Investment Advisor

CONVERSATIONS ON INVESTMENT MANAGEMENT

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CONTENTS

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"Investment is most intelligent when it is most businesslike."

-- THE INTELLIGENT INVESTOR, PROFESSOR BENJAMIN GRAHAM --

The investment world is constantly changing, as the world changes. New technologies, economic and geopolitical shifts, demographic changes and company and industry developments will always provide opportunities and risks that are actionable. Amidst change, our research and analysis tools and methods may change, but our investment principles remain.

We hope the articles in this edition of *Investment Advisor* are useful to you.

Macro [Global Economic] Insights

DEMOGRAPHIC UPDATE

For nearly two decades, we have advocated that the global collapse in birth rates [which pre-dates Covid-19] and rapid aging of the global population is one of the most important factors affecting labor force growth, economic growth, inflation and interest rates. We are making investment decisions in a very different world than in the past, demographically speaking.

We are in the midst of a dramatic decline in birthrates in many large countries. This decline is not just occurring in the developed world, but also in many less developed countries. On a combined basis, the global birth rate is causing a dramatic slowing in population growth, but most important is the slowing growth of the labor force, which we believe is a proximate cause of lower long-term economic growth, inflation and interest rates.

The Wall Street Journal has produced a series of excellent articles on the demographic [aging] challenges in China and the rest of the world. Here are some of their factual findings and conclusions:

- Covid-19 has accelerated the general trend toward lower birth rates, especially in developed countries. In Germany, the U.S., U.K. and France the total birth rate [prior to Covid-19] was below the level needed to keep the population steady, and is not expected to rise. Japan's birth rate is substantially lower.
- In December 2020, South Korea's central bank suggested that the decline in the country's birth rate in 2020 [already the world's lowest] would be lasting as delayed marriages led to permanent social changes and fewer children born overall.
- Recent economic research has suggested that falling birth rates are a major factor in the declining interest rates of recent decades, by some estimates even the largest single factor. Bank of Japan research published in 2018 indicates that more than 40% of the nation's decline in interest rates between 1960 and 2015 was caused by changes in the working-age population, about half of which is down to declining numbers of births, and the other half is down to increased longevity.
- Unlike some of the other factors at play, declines in birth rates are close to impossible to alter globally. One country can prop up its demographics with immigration from another, but globally that is a zero-sum game. A shrinking workforce caused by births two decades prior is easy to see coming and difficult to do much about.

Source: Baby Bust Effects Could Last Decades, Wall Street Journal, 3/7/2021.

The projected population declines coming in China are astounding, as cited in the articles below. Dropping the one-child policy many years ago has had no impact in increasing birth rates. China's collapsing birth rate has been unrelated to government policy. While China is the second fastest aging country [behind Japan] most of Asia faces a similar aging situation as Japan and China, with birth rates far below replacement levels.

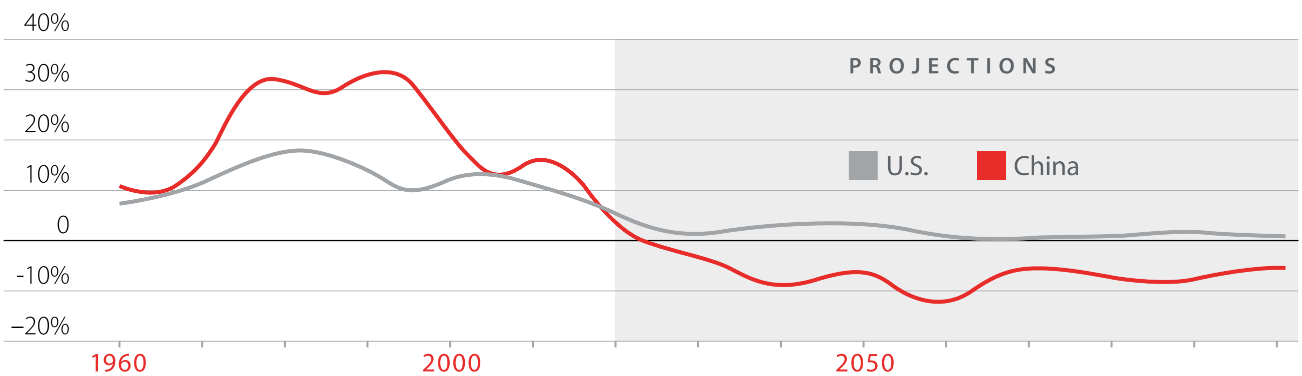
- China's population is expected to fall from the current 1.41 billion to roughly 730 million people by the end of this century, according to projections by an international team of scientists published last year in the British medical journal The Lancet.
- While some experts say a smaller population wouldn't be unwelcome, the structure of the population - without enough working-age people to support the swelling ranks of retirees - could weigh on China's economy for decades.

