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AN ASSESSMENT OF THE FINANCIAL VULNERABILITIES OF COMMODITY TRADERS IN ASIA

Key points:

- *The commodity market turmoil during the Russia-Ukraine conflict has highlighted the vulnerabilities of commodity traders and the implications for financial stability. This study complements ongoing assessments by international organisations by looking at oil and natural gas traders in Asia, given their importance in channelling energy resources to the region.*

- *Based on financial information of 122 oil and natural gas traders in Asia, Europe and America, this study provides three major findings. First, oil and natural gas traders in Asia are more reliant on short-term funding than those in Europe and America, which can make them more prone to liquidity issues. Secondly, European banks are one important funding source for oil and natural gas traders in both Asia and Europe, such that stress of European traders can spillover to Asia traders through their common linkages with European banks. Lastly, we find there is a low usage of derivative hedging by Asian traders, which could add further financial vulnerabilities for Asian traders by exposing them to unfavourable market movements.*

- *With limited credit exposures to oil and natural gas traders in Asia, the direct impacts of the above vulnerabilities on the financial sector in Asia appear to be contained. Nevertheless, the financial health of commodity traders in Asia merits continuous monitoring, as the stress for these traders can disrupt the regional supply chain and real activities, which in turn affects the financial system. In addition, the exposure of European banks to commodity traders in both Europe and Asia could be one significant source of cross-border spillover of risks during heightened volatility in the commodity market.*

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I. INTRODUCTION

Like the financial sector, the commodity sector is integral to the global economy by supplying raw materials and products for productions and consumptions. Unlike the financial sector, however, the commodity sector is much less regulated and fragmented,[1] with large data opacity preventing an informed understanding of the vulnerabilities of underlying activities and participants. A case in point is the commodity market volatility during the Russia-Ukraine conflict, which put liquidity of commodity market participants to test.[2] While the commodity sector was largely able to absorb the shock in this episode, the incident highlighted a lack of understanding of the financial risks of commodity traders, with international organisations (for example, Financial Stability Board, 2023) and major central banks (for example, Bank of England, 2022) calling for in-depth analysis of their financial vulnerabilities.

By connecting commodity producers and users, commodity traders are key intermediaries in the global supply chain (Chalmin, 1987). Therefore, soundness of commodity traders is essential to the smooth operation of the supply chain. At the same time, commodity traders are also connected to the financial sector, for instance through the financing channel. As such, an understanding of their vulnerabilities is also warranted from financial stability perspective.[3]

With the dominance of global commodity trading, analysis of commodity traders currently underway focuses on mega traders globally (mostly in Europe), but an **understanding of the issue from an Asian perspective is also important.** For example**,** majority of oil and natural gas consumed by Asian countries is imported from other regions (Chart 1, panel A), with commodity traders in Asia playing an important role in channelling these energy resources to the region (Chart 1, panel B).[4]

[1] For instance, regulatory changes such as increased capital requirements have forced many financial institutions to leave commodity trading. These exiting financial institutions provide opportunities for trading companies, which are mostly non-financial corporates and therefore not regulated, to fill the gap (KPMG, 2015).

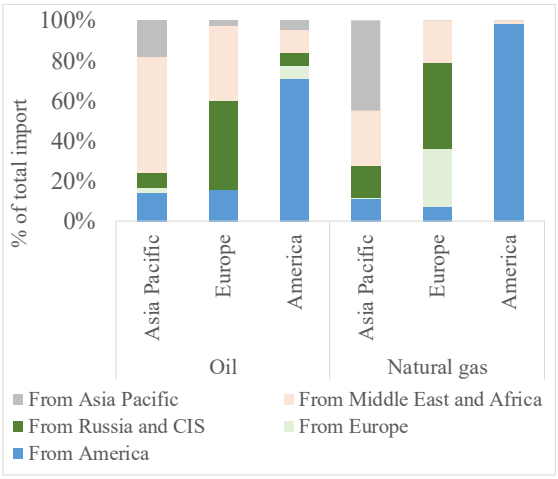
[2] The extreme volatility and commodity price hike have led to a spike in margin calls, and therefore liquidity demand, for participants involved in trading commodity derivatives. For instance, the initial margin requirement for European natural gas futures at the Intercontinental Exchange more than doubled after the start of the conflict and remained at around 50% above pre-conflict levels (Avalos and Huang, 2022).

