





Executive Summary

“It was the best of times; it was the worst of times.” So did Dickens describe the tumultuous era of the French Revolution. The Trump Revolution has not yet reached that level of blood thirstiness, but it also is creating a mixed picture. Geopolitics is evolving rapidly to an unknown destination. Domestic conflict has moved to a new level of strife. For the moment, however, the economy is proving resilient in the face of political chaos. The markets have rebounded from their April scare and in consequence once again look high priced relative to the underlying risk level. Our advice is unchanged: maintain a cautious stance.



The War

Russia-Ukraine

Russia has approximately 10 million men between ages 18 and 35 who are fit for military service. This number is its “military potential” – not the actual size of its military but an estimate of its theoretical maximum. So far accumulated Russian casualties in the war with Ukraine amount to 1 million men or 10% of its potential. This casualty rate approaches that of the major combatants in World War 1.

A daring covert operation by Ukraine destroyed about one third of Russia's heavy bomber fleet. This is probably the biggest military surprise attack since the Pearl Harbor bombing. The Russian air force was somewhat naive to have not better protected its airbases seeing the damage which

Ukraine had done to the Russian Black Sea fleet. That fleet saw about a third of its warships sunk at their moorings by Ukrainian attacks.

Immediately, however, these losses do not halt the Russians. They appear to be moving forward with a renewed summer offensive. Its tactics have improved to a degree and its industrial base is slowly gathering momentum. All pretenses of engaging in talks appear to have been dropped. It is difficult to estimate how much of a toll on Ukraine the war has taken. But it is over a year since the Ukraine liberated significant territory. Its ability to compromise Russian logistical lines also seems much attenuated. So clearly its war making powers are suffering despite the episodic brilliant strokes it continues to pull off. Ukraine has achieved tactical air superiority over its front line with its drone force, but it needs a effective conventional air force which can interdict Russian supply lines in the rear if it is to halt and then rollback the Russian creeping advance. It is clear the Kremlin will continue the war until its power is broken on the battlefield or its economy collapses. Any thought that it will exercise selfrestraint appears illusory.

Israel-Iran

Israel converted its long running covert conflict with Iran into open war. Its assassination teams operating in Iran killed a dozen top military officials and scientists working in the nuclear field. Cumulatively across this and other killings, Israel has significantly eroded Iran's top military leadership – to the point that control over policy has in measure transferred to a new generation of leaders whose thought process is currently less well understood than that of the old guard they replaced.

Israel's warplanes were able to range freely across Iran's skies - bombing at will, and they proved invulnerable to Iranian defenses. Initially they focused on destruction of Iran's nuclear fuels industry – destroying the enrichment chain and the parts industries which supported that chain. Later they broadened their targets to strike at the sinews of government power – hitting internal security and police operations, the national television station, the oil depot that generates much of Iran's export earnings and the gas processing plant that

feeds 90% of the country's electrical generating capacity. Israel talked about killing the Iranian head of state, Ali Khamenei, but in fact did not target political figures. Between 600 and 700 civilians and military were killed however. These counter regimes moves were not as systematic as the attack on the nuclear capability and seemed calibrated more to apply political pressure than to bring about specific results.

Iran was largely unable to defend itself. The Israelis clearly had significant intelligence/covert action operations in Iran. This suggests significant underground opposition to the regime and weaknesses in the regime's counterintelligence operations. As noted, Iran could down no warplanes and succeeded only in downing two drones. Iran fired many barrages of missiles and drones at Israel. The barrages lacked the mass required to saturate Israel's air defenses. Israel downed about 90% of the missiles and essentially all of the drones. The missiles also lacked the precision targeting required to do significant damage. They caused moderate random structural damage and a handful of casualties – fewer than the number of deaths in a month due to traffic accidents.

Iran's hardened enrichment facilities were, however, beyond Israeli reach. In particular the Fordow facility hosted two long galleries of enrichment centrifuges (1200 units each) in a subterranean site protected by reinforced concrete and buried 250 feet below ground. For Israel to destroy this facility it would have had to use one of its (as yet unacknowledged) nuclear bombs. Rather than see the principle of no nuclear use broken, the US chose to intervene. It dispatched B-2 (Stealth) bombers from their base near Kansas City to drop “bunker buster” bombs. These are basically steerable 15 ton steel darts which are released at an altitude of seven miles and which are carried by high momentum deep into the earth before exploding a 5000 pound conventional war head. To attack the Fordow facility the air force used 12 bombs. To gain access to the deep buried site it targeted access shafts and steering bombs down the track formed by a prior bomb.

The Air Force assessment is that the some warheads exploded within the centrifuge gallery and that the strong walls of the facility channeled the blast wave down the length of the gallery to cause maximum equipment damage. Presumably this assessment rests on seismic data interpreted through models. There is a debate as to exactly how much damage was done. Centrifuges are heavy steel cylinders and those further from the blast center would be sheltered from the blast by the centrifuges closer to the blast. It is unlikely that all the centrifuges were destroyed. However centrifuges are also precision equipment and centrifuge facilities are built to be non-stop operations which run continuously. It is likely that enough damage was done to put the facility out of operation.

Even salvage of equipment might be difficult if the blast destroyed access shafts or spread toxic radioactive dust about the facility. The Iranians knew the attack was likely imminent. They seem to have removed their inventory of highly enriched uranium (HEU) before the attack. It is not known if staff also was removed but it is likely there were no key personnel on site when the attack came.

Besides the Fordow facility, the US also attacked some other nuclear sites. The total operation employed about 125 warplanes and also cruise missiles launched from nuclear attack submarines. Iran did no damage to the attackers. Instead Iran responded by launching 14 missiles at the US airbase in Qatar. The number of missiles matched the number of bunker buster bombs dropped by the B-2s. Iran informed Qatar of the planned attack several hours ahead with the result that the US removed personnel and aircraft to other locations. In fact US air defenses intercepted all the missiles, so no damage was done to the base. At this point President Trump offered a ceasefire which was accepted by Iran, and after some public Presidential arm twisting, by Israel.

