russian stock market and crude oil price trends](image2)
Unconventional, but we now take a look at the population trends of Iran, a country that evokes extreme emotions. We will not prophesize on their beliefs, customs, geopolitical posturing or nuclear ambitions, but focus exclusively on their demographics.

Something happened in the early 1980s. Iran underwent such an extreme change in fertility patterns that I would be surprised if the Tehran Stock Market does not witness a spectacular boom in the near future. A fertility rate of between 6.4 and 7.0 children per woman from 1960 until 1983 resulted in a significant baby boom and a tremendous increase in the population. Over the subsequent 15 years (until 1998) Iran’s fertility rate plummeted to just over 2 children per woman, and the women now produce fewer offspring than their U.S. counterparts.

**Fertility rate**
The average number of births per woman. More info »

The ingredients for an economic boom are a massive baby boom followed by a baby bust. The sequence of events to bring this about are:

1) Increased sanitation and survivability (reduced infant mortality).
2) Widespread use of contraception
3) Increased literacy.
4) More educated women.
5) More women in the workforce.
Twenty years after this sequence, the economy starts improving, and 30 years later you should be in an economic boom.

Iran is about 25 years behind the U.S., demographically speaking.

The chart below shows that over the past 15 years, the number of potential investors has jumped from 5 million to 13 million, and will double again over the next 15 years.

The ratio of investors to spenders is a very low 58% now, but this will change dramatically starting in 2012. The ratio will pass 80% in 2019, hit the critical 100% level in 2022 and will rise to a spectacular 140% by 2030.

Iran should be a “buy on dip” story until 2022 when easy credit, excess leverage and demand for financial assets will accelerate the uptrend for about eight years and lead to a spectacular bubble.

This forecast is conditional upon Iran dealing effectively with its infrastructure, creating a fair judicial system and developing a diversified economy.
Hippies Return, Golfers Fade

Get in on a trend just as the supporting demographic starts increasing in numbers and exit before the demographic heads south. We saw the usefulness of that approach with motorcycles, high schools, iPods, real estate and the stock markets of emerging, submerging and rogue countries.

In the 1960s, hippies changed fashion, protested against wars, listed to psychedelic rock, and started a sexual revolution.

Now they need replacement parts: new hips, hearing aids, spectacles, and teeth. None of this is unexpected. This is actually the one of the few demographic trends that everyone recognizes. But looking at a chart of the growth of the 60-80 age group underscores the magnitude—and thus the significance—of a 50% increase in the senior population. Meanwhile the golfers will get better tee-off times.
Summary

Demography is Destiny

Japan may have a short respite in their race to extinction, but unless they invent fertility robots, the country is doomed.

The United States has a very bright future. They have a barbell demographic, with massive numbers of young technology consumers and elderly seekers of replacement parts. Among developed economies, their demographic profile is the brightest. Unfortunately, the investor group (35-49 years old) is missing.

Russia’s problems are similar to those of Japan (aging population with fewer youth) but they lack the longevity and discipline. Once the oil disappears or falls in price, China will probably buy them out. A new opportunity for private equity?

Europe, not discussed in this paper, has severe demographic issues. Maintaining their 1.3 to 1.5 babies per woman fertility rates (excluding Scandinavia) will result in declines in native populations from 55% to 70% by 2100.

Iran has one of the better population stories for a stock market boom, though they need to take care of a few housekeeping issues to make that happen.

People Migration, taxation and Mega Cities

We’ve established what makes a stock or housing market boom, and what makes demographic-appropriate product fly out door, but we haven’t looked at the options a country has at its disposal to deal with deteriorating demographics.

The global population will not start falling until 2040 to 2050, but many western countries are already in population decline. This will lead to fewer workers supporting retirees, lower tax revenue and significantly lower real estate and land prices. How much do you think that nice 18th century cottage in Tuscany will cost in 67 years when the population of Italy has halved?

Governments will become inventive in the schemes they conjure up to attract foreigners. The Government of Singapore, seeing the future, has offered quality of life, modern infrastructure and low taxes. Singapore, with one of the lowest fertility rates in the world at 1.09 children per woman, can expect to see its native population fall 50% by 2068.

People will not want to live in a dying country. Long before populations halve, residents of low fertility countries will leave for the more stimulating mega cities. Will New York, Tokyo, London, Rome, Shanghai, Zurich and Singapore all be wooing foreigners with low taxes and free land just to keep up the body count? Or will the young masses from high fertility countries emigrate and fill the voids? The Congo, Uganda, Somalia, Afghanistan and Niger all have fertility rates in excess of 6 babies per woman.