[3] The financial sector also connects to the commodity sector by i) providing risk management to physical commodity markets and ii) providing infrastructure to commodity markets (Bank of England, 2022).

[4] Specifically, the chart shows that Asia accounts for an overwhelming share of revenue of oil and natural gas traders in Asia (orange bars in the left most column, 96%), compared to 22% and 3% of the revenues of European and American traders respectively.

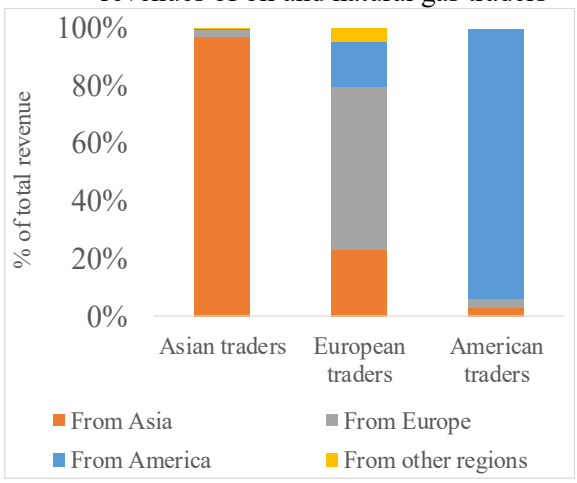
Chart 1: Importance of oil and natural gas trading to Asia

A. Oil and natural gas imports by source



Notes: 1. This chart depicts the sources of oil and natural gas imports for countries in different geographical regions, based on those reported by source. 2. 2021 figures. 3. CIS denotes Commonewealth of Indepdenent States.
Source: BP statistical review of world energy 2022 and authors' calculations.

B. Geographical distribution of the revenues of oil and natural gas traders



Notes: 1. This chart depicts the aggregate geographical distribution of revenues of sample oil and natural gas traders in this study. 2. Details of the formation of traders' sample is given in next section.
Source: Capital IQ and authors' calculation

Against this background, this study assesses the financial vulnerabilities of commodity traders in Asia, focusing on those engaging in oil and natural gas trading ("oil and natural gas traders"). Drawing on the financial information of a sample of oil and natural gas traders in Asia, Europe and America, this study will investigate the following three questions:

1. What are the major characteristics of the financial profile of commodity traders in Asia? How are they compared to traders in other regions?

2. How are commodity traders in Asia connected to the financial system? Do such connections increase the financial vulnerabilities of Asian commodity traders?

3. Do the financial characteristics of Asian commodity traders render them vulnerable to volatile market conditions?

This study is organised as follows. The next section discusses the data sample. Section 3 discusses the findings of the three research questions while the last section concludes.

II. DATA SAMPLE

In this study, oil and natural gas traders refer to firms that primarily engage in the business of oil and/or natural gas trading. To identify and construct a sample of oil and natural gas traders for our analysis, we first filter firms whose primary Standard Industrial Classification (SIC) code equals 5172 (*Petroleum and Petroleum Products Wholesalers, Except Bulk Stations and Terminals*) or the Statistical Classification of Economic Activities in the European Community (NACE) code equals 46.71 (*Wholesale of solid, liquid and gaseous fuels and related products*) in Capital IQ.[5] Next, we filter inactive firms by removing those that do not have any asset data in the past five financial years (i.e. 2017 – 2021). Finally, we apply another screening on remaining firms to exclude those that do not engage in oil and/or gas trading by referring to their business descriptions in Capital IQ.[6]

