**By Bill Spitz, Principal**

*As a Co-Founder of Diversified Trust, Bill has been instrumental in the ongoing development of the firm's investment platform. Bill also serves on the Board of Directors of Mass Mutual Financial Group, Acadia Realty Trust, and is Trustee emeritus of Kenyon College in Ohio. He authored Get Rich Slowly: Building your Financial Future through Common Sense and is a frequent speaker at financial conferences.*

# How Did That Happen?

## THE GREAT HANOI RAT MASSACRE

In a well-intentioned effort to modernize Hanoi, the French colonial government built a nine mile sewer system that unfortunately turned out to be a paradise for rodents who periodically came to the surface in search of food. Not only were the rats distasteful, there were scattered incidences of bubonic plague which was thought to be (and was) carried by them. The public was understandably outraged forcing a government response in 1902 which was initially to hire professional rat killers. Unfortunately, they only made a small dent in the rodent population so the government then created a bounty program under which any citizen would be paid for taking a rat tail to a local municipal office. Soon, officials began to notice tailless rats scurrying around the city which tipped them off that enterprising citizens were simply cutting off the tails and then releasing the rats back into the sewer where they bred in massive numbers. Moreover, truly entrepreneurial individuals actually created rat breeding farms in order to increase their bounty. When government officials finally realized the extent to which the system was being gamed, they terminated the program which resulted in the release of all of the rats held in the farms. The unintended consequence was that the rodent population actually increased as a result of the bounty program and the city continues to battle the problem to this day.

**Law of Unintended Consequences**

*Intervention in a complex process or system often results in unanticipated and frequently negative outcomes.*

This example illustrates one of my favorite topics in economics which is the Law of Unintended Consequences. It states that intervention in a complex process or system often results in unanticipated and frequently negative outcomes. The law actually applies to a great deal more than economics in that examples of unexpected results can be found in public policy, government regulation, taxation, medicine, and even nature.

DIVERSIFIED TRUST

I describe a number of negative outcomes of what were thought to be sensible and rational decisions. However, in the interest of balance and fairness, I also include some positive unintended consequences. This paper is primarily designed as a source of amusement and entertainment although there is an important lesson which is that every decision needs to consider secondary and tertiary effects, difficult though second order thinking may be for most of us.

## BACKGROUND

Sociologist Robert K. Merton was the first person to outline this concept in a 1936 article titled "The Unanticipated Consequences of Purposive Social Action." He outlined five possible causes of this phenomenon:

- **Ignorance** - Insufficient knowledge results in incomplete analysis that does not consider the full range of possible outcomes.
- **Errors in analysis** - Including the failure to update one's thinking in light of new or better information.
- **Time horizon** - Focus on short term goals without considering the possibility of negative long-term implications.
- **Basic Values** - A value system that requires or prohibits certain actions even if the long-term impact might be unfavorable. The best example is Prohibition which was driven by moral considerations associated with the Temperance Movement. However, Prohibition only temporarily decreased alcohol consumption at the expense of a significant increase in criminal activity.
- **Self-defeating prophecies** - Fear of some consequence that drives an unexpected negative outcome, frequently before the perceived problem actually occurs. A good example that is on the mind of Wall Street today is the possibility that the Federal Reserve overreacts to what may be temporary inflation thereby provoking a recession.

I think these can actually be consolidated into a single concept which is the difference between static and dynamic decision making. Static decision making does not consider the likelihood of changed behavior in response to a new regulation, tax, or policy; what the definition of unintended consequences terms an "intervention in a complex process or system."

This sounds like academic speak so let's consider a simple but potentially real example. Suppose a city that needs revenue decides to levy a 5% special tax on liquor sales which will be added to the normal sales tax of 6%. If liquor sales over the past year totaled $100 million, static analysis would predict $5 million in new tax revenue. Unfortunately, the static analysis ignores the fact that people will likely alter their behavior by crossing state lines to make purchases, buying on the black market, substituting other beverages not subject to the tax, or simply drinking less. Not only is the city unlikely to collect the $5 million in predicted new revenue, it may actually experience a material decrease in the $6 million in sales tax that it was already collecting. We will see real life examples of these kinds of policies later in the paper. In contrast, dynamic decision making assumes that people will alter their behavior and tries to capture the most likely outcome after considering a range of possibilities. Because human behavior is inherently difficult to predict, dynamic analysis is imprecise, but vastly superior to the static alternative.

