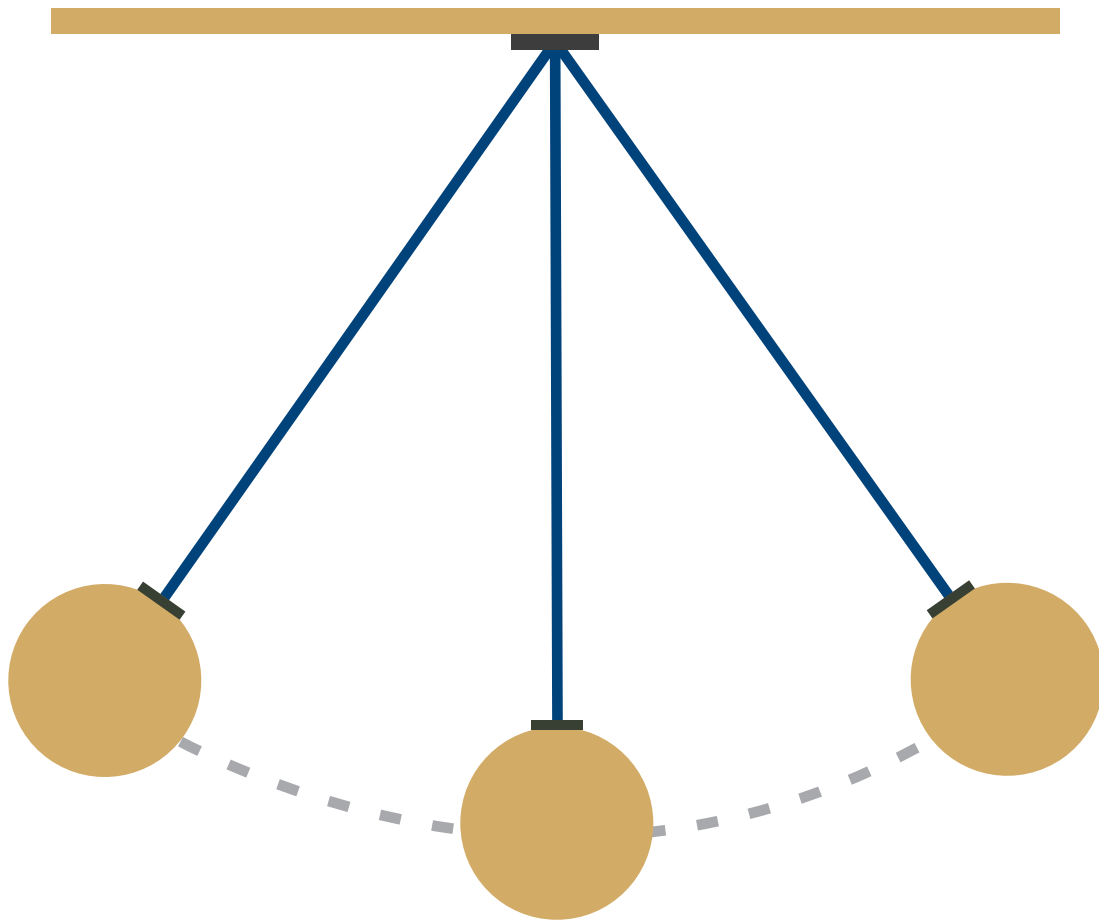




LLOYD TEVIS
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Market Commentary
November 2024



Executive Summary

The US took a turn to the hard right with the return of Trump to the presidency. Trump ran on the claim that the US is in trouble and he can fix it. While this message resonated with his key demographic of supporters who in fact are challenged by secular change in the economy, the reality is that the US is on a roll. Its foreign enemies are struggling and its own economy is gathering steam. The greatest risk to US prosperity at present is that Trump will replace competent technocrats by ideologues. Abroad the Trump victory raises deep concerns about shifts in US foreign policy. We doubt the US's most fundamental policies will change, but again we have low confidence in Trump's ability to sustain the attention required to successfully navigate a complex world.



