

MML INVESTORS SERVICES, LLC - Held NMS Stocks and Options Order Routing Public Report

Generated on Mon Jan 09 2023 13:43:55 GMT-0500 (Eastern Standard Time)

4th Quarter, 2022

October 2022

S&P 500 Stocks

Summary

| Non-Directed Orders as % of All Orders | Market Orders as % of Non-Directed Orders | Marketable Limit Orders as % of Non- Directed Orders | Non-Marketable Limit Orders as % of Non- Directed Orders | Other Orders as % of Non-Directed Orders |
|---|--|--|--|---|
| 100.00 | 99.02 | 0.08 | 0.80 | 0.10 |

Venues

| Venue - Non-directed Order Flow | Non- Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non- Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/ Received for Market Orders(cents per hundred shares) | Net Payment Paid/ Received for Marketable Limit Orders(USD) | Net Payment Paid/ Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/ Received for Non- Marketable Limit Orders(USD) | Net Payment Paid/ Received for Non- Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/ Received for Other Orders(cents per hundred shares) |
|--|--------------------------------|-------------------------|-----------------------------------|---|------------------------|---|---|--|--|---|---|--|--|
| Citadel Securities LLC (CDRG) | 35.19 | 36.14 | 29.55 | 6.71 | 15.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| VIRTU Americas, LLC (NITE) | 24.10 | 24.78 | 22.73 | 2.87 | 22.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| G1 Execution Services, LLC (ETMM) | 22.86 | 23.53 | 20.45 | 3.01 | 6.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Jane Street Capital, LLC (JNST) | 13.48 | 13.89 | 2.27 | 2.05 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| New York Stock Exchange (NYSE) | 1.34 | 0.00 | 13.64 | 43.53 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| NASDAQ Execution Services, LLC (NSDQ) | 1.11 | 0.00 | 11.36 | 36.07 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Two Sigma Securities, LLC (SOHO) | 1.05 | 1.08 | 0.00 | 0.14 | 1.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| UBS Securities, LLC (UBSS) | 0.56 | 0.58 | 0.00 | 0.00 | 1.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Cboe EDGX US Equities Exchange (EDGX) | 0.13 | 0.00 | 0.00 | 4.24 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

| Venue - Non-directed Order Flow | Non-Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non-Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/Received for Market Orders(cents per hundred shares) | Net Payment Paid/Received for Marketable Limit Orders(USD) | Net Payment Paid/Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Non-Marketable Limit Orders(USD) | Net Payment Paid/Received for Non-Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/Received for Other Orders(cents per hundred shares) |
|---------------------------------|-------------------------|-------------------|-----------------------------|---------------------------------|------------------|--|---|--|---|--|---|---|--|
| Instinet BlockCross (BLKX) | 0.12 | 0.00 | 0.00 | 0.00 | 55.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

Material Aspects:

Citadel Securities LLC (CDRG):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

VIRTU Americas, LLC (NITE):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

G1 Execution Services, LLC (ETMM):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Jane Street Capital, LLC (JNST):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

New York Stock Exchange (NYSE):
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NASDAQ Execution Services, LLC (NSDQ):
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UBS Securities, LLC (UBSS):
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Cboe EDGX US Equities Exchange (EDGX):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Instinet BlockCross (BLKX):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

October 2022

Non-S&P 500 Stocks

Summary

| Non-Directed Orders as % of All Orders | Market Orders as % of Non-Directed Orders | Marketable Limit Orders as % of Non-Directed Orders | Non-Marketable Limit Orders as % of Non-Directed Orders | Other Orders as % of Non-Directed Orders |
|--|---|---|---|--|
| 100.00 | 98.66 | 0.21 | 1.06 | 0.07 |

Venues

| Venue - Non-directed Order Flow | Non-Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non-Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/Received for Market Orders(cents per hundred shares) | Net Payment Paid/Received for Marketable Limit Orders(USD) | Net Payment Paid/Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Non-Marketable Limit Orders(USD) | Net Payment Paid/Received for Non-Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/Received for Other Orders(cents per hundred shares) |
|---------------------------------|-------------------------|-------------------|-----------------------------|---------------------------------|------------------|--|---|--|---|--|---|---|--|
|---------------------------------|-------------------------|-------------------|-----------------------------|---------------------------------|------------------|--|---|--|---|--|---|---|--|