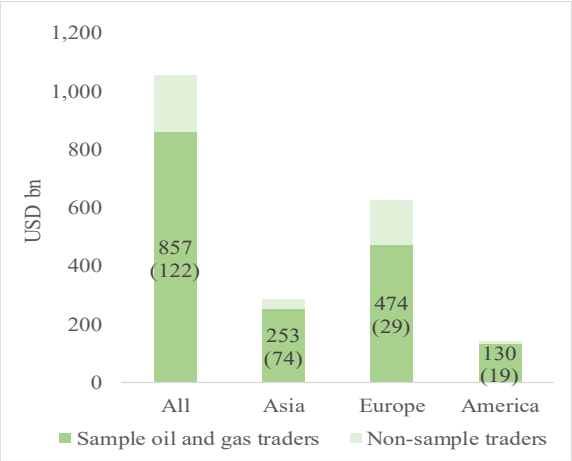
As a result, a total of **2708** oil and natural gas traders from Europe, Asia and America are identified, whose total assets amount to US$1,049 billion at the end of the 2021 financial year. From there we further select firms with detailed capital structure information which is necessary for answering our research questions. Taking this into account, our final sample consists of **122** oil and natural gas traders with total assets of USD$856 billion at the end of the 2021 financial year. Despite accounting for a small number of oil and natural gas traders identified above,[7] our sample oil and natural gas traders account for a dominant share of the total assets (82%) of the identified traders (Chart 2).

It is worth noting that some of the mega commodity traders, particularly those from Europe, are not covered in our sample either because i) their primary business is not oil and/or natural gas trading, or ii) their capital structure information is not available.[8] Nevertheless, our sample of European oil and natural gas traders resembles some of the key financial properties observed in these mega commodity traders.[9] As such, our sampled European traders enables an informed comparison with oil and gas natural traders in Asia, which is the focus of this analysis.

[5] The two selected industrial codes are based on the industrial code assigned to some of the largest oil and natural gas traders that primarily engage in trading business (specifically, Trafigura and Vitol).
[6] Specifically, we remove firms whose business descriptions do not contain trade-related keywords such as "trade", "trading" or "import/export". This helps remove firms that engage in non-trading businesses such as oil/gas exploration, transportation or oil/ gas stations. We further remove firms that do not cover oil/gas but other materials instead (e.g., coal).
[7] Many of the identified traders are not listed, such that detailed debt capital information is not available.
[8] These include, for example Vitol, Mercurian and Gunvor.
[9] For instance, high leverage, reliance on bank financing and short-term funding.

Despite accounting for a smaller part of the global commodity trading business, vulnerabilities of small and medium traders, such as those in our sample, also warrants attention as they tend to be affected more by tightened market conditions (Payne, 2020).[10]

Chart 2: Sampled oil and natural gas traders



Note: The numbers on the bars denote the total asset of sample oil and natural gas traders while the numbers in parentheses denote the number of sampled traders.

III. FINDINGS

Drawing on the financial information of the 122 sample oil and natural gas traders, this section presents our findings on the three research questions:

I. What are the major characteristics of the financial profile of commodity traders in Asia? How are they compared to traders in other regions?

While the level of financial leverage of oil and natural gas traders in Asia is similar to those in Europe and America, Asian traders are found to have **a larger reliance on short-term funding, making them more prone to liquidity issues**. As a measure of financial leverage, panel A of Chart 3 shows that the aggregate asset to equity ratio of Asian oil and natural gas traders in our sample is

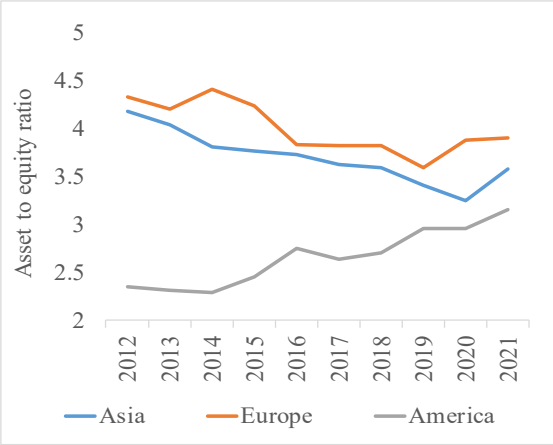
[10] Payne (2020) reported that during the COVID-19 episode, banks seeking to reduce their trade finance exposure are likely to favour their lending to well-established and large traders.

