24/7 trading and the politics of time

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24/7 Trading and the Politics of Time

The U.S. is moving toward 24/7 stock trading. In a world where politics and finance are increasingly intertwined, the effects will be transformative.

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Paolo Uccello, "24 hours clock" (1443), located in the Duomo di Firenze (Cattedrale di Santa Maria del Fiore), Florence, Italy.

The NIST-F4, maintained by scientists at the University of Colorado, Boulder, is one the world's most important clocks. By trapping atoms within a vacuum chamber and using lasers to record their oscillation, the NIST-F4 can measure the passage of time astonishing levels of accuracy. [1] Most of us have to reset our watches every so ofter address “drift.” But not the NIST-F4; it would take 100 million years for the clock to gain or lose one second. [2] This remarkable measurement is used to define the offici start of every second in the United States. [3] That data is then combined with estima from other countries to produce a weighted average, one broadcast to devices all o the world. [4] The time displaying at the corner of your screen as you read this post w in other words, partly made in Colorado.

These measurements of time are essential to today’s capital markets. Algorithms tra stocks, ETFs, and other instruments at sub-millisecond speeds, requiring highly prec measurements of which orders occurred first. [5] This would be easy if there were one central exchange where all this trading happens. But there isn’t just one exchange. There are hundreds. [6] And trading algorithms regularly participate in multiple venue simultaneously, buying at one location while selling in another. [7]

But what if two markets’ clocks are inconsistent? What, in other words, would happe if NYSE thinks it’s 02:13:01PM but Nasdaq thinks its 02:13:02PM? The answer, quite simply, is chaos! It would suddenly become less clear, for any one trade, whose orde should be processed first. Some lucky traders might benefit from the confusion, but others will find their order fulfilled at a worse price. Lawsuits will ensue. Systems cou crash. And it may provide an opening for nefarious traders to front-run competitors a practice known as ‘latency arbitrage.’

The solution to this problem is clock synchronization. U.S. exchanges are required to synchronize their clocks to within 100 microseconds of the time maintained by NIST in Colorado. [8] For brokers, the standard is 50 milliseconds. [9] Scientists from the National Institute of Standards and Technology have placed special clocks in exchar datacenters to achieve consistency. [10] But there is still room for variation. [11] Interact

Brokers, for example, discloses that it maintains its clocks to within 10 microseconds NIST-F4. [12] If another broker only synchs to within 50 *milli*seconds, that's an enormo difference! Trading algorithms are, in other words, a bit like Matthew McConaughey Interstellar: they may experience time at a different rate depending on the venue in which its measured. [13]

But now markets are experiencing another change to their space-time continuum: t advent of 24/7 trading. Historically, stock trading has been limited to normal workin hours. NYSE, for example, is currently open from 9:30AM to 4PM ET. But that standa was shattered by the SEC's recent approval of 24X, the first U.S. securities exchange facilitate around-the-clock stock trading. [14] This move poses complex challenges fo regulators. More significant, however, are the political implications. Capital markets not merely neutral venues of economic exchange. [15] They both reflect and shape political outcomes. And by changing their hours of operation, we are also changing the rules of this strategic game.

Opening Bell

One of Wall Street's great traditions is the ringing of the opening bell at the New Yo Stock Exchange. Originally, NYSE use a gavel, transitioning to a Chinese gong in the 1870s, and finally a brass bell in 1903. [16] The bell served a real purpose: signaling th precise moment official trading could begin. But its official function was phased out markets transitioned from physical 'pits' to computers. Today it is merely a ceremon made-for-TV event. Ringing the opening bell is a bit like winning the Heisman troph of American capitalism, an honor often bestowed to companies celebrating their ini public offering. But you'll also occasionally see the bell rung by important cultural figures, like Miss Piggy or Ronald Reagan.

Nevertheless, the opening bell still represents an important fact about American sto markets: trading hours are limited. The origin of these hours — 9:30AM to 4PM — a not entirely clear; they may reflect traditional conceptions of work and the necessity daylight from the 18th century. [17] What is clear, however, is that traders have long sought to push the boundaries. In 1864, for example, a businessman opened a hote Manhattan with an “evening” exchange, temporarily making New York the only city the world with 24-hour trading. [18] Exchanges also tried to draw customers away fro NYSE in the 1880s with earlier trading hours. [19]

But neither successfully disrupted the standard trading schedule. What has emerge instead are special windows of pre-market trading (as early as 2:30AM) and extende hours sessions (e.g., 4PM to 8PM). Both are risky. You can only use certain order typ during these periods, and because there are fewer participants, you are less likely tc your order at a competitive price. [20] Further, certain regulatory protections don’t ap outside normal trading hours. [21] It is, in other words, the late-night poker table — a place where amateurs are likely to get burned.