| Venue - Non-directed Order Flow | Non-Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non-Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/Received for Market Orders(cents per hundred shares) | Net Payment Paid/Received for Marketable Limit Orders(USD) | Net Payment Paid/Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Non-Marketable Limit Orders(USD) | Net Payment Paid/Received for Non-Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/Received for Other Orders(cents per hundred shares) |
|---------------------------------------|-------------------------|-------------------|-----------------------------|---------------------------------|------------------|--|---|--|---|--|---|---|--|
| Citadel Securities LLC (CDRG) | 34.06 | 35.36 | 30.00 | 7.68 | 4.26 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| VIRTU Americas, LLC (NITE) | 24.12 | 25.13 | 24.00 | 2.66 | 4.08 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| G1 Execution Services, LLC (ETMM) | 22.83 | 23.82 | 24.00 | 2.56 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Jane Street Capital, LLC (JNST) | 13.38 | 13.98 | 14.67 | 1.02 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| NYSE Arca (ARCA) | 1.10 | 0.00 | 2.00 | 28.89 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Two Sigma Securities, LLC (SOHO) | 1.06 | 1.11 | 1.33 | 0.07 | 0.18 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| New York Stock Exchange (NYSE) | 0.97 | 0.00 | 2.67 | 25.42 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Instinet BlockCross (BLKX) | 0.68 | 0.00 | 0.00 | 0.00 | 90.96 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| NASDAQ Execution Services, LLC (NSDQ) | 0.63 | 0.00 | 0.67 | 16.62 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| UBS Securities, LLC (UBSS) | 0.58 | 0.60 | 0.00 | 0.11 | 0.53 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

Material Aspects:

Citadel Securities LLC (CDRG):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

VIRTU Americas, LLC (NITE):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

G1 Execution Services, LLC (ETMM):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Jane Street Capital, LLC (JNST):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

NYSE Arca (ARCA):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Two Sigma Securities, LLC (SOHO):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

New York Stock Exchange (NYSE):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Instinet BlockCross (BLKX):

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NASDAQ Execution Services, LLC (NSDQ):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

UBS Securities, LLC (UBSS):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

October 2022

Options

Summary

| Non-Directed Orders as % of All Orders | Market Orders as % of Non-Directed Orders | Marketable Limit Orders as % of Non- Directed Orders | Non-Marketable Limit Orders as % of Non- Directed Orders | Other Orders as % of Non-Directed Orders |
|---|--|--|--|---|
| 100.00 | 72.47 | 3.05 | 23.94 | 0.54 |

Venues

| Venue - Non-directed Order Flow | Non- Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non- Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/ Received for Market Orders(cents per hundred shares) | Net Payment Paid/ Received for Marketable Limit Orders(USD) | Net Payment Paid/ Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/ Received for Non- Marketable Limit Orders(USD) | Net Payment Paid/ Received for Non- Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/ Received for Other Orders(cents per hundred shares) |
|--|--------------------------------|-------------------------|-----------------------------------|---|------------------------|---|---|--|--|---|---|--|--|
| Citadel Securities LLC (CDRG) | 42.22 | 46.70 | 36.00 | 35.12 | 60.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Susquehanna Capital Group (SUSQ) | 21.34 | 33.18 | 24.00 | 1.95 | 20.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Wolverine Execution Services LLC (WEXX) | 18.54 | 3.15 | 4.00 | 44.63 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Dash Financial Technologies LLC (DASH) | 13.74 | 12.31 | 24.00 | 15.37 | 20.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Morgan Stanley & Company LLC (MSCO) | 4.16 | 4.65 | 12.00 | 2.93 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

Material Aspects:

Citadel Securities LLC (CDRG):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Susquehanna Capital Group (SUSQ):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Wolverine Execution Services LLC (WEXX):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Dash Financial Technologies LLC (DASH):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Morgan Stanley & Company LLC (MSCO):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

November 2022

S&P 500 Stocks

Summary

| Non-Directed Orders as % of All Orders | Market Orders as % of Non-Directed Orders | Marketable Limit Orders as % of Non-Directed Orders | Non-Marketable Limit Orders as % of Non-Directed Orders | Other Orders as % of Non-Directed Orders |
|--|---|---|---|--|
| 100.00 | 98.83 | 0.08 | 0.98 | 0.10 |