Domestic Politics

US politics took a turn to the hard right. Former President Trump won a convincing victory of 314 electoral votes to 224. He also won the popular vote by a margin of about 5 million votes. Turnout was heavy at about 140 million votes and Trump's margin of victory in the popular vote was about 3.5% of the votes cast. In the Republican primaries Trump was consistently the candidate furthest to the right. In the national campaign he did not moderate his positions at all. In the Senate the Republicans took back a majority of at least 52 seats, possibly rising to 54 seats. Here also their candidates

were mostly drawn from the hard right. In the House, the Republicans retained their majority despite a record of continuous disruption by the hard right of the party. The state governorships showed no partisan change, with Republicans retaining 27 states and Democrats retaining 23 states.

In part the Republican victory is due to Democratic weakness. Harris excited the party faithful, but she was a generic candidate who brought little in the way of a distinctive energy to the ticket. She also shrank the Biden coalition – a point driven home on election night when she consistently under polled Biden's 2020 percentage by 3 to 5 percentage points straight across the country. The blunt conclusion is that the Democratic party's positions are too progressive for much of the country and it was Biden's personal appeal which was carrying the party. This will come as an considerable shock to most of the party, which was inclined to disrespect Biden as behind the times. Actually, until proven otherwise, one should assume Biden was the most left wing an electable candidate can be at present.

In part also the vote demonstrated an unwillingness to accept a woman presidential candidate. This was the second time the Democrats have fielded a woman against Trump only to be kicked in the teeth by the electorate. This result comes as a bit of a surprise given that women candidates have won in apparently less progressive countries such as India, the UK, and Mexico. We think American men are actually under some pressure from the progress women have made both in jobs and marital rights and they are reluctant to see the top political power position also flow to a woman. In countries where men feel less pressure they may more readily accept women in top political positions.

In part also the Republican victory reflects a superior marketing operation. The Republicans knew their product and stuck to it relentlessly. They ran a more modern digital campaign than the Democrats. They were extremely effective at framing the issues and controlling the narrative. The Democrats by contrast seemed like deer caught in the headlights.

Finally the economic cycle favored the Republicans. The economy has cooled off from its overheated state, but the turning of the cycle will not show up in family budgets for another six months. In this respect the Republican victory of 2024 is a counterpoint to the Democratic victory of 1992. In that year also, the timing of the cycle proved decisive to the electoral outcome. The economic cycle will provide Democrats unwilling to read the message of the election with an easy road to denial. Predictably, there will also be internal recriminations over this painful loss and an attempt to hang the blame on Biden and on those who engineered Harris's selection. Again that conversation is an easy distraction from the harder job of facing the reality that Democrats are unable to get elected in most regions of the country.

Trump will benefit for at least two years from a unified government. Only the Senate filibuster will exist to check his policies. He should have full control over appointments, budgets and administration policy. He will likely benefit from a supportive Supreme Court. As such he should be able to reshape major parts of government policy. The likely result is a great deal of near term disruption. For the changes to eventually prove beneficial they will need to survive the inevitable counter swing of the political pendulum. That may or may not happen.

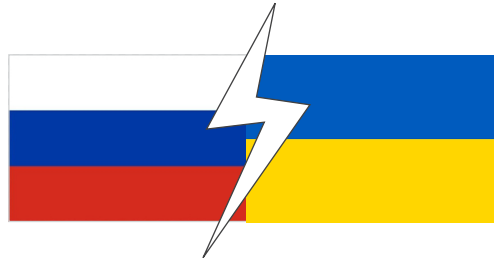
Among changes which we would expect Trump to make

1. renewal of expiring tax cuts, elimination of estate tax, reduction in capital gain tax and return of carried interest taxation to historic treatment.
2. active deportation of illegal residents and strong limitations on legal immigration
3. increased tariff barriers, particularly against China
4. reducing Federal cost sharing with blue states
5. reduced business taxes
6. reduced social safety net
7. replacement of aging conservative Supreme Court justices with younger conservative Justices, ensuring a conservative majority for another generation

8. disassembly of much Federal regulatory apparatus
9. roll back of green energy programs and increased support of the oil industry
10. roll back of conservation uses of public land in favor of private business use
11. possible stimulation of the nuclear power industry
12. possible increase in naval expenditure and likely increase in aerospace expenditure as the military builds a drone competency
13. rollback of diversity and inclusion programs
14. reduction in support to higher educational institutions which are seen as favoring multiculturalism over the Western canon.
15. increase in public pagentry affirming the central role of the WASP identity in the US tradition
16. defunding of Obamacare
17. defunding of public health
18. pardons for the January 6 rioters and the former officials indicted for attempting to steal the 2020 election.
19. a feast of private payolla

As for the Democrats, the desperate need of the Democrats is to move away from identity politics and rebuild a presence in the heartland. Until they broaden their appeal they will be confined to the liberal enclaves of New England and the West Coast in an increasingly hard right country.