## POSITIVE UNINTENDED CONSEQUENCES

The best known positive unintended consequence is a general concept that Adam Smith termed the "invisible hand." The idea is that each individual pursuing her own ends generates widespread benefits for society. For example, a shopkeeper is primarily focused on providing financial resources to her own family, but she makes available useful goods and services to a much wider audience. In terms of more specific examples, there are three that are commonly cited. First, drugs developed for one indication frequently have a therapeutic impact on other illnesses or conditions. A second example is that ships sunk in wartime created artificial reefs that support marine life. That unintended consequence resulted in the common practice today of sinking ships at the end of their useful lives to promote fishing, scuba diving, and so on. Finally, demilitarized zones such as the one between North and South Korea create unique biospheres because they are largely unimpacted by human activity. Negative consequences are much more interesting so let's consider a variety of unanticipated outcomes.

*Dynamic decision making assumes that people will alter their behavior and tries to capture the most likely outcome after considering a range of possibilities.*

## Fukushima Nuclear Power Plant

In March of 2011, a 9.0 magnitude earthquake off the coast of Japan created a tsunami that damaged several of the nuclear reactors at the Fukushima plant resulting in the release of a large amount of radioactive material. While there were no deaths directly attributable to the nuclear plant, approximately 15,000 people died from the tsunami creating a high level of public angst and an emotional groundswell of opposition to nuclear power. In response, the government agreed to end nuclear power and all 34 plants were shut down by 2013. Nuclear power had previously generated about 20% of Japan's electricity. In order to replace that energy, the country restarted older coal plants and began to actually build more of them. There were several unintended consequences. First, with the nuclear plants offline, there were electricity shortages in the colder months that led to misery on the part of those living on the northern islands, particularly the poor and elderly. Second, the price of electricity rose throughout the country due to shortages and the relative cost of fossil fuels versus nuclear energy. Most important, the increased emphasis on fossil fuels created pollution and environmental damage. The unintended consequence is that these factors are believed to have caused a great deal more illness and death than the tsunami itself. Interestingly, the Japanese government has since reversed course and the current goal is to have all nuclear plants upgraded and online by 2030.

*The unintended consequence is that these factors are believed to have caused a great deal more illness and death than the tsunami itself.*

*"In the short term we learn a lot, in the medium term a little, in the long term nothing at all."*

*–Jeremy Grantham*

## Misbegotten Tax Policy

Among all of the unintended consequences that will be discussed, this one may be my favorite because it so clearly demonstrates the weakness of static decision making.

In 1990, President Bush signed the Omnibus Budget Reconciliation Act of 1990 that imposed a 10% tax on the following "luxury" goods:

- **Cars** selling for more than $30,000
- **Boats** selling for more than $100,000
- **Aircraft** selling for more than $25,000
- **Jewelry and Furs** selling for more than $10,000

The bill's supporters estimated that it would generate $9 billion in new tax revenue over time including $31 million in the first year. Well, you can guess what happened. Sales of all of the newly taxed products plummeted with the greatest impact on yacht sales which fell 77% as buyers either deferred purchase or turned to overseas builders. So, rather than the $31 million in luxury tax receipts expected for 1991, the government actually collected just $16.6 million. An estimated 30,000 jobs were lost in the jewelry, aircraft, and yacht industries resulting in increased unemployment benefits and lost income tax and FICA revenues totaling approximately $24 million. So, the net impact on government revenues was a loss of $7.6 million. The luxury tax on yachts was repealed in August of 1993 while the automobile tax remained in place until 2002 when it too was repealed. As an aside, this bill represented a violation of President Bush's "no new taxes" pledge and is generally considered a major contributor to his defeat at the polls in 1992. Well-known investor Jeremy Grantham has said "in the short term we learn a lot, in the medium term a little, in the long term nothing at all." Consistent with that view, Canada is currently considering a luxury tax very similar to the 1990 U.S. version although the thresholds are somewhat higher.

The same basic story relates to several cities and states that enacted very high cigarette taxes. They typically had two objectives: discouraging smoking and raising revenue. The data indicate that higher taxes do in fact reduce demand, but tax receipts do not increase materially and have actually fallen in some instances because those who continue to smoke turn to the black market or travel to other jurisdictions with lower taxes.

