From: **Bruce O Knuteson** knuteson@mit.edu
Subject: strikingly suspicious overnight and intraday returns
Date: July 7, 2023 at 11:11 PM
To: robin.wigglesworth@ft.com

Dear Robin,

Thank you for your July 5 article [FT 2023] on overnight and intraday returns in the world's stock markets. Although I am critical of your articles on this topic, I appreciate your writing them. You have done more than others -- who, with few exceptions, have done nothing.

[FT 2023] repeats many of the objective, factual errors from your January 2022 column [FT 2022] noted in my rejoinder without acknowledging those errors. [FT 2023] again highlights the least obviously problematic index of those attached and unjustifiably throws all its dividends into the trash. [FT 2023] fails to acknowledge that each of the attempted explanations in [FT 2022] is either provably wrong or not an explanation. My May 25, 2023 email in [SEC thread], for example, notes the irrelevance of earnings announcements to the strikingly suspicious return pattern in JPMorgan's stock.

More importantly, [FT 2023] is not the article your readers deserve. The article your readers deserve is the one I have been urging for many years (e.g., [FT thread, SEC thread]): an article that clearly and accurately conveys the nature and scope of these strikingly suspicious overnight and intraday return patterns in the world's stock markets and clearly and honestly points out the problems with attempted innocuous explanations for them. No such article with wide readership has yet been written. You can still be the first to write it.

Continuing my unavailing encouragement of such an article, I attach plots like Figures 2 and 3 of [2022], updated with data through the end of June 2023. Your readers deserve to see *both* of these figures: the overnight/intraday patterns in the world's major stock market indices and a representative sampling of the overnight/intraday patterns in individual stocks. These two figures together tightly constrain the set of possible explanations. For example, although you might hope to find "a mix of factors" that add constructively in the same direction to explain the indices (as you unsuccessfully attempt in [FT 2022]), you aren't likely to find "a mix of factors" that somehow add constructively in one direction for a bunch of stocks (with very positive overnight returns, like ATVI, AMD, and AIG) and add constructively in the other direction for a different bunch of stocks (with very negative overnight returns, like ABT, ACN, and A). If you explicitly show your readers the overnight/intraday return patterns in individual stocks, they will understand the difficulty of seeking an explanation in terms of "a mix of factors."

With "a mix of factors" off the table, you are left with two options [2020]: you can try to explain these patterns in terms of the trading of many people, or you can try to explain them in terms of the trading of a few. The striking consistency of the patterns in the indices (and even in some individual stocks) argues very, very strongly against explanations invoking the trading of many people. People are not consistent. If you want to explain these suspicious return patterns in terms of the trading of millions of uncoordinated traders, you need to convincingly reconcile the striking consistency of many of these patterns with the stupefying inconsistency of millions of individual traders. If you explicitly show your readers the overnight/intraday return patterns in these indices, they will understand this striking consistency and the difficulty of explaining these patterns in terms of the trading of many people.

The logic so far leaves only an explanation involving the trading of a few. Since the round-trip trading required to produce these patterns is expensive, the only way the few could have survived is if their trading materially moved prices: specifically, enough that the resulting mark-to-market gains on their existing portfolio exceeded the cost of their round-trip trading. This is nefarious, and this is bad, and this is the only sort of explanation that seems to fit the attached plots. The article I have been urging (e.g., [FT thread, SEC thread]) stops here. Nothing to this point needs to involve me. There is no need to mention me, to reference my articles, or to take my word for anything. You can reproduce all the attached plots (and make many others) using data publicly available from Yahoo Finance. If you reproduce them yourself, please try not to screw them up (e.g., by throwing dividends into the trash), and please make them better labeled and less generally hideous than the plots from JPMorgan you include in [FT 2023].

The article I am urging you to write can stop there, but the straightforward implications of the attached plots go much further. The mark-to-market gains on culpable firm M's existing portfolio can exceed the cost of M's round-trip trading only if M's existing portfolio is sufficiently large. My crude estimate of "sufficiently large" [2016] is about a billion dollars. If you want to argue that no such M can exist because "sufficiently large" is actually much larger than my estimate (and larger than the portfolio of any potential culprit firm in real life), then you should do that quantitatively. You have not done that, and you have not referenced anyone who has [1].

The striking consistency of the patterns in the indices suggests M trades algorithmically. The decades-long duration of the patterns in the indices suggests M has been around since the early 1990s. The presence of the patterns throughout the indices shown suggests M trades globally.