Possibly the only group more miserable than the Democrats at Trump's victory are those Republicans who took a principled stand against him. There is no space for persons of principle in the Tammany Hall politics which Trump represents.



Russo-Ukraine War

US intelligence estimates the Russians have experienced about 600,000 casualties in the war to date. That is about half the active duty strength of the Russian military. Oryx estimates the Russians have lost 3400 tanks (60% of active fleet.) Remaining tank reserves are nominally 9,000, but probably only 4500 could actually be returned to service. Losses of armored personnel carriers and of lighter infantry fighting vehicles are estimated at 6300. Reserves are about 11,000 and again perhaps half of those could be restored to service. Artillery losses (towed & self propelled guns and rocket artillery) amount to 1676, which is about 40% of the active force. Nominal reserves are 12,000 so this loss is more manageable. Russia is not at the end of its military strength, but it is approaching the limit of what it can lose before it begins to put its external and internal security at risk.

Although there were earlier antecedents, military aviation was effectively born from the conflict of World War I. First applications to develop were scouting and artillery spotting. Next came light bombing. After that fighters vied for air superiority. Drones are following the same arc in the Ukraine war. Drones have played a vital reconnaissance role to date. For the past year drones have been delivering point bombing attacks on tanks, warships and fixed infrastructure. Now the first reports of autonomous drones patrolling above the battlefield in an anti-drone role are coming in. In World War I airplanes operated mostly in solo roles, whereas coordinated airwings were the standard deployment of World War II. Similarly, drones are evolving from single aircraft each controlled by individual operator to massed swarms capable of executing complex operations. Hardening drones against electronic warfare will push them towards greater autonomy and swarm operations where the swarm

prevails even in the face of heavy unit losses. Ultimately the side with the smarter software and faster chips will prevail in this arms race.

Russia is suffering labor cost inflation as a consequence of drains to the army and to the defense industry. It is attempting to alleviate the strain by importing workers from Central Asia and mercenaries from North Korea. Importing workers is triggering xenophobic responses – particularly among the ultranationalists who are key supporters of the regime. The motivation and effectiveness of the North Koreans is somewhat in question. Their motivation level is likely to decrease as they become familiar with Russian infantry tactics which are notoriously wasteful of soldier's lives. On the other hand, the transfer of lessons from the Ukraine battlefield to North Korea will potentially make North Korea a more dangerous foe.

According to unofficial Russian sources, the Ukrainians have claimed their first air victory with an F-16. The Ukrainians continue inventive in their use of drones and they manage a massive production. The Russians have been making a big push in an effort to achieve tangible goals before weather and mud cause a seasonal wind down in the campaign. Unintelligently, the Russians have degraded their own drone force by throwing trained drone operators into high casualty infantry assaults. Perhaps the Ukrainians will use the winter respite to build the forces needed to challenge for the battlefield initiative in 2025. That is the Russian fear. Their great hope is Trump will sell the Ukrainians out and 2025 will bring a decisive defeat of Ukraine.

Russia's attempt to interfere in the Moldavian elections was unsuccessful. Turnout cleared the 50% threshold required for a binding constitutional amendment. The referendum on joining the EU scrapped by with the narrowest majority. The constitutional court had earlier decided that this referendum did not need to meet the threshold requirement. But a later court could have reversed that finding. By meeting both the threshold requirement and attaining a majority yes vote the measure defeats certain Russian attacks. The president Maia Sandu was standing for re-election. She has strongly advocated for a pro-Western policy. In a field of 10

contenders she won 40% of the vote against the leading candidate of the pro-Russian opposition who won 27%. A run-off vote elected Sandu with 55% of the vote. Russia's main lever of interference is a break-away province (Transnistria) run by a local gangster and secured by a garrison of 1,000 Russian troops. In addition Russia has cultivated a minority ethnicity that is orthodox Christian but which speaks a language in the Turkish language family. Both local factions are more opportunistic friends of Russia rather than true believers in Putin's "Russian world." The EU should be able to buy their allegiance away from Russia. Securing Moldavia for the Western alliance avoids the expense of fortifying Romania's 1000 mile long border with Moldavia and it also secures Ukraine's rear.