**Cobra Effect**

*Describes how poorly designed incentives can lead to outcomes that are not only unanticipated but actually perverse.*

## The Cobra Effect

While it is not well documented and may be in part legend, a scenario similar to The Great Hanoi Rat Massacre is said to have played out in India which was overrun by very dangerous cobras. In this case, the British Colonial Governor offered a bounty on dead cobras that again led to the creation of cobra farms. When the program was terminated due to fraud, the farm bred cobras were released once again leading to an overall increase in the snake population.

The humorous Rat and Cobra anecdotes have actually been codified in an economic theory known as the "Cobra Effect" which describes how poorly designed incentives can lead to outcomes that are not only unanticipated but actually perverse.

While these may appear to be quaint and dated anecdotes, there was a coyote bounty program in South Carolina in 2019 and 2020 and one exists today in Utah.

## The Peltzman Effect

Another interesting concept in the field of unintended consequences is the Peltzman Effect which is named for Professor Sam Peltzman of the University of Chicago. This theory suggests that people adjust their behavior based on perceived levels of risk; in particular they tend to take more risk when they feel safe. The unintended consequence is that new laws such as those requiring seat belts, airbags, or bicycle helmets may actually increase rather than decrease fatalities. While the ratio of fatalities to accidents is almost certain to decrease because seat belts and airbags are very effective, the overall number of accidents may well increase because people engage in risky or reckless behavior based on an overestimation of the protection afforded by these devices.

The Peltzman Effect is currently being discussed in relation to Covid-19. Despite the availability of vaccines for more than one year, cases remain at a stubbornly high level in the U.S. Of course, there are many factors involved such as the development of more transmissible mutations and the fact that the vaccination rate is lower here than in many other developed countries. However, many individuals suffering from "pandemic fatigue" may be guilty of the Peltzman Effect by abandoning other safety precautions based on overconfidence in the ability of the vaccines to prevent disease.

## The War on Drugs

In 1971, President Nixon initiated the War on Drugs that was designed to eradicate the social, economic, and health ills associated with drug use. He told Congress "If we cannot destroy the drug menace in America, then it will surely in time destroy us." Fifty years later, we have spent more than one trillion dollars on the War with results that are both difficult to measure and mixed at best. However, two powerful statistics demonstrate that the war is far from won:

- The number of people over 12 who self-report having **used illicit drugs in the previous month was 13% in 2019 as compared to 8.3% in 2002**.
- The number of **overdose deaths per 100,000 people was 21.6 in 2019 as compared to 2.5 in 1980**. (The 2019 figure amounted to 70,000 deaths and very preliminary estimates indicate that 100,000 or close to 30 per 100,000 died in 2021)

The War on Drugs is highly controversial with "expert" recommendations ranging from further toughening of laws to decriminalizing all drugs. I am certainly not qualified to weigh in on the optimal approach, but I can point out that the War has been chocked full of unintended consequences.

- The drug trade has become dominated by cartels that wage huge economic and political power. They are very effective producers and distributors of illegal drugs.
- An estimated 85,000 people have been killed in drug wars in Mexico.
- Despite efforts to curb availability, drugs are as plentiful as ever and their price has declined 50-90% over the past thirty years depending upon the drug in question.
- The U.S. prison population has grown from 315,000 in 1980 to 1.4 million in 2019, a 4.4x increase. During the same period, U.S. population increased by just 45%. Roughly 46% of Federal prisoners and 14% of State prisoners are serving time for a drug related offense.
- The prison system is incredibly strained in every way including financially. Roughly $10 billion is spent per annum on caring for incarcerated drug offenders.

*Fifty years later, we have spent more than one trillion dollars on the War with results that are both difficult to measure and mixed at best.*

- There are important racial disparities related to drug incarceration. Eighty percent of drug offenders in Federal prisons and 60% in state institutions are Black or Latino.
- Drug profits have been used to finance terrorist groups around the world.

Of course, I do not have a better solution to our drug problems. However, there are many similarities between the consequences of the War on Drugs and those of Prohibition which once again confirms Jeremy Grantham's assertion that we really do not learn much in the long run.