Source: China Eyes Increase in Childbirth, Wall Street Journal, 6/19/2021.

- The labor force of China is now declining—in contrast to the steady, immigration-driven growth of the U.S., and is projected to lose 174 million workers by midcentury. To borrow a phrase from the political economist Nicholas Eberstadt, this will "bound the realm of the possible" in the Chinese economy. [Source: Governance in an Emerging New World, Roundtable, The Hoover Institution]
- The selection of boys during the era of the one-child policy means that now the country has a shortage of women. That doesn't amount to a no-child policy, but it may produce a no-child result.
- Meanwhile, China's population over age 65 will double by 2050 to 400 million.
  - Many will need housing or other public assistance.
  - In the past, a young, productive and risk-taking China did not budget for a social safety net.
  - Successive generations of one child families, [as early as 1990, four-fifths of Shanghai children had no siblings] have upended the family culture of caring for the elderly.

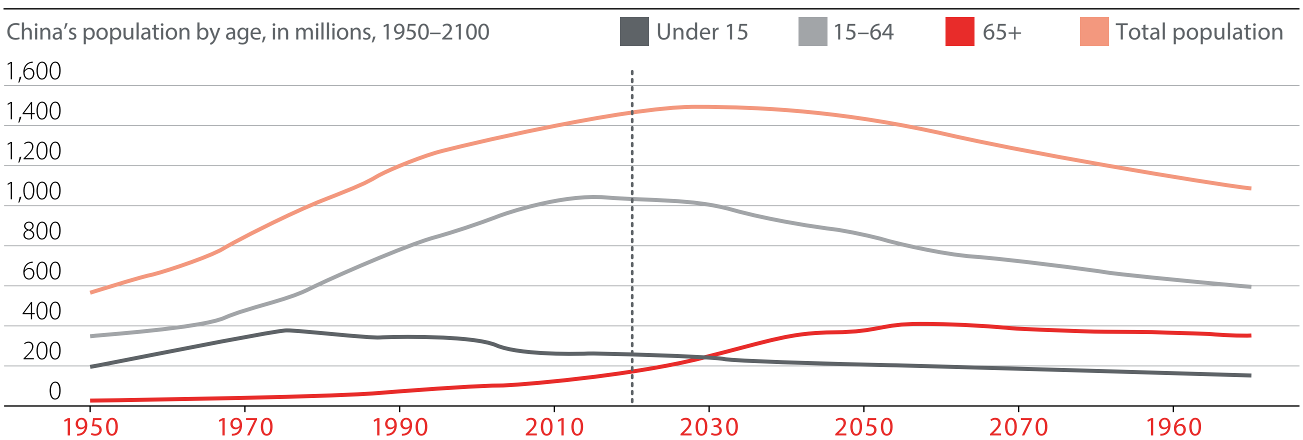
Source: China Has Troubles of Its Own, George P. Schultz, Wall Street Journal, 8/26/2020.