Russia was more successful in the Georgia elections. Georgia is a small nation on the Black Sea with an ancient history. Currently it is a vital link in an a trade route which permits intermodal traffic to flow between Europe and China in about half the time ocean borne transit requires. The country broadly supports joining the EU and the EU also is supportive of that goal. In fact, this goal is included in Georgia's constitution. However, Russia is eager for Georgia to reintegrate into its imperial system, now labeled the Russian Mir (World.) Russia's army has occupied 20% of the country and the leading political party, Georgia Dream, leans strongly pro-Russia. In the recent elections, Georgia Dream was awarded about 54% of the votes, which ill accorded with exit polls suggesting it would get 40% of the vote. The opposition is crying foul and protesting the election as rigged. The country's president is spear heading this protest and the EU/US are giving it quiet support. At least Georgia Dream did not secure enough votes to amend the constitution. It had earlier declared that it favored a one party state and would seek to amend the constitution accordingly.



Mideast

Israel's decapitation of Hezbollah has left Iran exposed with only second string proxies available to cause trouble on its behalf. Iran engaged in vigorous diplomacy in an effort to soften or ward off an Israeli counterstrike for its own failed attack of last month. However, Israel ultimately struck with a flight of about 200 planes. It apparently struck at will and without loss. Its targets were munitions factories and air defense systems protecting vital oil resources. The clear message to Iran was that the planes could return with a more ample kill list should Iran continue to escalate the conflict.

Hezbollah itself is retreating before the IDF and avoiding decisive engagements. As a result, its latent capacity for trouble making is being preserved. Israel has committed 5 division to Lebanon, with the apparent objective of pushing Hezbollah north of the Litani River, as called for by long ignored UN Resolution 1701.

Israel continues to scour Gaza for hostages and for Hamas's leadership. It achieved some success – killing Hamas's military leader Yahya Sinwar. But that result seems to have come more by chance than by planning. Efforts to rescue hostages have had only limited success. We infer that the neither the Gazan population nor Hamas's political competitors are providing the IDF with actionable intelligence, unlike Hezbollah which appears to have been well penetrated by Israeli intelligence.



Jamie Dimon's Views

Jamie Dimon is the CEO of JP Morgan Chase, the flagship US bank. Recently Dimon addressed a conference of finance executives and made the eye catching remark that World War Three may have already begun. Dimon called for the US to shed its naivete and wake up to the peril it faces. This remark is not the first cautionary comment from Dimon. Dimon's view on the economy and dollar inflation has been at the bearish end for several years. As such his prognostications have not been particularly accurate. We think Dimon's bearishness reflects his vantage point. JP Morgan is a company with its finger much more on the pulse of the international world than the typical US financier. At same time, it is squarely in the US Banking industry which is itself feeling stress from the interest rate cycle and the secular changes in commercial real estate. The offshore world is not enjoying the same prosperity as the US is. And the banking sector is under more pressure than the typical US sector. Nevertheless, Dimon is a serious and informed commentator and we should try to understand his viewpoint.

For that purpose it is helpful to begin by looking back at how the two previous world wars began and in particular how World War II began. Both wars took their origin from the ambition in Germany to challenge the existing geopolitical structure. This structure was one dominated by the British Empire and supported by a France and its network of alliances which sought to counterbalance and contain the inherent strength of Germany. Before World War I France allied itself with Russia. Before World War II France allied itself with several Central European states. In the run up to World War I the contending power blocks were clearly drawn, but the actual outbreak of war was largely accidental and unplanned by any of the major combatants. World War II was rather different. Germany was explicitly trying to revise the power structure established by the Versailles Treaty. The Stressa Conference of 1935 was the final attempt of the

victors of World War I to sustain that structure. Once their effort collapsed, the inevitability of war was broadly understood in diplomatic circles and the next four years saw tactical moves to prepare for conflict. Italy switched sides to ally with Germany. The new Axis powers intervened in the Spanish Civil War to test new military technology and to create a potential threat in France's rear. A series of moves against France's central European alliance system gradually disassembled it as France was unable to maintain it without the support of the British Empire. In the British Empire the ruling conservatives saw that a major war threatened both their internal domestic position and the integrity of the Empire and they, therefore, were willing to clutch at straws in an effort to avoid or at least delay war. Accordingly, they were unwilling to confront Germany over the French alliance system.