consistently above three throughout the sample period.[11] The level is similar to sampled traders in Europe and America.[12]

In addition to high leverage, Asian oil and natural gas traders are found to have a high reliance on short-term funding. The scatter plot in panel B of Chart 3 shows that the aggregate share of short-term liabilities to total liabilities of Asian traders hovers around 70% over the sample period, higher than that of European and American traders. Importantly, the chart also reveals a lower current ratio, a measure of trader's ability to cover its short-term debts with its current assets, for Asian traders. **The high leverage, together with a large short-term debt burden, for Asian traders could make it difficult for them to meet short-term debt obligations in times of stress, potentially resulting in larger liquidity risks**.

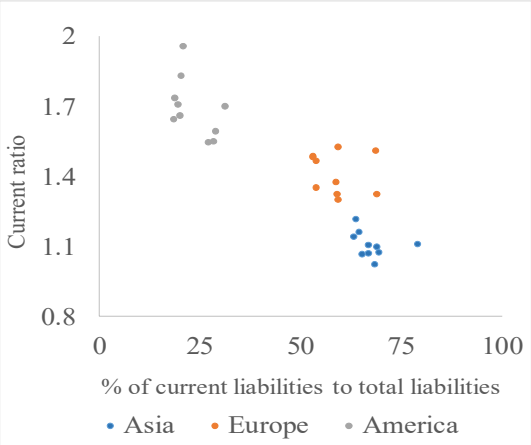
Chart 3: Financial profile of sample oil and natural gas traders

A. Leverage



Note: This chart depicts the aggregate asset to equity ratio of sampled oil and natural gas traders.
Source: Capital IQ and authors' calculations.

B. Short-term funding



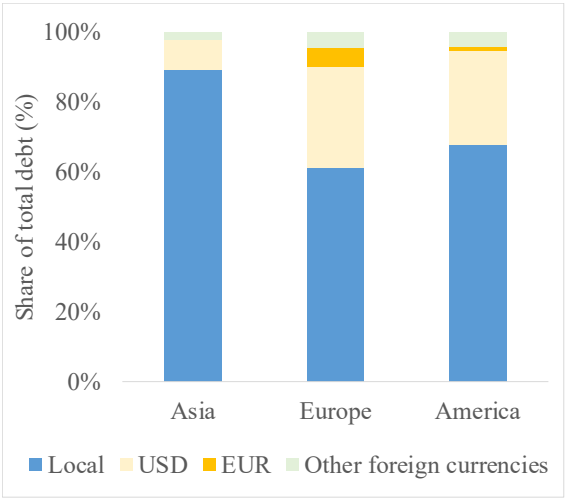
Note: This scatter plot compares the aggregate short-term liabilities (as % of total liabilities) against the current ratio of sampled oil and natural gas traders over time.
Source: Capital IQ and authors' calculations.

Although the majority of their debts are sourced in local currency, **oil and natural gas traders in Asia could still be vulnerable to unfavourable to currency movement**. Chart 4 shows that the majority of debts for Asian traders are denominated in local currency (90%). This helps reduce currency risks due to a mismatch between revenue and debt repayment when the majority of Asian traders'

[11] The high leverage for Asian oil and natural gas traders is partially driven by the exceptionally high leverage by Trafigura Group (~8.5 times equity in 2021), one of the largest commodity trader in the world. That said, the aggregate leverage for Asian traders excluding the Trafigura Group is still high at 2.7 times equity.
[12] The level of financial leverage is also similar to those of large commodity traders covered in the assessment by the Financial Stability Board (3.5 times equity), see Financial Stability Board (2023).

revenues are from the region (Chart 1, panel B). Nevertheless, these traders could still face currency risks when they import oil and natural gas from other regions (Chart 1, panel A), probably in US dollars, before selling them in local currency. This exposes Asian oil and natural gas traders to exchange rate fluctuations.