10-year Population Growth of 20–65 Year Olds



Source: United Nations Population Division

A Shrinking Workforce



Source: U.N. World Population Prospects, Adele Hayutin

- China, the world's most populous country, has begun aging rapidly over the past decade, but the pace is going to pick up even more as tens of millions reach retirement age. The working population - people between the ages of 15 and 59 - will drop by 65 million, or 5.5% of the total, in the next 10 years, according to United Nations projections.
- Even so, the elderly population of age 65 or above will still double in the next 15 years. That means slower growth and the government will have to shoulder a bigger burden to take care of its senior citizens, all while Chinese average incomes remain far below aging developed countries such as the U.S. and South Korea.

Source: As China Ages, Changes Are Needed, Wall Street Journal, 12/10/2020

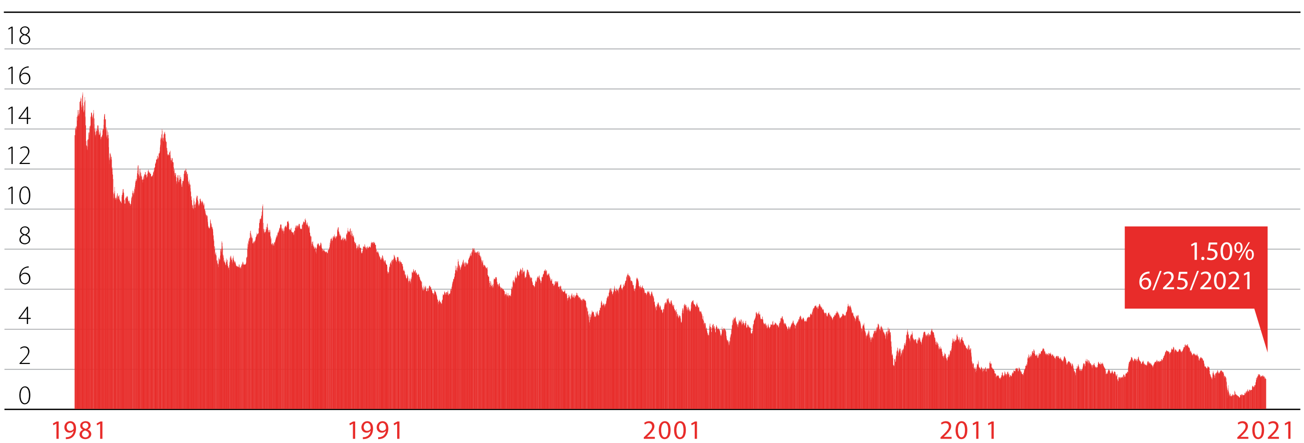
The expected population decline in China [cited in the article above and the article below] is also forecast for many other countries. Africa is the wild card, with its population still growing. And some countries, such as the United States, will see strong population growth through a reasonable birth rate combined with immigration.

- The number of children younger than 5 years is forecasted to decline from 681 million in 2017 to 401 million in 2100, a drop of 41%. At the same time, the number of individuals older than 80 years is forecasted to increase from 141 million in 2017 to 866 million in 2100. In 1950, 25 births occurred for every person turning 80 years old; in 2017 that number was seven and in 2100 is forecasted at one birth for every person turning 80 years old.
- Population decline and associated shifts in age structure in many nations might have other profound consequences. In 23 countries, including Japan, Thailand, Spain, and Ukraine, populations are expected to decline by 50% or more. Another 34 countries will probably decline by 25–50%, including China, with a forecasted 48% decline. These population shifts have economic and fiscal consequences that will be extremely challenging. With all other things being equal, the decline in the numbers of working-aged adults alone will reduce GDP growth rates.

Source: Institute for Health Metrics and Evaluation; Demographic Scenarios 2017 to 2100, 7/14/2020.

THE BOTTOM LINE: The rapid pace of aging and collapse in birth rates is changing global economics. The decline in interest rates over the last forty years may be unrelated to these factors, but for us, the evidence favors the view that these demographics changes are the proximate cause of slower economic growth, lower inflation and lower interest rates. We put less weight on the view that central banks are responsible for lower market based interest rates, and will be able to increase interest rates "at will" in the future. Our view is that much larger factors are at play. Enormous investment implications hang in the balance.