The current international situation has elements of the past. Today China steps into the shoes of Germany in seeking a reordering of international power. It sees the US as the heir of the British Empire who is potentially constraining and limiting China from taking its "natural place" in the world. It observes that country to country it is about the same strength as the US and that the US's greater power rests on a web of alliances. So disassembling that web is the necessary step China must take. It sees that the US alliance structure creates a wide flung set of obligations on the US. China can hope to break up the alliance structure by involving the US in simultaneous troubles across its structure until the US is too preoccupied to confront a direct Chinese move on Taiwan. If China can secure Taiwan, it gains control of sea lanes vital to Japan and South Korea. That pressure point might prove adequate to force them to abandon their US alliance. In that eventuality China would quickly come to dominate the two Koreas, Japan, Taiwan, the Phillipines and Indo-China up to the Indian border. This regional block would then command substantially more GDP than the US and raise China to be the world's leading power. So China has every reason to encourage Russia and Iran to create troubles in Europe and the Mideast. And they, for their part, are not adverse to seeing the US embroiled in Asian complications.

The current international situation differs from the past in some important ways. First, the US is a very different entity from the British Empire. Its strengths, weaknesses and sense of itself are entirely different. Most importantly, countries are trying to get into the Western world, not escape from it. Second, the US elite – far from being afraid of losing their status in an international conflict – is enjoying considerable current success, feels the wind at their back and is not at all timorous. Third, Russia and Iran are proving less competent allies of China than might be hoped. Fourth, the US has been consolidating its strength rather than frittering it away in secondary theaters, such as Afghanistan or the Sahel. Fifth, until China embarked on its nationalistic foreign policy the US hoped to engage with China rather than contain it. Chinese rhetoric and policies about reordering the world have created problems for China rather than laid the foundations for greater progress. Sixth, the news from the Ukraine and the Mideast must give China's strategists pause for thought. Ukraine has largely nullified the Russian navy despite having no navy of its own. That observation must concern anyone charged with planning an amphibious operation against Taiwan. Second, Israeli air defenses have nullified Iranian missiles while at sea US naval air defenses have proven equally effective against the Houthis. This is not an encouraging observation for a power looking to overwhelm the US fleet with missile fire.

So Dimon might be right that today's wars are the opening moves of to a larger conflict. But they could also be tests which ultimately persuade the Chinese that the situation is not yet favorable to a military reordering of world power. One runs tests after all because one is unsure of the outcome.



Batteries and Nuclear Energy

In mid-October we released a research note on battery technology. Currently the dominant application for rechargeable batteries is electric cars. An emerging market is energy storage as part of the green energy transformation. The reigning technology is the Lithium Ion battery which was originally developed for mobile computing and cell phones. The different requirements of transportation and energy storage, however, are driving the development of new technologies. Significant performance improvements look to be available. The implications for the competitiveness of electric vehicles and the character of the green transition are significant. This technology will likely be an important one for shaping the future economy.

This month we are publishing a research note on developments in nuclear power generation. Here we are moderately skeptical that a bonanza awaits investors or that the impact of these developments will be major. Basically we think the combination of renewable energy and cost efficient energy storage will be the dominant solution.

The Trump election raises the question as to how policy changes will effect the green energy transition. We think that transition is being driven primarily by economic factors. Trump will doubtless make policy changes which throw roadblocks in the way of the transition, but any efforts of his to turn back time will be about as hopeful as trying to divert flowing lava.



Safety Factors

In the UK the initially dominant Covid vaccine was developed at Oxford and marketed by Astra-Zenica. It was developed using traditional vaccine technology. About 50 million doses were administered and about 73 deaths are attributed to a specific rare side effect that can be clearly linked to the vaccine. That is about 1 death per 340,000 persons vaccinated (in a two dose regimen.) Those 50 million doses are estimated to have saved about 120,000 lives so the vaccine program delivered 1,600 lives saved for each life lost. However, mRNA based vaccine technology deployed by Pfizer and Moderna proved much safer. One can estimate that 50 million doses of that vaccine would result in about 21 fatalities (1 death per 1,200,000 persons vaccinated.) As a result the Astra-Zenica vaccine has been retired from use.