Chart 4: Currency composition of oil and gas traders' debts



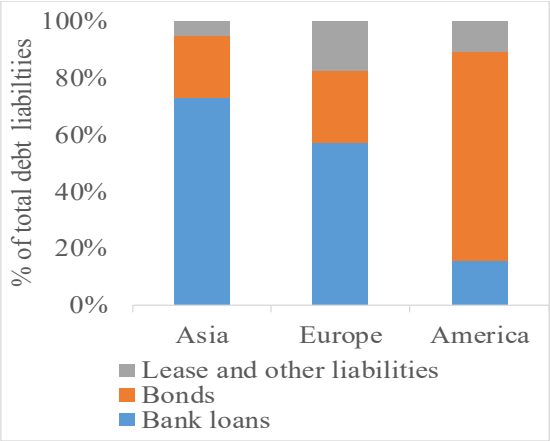
Notes: 1. This chart depicts the aggregate curreny distribution of the debts (bank loans, bond and others) of sampled oil and natural gas traders. 2. Position as at end 2020 financial year.
Source: Capital IQ and authors' calculations.

II. *How are commodity traders connected to the financial system? Do such connections increase the financial vulnerabilities of Asian commodity traders?*

Oil and natural gas traders in Asia connect to the financial system mainly by receiving loans from banks. Panel A of Chart 5 compares the debt capital compositions of sample oil and natural gas traders in different regions. Bank loans are the dominant source of debt capital for oil and natural gas traders in Asia and Europe, accounting for 73% and 57% of total debt liabilities at the end of the 2021 financial year respectively (left and middle columns, blue bars). Importantly, drawing on the syndicated loans obtained by the sampled oil and natural gas traders between 2013 and 2022, the maturity of bank loans obtained by Asian traders tended to be shorter than their peers in other regions, and is becoming shorter over-time (panel B, Chart 5). Such development may give rise to roll-over issue for Asian traders and increase their liquidity risks.

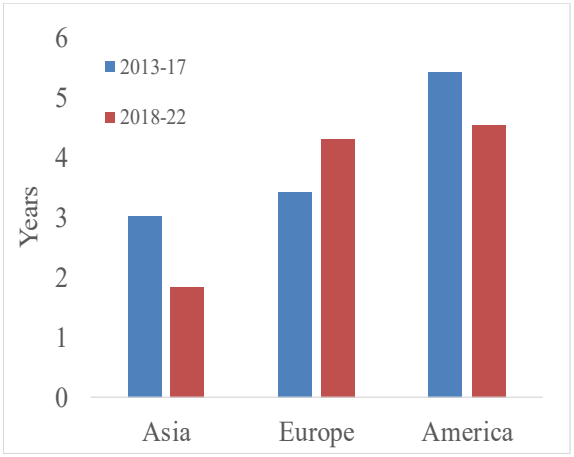
Chart 5: Debt capital composition of sampled oil and natural gas traders

A. Composition of debt liabilities



Notes: 1. This chart depicts the aggregate distribution of debt liabilities of sampled oil and gas traders in different geographical regions. 2. End of 2021 position. Annex depicts the evolvement of traders' debt capital compositions over-time.
Source: Capital IQ, company filings and author's calculation

B. Average maturity of bank loans across time

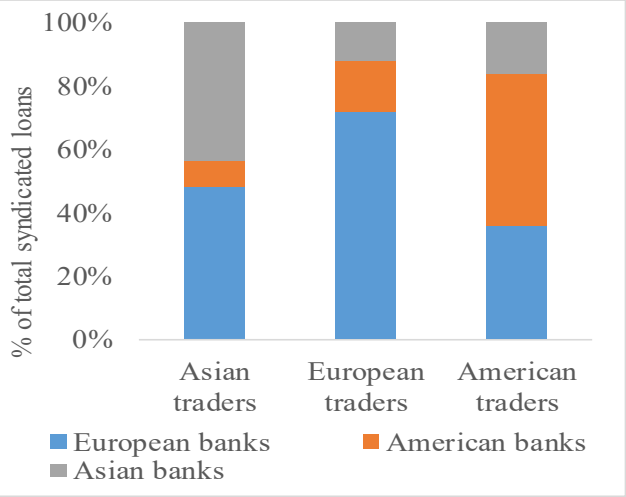


Note: Average maturity of bank loans in the periods specified is based on syndicated loans issued by sampled oil and gas traders in different geographical regions, weighted by syndicated loans' amounts.
Source: LoanConnector and author's calculation