Overall this affair has exhibited the carefully calibrated violence of a cabinet war on the part of all three belligerents. What has been accomplished? Israel has demonstrated military superiority over Iran. It was able to severely injure Iran's military while defeating any effective Iranian counter

stroke. However that does not change the fact that Iran is a country ten times Israel's size and 800 miles (at the closest) from Israel's border. Israel's coercive powers are limited to what its warplanes can achieve. Mainly Iran's nuclear industry has been put out of commission, several billion dollars worth of capital equipment has been destroyed and an important national symbol trashed.

However, Iran likely preserved some 400 kilograms of 60% enriched uranium. That quantity of material can be stored in cylinders amounting to a few scuba tanks and moved by passenger car. If you tried to pick up such a cylinder its weight would make clear these were no ordinary air cylinders. But externally there would be no radiation or heat signature to permit remote tracking. It is likely neither the US nor Israel knows where the material presently is. To create this amount of HEU, Iran had to start with about 34 tons of feed stock and the processing required an industrial plant. To further process the material to weapon grade enrichment (90%) requires only a workshop type installation. Probably a cascade of 20 centrifuges would be adequate. Or Iran could even employ an electromagnetic separator squirreled away inside a conventional power plant to do the job. Fully processed to weapon grade, Iran would have enough material for about 10 warheads of modern design. If Russia chose to give Iran the blue prints, Iran could still achieve a substantial nuclear weapon capability fairly quickly. Or on its own it could build a few Hiroshima type weapons – a less useful but still dangerous device.

Given the damage it does locally, a nuclear weapon is not very useful without a means to deliver it at distance. At present Iran's only way to deliver a Hiroshima type bomb to Israel would require sending it by ship. Modern bomb designs are deliverable by missile and those missiles do not require precision aim. But the low survival rate of Iran's missiles does give pause for thought. As long as Iran has only a few nuclear bombs, installing them on missiles, having the missiles shot down without achieving anything and then facing a full nuclear counterattack from Israel looks like a suicidal military strategy. The best Iran could hope to achieve in the near future is a limited deterrence capability.

Iran's humiliation in the recent conflict will certainly cause some internal voices to urge creation of a nuclear deterrent. Other voices will argue that continued confrontation is the road of folly and that Iran would be wise to barter away its HEU in exchange for the lifting of economic sanctions and the reintegration of Iran into the community of nations. That would likely be the preferred outcome for Israel and the US. It will take some time for emotions to cool adequately for reasoned internal policy and external diplomatic conversations to occur.

Historically it has been the military and internal security forces which have argued for a hard line, while the civilians have sought accommodation. The head of state, Ayatollah Ali Khamenei, seems to have temporized between them – building up deterrence capabilities but reluctant to gamble the survival of the regime in actual use of those capabilities. At the height of the conflict he established a succession plan, which is prudent in any case due to his current 86 years. As a result, his grip on power may now be diluted. The military humiliation Iran endured ought to have weakened the hard liners and caused the more moderate players to gain influence. But the general shaking of the regime may also have opened the door to a power play by the security forces intent on preserving their privileges. The situation is unsettled to say the least.

During the conflict the price of oil rose dramatically, from \$64 per barrel to \$78. It has now dropped back to \$67. Gold also rose – touching 3450 but it has now relaxed back to 3350. If pressure from Israel and the US to bring down the current regime in Iran were to prevail, the likely outcome would be a period of chaos in Iran ending in a military dictatorship. Even if tensions relax, Iran's oil exports will likely remain low until its internal situation stabilizes and it has time to repair its facilities. So we do not expect commodity markets to relax entirely for some time.

The Wider Mideast

Although the Iran war has crowded Israel's other activities off the front page, those activities carry on. The population of Gaza has been herded in to an area representing about one third of the total territory. They are living in tents on meager

rations inadequate to prevent famine. Somehow this treatment is supposed to deradicalize them and cause them to acquiesce to Israeli overlordship. The IDF continues to intervene in Lebanon and Syria as if those country's borders did not exist. Israel is displaying a remarkable level of dynamism.

Thus far that dynamism has brought about remarkable improvements in Israel's security. Hamas's leadership and experienced operatives are dead and its hold on the population of Gaza much shaken. Hezbollah's leadership is dead, much of its weaponry destroyed and its paramount position in Lebanon shaken. Assad's regime in Syria has collapsed and he has fled. Much of Syria's heavy weaponry has been destroyed and a buffer zone now protects Israel's position in the Golan heights. Iran's travails imply a diminished role for its proxies in Iraq and the opportunity for that country to move forward in a direction palatable to Israel. Iran's nuclear program is largely destroyed. Its missiles are revealed as not especially worrisome and its missile launch facilities are largely destroyed. The Houthis remain in power in part of Yemen, but their capacity to annoy Israel seldom amounted to more than pinpricks and they appear to be backing off even that. The conservative Arab states have not adopted a hostile attitude towards Israel and warmer relations can be anticipated once the fighting stops. Possibly Syria and Saudi Arabia will soon normalize relations with Israel.

Credit for these changes goes in several directions. The Israeli security forces have delivered a consistent high to outstanding level of performance. Netanyahu has successfully sustained his policy in a very tricky political environment and has – thus far – well balanced ambition and resources. The US has been a firm ally and the Europeans too have been more than supportive. Perhaps most importantly, an era has passed. In retrospect it is clear that the hard line opponents of Israel were men who had grown old in their posts, who were out of touch with current realities and were vulnerable to being swept aside.

The challenge for Netanyahu is to show that he is not another such an out-of-date leader, but that he can capitalize on the

new situation which has been created to secure lasting benefits for Israel.

Africa

There are 300,000 refugees from Somalia's civil war living in camps in Kenya. The US had been providing 70% of the funding for the camps, but Trump cut off funding entirely. Famine is stalking the refugee camps and Kenya's hospitals are overwhelmed by dying children. China has announced it will eliminate tariffs on all countries in Africa. It is easy to see that China is well along to winning African hearts and minds, while the United States's standing on the continent is set to plummet. While the continent is currently underdeveloped, it represents a huge latent growth opportunity. It also has plenty of strategic ports for naval forces and mines for strategic minerals. Political malpractice by the Trump administration is setting the United States up to lose in its competition with China. Chinese political and military penetration of East Africa also makes India's position increasingly encircled.