Honored Guests of the New York Stock Exchange. Photos by NYSE and Brad Barket.

The rapid rise of retail participation in stock markets — facilitated by electronic, zer fee brokerage platforms — has created pressure for change. Consumers are lookin other markets which trade 24/7, like cryptocurrencies, and saying: ‘hey, now *that’s* w a healthy market should look like.’ As Robinhood’s JB Mackenzie summarized at a recent industry roundtable:

> I think the client demand for 24-hour, seven-day-a-week trading is already there There's no question. So it's in the marketplace, you see it in digital assets, you se internationally. The fact of the matter is when the world is moving, you know, ne doesn't stop because of the fact — or world events — because of the fact that w closing our marketplaces. [22]

The Chief Investment Officer of Jump Trading, one of the world's most sophisticatec high-frequency trading firms, corroborated: "We know the endgame here. Markets be trading 24/7 in the not-too-distant future." [23] And, indeed, it appears that mome has already arrived in equities markets.

24X: Time is Flat Circle

The newly approved securities exchange, 24X, will take a phased approach to aroun the-clock stock trading. In 2025, it will start offering trading from 4AM to 7PM on weekdays. [24] And if all goes well, it will then be allowed to offer trading from 8PM o Sundays through 7PM on Fridays, with a one-hour pause each day. It is, in essence, 23/5 exchange — less than what was originally requested. The exchange first filed t offer trading seven days a week, and the CEO has expressed a desire to achieve this goal in the future. [25] In the meantime, NYSE has announced plans to follow its lead extending to 22 hours of trading on weekdays. [26]

The SEC's approval of 24X was not without controversy. SIFMA, an association whicl represents brokers, raised serious concerns about clearing and settlement. [27] This refers to the technical process by which money actually changes hands after a trade has been executed between two parties. The basic problem is that clearing doesn't normally occur between 9PM and 1:30AM ET. So if anything goes wrong during tho hours, brokers could be exposed to massive risks. [28]

Concerns have also been expressed about the human consequences. Is it healthy to encourage retail investors — students, grandmothers, your twice-divorced Uncle Fr

— to trade Tesla stock at 3AM? Better Markets, a non-profit focusing on fairness in finance, thinks not:

> …investing in individual stocks during off-hours trading is already "a risky gambl… And human nature dictates that risky gambles are more popular at night. So imagine what the consequences would be if stock market "gambling," combined with the gamification techniques that induce trading, was available 24 hours a d… we don't have to imagine the consequences. In 2018, the Supreme Court legaliz… sports gambling. Sports gambling addiction is now approaching a "national epidemic to rival the opioid crisis" [29]

It appears at least two of the SEC's five commissioners were satisfied these issues could be addressed through investor disclosures. [30] In America, you see, one shoul… free to self-immolate. The important thing is they are *informed*. And, indeed, why should the nanny state prevent you from selling Vietnamese bonds at 4AM when a… earthquake hits? The professionals can do it. Why can't Uncle Frank? He knows wha… he's doing. He watches CNBC, like, every morning.

Largely overlooked in these discussions, however, are the *political* implications of 2… trading. Markets are like living organisms, pulsating in response to world events an… turn, shaping political behavior. And they are also strategic arenas, places where investors can mobilize their capital toward political aims. But these interrelationship… have always been conditioned by *time*. Like a shot clock in a basketball game, mark… hours shape strategic decision-making. But what if there is no clock? What happens… other words, if the game never ends?