## Open Office Layouts

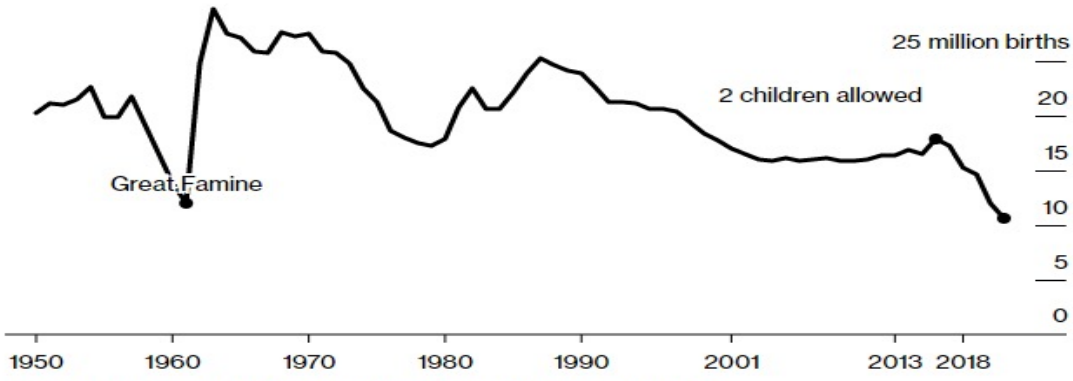
The previous section was certainly on the heavy side so let's turn to a lighter but still important example of unintended consequences. Originally, envisioned by Frank Lloyd Wright, open offices have been around since the 1960's and about 75% of companies now operate with some variation on this theme. The rationale for open offices is the belief that they promote face-to-face communication, collaboration, and teamwork. To test this hypothesis, Harvard professors Ethan Bernstein and Stephen Turban conducted a carefully controlled study of two large companies that converted to the open office format. They found several major unintended consequences: face-to-face interaction decreased by 70%, email usage increased by as much as 56%, and worker productivity declined. A survey conducted by software strategist William Belk found that the greatest impact was on high performers, 58% of whom stated that they required more privacy to use their analytical and creative thinking abilities to the fullest. The most common complaints in addition to the lack of privacy are audible and visual distractions. Moreover, some women argue that the open floorplans promote sexual harassment because they allow men to ogle them and pry into their lives. Finally, and particularly poignant in the time of Covid-19, an open office in Australia was blamed in part for 10% of the workforce contracting tuberculosis. Given the pandemic and the associated work from home movement, the future of offices is very much up in the air. There will surely be more studies on the desirability of various office formats and it will be interesting to see whether they confirm the findings of Bernstein and Turban. Will we revert to traditional individual offices or develop some modification to open office plans that actually promote interaction?

**They found several major unintended consequences:** *face-to-face interaction decreased by 70%, email usage increased by as much as 56%, and worker productivity declined.*

## China

I have saved the most significant and relevant set of unintended consequences for last. Based on significant population growth and the fear of famine, the Government of China implemented a "one child" policy in 1980. The first unintended consequence of this policy was a skewing of the population toward males. China has a cultural tradition in which males inherit the family name and are responsible for the care of elderly parents. Therefore, being restricted to what could turn out to be a single female child was highly undesirable. The net result was abortion, abandonment, and even infanticide of baby girls. Consequently, there are fewer women in China today of child bearing age, and the emergence of career opportunities for women discourages some from marriage and childbearing. The following chart depicts the major unintended consequence, the number of annual births in China is now about 10 million which is approximately equal to the number of annual deaths.