Civil Unrest

Trump continues to do what he does best – pile up enemies. Leonard Leo found himself described by the President as “a real sleazebag...a bad person who, in his own way probably hates America.” Leo is the Chairman of the Board of the Federalist Society – the legal organization which has spearheaded the Conservative revolution in American Jurisprudence and which counts among its members Supreme Court Justices Thomas, Alito, Kavanaugh, Gorsuch and Barrett. Additionally Chief Justice Roberts served as a member of the steering committee of the DC chapter but says he has never formally joined the Society. Leo was joined on the President's hit list by Kim Sajet Director of the National Portrait Gallery. Trump attacked Sajet as highly partisan and a strong supporter of DEI policies. But what appears to have attracted his attention is that Sajet declined to exhibit a pro-

Trump artwork by Julian Raven as “too political.” As a part of the Smithsonian Institution, the National Portrait Gallery curation tends to historic works of timeless value rather than pieces expressive of the contemporary moment. Although backed by her board, Sajet preferred to retire gracefully after 12 years of service. Less inclined to go quietly into the night was Elon Musk. His stint as head of DOGE came to its natural conclusion as he reached the time limit beyond which his employment would need review and confirmation. The rest of the Trump team was glad to see him go and made no effort to carve out a continuing association for him. Detached from the Administration, Musk lashed out at the President's “Big Beautiful Bill” – the measure which shifts \$1.6 trillion per year from poverty relief to tax relief for the United States's upper class. The bill is expected to expand the government's fiscal deficit and Musk attacked it as loaded with pork. In fact, a number of Republican Congressmen are nervous about the radicalism of the BBB and have demanded policy concessions in return for their support of it. From policy discussion the conversation rapidly evolved to ad hominem attacks. Trump called Musk an ingrate, claimed he was actually disappointed in the withdrawal of subsidies to Tesla and threatened to cancel his other government contracts. Musk reminded everyone (probably accurately) that it was his money and energy which turned Trump's floundering campaign into an election winner, accused Trump of complicity with deceased pederast and sex trafficker Jeffrey Epstein and threatened to fund a new political party.

To distract from the Musk imbroglio Trump provoked a fight with California. ICE agents were dispatched to mount raids in Paramount, a mostly Hispanic satellite city of Los Angeles. The ICE agent's heavy handed approach (masked plainclothes agents grabbing people off streets, invading homes and businesses and breaking up families) provoked a protest that turned riotous for a few hours. The Mayor of Los Angeles, Karen Bass, did not have jurisdiction in a neighboring city and the Governor did not involve himself in what was a local police matter. But Trump promptly assumed control of the California National Guard and dispatched 2000 troops to the scene, followed by a second wave of 2000 Guardsmen and 700 Marines. The Governor criticized the measure as inflammatory and promptly filed

suit to regain control of the Guardsmen (normally under his control.) The president taunted Thomas Homan, the Acting Director of ICE, for failing to arrest the Governor – a suggestion which Homan dismissed with the remark that the Governor had done nothing illegal.

Indeed, the Courts first returned the Guard to State control, and then on appeal returned them to the President's control. While the President may command the National Guard in specific situations, the Posse Comitatus Act clearly prevents him from using the other branches of the military for domestic law enforcement. So far the Marines have limited their involvement to guarding buildings. This clash of State and Federal authority is one in which Republicans would normally favor the State. Squaring that circle requires Republicans in the present instance to represent a non-crisis as a serious national threat. More thoughtful Republicans worry about how a Democratic president might use the precedents being set to – e.g. seize private holdings of guns or reduce the freedom of action which State governments currently possess in implementing Federal policies.

The Secretary of Homeland Security, Kristi Noem, flew into Los Angeles. Addressing the press she described a whole of government effort of the sort more usually deployed for natural disasters:

“We also have a US attorney here who has been aggressive has been making sure that we don't pick winners and losers in this country that the rule of law will be followed and that people who break the law and perpetuate violence will be brought to justice they will be prosecuted and there will be consequences for that kind of activity The Department of Justice is here and has a presence in our incident command center as well as the DEA the FBI and their investigative teams have been fantastic with their leadership And we also have the IRS here that's helping us track how these violent protesters are funded uh what NOS's [the Secretary's meaning is unclear as no commonly understood meaning of this acronym fits the context] out there what unions what other individuals may be funding these violent perpetrators that are in these protests that take people who may be wanting to come and be peaceful but instead turn them into

these very violent activities that go after law enforcement. That simply not acceptable. And I also want to thank our US Marshals uh they have been so great in helping us secure facilities but also operations and also transportation that as soon as someone is arrested and brought into incarceration that they are transported out uh and able to face prosecution and the consequences for their crimes I want people to know that while these officers and these agencies and our military are here doing these work this work and these operations uh that the people across this country are so grateful uh they are so grateful for the work that is being done here in Los Angeles. They are setting an example for what is happening across the country and other cities and putting together a model and a blueprint for how we can continue to work to make every single community great again and safe again for our kids and for our grand kids far into the futureLet me give just a few examples of those who have been rioting uh that many politicians that many politicians like Gavin Newsome and Karen Bass are defending. That there was a Vietnamese illegal alien who committed a mass shooting at a graduation party in 1994 that we have been able to take off the streets...[our officers] believe in America and they believe in freedom and they believe in law and order And that what we are doing is right here today and will continue to do for days to come until Los Angeles once again is at peace.”

Noem was followed by other speakers among whom was Greg Bavino chief patrol agent of the El Centro Border Patrol who remarked:

“That's why we're here right now is to remove those bad people and bad things Whether illegal aliens drugs or otherwise. We're here and we're not going away Border Patrol Office Field Operations and Air and Marine you'll see us in Los Angeles You'll continue to see us in Los Angeles Not going anywhere soon....Many millions of illegal aliens have passed across that border over the past several years it's our job to get them out and that is what we are going to do and that is what we're doing right now.”

Another speaker was Bills Sy, the US attorney for the Central District of California who added “And some people in the state of California have been conditioned to think that there's

no consequences for criminal activity And you know that might be true for the state of California but its not true with the federal government And we will bring charges and you will go to federal prison. This is federal government As the president said if you spit we hit and we'll hit you with a felony.”

During the question and answer period Noem stated further:

“we're going to stay here and build our operations until we make sure we liberate the city of Los Angeles...we literally have tens of thousands of targets [for arrest] So I think what's more important People should know that there are millions of people that are in the city illegally uh and we have thousands and thousands tens of thousands of targets that we will be going after.”