As commodity traders in both Europe and Asia are heavily exposed to banks in Europe, the stress on certain traders in the market could spillover to the others when European banks reduce their lending exposure to the commodity market. Drawing on data of syndicated loans of the sampled oil and natural gas traders, Chart 6 shows that European banks are active in lending to these traders, not just to those in Europe (72% of total amount of syndicated loans identified) but also to those in Asia (48% of total). The significant role of European banks in financing these traders could be a channel through which the stress of some commodity traders could spillover to the others.[13] Importantly, with a larger reliance on, and a shorter maturity of bank loans in the debt profiles, such a spillover is likely to pose a larger risk of financial stress on Asian traders, rather than the other way round.[14,15]

[13] For instance, when certain commodity trader experience financial difficulties, banks may suffer losses or extend additional loans to them in hope of avoiding losses. In return, banks may curtail lending to other traders, effectively passing on the stress to them.
[14] Using the detailed bond holdings of a group of energy funds (investment in energy sector bonds > 5% of fund assets), we also find that stress in European traders could also spillover to Asian traders through their common exposures to funds in Europe. However, the potential spillover effect is likely to be milder as bonds only account for a small share of their debt capitals (21.4% at end 2021 financial year).
[15] The possible spillover risk may be demonstrated by our additional (unreported) empirical analysis, where Asian traders with higher leverage, larger share of short-term liabilities and lower current ratio are found to record weaker stock market performance during the Russia-Ukraine conflicts in March-2022. Despite not being the source of shock in this episode, this finding may reflect the spillover risk faced by Asian traders with weaker financial fundamentals (say, through receiving funding from European banks when the European energy market was in stress) and priced by the market.

Chart 6: Bank lenders of sampled oil and gas traders



Note: This chart depicts the aggregated distribution of region of bank lenders of sampled oil and gas traders in different geographical region, based on syndicated loans issued by sampled oil and gas traders between 2013 and 2022.
Source: LoanConnector and authors' calculation.

III. Do the financial characteristics of Asian commodity traders render them vulnerable to volatility market conditions?

The financial performance of oil and natural gas traders in Asia is found to be more sensitive to unfavourable market movements, such as currency depreciation and oil price volatility, than traders in Europe and America. Panel A of Chart 7 depicts, for the sampled oil and natural gas traders, the correlation between i) aggregate return on equity and volatility of oil price (left part) and ii) aggregate currency losses and exchange rate depreciation (right part).

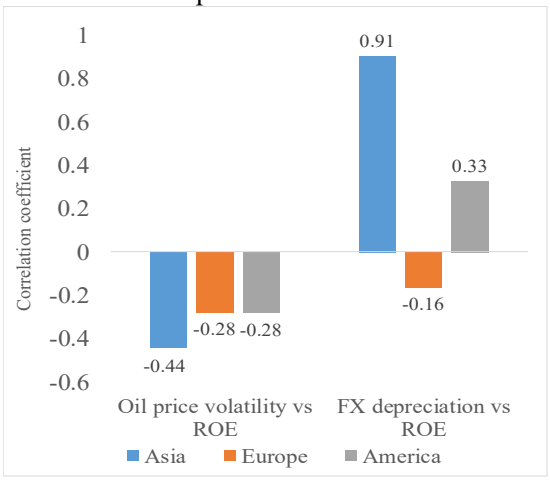
In the first case, a more negative relationship between aggregate return on assets and volatility of oil price is observed for Asian traders, indicating that the profitability of these traders would respond more negatively in times of larger fluctuations in the oil price. In the second case, these traders demonstrate a stronger positive relationship between currency losses and currency depreciation when compared to traders in other regions, reflecting also a larger sensitivity of Asian traders to currency changes.

The lower level of derivative hedging by Asian traders may contribute to such sensitivity. Panel B of Chart 7 depicts the derivative exposures of sample oil and natural gas traders at the end of the 2020 financial year, collected manually from traders' annual reports. They proxy the extent of derivative hedging employed by these traders, as most derivative exposures are reported by the traders

for hedging purpose (rather than speculation).[16] As can be seen, the use of derivative hedging is less common for Asian traders, reflected by both the smaller amount of derivative exposure and share of traders with derivative hedging. In return, the lower level of derivative hedging could render Asian traders more sensitive to volatile market conditions.