For human driven cars there are about 1.3 traffic fatalities per 100 million miles driven. That is about one fatality per 5,000 driver years. That makes driving a car 240x riskier than getting a vaccine. So far robo-taxis in San Francisco have clocked up 5 million miles driven with one pedestrian fatality. The sample is too small to estimate from, but for what it is worth robo-drivers are not yet matching human safety levels for driving on bustling city streets. So far there are only murmurings of concern about robo-taxis. The fatality rate for bicycle riding is after all about 34 per 100 million miles pedaled by persons who commute to work on bicycles. That would be above the extrapolated robo-taxi fatality rate of 20 fatalities per 100 million miles.

These figures are food for thought. Vaccines are a very safe technology which confer real and extremely valuable benefits. Yet vaccine hesitancy was so great in the US as to result in about 500,000 unnecessary fatalities. Cars are significantly more risky than vaccines. Bicycles and perhaps robo-cars are about 10x riskier than cars. Robo-taxis confer very marginal benefits over regular taxis. Yet the public is

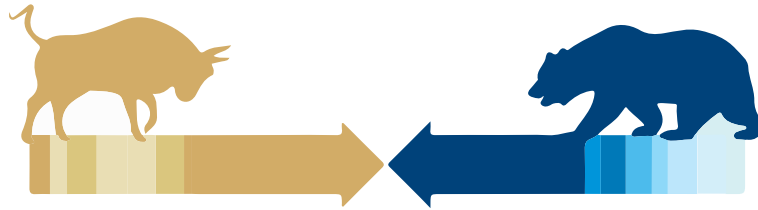
much less concerned about the risks of cars, bicycles and robo-taxis than they are about vaccines. Clearly the public response depends on more than just statistical risk. We would hazard the guess that the missing element is the sense of control. With vaccines control is out of the user's hands once they get the shot. The outcome will be whatever it is and it will be largely uncanny. With cars, bicycles and robo-taxis control remains with the user to a much greater degree. The user can terminate the journey at any point and an accident, should it occur, will likely be comprehensible rather than uncanny.

An interesting question is whether public acceptance of AI will resemble vaccines or robo-taxis. We hazard the guess that it depends very much on how the AI-user interaction is engineered. As long as users feel control remains in their hands we think they will fairly easily accept AI services.



Domestic Economy

The latest figures show inflation closing in on the Federal Reserve's 2% target. Job growth was nearly nil in October, but this figure was depressed by two hurricanes and a strike. It is now generally agreed that the Fed has achieved a “soft landing.” Successive measured reductions in interest rates should sustain forward momentum in the economy for some time.



Capital Markets

Most asset classes sold off in October after a strong upward move in September. We think this was mostly a case of pre-election jitters as they have rallied back on the election news. US equities do look fully priced at this juncture, however. Accordingly, we would not be surprised to see them start range trading. Bond prices should rise as the Fed cuts rates, with the biggest moves in bonds with distant maturity dates. This is a standard cyclical phenomena. Gold is rising on geopolitical tensions.

Asset Group	Asset Class	6-month trend	3-month return	1-month return
Equity	US Large Cap	rising	3.24%	-0.49%
	...Large Cap Growth	rising	3.97%	-0.16%
	...Large Cap Value	rising	2.40%	-0.88%
	...Growth – Value	outperform	1.56%	0.72%
	US Mid/Small Cap	rising	1.69%	-0.74%
	Intl Developed	rising	-1.42%	-5.13%
	Intl Emerging	rising	2.92%	-3.37%
Fixed Income	Treasury 3-7 year	rising	-0.65%	-2.39%
	Treasury 7-10 year	rising	-1.74%	-3.68%
	TIPS	rising	1.23%	-1.96%
	Municipal	flat	0.02%	-1.48%
	Investment Grade	rising	-0.74%	-3.53%
	Medium Grade	rising	0.75%	-1.52%
	Preferred	rising	3.40%	-1.23%
Commodity	REIT	rising	4.25%	-2.96%
	Euro	rising	0.55%	-0.76%
	Gold	rising	9.75%	2.67%
	Crude Oil	falling	-14.65%	-7.73%

Historically silver has traded as a certain ratio of gold's price. A ratio of 1:16 corresponds to the relative physical abundances of the two metals. That has usually been the high point of the silver price, touched at times when silver is trading as a secondary monetary metal. The low price for silver has usually been set by industrial demand. The historical low used to be about 1:40. As silver based photography disappeared the ratio moved as high as 1:120. More recently silver has moved to 1:80, implying that the silver price is now rising faster than gold. It would seem that demand from the electronic industry has finally compensated for the loss of photographic demand.