Senator Alex Padilla is a native son of Los Angeles as well as the senior senator for California. Probably wondering what the liberation of his hometown would entail, he attempted to ask Noem a question but was hustled from the press conference by Secret Service, ordered into a prone position by the FBI, handcuffed and detained. Speaking afterwards to the press a visibly emotional Padilla asked the question “if this is how Homeland Security treats a US Senator imagine how they are treating farmers and cooks.” Questioned about the incident Noem was unapologetic, claiming Padilla was out of order and asserting she did not know him. Padilla is the ranking member of the Senate subcommittee with oversight over Noem's department so we find that statement a bit incredible. We also noted he identified himself and he was wearing a shirt blazoned with the logo of the US Senate. We think it more likely Padilla's visibly Hispanic features simply typecast him as the enemy in the eyes of Noem's team and they reacted accordingly.

Momentarily Trump waffled on immigration enforcement. ICE agents have begun raiding businesses known for employing a large number of undocumented migrants – mainly in jobs too poorly compensated for anyone else to accept the wages employers were offering. Predominantly these businesses are in California's gigantic agricultural sector as well as hotels, fast food and food processing. ICE raids have terrorized the work force. The owners and

managers (mostly staunch Trump supporters) made strong remonstrances to the President. He gave them an initial soft answer and then ordered the raids to resume.

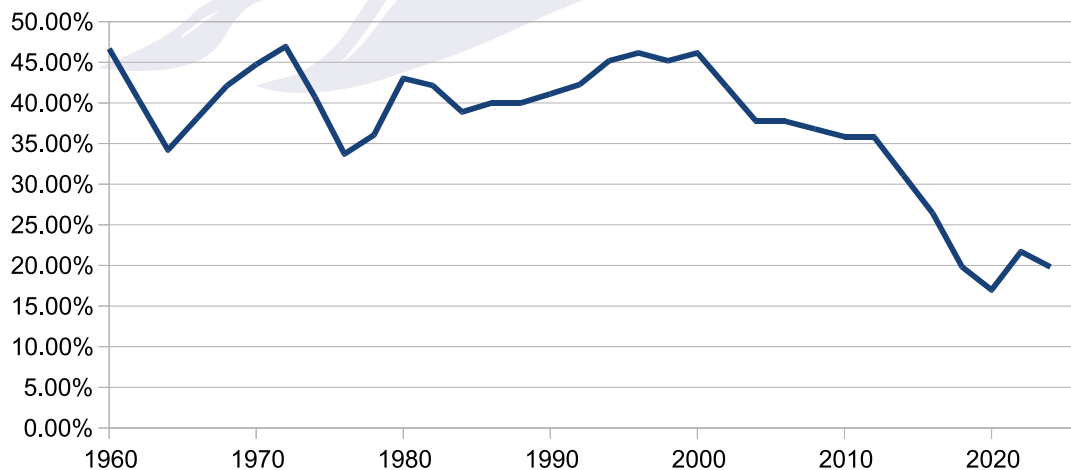
Just in case the citizenry of Los Angeles had not gotten the message about how Trump regards them, Trump then issued an executive order regarding air pollution. Famously the Los Angeles Basin has the worst air quality in the country due to the interaction of a dense population, a car culture and specific geographic features. Awareness of this issue made California Republicans more sensitive to environmental issues than the Eastern/Midwestern members of their party on whose territory the environmental problems arose primarily from industrial activity rather than consumer vehicles. Then Governor of California Reagan established the California Air Resource Board (CARB) in 1967 to establish emission standards. President Nixon (another California Republican) established the Environmental Protection Agency (EPA) in 1970. Although taking charge of emission standards nationally, the EPA granted California a waiver under which CARB could issue more stringent regulations. The California standards have not been stringent enough to clean up Los Angeles's air but they have kept it from getting more toxic as the population has increased. Trump's orders now voids the California regulations and impose the less stringent national regulations on the State. Trump stated "the joint resolutions prohibit the EPA from approving future waivers for California that would impose California's policy goals across the entire country and violate fundamental constitutional principles of Federalism, ending the electric vehicle mandate for good." Except that just last year the Supreme Court affirmed that California maintaining unique product regulations raise no issues of Federalism. As seeps out at the end of his statement, Trump's real goal is to discourage adoption of electric vehicles. This could be aimed at Musk, but more likely is a favor to supporters in the oil industry. In any case, Trump clearly does not think the citizenry of the nation's second largest city should be allowed to protect themselves from choking on bad air. Interestingly 75% of Republicans and higher percentages of Independents and Democrats believe the green energy transition (including electric cars) is a strategic necessity for the United States.

With his officials talking about liberating its major metropolis from its elected government and with Federal police powers being deployed at the cost of destabilizing major industries it is fair to say the President is not looking to win any votes in California. Its hard to remember that California was once a reliably purple state and that it only became a blue state in the Obama Administration. Republicans used to win 35%-45% of California's Congressional seats. This pattern held for 50 years even as the number of seats expanded from 30 to 53. Then in 2012 the pattern broke, most likely as a result of the Tea Party movement having radicalized the Republican Party. Trump looks set to complete the destruction of the California Republican party. It is an interesting case study in how the current polarization of American politics has come about. On the ground the economy and the voters remain mixed, but as Federal policy is implemented in an increasingly ideological manner with ever less regard for local conditions locals are forced to pick sides. Both parties have chosen this road of course.

Our discussion should not suggest that its just a Republican trait.

The Decline of the California Republican Party

Percentage of Congressional Seats Won (Sliding Average of 2 Elections)



Trump celebrated his birthday with a military parade in Washington DC costing \$45 million. In the US military parades have normally been celebrated only at the end of major wars and have focused on thanking the soldiers for their service. Trump, by contrast, put the focus on heavy equipment which he had shipped into DC from bases across the country. The budget was mostly to repair the roads damaged by the excess loads put upon them. Together with the \$450 million dollars for refurbishing the aircraft gifted by Qatar, Trump has spent a half billion dollars on vanity projects in the first 5 months of his term.