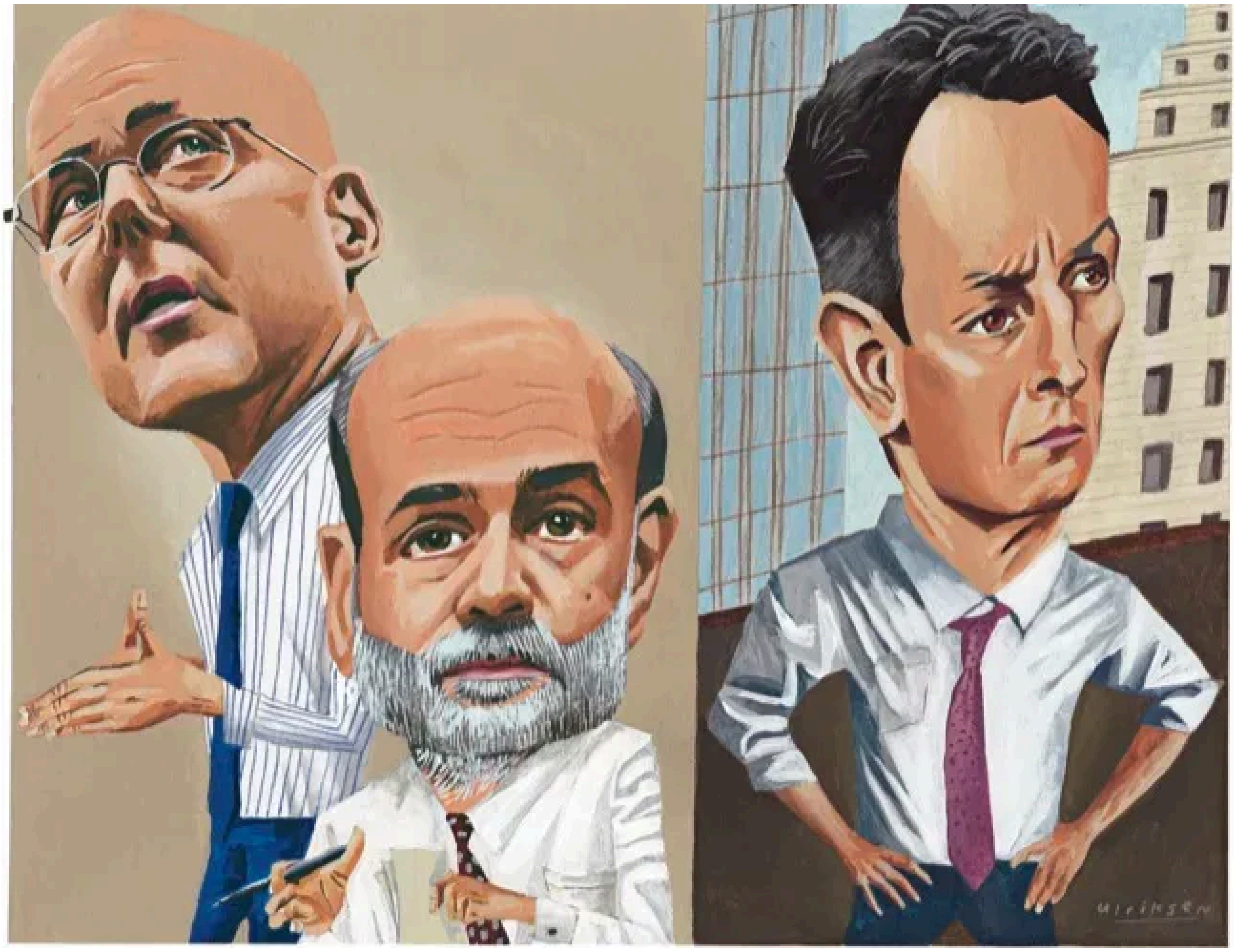
New Rules, New Game

In February 1994, the market for government bonds collapsed in what has come to… remembered as the 'great bond massacre.' [31] Then-President Bill Clinton was heavil… criticized, leading his advisor, James Carville, to famously remark that he would like… be reincarnated as the bond market: "You can intimidate everybody." [32] This quote, alongside his other big hit — "It's the economy, stupid" — has become a shorthand the power markets exert on politics. Policymakers must constantly consider how the market will respond to their every move. And the most successful political actors are often those who can skillfully play this strategic game.