Advice

In general you should maintain your strategy. US equity valuations are quite high at present as the euphoria of a Trump electoral victory (perceived as pro-business and pro-investor) has added to price increases due to favorable cyclical news. Tactical allocators may prefer to emphasize less pricey equity markets for the moment.

Now is a good time to finalize any year end tax planning. Generally loss making investments should be sold before year end. Any transactions which need to close before year end should have their timelines reviewed to be sure of closing in a timely fashion. Any income which can be deferred should be pushed to after year end unless you face a higher tax rate in 2025. If your tax rate will be higher in 2025 and you have income which can be brought forward, consider booking it in 2024.

We have published a white paper “Advising the Private Client : What Is Wrong With Investment Advice and How to Fix It. The paper critiques the standard protocol for advising clients. It shows that that protocol is so flawed as to deliver entirely unreliable advice. The paper then describes how we fix these problems at Lloyd Tevis. The paper is available through our website in the Resources:Publications section.



About Lloyd Tevis Investments

Lloyd Tevis Investments LLC is a registered investment adviser offering its services over the internet to US individual investors and their families. Our Precision investing™ service provides clients with highly personalized investment solutions tuned to the client's specific circumstances and objectives. We believe the strategic asset allocation decision is the key decision faced by our investors. Accordingly, our monthly commentary focuses on matters which can shape the longer term performance of asset classes. We do not time market swings or pick individual stocks. Discussion at this level of detail is made for the light which it throws on relative valuations and such discussion should not be read as an investment recommendation. Indeed, our investment focus is on maximizing diversification, careful risk budgeting and maximizing implementation efficiency. These are the proven builders of long term investment success.

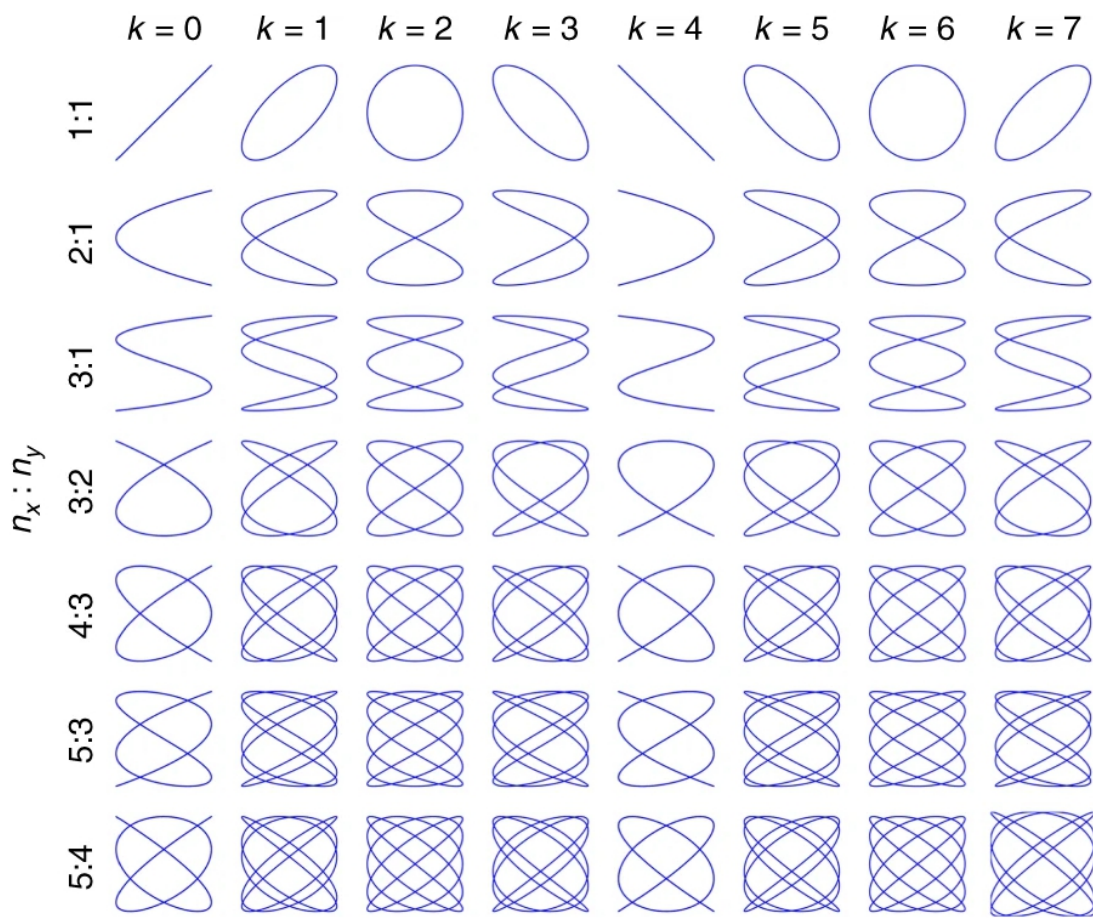
In evaluating political and social developments our perspective is that of long term investors. We believe the investor's interest is best served by a stable environment in which change occurs incrementally as broadly supported policies rather than by an environment of abrupt changes and frequent U-turns driven by transient partisan advantages. Finally, our assessments should always be read as what we consider likely to occur and not as expressions of what we would like to see come about. To learn more about our firm visit us at lloydtevis.com.