Evidently concerned about seeing the Administration's "LA blueprint" rolled out in their city, Trump's birthday was also marked by about protests mounted in about 1500 cities and towns spread across the US and collectively drawing several million protesters. We are 5 months in to a 48 month term.

The present is a sad moment in America life. Under a normal Administration, Republican or Democratic, the present would be a period of peace and prosperity in the country with relative good feelings between the different factions and substantial progress on a number of technological fronts would be laying the foundations for generational prosperity. Instead social division is being deliberately fomented and every tap root of American success and prosperity is being systematically poisoned. Large sections of the public are understandably agitated.



The Economy

Increased inflation has shown up at the wholesale price level. Inflation at the retail price level typically follows wholesale price inflation with a lag of a variable number of months. For the moment retail price inflation is steady. Employment also is not moving much yet. Trump's plan is to deport 0.6% of the work force this year. The economy can adjust either by moving people in to the jobs or it can shrink output (i.e. go into a recession.) Inevitably the response will be a

combination of both, but most likely leaning towards recession in the short term.

The World Bank has estimated Trump's tariff policy will reduce global growth to 2.3% per year – its lowest level since the 1960s. Country by country results will vary. Likely the growth decrease will be largest in the US, second largest with Canada and Mexico followed by other major trading partners (China, Japan, EU.) War in the Mideast briefly raised oil prices. This is a major gift for Russia's war effort, but bad for World and US growth otherwise. Fortunately the rest of world shows no interest in fighting trade wars. Their primary objective is to insulate themselves from the United States.



Government Finances

In the investment community considerable discussion has been ongoing regarding debt burdens – especially Federal government debt burden. We have attempted to put together some international comparisons. One may look just at central government debt – which in the United States means the Federal government. Or one can look at total government debt, which adds debt of regional (State) and local government. All of these figures omit real but unrecorded debts, such as unfunded pension obligations. Debt burden can mean either total debt or the annual interest cost. Dividing either measure by GDP gives a sense of how heavily that burden presses on the economy and provides a normalized measure which can be compared across economies. Subtracting the inflation rate from the interest cost provides a normalized measure of the real burden. Dividing the central government deficit by the outstanding debt stock shows how rapidly the debt burden is growing. The figures are in table 1 (next page.)

In general large tables of numbers produce eye glazing fatigue. But this table merits slow careful perusal as it proves as mysterious as any detective fiction. In the first row the eye catching number is US Treasury debt (labeled here as central

government debt.) At \$36 trillion it exceeds the combined total of the next three largest entities (China, EU and Japan) by \$8 trillion. This is the chicken little “the sky is falling” number. But the four entities have very different policies and we need to look closer.

In row 2 note that whereas state and local government debt in the US is only 10% of the central government number, in China the local debt is 4.45x the central government debt. China has kept its central government balance sheet strong while loading local government up with enormous borrowing to fund massive infrastructure and real estate development projects. In the EU and Japan local debt is 13% and 24% of central government debt – higher than the US but nothing like China.

The next line (row 3) is labeled eliminations. This category captures several things: government pension system holding of government debt, loans to local government from the central government, local government savings invested in central government bonds and (for the EU) loans between member governments. This number is the hardest to pin down and it should be taken with a large grain of salt. For China we have not even tried to determine a figure and so this cell is blank. For the US eliminations turns out to be a big number - \$8 trillion. But for Japan the figure is extraordinary – eliminations eliminate most of the government debt! The difference is in pension fund policy. For years the US has collected a payroll tax which it forces the pension fund to invest in US Treasury bonds. For about 5 years the payroll tax proceeds have been inadequate to fully fund the pension benefits and so pension fund holdings of Treasury debt are being run down. The same picture applies in Japan, but the Japanese government did something very different. They issued central government bonds and used the proceeds to pay benefits. Instead of running pension fund assets down or lending them to the central government, they invested them in a portfolio of global bonds and equities. In effect they turned the pension fund into a huge sovereign wealth fund. The result is that income on the pension fund assets now exceeds carrying cost on the central government debt. Basically the government borrowed from the public, invested the proceeds and is using the profits to supplement its tax revenues.

The next set of numbers looks at debt as a percentage of GDP. Japan's central government debt comes out at an eye catching 218%. But as we just learned that is a highly misleading number. After eliminations Japanese debt is 78% of GDP, slightly more conservative than the EU's 85%. The US federal debt at 121% of GDP is another chicken little number, but on a consolidated basis its figure of 103% is only a measure greater than the EU. China ends up with the highest debt ratio at 141% - even as its central government debt of 26% of GDP appears the most conservative.

But what is the cost of carrying this debt? Determining the comprehensive reported interest cost would be quite difficult. We took an easier route and just applied the local 10 year government bond rate to each country's debt. This is, in most cases, an overestimate of the interest cost as reported in government accounts. Governments are very clever at keeping reported debt costs low, e.g. by borrowing from the central bank, by forcing private financial institutions to carry government debt through reserve requirements and by offering tax concessions on debt. But all of these tricks create hidden drags on the economy. Our calculation – fictitious as it is – may give a better sense of the interest burden. Again we see that the US number is bigger than the other three combined.

Dividing interest cost by GDP we get figures ranging from 1.1% for Japan to 4.5% for the US with China and the EU both around 2.5%. This gives a first idea of the burden of debt. But some of that interest is just marking up the principal value of the debt for inflation. To get a more meaningful comparison we should eliminate this effect. Our adjustment is based on subtracting the current inflation rate from the bond rate to get a real rate. This real rate is applied to the stock of debt to get the real carrying cost and then dividing the real cost by the GDP gives our final measure. Currently Japan is extracting wealth at the rate of 1.62% per year from its creditors as bond yields have not yet fully repriced to compensate for a recent increase in inflation. After years of extracting wealth from its creditors with negative nominal interest rates, the EU has actually resumed paying them. However the just under 1% of GDP it devotes to this task is hardly burdensome. The US with a real interest cost of 2% of

GDP also is in no danger of defaulting. Finally China's burden ends up at 2.43% of GDP – the heaviest burden of the group, but entirely understandable given the massive investment program it has been funding.

Finally we compare central government budget deficit to the outstanding amount of central government debt to see how quickly that debt is growing. The result is low single digits everywhere except China. Currently China's debt is exploding (from a low base) as it bails out its local governments from their capital investment fiasco. Our two Asian countries provide an interesting contrast – Japan with its aggressive and successful portfolio investment strategy and China with an equally aggressive but currently more problematic real investment strategy. Readers surveying their own portfolios can take heart that mixed results dog investors of all sizes.