Like any game, there are rules. And perhaps no rule is more important than *time* — periods in which markets can react. There is a reason companies release bad news l on a Friday or outside trading hours. [33] It's the same reason policymakers try to reso problems before 9:30AM. [34] At the height of the 2008 financial crisis, for example, President Obama's top economic advisors were constantly rushing to find solutions before the opening bell:

> Fed officials didn't feel that they had time to discuss the weekend's events in det with [Harvey Miller, Lehman Brothers' head bankruptcy lawyer]. Their goals were make sure that Lehman officials and their lawyers understood that there would b no reprieve and that the company had to file for bankruptcy before the markets opened on Monday morning. "The alternative would have been chaos," [Tom Ba General Counsel for the New York Federal Reserve] said. "Everyone would have known that the weekend's rescue efforts had failed. You'd have had a mad dash assets worldwide." [35]

But 24/7 trading changes everything. There will no longer be natural breaks in whic politicians can sort out problems before the opening bell. The reason is simple: ther won't *be* an opening bell. Markets will react, in real-time, to every piece of news on never-ending basis. This will not be fun for Congressional aids. And it may impose r time pressures on policymakers to take hasty action. How would the response to th 2008 financial crisis have differed if markets never closed?



Nobody appreciates the importance of market hours more than Henry Paulson, Ben Bernanke, and Timothy Geithner. Illustrations by Mark Ulriksen for the New Yorker.

But the impact of 24/7 trading won't be limited to fiscal policy. Recent events have demonstrated that markets can serve as venues for political mobilization. In 2021, f example, retail investors, coordinating in mass through Reddit (and potentially help by hedge funds riding the wave), successfully pushed up the price of Gamestop by over 2000%. [36] Their goal was largely political: to punish short-sellers and protest against the inequities of the financial system. And their success triggered a political firestorm, leading to investigations, court battles, and Congressional hearings on th regulation of U.S. stock markets. [37]

The short-squeeze was, however, carried out within the standard time constraints o U.S. stock markets — the temporal rules of the game. Sure, there were professional trading Gamestop in pre-market sessions or afterhours. But the bulk of the action, particularly for retail investors, took place from 9:30AM - 4PM ET. What will happen when we eliminate these constraints? How, in other words, will 24/7 trading impact market's strategic dynamics?

One possibility is that it provides more strategic flexibility to retail investors, allowin them to pressure short-sellers throughout the night. But it is equally plausible that extended hours will dilute their collective impact. And, indeed, non-stop trading ma ultimately benefit professional traders. Like crocodiles in a swamp, they'll happily wa for amateurs to cross the water late at night.

What we can say for certain is that 24/7 trading will fundamentally alter markets an in turn, political decision-making. We can't change the time displaying at the corne your screen — we can only measure it. But the hours we establish for trading are ve much man-made. For hundreds of years, we've decided those hours should be stric limited. And now those limitations are being withdrawn. The implications, both for o markets and our politics, will be seismic. Because the best strategy for a game is ver different when it has no end. [38]

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1 NIST's Cesium Fountain Atomic Clocks.

2 NIST Cesium Fountains Set Standard for Precision Timekeeping. But it is not the world's fastest. That honor — orders of magnitude more accurate — goes to Alexander Aeppli, Kyungtae Kim, William Warfield, Marianna S. Safronova, Jun Ye, *A clock with 8×10−19 systematic uncertainty*.

3 NIST, How Does Atomic Time Get to Your Computer?

4 Ibid.

5 Flash Boys, Dark Pools, Darkness by Design, Global Algorithmic Capital Markets, etc. etc.

6 Check out all these exchanges (seems like too many?). This doesn't include the alternativ trading systems and broker-dealer internalization processes which brings the total numb

of venues past 100. I talk about this more in *Market Structure and Disempowering Regula Intermediaries: Insights from U.S. Trade Surveillance*.

7 In the U.S. this is facilitated through Regulation NMS. One of the central components of NMS, as its called in *cool* regulatory circles, is to force brokers to route customer orders t whichever venue offers the best price. Some people think this is bad.

8 STANDARDS FOR SELF REPORTING DEVIATIONS OF CLOCK SYNCHRONIZATION STANDARDS TO FINRA CAT.

9 In the EU it's 100 microseconds, a 500x difference in precision.

10 Pretty fascinating stuff.

11 And, indeed, there is still evidence of latency arbitrage opportunities.

12 Interactive Brokers Clock Synchronization Attestation.

13 Would an astrophysicist approve of this metaphor? No idea. But it's fun.

14 24 Exchange Receives SEC Approval of its New National Securities Exchange, "24X Natior Exchange."