A quick thought experiment suggests M's portfolio is market neutral: imagine an M successfully running this manipulation with a long-only portfolio, and note that M can dramatically improve his performance by adding a short-only portfolio. Adding the short-only portfolio (of roughly the same size as M's long-only portfolio, and composed of different stocks) will (in expectation) double M's profit (since M can expect to make as much manipulating his shorts as M has been making manipulating his longs), decrease the volatility of M's returns (since, now market neutral, M is no longer exposed to moves in the overall market), and dramatically reduce the amount of capital M needs (toy example: owning a $1M long position in AAPL ties up $1M of M's money, but if M adds a $1M short position in MSFT [i.e., borrows $1M of MSFT stock from somebody and sells it to somebody else for $1M], M get his $1M back). So we expect M's portfolio will be market neutral, which, as noted in Section V of [2022], superficially fits the mix of patterns

back). So we expect M's portfolio will be market neutral, which, as noted in Section V of [2022], superficially fits the mix of patterns in individual stocks attached better than we have any right to expect.

To summarize, the world's stock markets display robust, undisputed, easily reproducible, decades-long, strikingly suspicious return patterns in indices and in individual stocks that the public at large still doesn't know about because nobody with a meaningfully sized audience, including the *Financial Times*, has clearly and accurately described them. Salient features of these strikingly suspicious return patterns tightly constrain the set of possible explanations. These return patterns appear to have one nefarious explanation [2016, 2018, 2019] that fits the facts like a glove and no other explanation that comes close.

Your continued claim (in the comments of [FT 2023]) that the explanation in [2016, 2018, 2019] cannot be correct because if it were, the world's regulators would have publicly acknowledged and definitively addressed it inadequately empathizes with regulators' incentives (see for example Section II of [2021]) and abilities (Section III of [2022]). Of course, if you really believed your claim, you presumably would have just asked a regulator to provide a definitive answer as to whose trading caused these patterns (or, alternatively, a compelling reason for why these patterns are fine, or at the very least a statement that they looked at this and are sure no large quant firm has ever traded in a manner that could possibly produce these plots) and printed their response in your article [2]. My July 4, 2023 email in [SEC thread] lists many regulators you can ask. You have not done that, and you still have not provided even a single historical example of a strikingly suspicious return pattern in a financial market that turned out to clearly be fine.

Regards,
Bruce

[1] The correct theory of market impact remains closely kept [2018], so you should have no trouble finding someone who doesn't know it, is unencumbered by an employment agreement, and is willing to provide a misleadingly large estimate. You can start by asking around at JPMorgan.
[2] No regulator is going to voluntarily admit they missed a problem this obvious, this long-lasting, and this important, so the more detailed and independently checkable and less "trust us, it's fine" their response, the better.
[2016] Information, Impact, Ignorance, Illegality, Investing, and Inequality (SSRN, arXiv)
[2018] How to Increase Global Wealth Inequality for Fun and Profit (SSRN, arXiv)
[2019] Celebrating Three Decades of Worldwide Stock Market Manipulation (SSRN, arXiv)
[2020] Strikingly Suspicious Overnight and Intraday Returns (SSRN, arXiv)
[2021] They Chose to Not Tell You (SSRN, arXiv)
[2022] They Still Haven't Told You (SSRN, arXiv)
[FT 2022] The curious case of rising stocks in the night-time
[FT 2023] Exploiting the wonderfully weird overnight drift of stocks
[FT thread] https://bruceknuteson.github.io/spy-day-and-night/correspondence/1/FT.pdf (referenced in [2021])
[SEC thread] https://bruceknuteson.github.io/spy-day-and-night/correspondence/2/SECandOthers.pdf

[Figures] The first figure attached (link), which shows overnight and intraday returns to major stock market indices, is similar to Figure 2 of [2022] and identical to the figure included in my July 4, 2023 email in [SEC thread]. The second figure attached (link), which shows overnight and intraday returns to the first fifty stocks in the S&P 500 index ordered alphabetically by company name, is similar to Figure 3 of [2022]. The attached figures show data through June 30, 2023 and display returns in units of percent; the corresponding figures in [2022] show data through December 31, 2021 and display returns as a fraction of unity.