Trading Demographics

Most people find demographic trends interesting, but don’t believe they can actually apply the information in their business or investment decisions. The trends are just too lengthy and the trend changes are too difficult to call.

But as we saw with the Japanese and U.S. investor/spender ratios, the 70s belonged to
Japan, the 80s to both countries, the 90s to the U.S., the subsequent 15 years to Japan, and from 2015 onwards, Japan should be ignored in favor of the U.S. This is vital information for pension planners, insurance companies, sovereign wealth funds and private equity partnerships. Can anyone guess what will happen to China housing demand in 2012?

Notes and Sources

Page 1
1. “Demography is Destiny” is attributed to Auguste Comte by several sources, and it has become more of a cliché than a quotation.

2. The investor/spender ratio concept that the size of the investor group relative to the spending group—and not just the size of the investor group—is important, makes intuitive sense. Overlaying time series of this ratio with the equity indices of numerous countries and viewing the consistently close correlation satisfies me that this is a valid tool to ensure one is on the right side of long-term trends. (Volatility Research & Trading)

Page 2
3. Categories determined by Volatility Research & Trading (“Moocher” is not intended to be a derogatory classification. My 13-year old son is a delightful moocher).

Page 3

5. “filthy and uninhabitable” - Mike Hooper, Chief Executive of the Commonwealth Games Federation on 23 Sep 2010.

Page 4
7. Population model from Volatility Research & Trading. An initial data set of population by age is advanced yearly by assuming a 1st child is born at 26 years and subsequent children (or fractions thereof) every two years thereafter. All are assumed to die at the average life expectancy age. The model makes no allowance for emigration or increased life expectancy, and assumes a constant fertility rate into the future. The following chart is the expected population of Italy if the current fertility rate of 1.41 persists.

Fred Pearce is more pessimistic and suggests in his book *Peoplequake* that by 2100 Germany will lose 83% of its native population and Italy will lose 86%.

---


10. Full quote from Steve Jobs: “There’s an old Wayne Gretzky quote that I love, ‘I skate to where the puck is going to be, not where it has been.’ We’ve always tried to do that at Apple. Since the very, very beginning. And we always will.” Apple, Macworld San Francisco 2007 Keynote Address; [Http://www.apple.com/quicktime/qtv/mwsf07](http://www.apple.com/quicktime/qtv/mwsf07)


12. Admob (same link URL as note 11). “In Total, 74 percent of iPhone users are over the age of 25.”


14. Robert Shillers’ PE data available in excel format at

Page 11


Page 13
http://online.wsj.com/article/SB10001424052748703618504575459583913373278.html
http://online.wsj.com/article/SB10001424052748703431604575467671864739004.html

Page 14
22. http://www.globalpropertyguide.com/Asia/South-Korea

Page 15
24. Japanese Residential Land Price Data

Data for the numerous charts come from a variety of sources, listed below in no specific order.

Bloomberg—Equity and CPI data
http://www.census.gov/ipc/www/idb/groups.php
http://www.google.com/publicdata?ds=wb-wdi&met=sp_dyn_tfrt_in&dim=country:ITA&dl=en&hl=en&q=italy+fertility+rate
http://data.worldbank.org/indicator/SP.DYN.TFRT.IN?cid=GPD_11
http://www.pbase.com/selsadek10/profile
http://www.worldlifeexpectancy.com/world-health-rankings

Books on Demographics:

Fred Pearce, PEOPLEQUAKE. Mass Migration, Ageing Nations and the Coming Population Crash, Eden Project Books, 2010

Kenneth W. Gronbach, The Age Curve. How To Profit from the Coming Demographic Storm.
AMACOM, 2008.


A blog by Carolyn Monyihan commented that in Germany in 2009 “births dropped by 30,000 and there was a net loss of 13,000 people through migration.”
http://www.mercatornet.com/demography/

**Volatility Research & Trading** simplifies the complexity of global opportunities, trends and risks.

Research Areas include:

1. Volatility Analysis and Forecasting
2. Demographic Analysis and Forecasting
3. Practical Risk Management Solutions based on Power Distributions & “Four Quadrant” Analysis
Europe Campus
Boulevard de Constance
77305 Fontainebleau Cedex, France
Tel: +33 (0)1 60 72 40 00
Fax: +33 (0)1 60 74 55 00/01

Asia Campus
1 Ayer Rajah Avenue, Singapore 138676
Tel: +65 67 99 53 88
Fax: +65 67 99 53 99

Abu Dhabi Campus
Muroor Road - Street No 4
P.O. Box 48049
Abu Dhabi, United Arab Emirates
Tel: +971 2 651 5200
Fax: +971 2 443 9461

www.insead.edu