15 See, e.g., Johannes Petry's *Financialization with Chinese characteristics? Exchanges, contro and capital markets in authoritarian capitalism*.

16 NYSE, History of the Bell.

17 Robert Sobel, *The Big Board: A History of the New York Stock Market*.

18 Ibid, 78.

19 Eugene N. White, Competition among the exchanges before the SEC: was the NYSE a nat hegemon?

20 FINRA, Extended-Hours Trading: Know the Risks.

21 SIFMA, Application of 24X National Exchange LLC for Registration as a National Securitie Exchange.

22 DCR Announces Staff Roundtable Discussion on New and Emerging Issues in Clearing (10/16/24).

23 DCR Announces Staff Roundtable Discussion on New and Emerging Issues in Clearing (10/16/24).

24 24 Exchange Receives SEC Approval of its New National Securities Exchange, "24X Natior Exchange.

25 Per Linkedin comment in response to a question of whether they would change their nar to 23x, "Not yet, I would rather see it 24hours and 7 days in the future."

26 New York Stock Exchange to extend after-hours trading**.**

27 SIFMA, 24X National Exchange LLC; Notice of Filing of Amendment No. 2 to an Applicati for Registration as a National Securities Exchange under Section 6 of the Securities Excha Act of 1934 (File No. 10-242).

28 Ibid (4-5): "*It is SIFMA's preliminary understanding, gleaned from discussions with various market participants (and not based on the very general information in the 24X Application that because the NSCC and DTCC systems are not operational between 9:00 p.m. ET and 1. a.m. ET, 24X would submit to NSCC for central clearing all trades executed during those tin via the Universal Trade Capture ("UTC") system at 1:30 a.m. ET the following trade date, ar those trades would settle on the subsequent settlement day. Therefore, for trades executed 24X between 9:00 p.m. ET and 1:30 a.m. ET, there would be no CCP guaranteeing any aspe the trades for more than five hours, and all default risks (and related clearance, settlement, payment, and delivery risks) associated with such executions would be borne by the broker dealers whose customers are on either side of the trades, until the trades were transferred t DTCC for novation at or around 1:30 a.m. ET.*"

29 Better Markets (4), Re: File No. 10-242, 24X National Exchange LLC.

30 In a statement on the approval, Commissioners Hester M. Peirce and Caroline A. Crensha wrote, "*The Exchange's rules provide for additional disclosures to investors regarding the ris of trading in the overnight session, and the approval order allows overnight trading to commence only after the Equity Data Plans are in concurrent operation. With this order, th Commission provides for innovation in our lit markets with disclosure-based investor protection measures that are consistent with the Commission's historical practice.*"

31 Adam Tooze, Chartbook Newsletter #14: Are bond vigilantes real? The strange case of th 1994 bond market massacre.

32 Ibid.

33 Around-the-Clock Media Coverage and the Timing of Earnings Announcements.

34 See, e.g., Timothy Geithner's *Stress Test*. See also THE TIMING OF CENTRAL BANK COMMUNICATION.

35 James B. Stewart, Eight Days.

36 CRS, GameStop-Related Market Volatility: Policy Issues.

37 Waters and Green Complete Investigation of Meme Stock Market Event; Release Report Revealing the Troubling Business Practices and Inadequate Risk Management Leading up the Trading Frenzy.

38 Here Matthew McConaughey has traveled through time, from the introduction to the conclusion, for his rendition of Nietzche's eternal recurrence.

Discussion about this post

Comments Restacks

Write a comment...

David Merkel David Merkel 6 Jan

Liked by Miles Kellerman

Part of this is to let everyone in the Eastern Hemisphere invest in our markets more easily. I get t
Though I can't put my hands on it right now, I remember looking at some research that said the
trading hours are, the more volatile prices get.

I'm a one-man RIA with about 30 clients. There is no way I will do any significant trading outside
current normal hours. My concern is that liquidity might diminish during current normal hours. T
again, I tend to be a patient trader, adding liquidity, not demanding liquidity, so maybe I could g
some better executions in the new hours.

This will turn price volatility due to news releases into an instant thing, rather than a gap from th
to the open.

I don't like it. It's good for markets off all sorts to have time when they are closed so that people
sleep, and the back office can catch up. At T+1 how will they deal with settlement failures? Marg
calls? I guess we will have to learn the hard way.

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