10 Year U.S Treasury Bond Yield [%] 40 Years [1981 to 2021]



Some economists actually predict higher inflation and interest rates from demographic changes, for a variety of reasons. Two economists we respect do not share this view. Here are some comments from Steve Major and Richard Hokenson, with Hokenson being one of the most accurate economic/demographic strategists, starting nearly twenty years ago:

From Steven Major, Global Head of Fixed Income Research, HSBC, Financial Times 1/8/2021:

- Debt servicing costs are a function of the debt stock and average rate charged on it, so a small upward move in interest rates today has a bigger impact than in past cycles. Higher debt servicing costs deflect cash flow away from investment and consumption. **To put it simply, a 1 percentage point rate rise today may have the impact of a 3 to 4 point increase 20 years ago.**
- We must not lose sight of the longer-term secular backdrop. In addition to the overhang of debt weighing on future growth, there are a number of trends that are not going to suddenly disappear. For example, **aging populations require greater savings.** This will push more money into bond markets, depressing yields. Greater savings also **means less of a consumption boost** for the economy. And **technological change will continue to have a deflationary impact.**
- We believe yields in the year ahead will be lower than the current reflation trend and consensus forecasts are anticipating. Ultimately, policies such as quantitative easing and fiscal stimulus are responses to a lack of demand in the economy. **Yields will only rise if we find a permanent solution to this problem**, rather than a short-term anesthetic.

From Richard Hokenson, Lecture at the Chevy Chase Trust 2014 Fall Investment Symposium:

- For the first time ever in the history of the planet, we're confronted with the situation of generations not replacing themselves in the population pool; having more brothers and sisters than children. 46% of the world's population is comprised of people living in countries with below replacement birth rates, but that's not [the case] in the U.S.
- The labor force growth rate remains low, but positive. It never, repeat, never turns negative in America. So this is continued downward pressure on inflation and interest rates. **The most important conclusion that comes out of this: an aging plant crushes [long-term] inflation. I'm not surprised we are in an environment of low inflation, low interest rates.**
- Yes, there will be cycles. People will think growth is going to be too fast, and inflation is going to be a problem. Many say "The bond market bubble is going to burst, and the bull market in bonds is over". It's not over [although] the future is not going to have the same high total returns that you had in fixed income in the past.

Keep in mind the above views of Hokenson are from 2014 but basically repeat his consistent views of the last twenty years. Of course, many experts and investors viewed such forecasts as non-sense, believing that interest rates would move much higher due to the global central banks printing of money and other factors. However, as a result of Hokenson's low interest forecasts, he was very positive on U.S. equities and quality real estate, particularly in areas where the baby boomers were moving for retirement [in warm areas near the coasts]. We find his research compelling, even if we put aside his favorable views on future returns for higher risk U.S. assets [equities and certain real estate].

Finally, despite the rapid aging and coming population declines [yes, actual "de-population"] in many countries, some other countries such as Brazil and India, have attractive demographic growth prospects in their labor force, and overall population [similar to the U.S.]. Despite some areas of population growth, the overall global picture is one of declining labor force growth followed by actual declines in the labor force, and eventually in the global populations [toward the end of this century]. While that may be beyond our lifetimes, these early trends are impacting the global economy, inflation and interest rates now.

- Europe's working age population turned negative ten years ago and the decline is gradually accelerating.
- China's working age population turned negative five years ago and the decline is substantially accelerating from here.
- Japan's total population has been decreasing since 2009. South Korea and Taiwan are slowing in population growth dramatically.
- Most countries in Western and Southern Europe are just starting to see population declines, or have stopped growing and will soon begin to decline.