About the Cover

The pendulum has long been the metaphor for a stable oscillatory process. As such it has provided a metaphor for oscillations in the social sphere – especially politics and the economy – as well. Examples of such oscillations include the alternation of major political parties in control of government and the business cycle.

As a physical oscillator a pendulum has certain properties. First it not only sways from side to side, but also varies between high potential energy (at the extrema of the swings) and high kinetic energy (while passing through the middle.) As a result it moves from extreme to extreme spending relatively little time at its average or center position. Second, its regularity permits its use as a time keeper. Third, its stable behavior provides a reference point against which changes in its environment can be detected. Thus, Foucault's pendulum allows one to directly demonstrate the rotation of the earth – a motion otherwise imperceptible to us.

The simple pendulum traces out a very simple arc. But suppose we couple two such pendulums together each swinging in a plane orthogonal to the other. In this case a very complex design is traced out known as the Lissajous figures. The particular figure that results depends on the ratio $n_x:n_y$ of the periods of the two pendulums and the phase shift k between the oscillators.



We can perhaps look to see if these properties of the pendulum carry over to the social oscillators for which it is a metaphor. The philosopher Hegel sought to read all of human history as a succession of stimuli and responses in which each response gives birth to the next stimulus. He termed this process dialectics. Marx tried to erect a science of history on this foundation, but the results suggest the superstructure was too heavy for the foundations. More modestly, we can suggest that the oscillation of domestic politics is driven by the actions of one side stimulating a response from the other side. This oscillation, if of modest amplitude, serves to stabilize the system as a whole. But if the stimulus is being pumped up by some factor, the amplitude of the oscillations could grow to the point of ripping the system apart. This reflection suggests that the role of the statesman is not to try to halt the oscillation, but rather to dampen it so that it exhibits only mild swings. A similar remark could apply to central banking. Trying to halt the business cycle is probably a mistake which will cause tensions to build up in the system until the braking force is

swept away. However, by applying a modest counter cyclical force one can hope to dampen the oscillations to a level which does not threaten the integrity of the system.

The social sphere of course contains multiple oscillators. We have mentioned politics and economics, but oscillators are well known in fields as diverse as fashion (hemlines), art (abstraction/realism) and religion (literal/figurative interpretation.) The Lissajous figures show us how individually simple oscillators can combine to create complex behavior. The rich tapestry of human history could in part be due to the interaction of many independent simple oscillators. As a result each period has its own unique state and character.

Applying these thoughts to the present period, we would note that the synchronization of the economic and political cycles worked out in such a way as to cause an abrupt shift from the centrist Biden to the extreme represented by Trump. Normally the two cycles are correlated in such a manner that these extreme shifts do not occur. But the Covid epidemic provided the external factor which shifted the relative phase of the two cycles and permitted less usual behavior to emerge. Examining the figure above, we note that small shifts in k can cause at times dramatic changes in the figures. Are we in a setting where the amplitude of the swings will grow or decay? The answer will powerfully effect medium term prosperity.

Reference: The figure is from Wang, J., Zhang, G. & You, Z. Design rules for dense and rapid Lissajous scanning. *Microsystem Nanoengineering* 6, 101 (2020). <https://doi.org/10.1038/s41378-020-00211-4>