Venues

| Venue - Non-directed Order Flow | Non-Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non-Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/Received for Market Orders(cents per hundred shares) | Net Payment Paid/Received for Marketable Limit Orders(USD) | Net Payment Paid/Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Non-Marketable Limit Orders(USD) | Net Payment Paid/Received for Non-Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/Received for Other Orders(cents per hundred shares) |
|---------------------------------------|-------------------------|-------------------|-----------------------------|---------------------------------|------------------|--|---|--|---|--|---|---|--|
| Citadel Securities LLC (CDRG) | 33.41 | 34.65 | 28.85 | 5.38 | 25.53 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| VIRTU Americas, LLC (NITE) | 26.59 | 27.64 | 15.38 | 2.73 | 23.40 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| G1 Execution Services, LLC (ETMM) | 21.47 | 22.30 | 9.62 | 3.31 | 4.26 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Jane Street Capital, LLC (JNST) | 13.06 | 13.59 | 11.54 | 1.32 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| NASDAQ Execution Services, LLC (NSDQ) | 1.90 | 0.00 | 13.46 | 45.55 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| New York Stock Exchange (NYSE) | 1.48 | 0.00 | 13.46 | 35.49 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Two Sigma Securities, LLC (SOHO) | 1.10 | 1.13 | 3.85 | 0.26 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| UBS Securities, LLC (UBSS) | 0.54 | 0.55 | 3.85 | 0.09 | 5.32 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Cboe EDGX US Equities Exchange (EDGX) | 0.18 | 0.00 | 0.00 | 4.23 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| INTL Trading, Inc. (INTL) | 0.14 | 0.14 | 0.00 | 0.00 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

Material Aspects:

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MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

VIRTU Americas, LLC (NITE):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

G1 Execution Services, LLC (ETMM):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Jane Street Capital, LLC (JNST):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

NASDAQ Execution Services, LLC (NSDQ):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

New York Stock Exchange (NYSE):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Two Sigma Securities, LLC (SOHO):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

UBS Securities, LLC (UBSS):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Cboe EDGX US Equities Exchange (EDGX):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

INTL Trading, Inc. (INTL):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

November 2022

Non-S&P 500 Stocks

Summary

| Non-Directed Orders as % of All Orders | Market Orders as % of Non-Directed Orders | Marketable Limit Orders as % of Non- Directed Orders | Non-Marketable Limit Orders as % of Non- Directed Orders | Other Orders as % of Non-Directed Orders |
|---|--|--|--|---|
| 100.00 | 98.36 | 0.30 | 1.28 | 0.06 |

Venues

| Venue - Non-directed Order Flow | Non- Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non- Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/ Received for Market Orders(cents per hundred shares) | Net Payment Paid/ Received for Marketable Limit Orders(USD) | Net Payment Paid/ Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/ Received for Non- Marketable Limit Orders(USD) | Net Payment Paid/ Received for Non- Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/ Received for Other Orders(cents per hundred shares) |
|---|--------------------------------|-------------------------|-----------------------------------|---|------------------------|---|---|--|--|---|---|--|--|
| Citadel Securities LLC (CDRG) | 33.27 | 34.75 | 36.18 | 5.31 | 3.46 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| VIRTU Americas, LLC (NITE) | 26.14 | 27.35 | 26.02 | 3.04 | 5.08 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| G1 Execution Services, LLC (ETMM) | 21.50 | 22.51 | 21.95 | 2.67 | 0.41 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Jane Street Capital, LLC (JNST) | 12.90 | 13.52 | 10.57 | 1.39 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

| Venue - Non-directed Order Flow | Non-Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non-Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/Received for Market Orders(cents per hundred shares) | Net Payment Paid/Received for Marketable Limit Orders(USD) | Net Payment Paid/Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Non-Marketable Limit Orders(USD) | Net Payment Paid/Received for Non-Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/Received for Other Orders(cents per hundred shares) |
|---------------------------------------|-------------------------|-------------------|-----------------------------|---------------------------------|------------------|--|---|--|---|--|---|---|--|
| New York Stock Exchange (NYSE) | 1.40 | 0.00 | 1.63 | 31.39 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Two Sigma Securities, LLC (SOHO) | 1.07 | 1.12 | 0.81 | 0.13 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| NYSE Arca (ARCA) | 0.98 | 0.00 | 0.41 | 22.03 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| NASDAQ Execution Services, LLC (NSDQ) | 0.91 | 0.00 | 1.22 | 20.35 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| UBS Securities, LLC (UBSS) | 0.57 | 0.59 | 0.81 | 0.11 | 0.61 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Instinet BlockCross (BLKX) | 0.53 | 0.00 | 0.00 | 0.00 | 90.24 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

Material Aspects:

Citadel Securities LLC (CDRG):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

VIRTU Americas, LLC (NITE):
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November 2022

Options

Summary

| Non-Directed Orders as % of All Orders | Market Orders as % of Non-Directed Orders | Marketable Limit Orders as % of Non- Directed Orders | Non-Marketable Limit Orders as % of Non- Directed Orders | Other Orders as % of Non-Directed Orders |
|---|--|--|--|---|
| 100.00 | 76.88 | 1.48 | 16.86 | 4.78 |