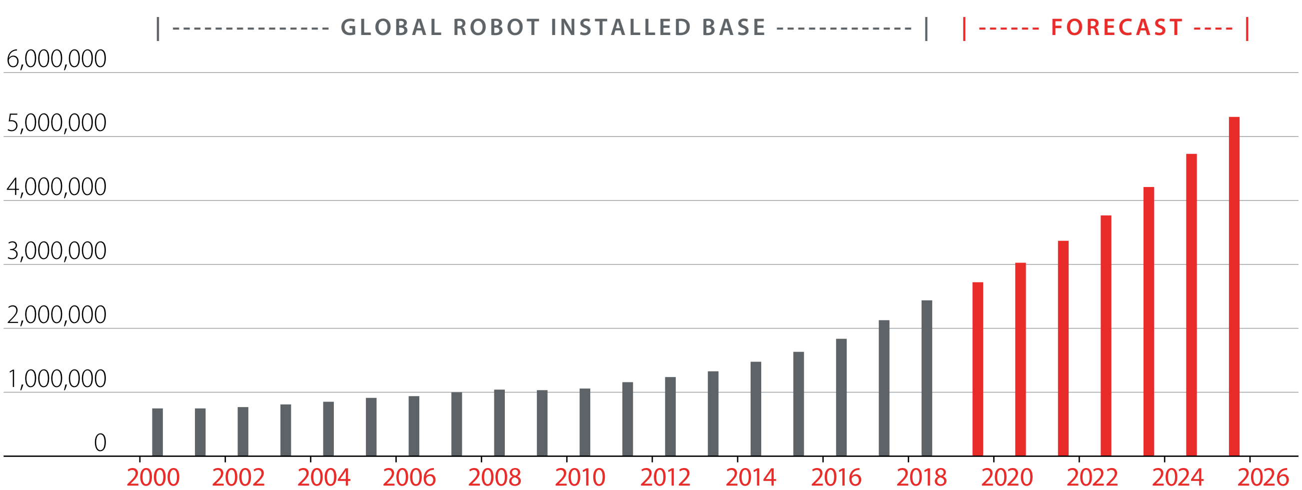
THE BOTTOM LINE: The forty year trend in U.S. interest rates has been lower. Is the recent increase in yield from .50% to 1.50% on the 10 Year Treasury Bond an early stage trend reversal toward materially higher interest rates? If so, what investment changes should be made? If not, what investment strategy is most beneficial in a continued low interest rate environment? These are critically important questions to consider, in our view. Interest rate forecasts may seem like a fool's game, but interest rates have historically been a major factor in future investment returns.

Trends and Developments

GLOBAL INDUSTRIAL ROBOT INSTALLED BASE TO DOUBLE

- As global work force growth slows due to aging, low birth rates, and people leaving the work force more recently due to Covid-19 concerns, the ability to "make stuff" and "transport stuff" has become an issue.
- However, productivity gains through automation and robotics continue unabated. Human tasks are more often being replaced by automation, as shown by the chart below. Robotics are becoming much more advanced and able to replicate human function and fine motor skills [think smart phone assembly]. This long-term trend toward automation is reaching new levels of sophistication which helps offset a world with fewer workers.

Global Industrial Robot Installed Base to Double in Next 5 Years



Source: IFR, BofA Global Research Estimates, World Bank

MACHINES WILL GENERATE MOST OF THE FUTURE DATA GROWTH, NOT PEOPLE

We are in the early innings of a major trend whereby machines will generate much more data on their own, than humans using machines. In other words, the explosion in data use is decoupling from slowing population growth.

As a result, several interesting comments are being made by industry leading executives:

