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Among all the accesses to Chinese capital market, the Connect program (including both stocks and bonds) represents the most recent “opening-up” effort from Beijing and quickly became the dominant investment channel for foreign investors. On April 10, 2014, the China Securities Regulatory Commission (CSRC, the regulator on the mainland side) and the Securities and Futures Commission (SFC, the regulator on the Hong Kong side) approved the development of a pilot program for establishing mutual market access between the mainland exchanges and Hong Kong Stock Exchange (HKEX). Accordingly, the “Shanghai-Hong Kong Stock Connect” and “Shenzhen-Hong Kong Stock Connect” were officially launched on November 17, 2014 and December 5, 2016, respectively.

The Stock Connect works like a bridge that not only enables foreign investors—but also qualified investors from Mainland China—to directly trade eligible shares listed on the other market via their local exchanges, *without* the need to adapt to the operational practices on the other side.¹

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¹By December 2022, international investors hold RMB 2.2 trillion of A-shares through the Stock Connect, accounting for 2.53% of A-share total market capitalization. This is more than ten times the amount held through the other two channels combined, i.e., Qualified Foreign Institutional Investors (QFII) and Renminbi QFII. For more details about the Stock Connect, please refer to Liu et al. (2021) and He et al. (2023).

I. Cross-border participants’ responses to macro-related shocks

The price impact of the China’s Stock Connect has been highlighted, for example, by Liu et al. (2021) and Ma et al. (2021), who show that connected stocks experience a significant value appreciation. However, little is known about how cross-border flows in the Stock Connect respond to macroeconomic conditions of China and outside China. At the 2022 Global Financial Leaders’ Investment Summit, Xinghai Fang, vice chairperson of the CSRC, urged top officials from 120 leading international financial institutions to pay more attention to the Stock Connect program. In light of this point, the paper analyzes how cross-border investors respond to macro-related shocks, which in turn helps the regulators profile participants in the Stock Connect.

A. Data and variable construction

Data on aggregate northbound and southbound net inflow are from Choice database. The sample period spans from November 2014 (when the Stock Connect was launched) to June 2022. Our methodology follows the growing literature examining the push and pull factors of cross-border equity flows (Ghosh et al., 2014), and further categorizes these factors into four groups, namely stock market forces, monetary shocks, policy uncertainty, and informed trading activities. All variables are standardized with zero mean and unit standard deviation.

Stock Market Forces. We consider three stock market returns, including those in the U.S., all other developed countries, and China.² We also include A-H premium, computed as the value-weighted average of

²The first two set of returns are from Kenneth French’s data library. China’s market return data are from the CSMAR database. All the three time-series of

the ratio of the A-share price (in Chinese mainland exchanges) price to its twin H-share price (in the Hong Kong exchange), for all dual-listed firms. A-H premium captures the valuation disparity of A-share and H-share markets.

Monetary Shocks. Monetary policy shock, especially the one in U.S., is another pervasive macro-related risk that affects market return and global equity flow (Bernanke et al., 2005). A recent study (Acosta, 2022) decomposes the high-frequency monetary shocks into monetary policy shocks and information shocks. We obtain the two series of shocks from Mguel Acosta’s website.³ China’s monetary policy shock, i.e. weekly PBC net issuance of open market operations, is collected from Choice database.⁴ We also explore the risk related to the change in exchange rate, which is obtained from the CSMAR database.

Policy Uncertainty. Cross-border fund flows are likely sensitive to the economic policy uncertainty (EPU) of the destination market. Data on EPU in the U.S. are collected from the Federal Reserve Economic Data. Data on EPU in China are from the website of Paul Luk, who builds on the work of Baker et al. (2016) to develop the EPU indices for China.⁵

Informed Trading Activities. Finally, we study insider trading—a stylized form of informed trading activities—in the mainland market, and examine its correlation with cross-borders flows. We collect relevant data from Wind database and apply standard filters following He et al. (2023). Net insider purchase is computed as the average ratio of trading amount by insiders scaled by stock market cap in one week across all stocks.

market returns are winsorized at the 5% and 95% levels to limit the effect of abysmal market situations, e.g., the global outbreak of COVID during March of 2020.