Overnight and Intraday Returns to Major Stock Market Indices

overnight
intraday

United States
S&P 500 SPDR ETF
+1,499%
0
+11%

United States
NASDAQ Composite
+3,946%
-25%

United States
iShares Russell 2000 ETF
+1,523%
-66%

United States
S&P 400 Mid-Cap SPDR ETF
+4,206%
-57%

Canada
iShares TSX 60 ETF
+1,476%
-66%

France
CAC 40
+677%
-48%

Spain
IBEX 35
+789%
-62%

Brazil
iShares MSCI Brazil Capped ETF
+11,060%
-97%

Germany
DAX
+1,718%
-59%

Netherlands
AEX
+1,402%
-59%

Belgium
BEL 20
+1,241%
-78%

Norway
DNB OBX ETF
+4,000%
-90%

Italy
iShares FTSE MIB ETF
+2,654%
-95%

Israel
TA-125
+744%
-78%

India
NIFTY 50
+4,546%
-91%

India
S&P BSE SENSEX
+1,369,990%
-99.89%

Australia
SPDR S&P/ASX 200 Fund
+537%
-71%

Thailand
SET Index
+98,396%
-99.83%

Korea
KOSPI Composite Index
+7,995%
-96%

Taiwan
TSEC Weighted Index
+183,320%
-99.90%

Singapore
SPDR Straits Times Index ETF
+1,251%
-87%

Japan
Nikkei 225
+1,657%
-95%

Hong Kong
Hang Seng Index
+2,911%
-78%

China
SSE Composite Index
+4,975%
-95%

1990 1995 2000 2005 2010 2015 2020

Overnight and Intraday Returns to 50 Stocks in the United States S&P 500

overnight
intraday

first 50 stocks ordered alphabetically by company name on June 30, 2023

3M
MMM
+300%
+232%
0

A O Smith
AOS
+1,572%
+1,183%

Abbott Laboratories
ABT
+17,864%
-67%

AbbVie
ABBV
+222%
+84%

Accenture
ACN
+126,478%
-98%

Activision Blizzard
ATVI
+1,900,170%
-99.6%

Adobe
ADBE
+5,766%
+601%

Advance Auto Parts
AAP
+370%
+26%

Advanced Micro Devices
AMD
+4,382,754%
-99.93%

AES
AES
+210%
+206%

Aflac
AFL
+13,865%
-25%

Agilent Technologies
A
+2,241%
-81%

Air Products
and Chemicals
APD
+3,039%
+82%

Akamai Technologies
AKAM
+200,376%
-99.96%

Alaska Air
ALK
+3,758%
-69%

Albemarle
ALB
+1,674%
+175%

Alexandria Real
Estate Equities
ARE
+1,781%
-26%

Align Technology
ALGN
+10,060%
-81%

Allegion
ALLE
+78%
+49%

Alliant Energy
LNT
+6,120%
-64%

Allstate
ALL
+1,929%
-27%

Alphabet
GOOGL
+6,781%
-30%

Altria
MO
+3,184%
+145%

Amazon
AMZN
+3,906%
+2,570%

Ameren
AEE
+291%
+64%

American Airlines
AAL
+238,179%
-99.96%

American Electric Power
AEP
+399%
+180%

American Express
AXP
+1,185%
+170%

American International
Group
AIG
+106,947%
-99.95%

American Tower
AMT
+5,599%
-74%

American Water Works
AWK
+576%
+49%

Ameriprise Financial
AMP
+573%
+87%

AmerisourceBergen
ABC
+1,195%
+561%

AMETEK
AME
+48,887%
-75%

Amgen
AMGN
+15,871%
+84%

Amphenol
APH
+2,196%
+1,343%

Analog Devices
ADI
+5,599%
+225%

Ansys
ANSS
+70,450%
-84%

Aon
AON
+31,432%
-83%

APA Corporation
APA
+211,068%
-99.7%

Apple
AAPL
+85,892%
-10%

Applied Materials
AMAT
+168,664%
-74%

Aptiv
APTV
+800%
-30%

Arch Capital Group
ACGL
+8,135%
-60%

Archer-Daniels-Midland
ADM
+520%
+161%

Arista Networks
ANET
+351%
+160%

Arthur J Gallagher
AJG
+7,498%
+32%

Assurant
AIZ
+444%
+37%

AT&T
T
+938%
+1%

Atmos Energy
ATO
+1,621%
+126%

1990 2000 2010 2020