- You're seeing a hand-off from consumer-oriented devices to something that's far larger and more substantive around this fourth wave of compute, the data economy. By 2025, machines will generate 99% of the data, humans will generate 1%. [CEO of Applied Materials, 5/20/2021]
- We are moving from networks that connect people to networks that connect things. [CEO of Crown Castle, 12/17/2020]
- Every industry is becoming a technology industry. Artificial intelligence [AI] is the most powerful technology force of our time. [CEO of Nvidia, 5/26/2021]
- We're in early innings of 5G deployments but 6G technology is currently under development. It seems crazy to think about the next generation of cellular technology while the current one is still in its infancy, but the first third of a 10-year cycle is dedicated to doing research and analysis to figure out what functionality might be possible, and that is under way for 6G. Some services and applications like 1 terabyte per second speeds…and holographic communications are possible services on deck for the next "G" upgrade. With all eyes pointed to 2030, more revolutionary technological changes will come front and center as they're constructed, tested, and standardized over that timeframe. [Peter Rysavy, Wireless Industry Expert, 6/8/2021]
- To improve the quality of artificial intelligence [AI], you have to increase the amount of date you use to train the model. In essence, if you train an algorithm with 10x the data, the quality of the algorithm doubles. So you get these feedback loops: If you have a great product like a search engine, more people use it, you get more data, the product gets better, even more people use it and so forth. The primacy of data for AI quality means that some of these companies are truly unique because their competitive advantage is not just growing every year, it's literally growing every second. AI, because data quantity is so important for quality, is much more semiconductor intensive. AI is all about semiconductor brute forces. The semiconductor intensity of global GDP will rise significantly as AI rises, and it is happening against the backdrop of a very consolidated industry. [Gavin Baker Interview, Semiconductors Are Closest Thing to Magic in Modern World, 11/3/2020]

Industry Insights

HOUSING AND HOME IMPROVEMENT

For nearly fifteen years, since mortgage underwriting standards began to tighten and homebuilders began to pull back from new projects, the United States has not built enough new homes for current and projected demand. Despite the aging of America, and most other countries, there are pockets of population growth within the larger demographic changes. In the case of housing and home improvement, consider the following:

- Based on birth rates from 1996 to 2005, the number of people becoming 30 years old [a key home buying age] has averaged 3.4 million per year. Over the next five years, the number of people becoming 30 years old will increase to an average of 4.0 million per year, before declining again. [Source: U.S. Department of Health and Human Services, National Vital Statistics System]
- During the last 12 to 15 years, something along the lines of a cumulative five million housing units were under-built. So, with housing peaking at 2.4 million units all the way back in 2005, 2006, we ran at 600,000, 700,000, 800,000 units for years and years and the cumulative effect of that is we're five-odd million houses short in this country. So, while there may be supply and demand and price dynamics over the next several months, back to this medium-term, long-term dynamic, it's extremely healthy for our space. [CEO of Home Depot, 6/2/2021]

WIRELESS DATA

- The world's biggest networks are wireless networks. And what's happened technically with 5G is that in the move between…4G and 5G, you need about 100x more fiber to deliver a true 5G experience [CEO of Corning 6/2/2021]
- The impact on wireless networks from the persistent 30% plus annual growth in mobile data demand is staggering. The amount of wireless data used in 2019 was 96 times greater than the data demand is in 2010. The world is continuing to move toward wireless. The amount of data traffic is growing at an unbelievable pace.
- It also highlights the necessity of everything in the network being connected by fiber, both small cells, macro sites, edge compute. And I think it's another indication of the necessity and the importance of fiber in the next-generation of wireless networks. [CEO of Crown Castle, 10/22/2020]

GREEN ENERGY – HYDROGEN/AMMONIA

One of the emerging energy concepts in the move to "green energy", or less carbon intensive energy" is the use of hydrogen. We think hydrogen will become more evaluated and likely to be adopted as a partial alternative to the "oil complex" of energy. How widely hydrogen is adopted will depend on incentives from governments. Ammonia is a key enabler of hydrogen energy due to its transportation properties. As a result, ammonia producers are excited about their ability to enable hydrogen energy.

Many companies and industries believe hydrogen is going to represent a significant portion of the energy deck across many industries. Initial applications are likely to be the use as a shipping and transportation fuel, including in farming as incentives are likely to be provided for lower carbon farm usage. Hydrogen has been talked about for decades, but it is now approaching wider scale evaluation and adoption, but only as incentives are provided to bring the cost down to more competitive levels relative to the "oil complex".