**Number of births in China in 2020 fell to lowest since at least 1950**

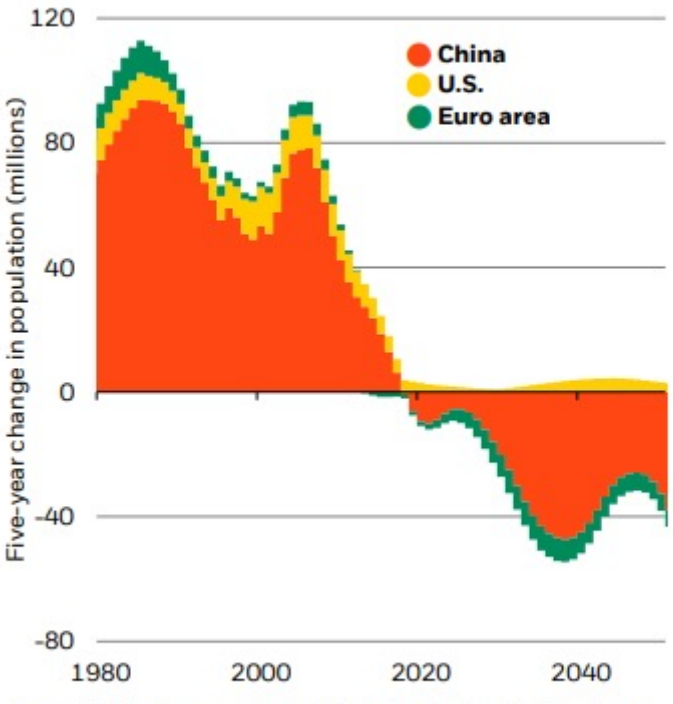



Source: Demographer He Yafu based on National Bureau of Statistics

For the first time in recent history, China actually faces the prospect of a declining population. Combining the low number of births with the fact that life expectancy in China has increased from 66.8 years in 1980 to 76.9 currently, an ever smaller number of working people must support an aging population.

**Shrinking working-age population**

*Working-age population change, 1980-2050*




Source: BlackRock Investment Institute, UN, with data from Haver Analytics, January 2022. Note: The chart shows the five-year changes in the working-age population (aged 16-64) in China (orange bars), the U.S. (yellow bars) and the euro area (green bars) using projections from the UN Population Database.

As shown, the working age population in the U.S. is expected to be relatively flat whereas both Europe and China will likely experience a significant decline. The key point is that economic growth is equal to the sum of growth in the working age population and productivity growth. Therefore, unless China can stimulate significant productivity growth, it can expect a significant slowdown in economic growth. While not top of mind for most Americans, this likely slowdown has important implications for the U.S.

First, slower economic growth may cause socio-political issues for the Chinese government which may further complicate already tense international relations. Second, a shrinking workforce in China will likely result in higher wages which may import inflation to the U.S. given our dependency on China for the manufacturing and assembly of so many types of goods. Third, recent supply constraints in the U.S. will likely continue on a sporadic basis. Finally, a maturing population in China will consume internally more of what it produces. This example is so fascinating because the unintended consequences of a forty year old policy decision are currently impacting the entire globe.

## CONCLUDING THOUGHTS

As stated at the outset, the primary purpose of this paper is to give us the opportunity to chuckle at our fallibility. However, I do believe there are lessons to be learned from these examples. They are particularly relevant to policy makers although each of us can also sharpen our own decision making faculties.

- Every decision should evaluate multiple outcomes. There will always be "unknowable" outcomes, but it is wise to consider the broadest possible range of results.
- It is critical to estimate the cost and impact of possible unintended consequences. What happens if we are wrong?
- The biggest variable in "complex processes or systems" is human behavior which is largely unpredictable.
- For that reason, quantitative models and forecasts will always be subject to error.
- Incentives should be very carefully designed because people will always behave in a way that is consistent with their incentives.
- There should always be a Plan B in case perverse outcomes begin to occur.

**ATLANTA**
877.955.8266

**CHARLESTON**
866.619.1003

**GREENSBORO**
855.821.4999

**MEMPHIS**
800.264.7498

**NASHVILLE**
877.386.7332

## Important Notes and Disclosures

This White Paper is being made available for educational purposes only and should not be used for any other purpose. Certain information contained herein concerning economic trends and performance is based on or derived from information provided by independent third-party sources. Diversified Trust Company, Inc. believes that the sources from which such information has been obtained are reliable; however, it cannot guarantee the accuracy of such information and has not independently verified the accuracy or completeness of such information or the assumptions on which such information is based.

Opinions expressed in these materials are current only as of the date appearing herein and are subject to change without notice. The information herein is presented for illustration and discussion purposes only and is not intended to be, nor should it be construed as, investment advice or an offer to sell, or a solicitation of an offer to buy securities of any type of description. Nothing in these materials is intended to be tax or legal advice, and clients are urged to consult with their own legal advisors in this regard.