³<https://www.acostamiguel.com>. Observations in month without FOMC announcement are valued as zero following Bu et al. (2021).

⁴Weekly PBC net issuances of open market operations exhibit a quite weak series autocorrelation (-0.069), capturing monetary policy innovations to the market.

⁵<https://economicpolicyuncertaintyinchina.weebly.com/>.

B. Time Series Regressions

We regress weekly equity flows of northbound and southbound investors on contemporary macro-related variables. In Table 1, Columns (1) and (3) show the results of univariate variable regressions while Columns (2) and (4) are multivariate kitchen-sink regressions.

We first investigate the relationship between northbound flows and stock market performances. Consistent with the rebalancing effect that a high U.S. market return is accompanied by flows toward the rest of world (Bohn et al., 1996), we find that northbound flows are positively correlated with U.S. market returns, but not for southbound flows.

Second, it is worth noting that northbound and southbound flows display opposite correlations with the A-H premium. A one standard deviation increase in the A-H premium is associated with a 0.138 standard deviation more southbound flow, and a 0.110 standard deviation less northbound flow. This is in support of the cross-market arbitrage theory, as domestic (foreign) investors flow toward (back to) the Hong Kong market when A-shares are overvalued relative to their legally identical H-shares.

Contrary to what may be widely believed, our results indicate that both northbound and southbound flows have little correlation with both U.S. and Mainland China’s policy uncertainty.

Finally, it appears that U.S. contractionary monetary policy shock has a mild impact on northbound flows. Interestingly, this set of results changes when we later zoom in and decompose the aggregate flows based on heterogeneity in investor type.

II. Heterogeneity in northbound participants

He et al. (2023) study one of the dark sides of the Stock Connect program, whose regulatory loophole opens the door for opportunistic mainland investors (say, corporate insiders) to conduct potentially illicit trading via the connect. In the context

of this paper, this implies that these bogus foreign investors are more likely to be positively correlated with the Chinese stock market performance while other risk factors, e.g., exchange rate risk, are more likely to be a discouragement to genuine foreign investors.

A. Why such northbound participant heterogeneity

Hong Kong adopts an indirect holding system of securities, in which financial intermediaries hold their clients' securities under the names of custodians. The Chinese mainland market, however, adopts a "see-through" supervision model, for which trading orders are labelled with the account number mapping to the investor's real identity. During the first three years after the launch of the Stock Connect, northbound trading followed the scheme that is consistent with Hong Kong's jurisdiction, giving mainland investors an opportunity to engage in northbound trading as if "foreign investors."

The see-through regulatory reform in the third quarter of 2018 is a game changer. On August 24, 2018, the regulators on both sides announced that the Connect would establish the Northbound Investor Identification System, under which northbound custodians are required to assign a unique identifier to their northbound clients, known as the Broker-to-Client Assigned Number (BCAN). Every northbound order is tagged with the BCAN, which allows the HKEX to assist mainland regulators in fighting against financial crimes.

We conjecture that among all foreign custodians, before the regulatory reform Chinese mainland investors were more likely to engage in homemade foreign trading via those less prestigious ones, because those custodians suffer less reputational damage for potential misconduct. Meanwhile, among all mainland custodians, cross-operating custodians can better accommodate homemade foreign trading thanks to mainland investors' hometown preference as well as those custodians'

business connections.⁶ In fact, He et al. (2023) study the stock return predictability of custodian-based northbound flows, and present evidence that homemade foreign trading is more likely to be hidden behind less prestigious foreign custodians and cross-operating mainland custodians.

B. Responses of heterogeneous northbound participants to macro-related shocks

For each category of custodians, northbound net flows are constructed as the change of holding value after adjusting for the effects from market performance. Following He et al. (2023), the sample period for custodian-level flow spans from March 2017 (when the regulator started releasing custodian holding to the public) to December 2019.

Table 2 presents the results of multivariate kitchen-sink regressions. First, flows from foreign custodians, especially more prestigious ones, show a higher correlation with the contemporary U.S. market return: a one standard deviation higher U.S. market return is associated with a 0.225 standard deviation more investment flow from more prestigious foreign custodians (Column 4). In contrast, flows from cross-operating mainland custodians (where homemade foreign investors are more likely to hide) show a higher correlation with the Chinese mainland market return than their non-cross-operating counterparts (0.321 v.s. - 0.297). For A-H premium, as stated in Section I.B, we do observe the strongest effect among more prestigious foreign custodians, who are more likely to be genuine foreign investors.