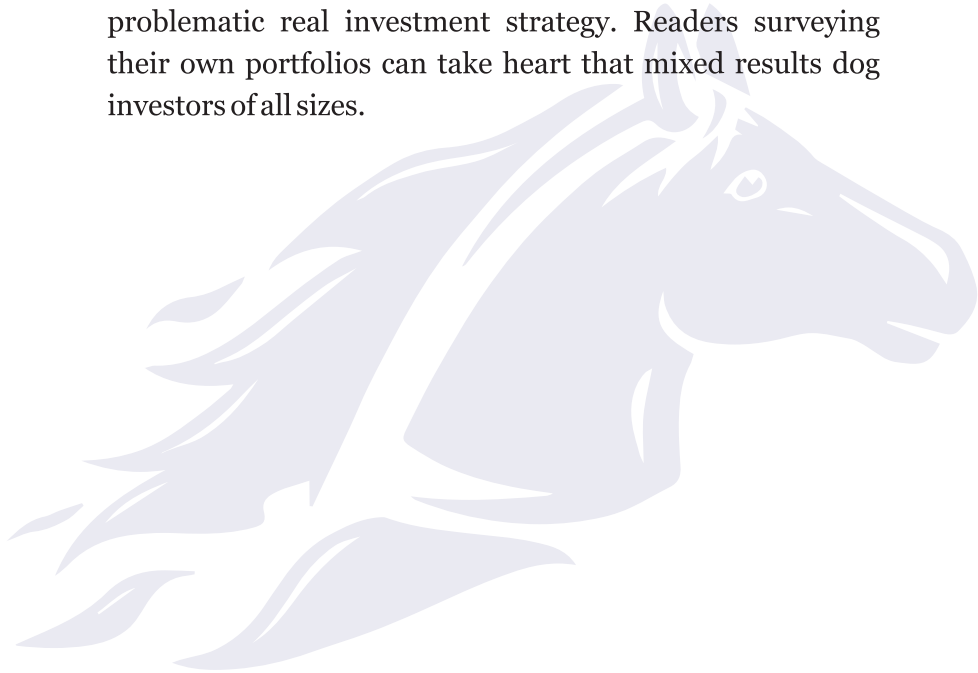


Table 1: Comparison of Government Finances

Item	US	China	EU	Japan
Government Debt (T\$)				
...central	36.2	4.84	14.8	9.14
...local	3.3	21.58	1.92	2.2
...eliminations	-8.576		-0.24	-8.06
...all	30.924	26.42	16.48	3.28
GDP (T\$)	29.977	18.8	19.412	4.2
Debt % GDP				
...central	121%	26%	76%	218%
...local	11%	115%	10%	52%
...eliminations	-29%	0%	-1%	-192%
...all	103%	141%	85%	78%
Government Bond Rate (%)	4.38	1.73	3.06	1.42
Interest (annual T\$)				
...central	1.59	0.08	0.45	0.13
...local	0.14	0.37	0.06	0.03
...eliminations	-0.38	0.00	-0.01	-0.11
...all	1.35	0.46	0.50	0.05
Interest % GDP				
...central	5.29%	0.45%	2.33%	3.09%
...local	0.48%	1.99%	0.30%	0.74%
...eliminations	-1.25%	0.00%	-0.04%	-2.73%
...all	4.52%	2.43%	2.60%	1.11%
Inflation Rate (%)	2.35	0	1.9	3.5
Real Government Bond Rate (%)	2.03	1.73	1.16	-2.08
Real Interest % GDP				
...central	2.45%	0.45%	0.88%	-4.53%
...local	0.22%	1.99%	0.11%	-1.09%
...eliminations	-0.58%	0.00%	-0.01%	3.99%
...all	2.09%	2.43%	0.98%	-1.62%
Government Deficit (T\$)	1.36	1.65	.62	.10
Deficit % Central Government Debt	3.76%	34.18%	4.20%	1.14%

We can draw several conclusions from this analysis. First, getting a true picture of the state of government finances is not easy. Headline numbers and casual comparisons made in most journalistic treatments of the subject lead to incorrect conclusions. Second, the world's four major governments have their finances pretty much in order – investors have better things to worry about. Third, although debt burdens are not excessive at present, that does not mean governments are free of financial constraints. With debt to GDP ratios of 100% a big spending spree or tax holiday can snowball debt into an uncomfortable burden pretty quickly. Currently only China has real fiscal flexibility and it is tapping a good chunk of that flexibility at present.

In the United States the two parties have had a very different impact on debt. The Reagan administration slashed taxes and orchestrated a large military build up. The older Bush moderated these policies only marginally. Clinton restored fiscal restraint to the White House. The younger Bush launched two wars and allowed a massively expensive regulatory mess to develop in the banking industry. Obama expanded benefits but funded them with tax increases. Trump slashed taxes and mishandled the Covid epidemic necessitating a costly rescue of the economy. The Biden administration largely left taxes and spending where it found them, but it nurtured economic growth which reduced the debt burden and it was careful not to launch expensive unfunded policies. We give the figures on Federal government burden to show how the different administrations got us to our present situation. As can be seen the near quadrupling in debt burden, from 32% at the end of the Carter administration to 123% currently is almost entirely chargeable to Republican administrations. Combining high military spend with regulatory laxness and generous tax cuts has created in an ingrained fiscal indiscipline in the party.

Table 2: Party Differences in Fiscal Policy
Rate of Growth in Real Debt and Debt Burden

President	Real Debt	Debt % GDP	Chg Burden
Reagan	14.10%	6.32%	19.90%
Bush Sr	11.49%	6.08%	13.71%
Clinton	0.74%	-2.04%	-10.09%
Bush Jr	9.46%	5.28%	27.07%
Obama	6.92%	3.14%	22.47%
Trump	8.99%	4.72%	20.47%
Biden	7.65%	-0.41%	-1.58%
Republicans	11.27%	5.67%	81.14%
Democrats	4.43%	0.40%	10.81%

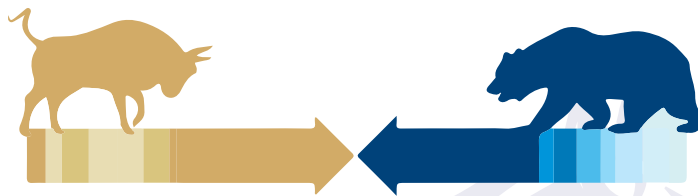
Average over policy years (commencing fiscal year after election and continuing to end of fiscal year in which left office)

Change in Burden is change in Debt % GDP over term of office (policy years.)