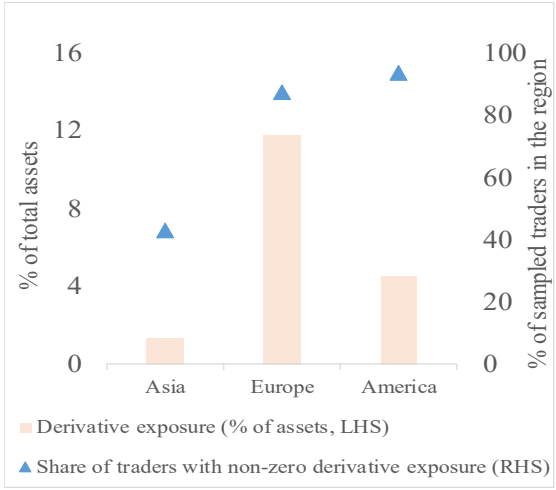
Chart 7: Effect of volatile market condition on commodity traders' profit

A. Relationships between FX movement & commodity price volatility and traders' profits



Note: This chart depicts the correlations between i) aggregate traders' ROE and annual volatility of daily oil price changes (left part) and ii) aggregate traders' FX gain (% of total revenue) and annual percentage depreciation in FX rate (right part), for sampled oil and gas traders in different geographical regions.
Source: Capital IQ and authors' calculations.

B. Derivative exposures of commodity traders



Notes: 1. This chart depicts the aggregate market value of traders' derivative positions (sum of derivative assets and liabilities, measured in fair value and represented as % of assets) and share of oil and gas traders with non-zero exposure of sampled traders in different regions, based on 94 traders that disclose their derivative exposures in annual reports. 2. Positions as at end 2020 financial year.
Source: Company filings and authors' calculations.

The stabilizing effect of derivative hedging is further demonstrated by the following cross-section regression analysis. Specifically, we regress the fluctuation of traders' profitability against their derivative exposure, after controlling for their size and leverage. Table 1 shows that the estimated effect of derivative hedging is negative and statistically significant (see row $Derivative$, with an estimated coefficient of -0.07), suggesting that traders' with more derivative hedging tend to attain more stable profits.

At the same time, the estimation results also reflect the importance of sufficient cash buffers, as the negative effect of derivative hedging is stronger among traders with larger cash buffer (see row $Derivative * Dummy\_cash$, with an

[16] Based on traders' disclosures in annual reports (whenever available).

estimated coefficient of -0.97). In times of volatile market condition, sufficient liquidity will be required to fulfil margin calls and maintain derivative positions.

Finally, we find a significant and positive relationship between fluctuations in profitability and profits and losses from derivative positions (see row $Derivative\_gain/loss^{SD}$, with an estimated coefficient of 0.39). While derivative instruments can be useful in hedging against volatilities in the commodity and foreign exchange market, this finding points to the importance of careful management of hedging positions to avoid excessive losses that could instead increase the financial vulnerabilities of commodity traders.

Table 1: Regression analysis of volatility of traders' profitability

This table reports results of cross-section regression of standard deviation of traders' profitability (return on equity) between 2012 and 2021 ("period") against a number of traders' financial characteristics. *Size* denotes average total assets (in logarithm form) during the period. $Derivative$ denotes trader's average derivative position (sum of derivative assets and liabilities, measured in fair value and as % of total assets) during the period. $Dummy\_cash$ is a dummy variable which equals one when the average cash positions of trader during the period is larger than 75th percentile of the sample.$Derivative\_gain/loss^{SD}$ denotes the standard deviation of the annual derivative gain/loss (as % of total assets) during the period. *Leverage* denotes trader's average leverage (asset to equity ratio) during the period. For ease of comparison, all variables are standardised into zero mean and unity variance. Only traders with at least eight years of derivative hedging information during the "period" are included. Figures in parentheses refer to the standard errors of the estimated coefficient. ***, ** and * denotes statistical significance at 1, 5 and 10% respectively.