In terms of the heterogeneous relationship between northbound flows and monetary shocks, the coefficient of the U.S. monetary policy shock is only significantly neg-

⁶Following He et al. (2023), we define a foreign custodian as being more prestigious, if it i) ranks above the median for "fee and commission income," or ii) is voted as a leader in custody in the emerging markets. We match custodians with their parent company and classify a custodian as cross-operating if its parent company appears on the list that report both mainland and overseas brokerage revenues to the Securities Association of China in that year.

ative for flows from more prestigious foreign custodians. This suggests that U.S. contractionary monetary policy shocks deter flows from genuine foreign investors to the Chinese stock market, which is consistent with the spill-over effect as in Anaya et al. (2017).

Moving on to exchange rate risk, note that connected A-shares are quoted and traded in RMB. Then, compared to investors—say, homemade foreign investors—who already own offshore RMB, genuine foreign investors who hold USD (or HKD that is pegged to USD) are more likely subject to the currency risk. Consistent with this hypothesis, we observe that flows from foreign custodians shrink when USD weakens against RMB, and this pattern is more pronounced among more prestigious foreign custodians.

Finally, we provide further evidence of the presence of round-tripping mainland insiders as documented in He et al. (2023). We add net insider purchase, a post dummy equal to one for observations after the announcement day of regulatory reform (2018/8/24), and their interaction terms in our regressions. The coefficient in the interaction term is negative for cross-operating mainland custodians, indicating that the reform weakens the relation between mainland insider trading and northbound trading of homemade foreign investors.

III. Conclusion

Compared with round-tripping investors through the Stock Connect, genuine international investors are more likely to be affected by macroeconomic fundamentals including monetary shocks in U.S., exchange rate risk, U.S. market returns, and the cross-market valuation disparity. On December 19, 2022, the mainland and Hong Kong exchanges reached an agreement on the further expansion of eligible stocks under Stock Connect. We hope our study can offer useful insight to regulators on both sides for better monitoring and supervision going forward.

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TABLE 1—AGGREGATE NORTHBOUND/SOUTHBOUND FLOW AND MACRO-RELATED SHOCKS

| | | (1) Northbound | | (3) Southbound | |
|-----------------------------|-------------------------------|----------------------|----------------------|----------------------|--------------------|
| | | Univariate | Multivariate | Univariate | Multivariate |
| Stock market forces | CRSP Ret | 0.315*** (5.18) | 0.146* (1.81) | -0.044 (-0.64) | -0.082 (-1.24) |
| | A-share Ret | 0.345*** (5.87) | 0.239*** (4.16) | 0.058 (0.98) | 0.097** (2.00) |
| | Developed ex US Ret | 0.327*** (5.71) | 0.088 (1.14) | -0.011 (-0.16) | 0.017 (0.24) |
| | A-H premium | -0.119** (-2.35) | -0.110** (-2.28) | 0.164*** (3.72) | 0.138*** (3.13) |
| | Monetary Policy Shocks: US | -0.046 (-0.77) | -0.057 (-1.25) | 0.093 (1.51) | 0.200** (2.28) |
| Monetary shocks | Information Shocks: US | 0.006 (0.10) | -0.011 (-0.21) | 0.083** (2.39) | 0.162*** (2.71) |
| | Monetary Policy Shocks: China | -0.039 (-0.72) | 0.007 (0.15) | 0.004 (0.06) | 0.029 (0.50) |
| | Δ RMB/USD | -0.243*** (-4.00) | -0.144*** (-3.02) | -0.025 (-0.47) | -0.004 (-0.10) |
| | Δ US EPU | -0.137* (-1.94) | -0.077 (-1.50) | 0.065 (0.71) | 0.058 (0.73) |
| Policy uncertainty | Δ China EPU | -0.047 (-0.71) | -0.030 (-0.51) | -0.003 (-0.06) | -0.000 (-0.01) |
| | Net insider purchase | -0.083 (-1.07) | -0.003 (-0.04) | -0.160*** (-3.57) | -0.078 (-1.53) |
| Informed trading activities | Post | 0.132*** (2.62) | 0.249*** (2.69) | 0.182*** (3.66) | 0.108 (1.38) |
| | Post*Net insider purchase | -0.056 (-0.65) | 0.126 (0.98) | -0.179*** (-3.30) | -0.014 (-0.16) |
| | Obs. | | 388 | | 386 |
| | R-Squared | | 0.245 | | 0.099 |