PRECISION AG EQUIPMENT

Despite a near depression in ag equipment sales from 2014 to 2019, magnified by China tariff concerns in 2018/2019, the productivity improvements in ag equipment from precision technology is leading to higher profits for farmers and ag equipment providers. Consider these developments from a major ag equipment manufacturer:

- New, high tech planters that provide more accurate and effective seed planting represent more than 90% of new company planter sales, despite the much higher cost because the improved profitability covers the additional cost.

- New, high tech tillers allow farmers to adjust tiller depth from the touch of a button with only a six second delay from the cab, so farmers can till more acres per day. 60% to 70% of new company tiller sales are for these precision tillers.
- New, high tech precision sprayers can reduce herbicide use by 2% to 5%, with new technology [soon to be released] providing an 80% to 90% reduction [in testing]. These higher cost precision sprayers pay for themselves in reduced herbicide costs in a short period of time.
- The average age of ag equipment in the U.S. has reached its highest point in over a decade. Many U.S. farmers will reach a point where they simply need to replace their equipment.
- In addition to the aging of the fleet, the impact of precision technology is further driving these replacement decisions.

Personal Reflections: On Defining Moments

Over our last twenty plus years, there have been several defining moments that materially impact the future wealth and financial security of clients. These defining moments usually revolved around periods of "high stress" in the world, geopolitically and/or economically, such as:

- Collapse of tech/internet stocks starting in 2000/2001
- September 11, 2001 terrorist attacks
- Iraq War
- Global Financial Crisis of 2008/2009
- Covid-19 Pandemic and Economic Shutdown
- Geopolitical Uncertainty [North Korea Threats, Middle East Turmoil, Other Wars/Incursions]
- Tariff Disputes with Europe, Mexico, Canada and especially China,
- Various National and State Elections with Uncertain Outcomes and Future Policies

During these periods of high stress, the media often focuses on pessimism and provides much more air time to fear mongering experts, taking the public to the edge of panic. The same thing often happens in periods of "extreme bullishness" or exuberance. As stock markets hit all-time highs, the media often highlights the success stories of aggressive investors and speculators influenced by greed, without providing a balanced view of what can go wrong.

Investors often react emotionally to fear and greed and make investment decisions that dramatically impact their future wealth and financial security. Consider the following results from a recent study of investor behavior during the Covid-19 stock market declines in the Spring of 2020:

- At LPL Financial [where clients use a financial advisor], nearly 35% of all investors over 65 years old sold their full equity holdings between February and May 2020. [Source: Wealth Advisor, 6/28/2020]
- Nearly 18% of all investors [regardless of age] sold all their full equity holdings during this same time period. [Source: Same as above]
- Cash in all money funds [institutional and retail] hit a record high of $4.8 Trillion in late May 2020. [Source: ICI]

The way we research, think, and advise our clients in these "high stress" moments is crucial. We express our opinion clearly, even as others might shy away from having a clear opinion, and even when clients have a contrary view coming into our discussions. Clients know where we stand, backed by research, much thought, and disciplined analysis and evaluations. In our experience over the last twenty plus years, that is what clients need in periods of "high stress". They need confidence to stand against contrary peer pressure, so they can do the right thing with us.

Does that mean we always know what will happen or that we are 100% right with our advice? Of course not. But clients can usually tell when an advisor does not have deep research and logic supporting a coherent strategy. That type of situation only adds to the "high stress" and can result in decisions which turn a "defining moment" into a very negative outcome; often involving a permanent loss of both current and future wealth, and harming the client's long-term financial security.

A friend of mine told me his father once gave him some excellent advice.

"Son, you want to be so valued as an advisor and counselor,
that your client calls you before making any major decision."

You don't get those client calls unless you deserve them by earning the trust of clients. Those calls often come at difficult times; in times of "high stress". But that's when the defining moments come, and we have to be prepared for those defining moments. That's the highest calling for an advisor and counselor to clients regardless of the field of expertise.