Venues

| Venue - Non-directed Order Flow | Non- Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non- Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/ Received for Market Orders(cents per hundred shares) | Net Payment Paid/ Received for Marketable Limit Orders(USD) | Net Payment Paid/ Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/ Received for Non- Marketable Limit Orders(USD) | Net Payment Paid/ Received for Non- Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/ Received for Other Orders(cents per hundred shares) |
|--|--------------------------------|-------------------------|-----------------------------------|---|------------------------|---|---|--|--|---|---|--|--|
| Citadel Securities LLC (CDRG) | 42.19 | 45.93 | 28.57 | 29.13 | 88.10 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Susquehanna Capital Group (SUSQ) | 22.61 | 33.04 | 28.57 | 3.00 | 9.52 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Wolverine Execution Services LLC (WEXX) | 19.68 | 5.04 | 14.29 | 51.95 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Dash Financial Technologies LLC (DASH) | 11.16 | 10.52 | 14.29 | 13.51 | 2.38 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Morgan Stanley & Company LLC (MSCO) | 4.26 | 5.48 | 14.29 | 2.10 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Interactive Brokers LLC (IBKR) | 0.09 | 0.00 | 0.00 | 0.30 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

Material Aspects:

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December 2022

S&P 500 Stocks

Summary

| Non-Directed Orders as % of All Orders | Market Orders as % of Non-Directed Orders | Marketable Limit Orders as % of Non- Directed Orders | Non-Marketable Limit Orders as % of Non- Directed Orders | Other Orders as % of Non-Directed Orders |
|---|--|--|--|---|
| 100.00 | 99.08 | 0.06 | 0.81 | 0.05 |

Venues

| Venue - Non-directed Order Flow | Non- Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non- Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/ Received for Market Orders(cents per hundred shares) | Net Payment Paid/ Received for Marketable Limit Orders(USD) | Net Payment Paid/ Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/ Received for Non- Marketable Limit Orders(USD) | Net Payment Paid/ Received for Non- Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/ Received for Other Orders(cents per hundred shares) |
|---------------------------------------|--------------------------------|-------------------------|-----------------------------------|---|------------------------|---|---|--|--|---|---|--|--|
| Citadel Securities LLC (CDRG) | 34.56 | 35.33 | 30.56 | 8.04 | 15.52 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| VIRTU Americas, LLC (NITE) | 26.17 | 26.82 | 16.67 | 3.65 | 25.86 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| G1 Execution Services, LLC (ETMM) | 23.81 | 24.42 | 19.44 | 3.38 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Jane Street Capital, LLC (JNST) | 10.95 | 11.20 | 16.67 | 2.23 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Two Sigma Securities, LLC (SOHO) | 1.17 | 1.19 | 0.00 | 0.47 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| New York Stock Exchange (NYSE) | 1.16 | 0.00 | 5.56 | 42.00 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| NASDAQ Execution Services, LLC (NSDQ) | 0.94 | 0.00 | 11.11 | 33.76 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| UBS Securities, LLC (UBSS) | 0.53 | 0.55 | 0.00 | 0.00 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| INTL Trading, Inc. (INTL) | 0.47 | 0.48 | 0.00 | 0.07 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Cboe EDGX US Equities Exchange (EDGX) | 0.13 | 0.00 | 0.00 | 4.86 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

Material Aspects:

Citadel Securities LLC (CDRG):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

VIRTU Americas, LLC (NITE):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

G1 Execution Services, LLC (ETMM):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Jane Street Capital, LLC (JNST):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Two Sigma Securities, LLC (SOHO):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

New York Stock Exchange (NYSE):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

NASDAQ Execution Services, LLC (NSDQ):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

UBS Securities, LLC (UBSS):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

INTL Trading, Inc. (INTL):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Cboe EDGX US Equities Exchange (EDGX):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

December 2022

Non-S&P 500 Stocks

Summary

| Non-Directed Orders as % of All Orders | Market Orders as % of Non-Directed Orders | Marketable Limit Orders as % of Non- Directed Orders | Non-Marketable Limit Orders as % of Non- Directed Orders | Other Orders as % of Non-Directed Orders |
|---|--|--|--|---|
| 100.00 | 98.73 | 0.20 | 0.99 | 0.07 |