Note: The table shows the coefficients of northbound and southbound flows on factors of the corresponding week. All variables are standardized with zero mean and unit standard deviation. The sample period spans from November 2014 to June 2022. Robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

TABLE 2—CUSTODIAN-LEVEL NORTHBOUND FLOW AND MACRO-RELATED SHOCKS

| | | (1) Foreign | (2) Mainland | (3) Less-prestigious Foreign | (4) More-prestigious Foreign | (5) Cross-operating Mainland | (6) Non cross-operating Mainland |
|-----------------------------|-------------------------------|----------------------|--------------------|------------------------------------|------------------------------------|------------------------------------|--|
| Stock market forces | CRSP Ret | 0.241** (2.21) | 0.018 (0.15) | 0.201* (1.71) | 0.225** (2.02) | 0.016 (0.14) | 0.010 (0.08) |
| | A-share Ret | 0.163** (2.05) | 0.151* (1.65) | 0.229** (2.45) | 0.136* (1.73) | 0.321*** (3.28) | -0.297*** (-2.65) |
| | Developed ex US Ret | 0.109 (0.84) | 0.291** (2.09) | 0.254** (2.11) | 0.074 (0.57) | 0.193 (1.48) | 0.159 (1.30) |
| | A-H premium | -0.216** (-2.54) | -0.157* (-1.67) | -0.064 (-0.73) | -0.224** (-2.56) | -0.115 (-1.16) | -0.074 (-0.66) |
| | Monetary Policy Shocks: US | -0.256* (-1.96) | -0.004 (-0.03) | 0.022 (0.18) | -0.283** (-2.14) | -0.035 (-0.26) | 0.055 (0.49) |
| Monetary shocks | Information Shocks: US | -0.035 (-0.23) | 0.142 (1.02) | 0.053 (0.41) | -0.048 (-0.31) | 0.043 (0.31) | 0.171 (1.02) |
| | Monetary Policy Shocks: China | -0.115 (-1.53) | 0.034 (0.43) | 0.110 (1.20) | -0.146* (-1.94) | 0.073 (0.99) | -0.061 (-0.68) |
| | Δ RMB/USD | -0.228*** (-2.65) | -0.006 (-0.07) | -0.135* (-1.78) | -0.224** (-2.45) | -0.072 (-0.92) | 0.113 (0.87) |
| | Δ US EPU | -0.072 (-0.94) | 0.038 (0.52) | -0.005 (-0.07) | -0.078 (-0.99) | -0.003 (-0.05) | 0.068 (0.82) |
| Policy uncertainty | Δ China EPU | 0.047 (0.60) | 0.002 (0.03) | 0.002 (0.02) | 0.050 (0.63) | 0.024 (0.32) | -0.038 (-0.35) |
| | Net insider purchase | 0.096 (0.55) | 0.077 (0.40) | -0.013 (-0.09) | 0.106 (0.61) | 0.185 (0.98) | -0.187 (-1.48) |
| Informed trading activities | Post | -0.085 (-0.56) | -0.226 (-1.56) | -0.064 (-0.59) | -0.082 (-0.52) | -0.178 (-1.36) | -0.070 (-0.48) |
| | Post*Net insider purchase | -0.348 (-1.39) | -0.271 (-1.21) | -0.010 (-0.06) | -0.377 (-1.46) | -0.413* (-1.86) | 0.243 (1.11) |
| | Obs. | 140 | 140 | 140 | 140 | 140 | 140 |
| | R-Squared | 0.346 | 0.188 | 0.366 | 0.320 | 0.252 | 0.182 |

Note: The table shows the kitchen sink regression coefficients of northbound flows from different categories of custodians on factors of the corresponding week. All variables are standardized with zero mean and unit standard deviation. The sample period spans from March 2017 to December 2019. Robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.