Note: Biden is average over 3 years as final fiscal year is not yet complete.

With the Big Beautiful Bill set to continue the first Trump Administration's policy of spend and do not tax, the second Trump Administration is likely to continue the deterioration of Federal finances. The Administration is taking several other steps which may be building large "off balance sheet" problems for the future. Slowing the green energy transition is likely to result in an expensive need to make up lost ground after the administration leaves office. In particular, if Administration actions cause consumers or business to invest in capital equipment which then needs to be retired early for climate reasons the costs could be substantial. Allowing Russia to strengthen its position in Europe is going to result in more pressure on NATO's frontiers which will increase the need for military spending. The Trump Administration's planned draw down in military spending is also likely to cause deficits in the naval, drone and space forces which will have to be expensively recouped in the future if we are to maintain strategic balance with China. Similarly the Administration's savaging of America's soft power will require rebuilding of those assets. Finally the

Administration's anti-regulatory stance has the potential to build large off balance sheet problems as happened in the younger Bush Administration. Where those issues will show up is uncertain, but regulation of clean air and water is one potentially very expensive area in which the Administration is determined to reduce regulation. These considerations suggest that the near term outlook for Federal finances is further deterioration. It also suggests that Trump's expensive border policies and tax relief measures are likely to be partially rolled back in the future. In the final analysis, both his anti-immigration and pro-tariff policies are social engineering programs. The American public has seldom been able to sustain an enthusiasm for social engineering much above one Presidential term.



Capital Markets

Almost every asset class turned in a solid gain for the month. US Large Cap Growth and International Emerging were the leading equity categories. In bonds Corporate Investment Grade turned in the best result followed by TIPS, Medium Grades and Preferred. The Euro continued to advance. Oil enjoyed a war rally. Gold rose during the war and retreated as hostilities wound down, so its net motion for the month was flat.

Table 3: Recent Market Performance

Asset Group	Asset Class	6-month trend	6-month return	12-month return
Equity	US Large Cap	flat	10.41%	4.77%
	...Large Cap Growth	flat	19.00%	6.65%
	...Large Cap Value	flat	2.37%	3.23%
	...Growth – Value	outperform	16.63%	3.42%
	US Mid/Small Cap	flat	8.06%	3.93%
	Intl Developed	rising	9.34%	0.62%
Fixed Income	Intl Emerging	rising	10.34%	5.93%
	Treasury 3-7 year	rising	1.10%	0.76%
	Treasury 7-10 year	rising	0.69%	1.23%
	TIPS	rising	-0.28%	1.36%
	Municipal	falling	-0.66%	0.60%
	Investment Grade	rising	1.25%	1.72%
	Medium Grade	flat	2.73%	1.36%
	Preferred	falling	0.26%	1.36%
	REIT	flat	-0.60%	-1.12%
Commodity	Euro	rising	8.78%	3.25%
	Gold	rising	6.00%	0.32%
	Crude Oil	falling	-10.89%	8.50%



Advice

We remain in an environment of elevated risk. The wars, tariffs and deportation policies remain in a state of flux. The economy is being impacted by these factors. The impact stems both from the policies themselves, which tend towards stagflation, and from the chilling effect on business planning of the uncertainty created. The magnitude and pace of the economy's response is not yet defined. It is possible the economy will process the impacts quickly with only temporary reduction in GDP growth. It is also possible we are in the early stage of a slow developing but deep and lingering recession. Other government policies seem diametrically opposed to secular policy needs in the areas of defense, climate change, administration, health and demographics. We feel an emphasis on capital preservation is appropriate in the present environment. Specifically, investors should

1. formulate the correct investment strategy for their personal situation and stick close to it
2. emphasize asset quality
3. opportunistically build liquidity reserves
4. work, as appropriate, to reduce financial risk in their real asset portfolio
5. Once the core portfolio is in good shape investors may consider satellite positions in opportunities where high potential return compensates for exposure to the current risk environment.

Cover Photo

Our cover explores the history of the centrifuge. The forerunner of this device seems to have been a hand cranked device for separating raw milk into cream and skim milk (cover central figure.) If milk is allowed to sit overnight, the two fractions will separate of their own accord. But the mechanical milk separator allows the process to be done in a few minutes with a more complete separation of the components. Apparently this device was invented in the 1300s, but we could find no images prior to the 19th century. Hand cranked separators are still offered for sale and the latest model available on Amazon seems only cosmetically changed from its 19th century version.

The milk separator exploits the centrifugal force. This force was first named by Christian Huygens (cover 9 o'clock) in his path breaking investigations of 1659. Improvements to the milk separator are attributed to the German master brewer Antoine Prandtl (cover 10 o'clock) assisted by his brother Alexander Prandtl who taught engineering studies. Their improvements (1865-1875) transformed the device from one which operated in batch mode to one which operated in a continuous mode. This opened its application to processing larger volumes in commercial dairies as opposed to family farms. The next step was taken by the Swedish engineer Gustaf de Laval (11 o'clock) who in 1878 integrated a steam turbine to the device to support such high volume applications. This product proved a huge commercial success and de Laval went on to create a substantial industrial enterprise from this beginning. Incidentally Alexander Prandtl is the father of Ludwig Prandtl (1875-1953) who

developed the science of fluid flow and aerodynamics. It is his contributions which are commemorated in the Prandtl number - a key quantity for characterizing different fluid flows.

The next development was pioneered by Friedrich Meischer (cover noon.) He was investigating pus collected from hospital patients. After much biochemical processing he ended up with a mixture which in 1869 he used an early centrifuge to separate. The bottom fraction was recognized by him as a new component of living tissue – nucleic acid or DNA. This discovery inspired the creation of centrifuges as a laboratory tool and created a desire for ever higher separative powers. Again it was a Swede who took the vital step. Theodor Svedborg (1884-1971, cover o'clock) was a physical chemist who developed the ultracentrifuge in the 1920s and applied it to investigations in colloid chemistry, biochemistry and virology which won him the Nobel Prize in Chemistry for 1926.