	ROE^{SD}
$Size$	**0.16* (0.09)**
$Derivative$	**-0.07*** (0.03)**
$Dummy\_cash$	-0.15 (0.17)
$Derivative * Dummy\_cash$	**-0.97** (0.44)**
$Derivative\_gain/loss^{SD}$	**0.39** (0.18)**
$Leverage$	**0.69*** (0.11)**
$Constant$	-0.03 (0.11)
R-squared	0.59
Number of observations	50

IV. DISCUSSION AND CONCLUSION

The commodity market turmoil during the Russia-Ukraine conflict has highlighted the vulnerabilities of commodity traders. This study complements ongoing assessments by international organisations, which focus on mega traders globally, by assessing the financial vulnerabilities of oil and natural gas traders in Asia. Despite accounting for a relatively small share of the global oil and natural gas trading, there is merit in an assessment of their vulnerabilities given the importance of Asian traders in channelling energy resources to the region.

Drawing on the financial information of 122 oil and natural gas traders in Asia, Europe and America, this study provides three major findings. First, while

the level of financial leverage of Asian traders is similar to those in Europe and America, Asian traders could be more prone to liquidity issues due to their greater reliance on short-term funding. Secondly, drawing on data of syndicated loans obtained by oil and natural gas traders, European banks are an important funding source for oil and natural gas traders in both Asia and Europe. Stress of European traders can thus spillover to Asian traders through their common linkages with European banks. Finally, we find there is a low usage of derivative hedging by Asian traders, which could add further financial vulnerabilities for Asian traders by exposing them to unfavourable market movements.

Despite the financial vulnerabilities of Asian oil and natural gas traders identified in this study, their direct impacts on the regional financial sector appear to be contained given the limited credit exposures to these traders.[17] The low usage of derivative hedging by Asian traders further limits the potential counterparty credit risks faced by banks in Asia. Nevertheless, the financial health of commodity traders in Asia merits continuous monitoring, as financial stress in these traders can disrupt the regional supply chain and real activities, which in turn affects the regional financial system. In addition, the exposure of European banks to commodity traders in both Europe and Asia could be one significant source of cross-border spillover of risks during heightened volatility in the commodity market.

[17] Such assessment is based on i) a noticeable portion of banks loans to Asian traders are provided by European banks (e.g., Chart 6) of ii) based on 234 banks in the EMEAP region with reported sectoral loan exposures, loans to utilities & energy sector accounted for only 8.6% of Asian banks' retail and corporate loan portfolio, and majority of the loans are likely granted to utilities and energy producers (instead of traders).

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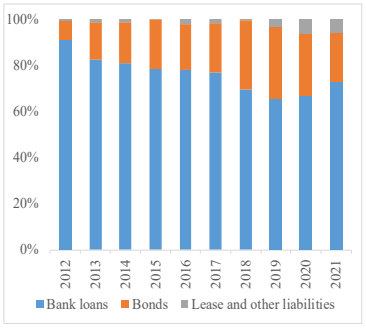
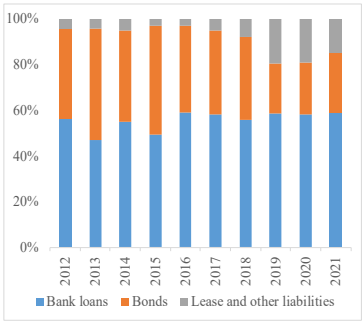
Annex

Compositions of oil and natural gas traders' debt liabilities over time

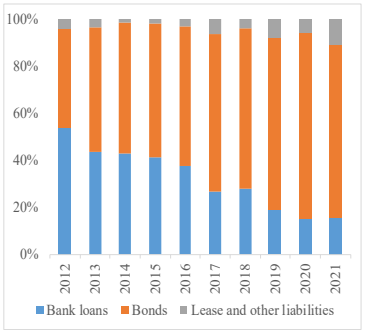
A. Asia



B. Europe



C. America



Source: Capital IQ and authors' calculations.