Venues

| Venue - Non-directed Order Flow | Non- Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non- Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/ Received for Market Orders(cents per hundred shares) | Net Payment Paid/ Received for Marketable Limit Orders(USD) | Net Payment Paid/ Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/ Received for Non- Marketable Limit Orders(USD) | Net Payment Paid/ Received for Non- Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/ Received for Other Orders(cents per hundred shares) |
|---|--------------------------------|-------------------------|-----------------------------------|---|------------------------|---|---|--|--|---|---|--|--|
| Citadel Securities LLC (CDRG) | 34.25 | 35.39 | 32.78 | 6.59 | 3.59 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| VIRTU Americas, LLC (NITE) | 26.02 | 26.93 | 22.78 | 3.19 | 6.10 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| G1 Execution Services, LLC (ETMM) | 23.33 | 24.15 | 26.11 | 3.29 | 0.90 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Jane Street Capital, LLC (JNST) | 10.96 | 11.35 | 10.56 | 1.37 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| New York Stock Exchange (NYSE) | 1.10 | 0.00 | 3.33 | 33.71 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Two Sigma Securities, LLC (SOHO) | 1.09 | 1.12 | 1.11 | 0.42 | 0.18 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

| Venue - Non-directed Order Flow | Non-Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non-Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/Received for Market Orders(cents per hundred shares) | Net Payment Paid/Received for Marketable Limit Orders(USD) | Net Payment Paid/Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Non-Marketable Limit Orders(USD) | Net Payment Paid/Received for Non-Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/Received for Other Orders(cents per hundred shares) |
|---------------------------------------|-------------------------|-------------------|-----------------------------|---------------------------------|------------------|--|---|--|---|--|---|---|--|
| UBS Securities, LLC (UBSS) | 0.58 | 0.59 | 0.00 | 0.25 | 0.54 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| NASDAQ Execution Services, LLC (NSDQ) | 0.57 | 0.00 | 0.56 | 17.76 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| NYSE Arca (ARCA) | 0.57 | 0.00 | 2.22 | 17.62 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Instinet BlockCross (BLKX) | 0.56 | 0.00 | 0.00 | 0.00 | 88.69 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

Material Aspects:

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VIRTU Americas, LLC (NITE):
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G1 Execution Services, LLC (ETMM):
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Jane Street Capital, LLC (JNST):
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New York Stock Exchange (NYSE):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Two Sigma Securities, LLC (SOHO):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

UBS Securities, LLC (UBSS):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

NASDAQ Execution Services, LLC (NSDQ):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

NYSE Arca (ARCA):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Instinet BlockCross (BLKX):
MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

December 2022

Options

Summary

| Non-Directed Orders as % of All Orders | Market Orders as % of Non-Directed Orders | Marketable Limit Orders as % of Non-Directed Orders | Non-Marketable Limit Orders as % of Non-Directed Orders | Other Orders as % of Non-Directed Orders |
|--|---|---|---|--|
| 100.00 | 73.26 | 3.49 | 21.19 | 2.07 |

Venues

| Venue - Non-directed Order Flow | Non-Directed Orders (%) | Market Orders (%) | Marketable Limit Orders (%) | Non-Marketable Limit Orders (%) | Other Orders (%) | Net Payment Paid/Received for Market Orders(USD) | Net Payment Paid/Received for Market Orders(cents per hundred shares) | Net Payment Paid/Received for Marketable Limit Orders(USD) | Net Payment Paid/Received for Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Non-Marketable Limit Orders(USD) | Net Payment Paid/Received for Non-Marketable Limit Orders(cents per hundred shares) | Net Payment Paid/Received for Other Orders(USD) | Net Payment Paid/Received for Other Orders(cents per hundred shares) |
|---|-------------------------|-------------------|-----------------------------|---------------------------------|------------------|--|---|--|---|--|---|---|--|
| Citadel Securities LLC (CDRG) | 39.89 | 45.50 | 57.14 | 27.47 | 62.50 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Wolverine Execution Services LLC (WEXX) | 22.89 | 4.94 | 10.71 | 56.48 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Susquehanna Capital Group (SUSQ) | 22.03 | 33.33 | 28.57 | 1.23 | 31.25 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Dash Financial Technologies LLC (DASH) | 11.23 | 11.11 | 3.57 | 12.65 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Morgan Stanley & Company LLC (MSCO) | 3.85 | 5.11 | 0.00 | 2.16 | 0.00 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |
| Interactive Brokers LLC (IBKR) | 0.11 | 0.00 | 0.00 | 0.00 | 6.25 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 | 0 | 0.0000 |

Material Aspects:

Citadel Securities LLC (CDRG):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Wolverine Execution Services LLC (WEXX):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Susquehanna Capital Group (SUSQ):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Dash Financial Technologies LLC (DASH):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Morgan Stanley & Company LLC (MSCO):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.

Interactive Brokers LLC (IBKR):

MMLIS Investor Services LLC did not receive any payment for orders routed to the venues listed above.