Svedborg's device was a room size piece of equipment. Improvements made to it by three men would reduce it to a lab bench piece of equipment. The French chemist Emile Henriot in the 1930s showed that compressed air provided an effective driving force for rotary devices where vibrations should be avoided. The American physicist Jesse Beams (cover 2 o'clock) applied this concept to ultracentrifuges. His graduate student Edward Greydon Pickels in 1935 solved the problem of overheating by placing the spinning parts in a vacuum chamber and thus eliminating air friction. Pickels went on to commercialize this device through the company he founded in 1946: Specialized Instrument Company (SPINCO.) However, SPINCO had difficulty breaking into the commercial laboratory market and SPINCO only achieved success when it folded in to Beckman Instruments in 1954. Beckman made the centrifuge a standard piece of equipment for research, pharmaceutical production and clinical laboratories.

Application of the centrifuge to isotopic separation had been the original motivation for Beams's work. In the 1940s he continued this work as part of the Manhattan project. However this approach was judged too technically risky for

immediate application and it was set aside in favor of electromagnetic and gas diffusion separation technologies. Russian intelligence gathering lifted this concept from the Manhattan project and brought it back to Russia. The Russians applied a prisoner of war, the Austrian engineer Gernot Zippe (cover 3 o'clock) to working on the problem. He and colleague Max Steenbeck developed Beams's gas centrifuge into a workable device for isotope separation in the early 1950s. An important improvement was applying a temperature gradient along the length of the centrifuge cylinder. In general a centrifuge creates a radial gradient within itself, with lighter material collecting in the center and heavier material at the circumference. Differential heating along the length of the cylinder sets up a counter current convective flow within the cylinder that sweeps heavy material to one end and lighter material to the opposite end. The result is improved separation. This led to an industrial process which in terms of electricity usage was 50 times more efficient than gas diffusion and 200 times more efficient than electromagnetic separation. The Russians repatriated Zippe in 1956. Zippe found his technology was substantially ahead of that existing at that time in the West. He went on to develop the European isotopic separation business at Urenco. Currently the gas centrifuge is the only technology used commercially for uranium enrichment.

Several substantial businesses developed out of this history. De Laval was a prolific inventor and successful industrialist. His initial work was in the stream turbine. Here he developed the Laval nozzle which has found application in rocket engines. From his success with the milk separator Laval went on to create a range of specialized equipment for the dairy industry. From this foundation he branched out into the needs for process equipment in a range of other industries. Another important invention of his was the conical separator disk, known as the Alfa Disk, which improved the separation efficiency of the centrifuge. His company, originally known as AB Separator was eventually renamed as Alfa-Laval. It was listed on the Swedish Stock exchange from 1901 to 1991, when it was taken private by Tetra-Pak. Tetra-Pak itself had started as the firm Akerlund & Rausing manufacturing packaging materials primarily for dry foodstuffs. In 1944 its research

engineer Erik Wallenberg developed an efficient waxed carton package for milk in a tetrahedral shape. This product led to the company eventually adopting the name Tetra-Pak. It required a further 19 years of R&D to develop a product which would be a substantial commercial success, however. Finally the company came up with the aseptic Tetra-Brik package which it launched in 1963. The company grew rapidly thereafter until it was able to take over the older Alfa-Laval in 1991. It reorganized its acquisition into DeLaval which held the parts of the business serving the dairy industry and Alfa-Laval which retained the businesses serving marine, energy, food and water industry customers. The new Alfa-Laval was relisted on the Swedish exchange in 2002. Currently it has a market capitalization of \$18 billion on a turnover of \$7 billion. The deLaval subsidiary was retained by Tetra-Pak which remains a private company owned by Rausing's descendants.

As noted SPINCO was taken over by Beckman Instruments in 1954. Beckman itself had begun in 1935 selling pH meters invented by Arnold Beckman – a Caltech professor. It gradually built up a substantial line of precision instruments. The SPINCO acquisition was a part of that strategy. The next year Beckman established the Shockley Semiconductor Laboratory in Mountain View, California to commercialize the transistor. A group of employees left this firm in 1957 to found Fairchild Semiconductor from which the origins of Silicon Valley are traced. In 1982 Beckman merged with the drug company SmithKline to form SmithKline Beckman. However that firm split up in 1989 with the SmithKline part developing into GlaxoSmithKline (now GSK group) and Beckman continuing as the instrument company. In 1989 Beckman acquired Coulter, another instrument company, to form Beckman Coulter. It continued to grow until in 2011 when it was purchased by Danaher. Danaher is a manufacturing conglomerate with several segments. It is capitalized at \$142 billion on revenue of almost \$24 billion.

The uranium enrichment business is a small oligopoly. The largest provider is Rosatom with 43% percent of the industry's capacity. Rosatom is owned by the Russian government and it is a dominant player in the nuclear industries. Urenco is the second largest uranium enricher

with 28 % of capacity. It is owned by a consortium of the Netherlands, UK and two German utilities . CNNC, the China National Nuclear Company, has 16% of capacity but so far limited presence in international trade. Finally the French firm Orano has 12% of capacity. It is 90% owned by France with a 10% interest held by two Japanese firms. These four providers dominate the commercial enrichment market. There are a few niche players serving just their local national market. Collectively these later firms constitute about 1% of capacity.

Several characteristics of this history are typical of technology businesses in general. First, fundamental technologies such as material separation can find very wide applications. Second, there is a back-and-forth dynamic in which technical advances open up new areas of application and new areas of application inspire technical improvements. Third, the growth of technology is an international enterprise occurring over several lifetimes. In general it has required dedicated effort over many years to take improvements from test bench to commercial success. But once a definitive product or process is arrived at it can hold its place even for centuries. Finally, the scientists and engineers who dedicate their lives to these pursuits are very little known by the wider culture despite their significant contributions. The web of connections between the cream for the morning's coffee, rocket motors, DNA, Silicon Valley and Stealth bombers raiding Iran is all but invisible to even the well educated public.



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